TRANSITIONING TO SUSTAINABLE URBAN DEVELOPMENT: A NICHE-BASED APPROACH

BY

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DISSERTATION

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Abstract

Solving the 'wicked' and 'persistent' environmental problems of the twenty-first century will require changes in the social and technological structures that guide urban development. While modern planning offers a century's worth of solutions to environmental problems at the local scale, many of these 'first-order' solutions exacerbate problems at larger scales (e.g. sprawl, auto dependency, climate change). Change of the 'second-order' is necessary to address problems such as climate change, energy scarcity, and the destruction of finite ecosystems. The Multi-Level Perspective of Socio-Technical Systems (MLP) claims that 'second order' structural change is resisted by *socio-technical regimes*—a tangle of mutually reinforcing rules, physical structures, and social networks. While regimes are critical for day-to-day functioning in a complex world, the regime structures that guide urban development in North America have resulted in human settlements that consume life-supporting resources faster than they can replenish, and result in diffuse social and environmental consequences that are difficult to 'solve' at the local scale. According to the MLP, regimes begin to transform under the exogenous pressure of *socio-technical landscape* forces (e.g. demographic shifts, national politics, armed conflict, resource scarcity) and with alternatives incubated in *socio-technical niches*, or networks of actors that play by different 'rules of the game.'

This dissertation looks specifically to the relationship between local urban development regimes and ecovillages—grassroots niche projects ideologically committed to low-impact living. Ecovillages are a locally-rooted response to the inadequacies of government environmental policy in the twenty-first century. They exist in urban, suburban, and rural areas on six continents. They attempt to model alternative housing, transportation, energy production, food production, and social governance all on one site. In recent years, multiple ecovillages have earned media attention for partnering with local policy makers on climate change and other environmental initiatives. Some have helped craft new land use regulations that allow for a broader mix of uses and cooperative spaces. Others are less influential. Why are certain ecovillages *influential* and others less so – especially in terms of urban policy? Drawing from

Smith (2007), I hypothesize that the most influential ecovillages share some but not all elements of the urban development regime. That is, they are 'intermediately' situated relative to the mainstream and the radical grassroots. This enables them to translate their innovative practices to mainstream actors.

I test this relationship by disseminating a survey to ecovillages across the United States and Canada and scoring them on two scales: *regime distance* (independent variable) and *regime influence* (dependent variable). The survey results confirm Smith's hypothesis. "Intermediacy" is a necessary but insufficient condition for ecovillage projects to influence mainstream planning policy. I elaborate on these results by conducting several ethnographic case studies that compare 'influential' ecovillages against their less influential counterparts. Taking up residence in ecovillages and conducting semi-structured interviews with ecovillage member-residents, I find that 'intermediacy' is a dynamic and liminal state. Influential ecovillages exist simultaneously inside and outside the urban development regime, but they do not start as intermediate. Rather, they "earn" this status by 'settling in' to the regime, accepting some regime rules, and demonstrating their feasibility to institutional actors in the mainstream. It is through these connections that the regime begins to 'warm up' to the niche experiments, and begins to adopt their practices as municipal code.

The results of this dissertation offer planners a path toward a clearer understanding of systemic change for sustainable communities and support interpretive/pragmatic conceptions of planning, which frame planners as facilitators of communication amongst diverse entities rather than objective analysts or experts. Future research and practice might use the MLP and similar theories to frame innovative local and regional environmental policies as *regime transition*.

Foreword

In the spring of 2010, a friend invited me to dinner at her home in an "ecovillage" just outside Urbana, Illinois. The small community included a mix of students and retired couples working together to achieve energy, water, and food semi-sufficiency. They generated their own electricity using solar photovoltaic panels, they grew much of their own food, and harvested and filtered their drinking water on-site. The community residents drove less than most individuals in the region—they explained—because they met many of their needs in their 'neighborhood'. What encouraged me most about this small initiative was that it achieved low-impact, presumably more sustainable living through neither space-age technology nor self-deprivation, but rather a combination of off-the-shelf tools, smart design, and simple changes in routine. Clever building design took advantage of free sunlight and nightly fluctuations in temperature to reduce the amount of energy necessary to achieve comfortable lighting and climate. Buildings conserved heat by storing it in the thermal mass of the floor and walls. Residents reduced their energy footprint by finding clever ways to live in smaller dwelling units, and share cars, kitchens, laundry machines, and open space. And no one was suffering. *In fact*—I thought to myself—*I think I'd enjoy living here*. It seemed as if a feasible model for sustainable urban development had arrived!

Or had it? The small ecovillage project I visited was only possible because it existed *outside* city boundaries where it had the space and relative freedom to experiment with new buildings and infrastructure. And as it stood, the community was effectively frozen in place because even rural zoning regulations limited the cooperative experiment in a number of ways. Furthermore, the ecovillage was likely be 'zoned out' in the near future as the city grew and inevitably annexed the surrounding land.

That this community was marginalized by municipal regulations rather than embraced by policy makers caught my attention. Having interned for months in a city planning office, I knew local policy makers were interested in "sustainability." My planning co-workers were especially enthusiastic about energy-saving best practices and walkable communities. They rode their bikes to work, assigned me to

research energy efficiency standards, and had recently added a sustainability element to the comprehensive plan. Wasn't such an ecovillage experiment useful to policy makers interested in sustainability, both for its successes and shortcomings? Where did planners and policy makers draw the line between a 'zoning violation' and 'useful experimentation?' Wouldn't it be fascinating to see if such a settlement *could* work in the city? More importantly, if achieving sustainability goals like lowering greenhouse gas emissions required major changes in society—as I believed then and now—where would major change come from if not from spaces that allowed for imagination, experimentation, and safe exposure to alternatives? And if such spaces existed, how could planners use them to understand and stimulate larger change?

It was this enigma that propelled me to examine the relationship between 'niche' experiments and creating sustainable community.

Acknowledgements

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Chapter One: Introduction

Stuck in Un-Sustainability

Modern social science conceives of humanity as distinct and superior to all non-human life—capable of disciplining a singular, malevolent "nature" (Beck, Bonss, and Lau 2003; Scott 1999; Swyngedouw 2007). In the past two centuries humans have disciplined nature in some spectacular ways. We have drilled miles into the earth's crust to extract and harness the energy of coal, methane gas, petroleum, and uranium. We have reversed the flow of rivers, created new land formations in the ocean, and built dams that produce enough electricity to power a small nation. Our mastery of natural resource stocks and energy production has literally and figuratively paved the way for larger and larger climate-controlled homes in the United States and most wealthy nations. Modern air travel allows us to eat breakfast in New York City and dinner in Los Angeles on the same day. Our transportation and food preservation technology allows Swedes to purchase South African-grown avocados from their local grocers all year long. Our fertilizers, pesticides, and irrigation systems have shattered historical limitations on agricultural yields, allowing the human population to blossom beyond seven *billion.* The limits of nature, it seems, are humanity's to challenge.

Yet these human triumphs yield costs and debts that remain overlooked by our modern systems of accounting (Daly 1996). At some point in the early 1970s, global human consumption silently and unceremoniously exceeded the total productive and absorptive capacity of the planet (World Wide Fund for Nature 2012). Global consumption, measured in "ecological footprint" has continued to escalate into the twenty-first century such that total human consumption—including transportation, food, shelter, goods, and services—in the year 2008 required 1.52 years' worth of

the earth's available biocapacity[1]. If every human on earth adopted the consumption habits of the average American in 2008, one year of consumption would require *four* earths. Meanwhile humanity's global ecological footprint is forecast to soar far beyond our current unsustainable consumption levels as growing nations like China, India, Indonesia, Russia, and Brazil begin to consume more like Americans (World Wide Fund for Nature 2012). Of course, there is only one earth from which to draw resources, and the human species is sinking deeper and deeper into bioproductive "debt," paying "interest" in the form of global climate change, energy scarcity, the depletion of fresh water systems, collapsing food systems and all the ensuing political, economic, and military tensions.

In the past quarter century almost every global indicator of environmental health has declined (United Nations Environment Programme 2012). Rates of species extinction are approaching levels only observed five previous times in Earth's fossil record (Barnosky et al. 2011), rates of global deforestation remain "alarmingly high" (United Nations Environment Programme 2012, 20) despite slowing in recent decades, and atmospheric greenhouse gas concentrations have continued their geometric ascent (National Oceanic and Atmospheric Administration 2012), very likely exacerbating the effects of global climate change (Solomon et al. 2007). At the same time, the United States Military estimates that global oil supplies—upon which modern transportation and food systems rely—are forecast to decline to levels of critical shortage as soon as 2015 (United States Joint Forces Command 2010).

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[1] "Ecological footprint" is a metric developed by ecological planners Mathis Wackernagel and William Rees (1996) to quantify the amount of productive land required to support a certain amount of consumption. It combines 1) the amount of forest land required to absorb carbon dioxide emissions; 2)cropland ; 3) grazing land; 4)forest; 5) built-up land; and 6) fishing grounds. Biocapacity is the ability of natural systems to support this consumption both through production and reabsorption of wastes.

Whereas environmental hazards like flooding, drought, fires, industrial contamination, communicable disease, and automobile congestion, were once 'solved' by advances in technology, infrastructure, and regulation, these 'first-order' issues are now emerging as the *result* of twentieth century modern triumphs (Beck 2006; Beck, Bonss, and Lau 2003)—that is, old solutions have spurred new system-wide problems, often in forms that are hard to track, mitigate, or extract from the day-to-day lives of individuals.

Climate change and similar "wicked" (Rittel and Webber 1973) or "persistent" (Rotmans, Kemp, and Asselt 2001) problems demand unconventional, non-linear, and 'second-order' changes that individuals cannot make unitarily, *even if they want to*. Americans generally express support for federal-level environmental policies[2], yet a North American living within earth's bioproductive limits in the twenty-first century is either living *very poorly* or is uncommonly capable of re-designing the world around her[3]. This is because most homes, cities, and regions in North America are built in such a way that individuals have little choice *but* to drive to their job, control the climate of their homes by consuming fossil fuels, and purchase food and material goods imported from hundreds or thousands of miles away. The day-to-day choices that result in unsustainable consumption and twenty-first century global environmental crises are largely outside the control of individual consumers: our transportation, housing, electricity, and food 'choices' are bound in a tangle of structures that render day-to-day social and economic

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[2] March 2012 gallup poll revealed that 70 percent of American adults (85% Democrats, 54% Republicans) support "setting higher emissions and pollution standards for business and industry", and no less than 50 percent of Americans support more government spending on developing solar and wind power; developing alternative automobile fuel; imposing mandatory controls on greenhouse gas emissions; stronger enforcement of federal environmental regulations; and setting higher auto emissions standards.Gallup Poll results from March 8-11 <retrieved July 18, 2012> can be viewed at http://www.gallup.com/poll/153803/Americans-Endorse-Various-Energy-Environment-Proposals.aspx

[3] In 2008, total global biocapacity was about 1.8 hectares per person. Countries that lived at this average ecological footprint include Gabon, Tunisia, Colombia, and Uzbekistan, whose respective per capita income levels in 2011 were $16,000, $9,500, $10,100, and $3,000.

transactions more efficient, but render radical departures from the 'rules of the game' very difficult (Geels 2002; Kemp, Schot, and Hoogma 1998; Rip and Kemp 1998). Such structures are absolutely necessary for survival in a complex world, but must be fundamentally re-sorted if humanity is to achieve sustainable levels of resource consumption in any desirable, equitable way.

The Rise of Sustainable Development

The planning profession has begun to address global environmental and resource scarcity issues through the Sustainable Development agenda. While the concept of sustainability has existed in academia and industry since the middle twentieth century (Kidd 1992), it began to appear in international treaties in the late 1970s (Rees 1995), and ascended to global political discourse in several major international declarations in the late 1980s and early 1990s. Perhaps the most often cited international declaration, *Our Common Future* (also known as the Brundtland Report), was released by the World Commission on the Environment and Development in 1987. The Brundtland Report famously defined Sustainable Development as development that "…meets the needs of the present without compromising the ability of future generations to meet their own needs." The report attempted to carve out a space for resource conservation without perturbing global capitalism, by acknowledging both that there are ecological limits to economic growth that humanity ought to respect, and that both global poverty and environmental crises can be resolved through *more* but qualitatively *different* (sustainable!) economic growth (Robinson 2004a). Much of the detailed work prescribed by the Brundtland Report was left to national and local governments, and by 1990 Sustainable Development was beginning to attract more and more municipal-scale adherents. In May of that year, 200 local governments from 43 different countries forged the International Council for Local Environmental Initiatives (ICLEI), a network of local governments verbally committed to addressing sustainability issues. The organization continues to attract members today, and now

unites over 1,000 local governments in 84 countries, including 528 local governments in 49 US States.

Urban planning scholars began to engage sustainability some time prior to 1995, when the Journal of Planning Literature (Volume 5, Issue 9) devoted a special issue to *The Many Meanings of Sustainability*. In the issues introduction Timothy Beatley (1995) acknowledges the "ambiguity" of sustainability, but embraces its potential for generating critical dialogue. Shortly thereafter, planning scholar Scott Campbell (1996) declared, "…in the battle of big public ideas, sustainability has won: the task of the coming years is simply to work out the details and to narrow the gap between theory and practice (301)." In the intervening years sustainability has emerged as a sub-discipline in American, British, and Australasian planning curricula (Gunder 2006) and has reached "major new paradigm" status in the planning profession (Beatley 2009, p.17), yet scholars continue to struggle to make sense of planners and policy makers' seemingly inconsistent interpretation of the concept (Berke and Conroy 2000; Holmen 2001; Marcuse 1998; Saha and Paterson 2008; Zeemering 2009), and focus disproportionately on the *adoption* of sustainability policy rather than on the results of its application (Saha 2009). Berke and Conroy (2000), for example, find that there is no substantial difference between plans that claim to promote sustainable development and those that make no mention of the concept at all. New Zealand planning scholar Michael Gunder (2006) comments, "Sustainability is a concept that everyone purports to understand intuitively but somehow finds very difficult to operationalize into concrete terms. Regardless, no planning or policy document can omit the concept…(p. 211)." Critics, meanwhile, note that sustainability has done little more than assuage the contradictions of modern capitalist growth (Beck 2006; Gibbs 2000; Gunder 2006; Harvey 1996; Parr 2009).

Technological vs. Ecological Sustainability

Ultimately, confusion surrounding the meaning of sustainability and Sustainable Development can be settled by clarifying what ought to change and to what degree. Multiple

scholars (Orr 2011; Robinson 2004; Rees 1995) have divided the *what-is-sustainability?* debate into two broad camps. David Orr (2011) labels these two camps "technological" sustainability and "ecological" sustainability. Adherents of technological sustainability argue that solving twenty-first century environmental crises is a matter of relatively incremental and market-driven improvements in technological artifacts. Achieving sustainability goals, according to this perspective, requires that we further pursue our mastery of natural systems, allow environmental problems (e.g. climate change or energy scarcity) to signal a market demand for solutions, and trust that new technology will substitute for scarce resources. It is a comfortable perspective for policy makers, as it attempts to reconcile politically popular imperatives of economic growth and environmental protection, and assumes that solutions to environmental problems will emerge in the marketplace. It is the perspective that multiple authors (e.g. Orr 2011; Vander Ryn and Cowan 2007; Daly 1996; Rees 1995) associate with the Brundtland Report, and that critics rightly associate with the broad Sustainable Development agenda.

Ecological sustainability (Orr 2011) or the "value change" paradigm (Robinson 2004b), on the other hand, does not deny technology's importance *per se*, but posits that addressing global environmental issues is more a matter of simultaneous changes human morals, public education, and conceptions of the humanity/nature relationship. Ecological sustainability challenges the premises upon which human triumph is judged, and recognizes that these premises must change in order to avoid the social and environmental consequences of modern production and consumption. More concretely, this perspective suggests that the boundaries of the human macro-economy should not exceed the earth's bioproductive limits and demands that humanity reconceives itself as inextricable from—rather than superior to—non-human life (Rees 1995; Wackernagel and Rees 1996; Daly 1996).

This dissertation adopts the later perspective, ecological sustainability, and attempts to offer the planning discipline a useful frame through which to *understand* and *shape* the complex

and radical changes necessary to achieve sustainability goals. I argue that achieving sustainability goals like lowering greenhouse gas emissions, transitioning away from fossil energy, and conserving the finite ecosystem services essential for all life on earth requires "second-order" (Sartorius 2006) solutions. That is, achieving sustainability goals requires transitions in social and technological systems rather than attempting to work within existing systems to achieve new goals. The following chapters explore theories of systemic change and attempt to shed light on ways that planners can better understand and initiate systemic transition processes.

Where are we going? Summary of Chapters

In **Chapter Two** I review the Multi-Level Perspective of Socio-Technical Systems (MLP) and several similar theories that explain how mutually reinforcing social and technological structures—or *socio-technical regimes*—begin to shift under exogenous selection pressure from macro-scale societal forces, or the *socio-technical landscape*. Such pressure allows for the emergence of radical alternatives, incubated outside the regime in *socio-technical niches*. To date, most empirical literature uses historical case studies and secondary archival sources to detail regime transition processes. I argue that a better understanding of regime transition can come from exploring the ongoing interaction of regimes and individual niche projects using survey and ethnographic methods. I also argue that the planning discipline has an important role to play in regime transition processes, especially if planners are conceived as facilitators of communicative or collaborative processes rather than rational experts.

In **Chapter Three**, I argue that unsustainable urban development in North America is the result of an *urban development socio-technical regime*. I construct this regime drawing from existing literature in urban planning. I contrast this regime with the global ecovillage movement, a grassroots socio-technical niche. Ecovillages are full-featured, human-scaled settlements that are modeling environmentally low-impact and socially cooperative lifestyles. They exist all over the world in urban, suburban, and rural places. Ecovillages incubate practices that would likely be

confronted with resistance in the mainstream, but that are able to thrive outside the regulatory, normative, and cognitive rules of mainstream urban development. In recent years, several ecovillages have made headlines for influencing local sustainability policy, often in the form of "ecovillage zoning" or partnerships with local governments on long-range sustainability initiatives. Framing this influence as an early sign of regime transition, I ask **why are certain ecovillages influencing mainstream policy while others are not?** I contend that understanding why certain niche projects are relatively influential will help planners better understand regime change for sustainability. Drawing from Smith (2007), I hypothesize that the influence of ecovillages on mainstream policy can be understood as a factor of a project's conceptual distance from the urban development regime. Very radical ecovillages will have little direct influence on local urban development processes while niche projects that very much resemble the mainstream offer little in the way of innovation. "Intermediately" situated communities, however, exist in a conceptual 'sweet spot' where they can translate their innovations to the mainstream.

In **Chapter Four**, I test this hypothesis by surveying ecovillages in North America, measuring their 'distance' from mainstream urban development (the regime), and their 'influence' on local urban development processes. Drawing from two online databases, I identied 149 eligible ecovillages. The survey was administered both online and through the mail. In total, 46 valid responses were collected. As hypothesized by Smith (2007), the most "influential" communities—those that have partnered with local policy makers, influenced policy changes, advised policy makers, or influenced the creation of new land use codes—scored within one standard deviation of the mean 'regime distance' score. Relatively 'mainstream' and relatively 'radical' ecovillage projects seem to be limited in their direct influence. This affirms Smith's hypothesis that the most influential ecovillages are 'intermediately' situated, but it offers only a static snapshot of innovation processes. More in-depth, contextual observation is necessary to elaborate on the properties and dimensions of intermediacy.

Survey comments hint that the state of intermediacy is, in fact, a dynamic state. That is, the distance and influence of ecovillages change as they "settle in" to their regime context and members of the regime "warm up" to their alternative practices.

Drawing from these survey results, I select three sites for more in-depth observation in **Chapter Five.** These case studies elaborate on the phenomenon of 'intermediacy,' and dynamic processes of 'settling in' and 'warming up.' The chapter begins with a discussion of case study selection and research methodology. I then focus on three sites: Dancing Rabbit Ecovillage (Scotland County, Missouri); EcoVillage at Ithaca (Town of Ithaca, New York); and Los Angeles Eco-Village (Los Angeles California). All three sites have existed for fifteen years or more, have stable residential memberships, established non-profit outreach arms, and are actively trying to influence the mainstream through a variety of means. They vary, however, in their relative influence on the mainstream. I find that 'intermediacy' is a two-sided coin, and that socio-technical niche projects *become* intermediate through processes of 'settling in' and 'warming up.' EcoVillage at Ithaca models this phenomenon most closely. It has influenced important structural changes in its region and may serve as a model for similar jurisdictions across the continent. Los Angeles Eco-Village demonstrates the complexity of regime transition in dense urban spaces and while it is a relative 'drop in the bucket' in the metropolis of Los Angeles, it is transforming its immediate neighborhood and spurring multiple city-wide initiatives. Dancing Rabbit Ecovillage is an inspirational site that models how very low-impact living can be achieved without deprivation. The community is able to meet its needs at a fraction of the energy and resource consumption of the average American through what I label "radical participatory democracy" or an uncommon investment in cooperative skills. It has achieved such low-impact living because of its spatial and conceptual withdrawal from the urban development regime. As a result, it has had little direct influence on urban development structures outside its boundaries. It has, however,

certainly influenced individuals through its educational programs and tours, a phenomenon called 'niche replication' which should be investigated further in subsequent research.

'Intermediacy' is a dynamic and liminal status—it is not the midpoint between radical and mainstream, rather it characterizes a niche situated inside and outside the regime at the same time. Regime change requires "mutual partial adjustment" (Stein and Harper 2012) between the niche and the regime. That is, the niche must play by *some* of the regime's rules as it 'settles in' to the regime context. The process of warming up is initiated when regime actors recognize that a niche practice is still within a realm of appropriateness despite its deviation from the norms established in the regime. It is at this point that a regime can begin to "warm up" to a niche, and employ some of its practices in policy. In the case of EcoVillage at Ithaca, this was facilitated by forums at which niche and regime members could feely share information and signal intention (i.e. *do* planning*)*. When landscape opportunities (e.g. federal government grants) presented themselves, members of the socio-technical regime (e.g. planners) were able to engage the ecovillage's members and draw from their lessons to benefit the whole region.

Chapter Six offers concluding thoughts. These results confirm many discussions in collaborative, communicative, and dialogical planning—namely that the role of the planner in achieving change is one of communicative facilitator rather than rational analyst or expert. When diverse actors have an opportunity to collaborate, they co-generate knowledge in response to dynamics in the socio-technical landscape.

Planners should remain aware of niche spaces, and find opportunities to include niche actors in collaborative process. In the case of EcoVillage at Ithaca, the lines between niche actor and regime actor have effectively dissolved over time. "Radical" niche projects that avoid interaction with regime structures are inspiring to members of the global niche (i.e. the global

ecovillage movement), but have produced few tangible changes in urban or local policy, or if they have, they are very difficult to measure.

This chapter also touches on future research, including an investigation of "innovative" contexts nation-wide, an exploration of niche networks or "replication benefits" of ecovillages, and work that elaborates on the sociological findings in the Dancing Rabbit community.

This dissertation departs from the assumption that sustainability is a matter of radically changing unsustainable regimes . I ask, *how do socio-technical regimes change?* and, more specifically, *In what circumstances and in which places have ecovillages influenced mainstream planning policy?* I pose these questions both positively and normatively: I believe the answer to these questions will focus our attention on useful examples of regime transition. I also believe that a richer understanding of socio-technical regime change will enable decision-makers to initiate and guide change that cannot come too soon.

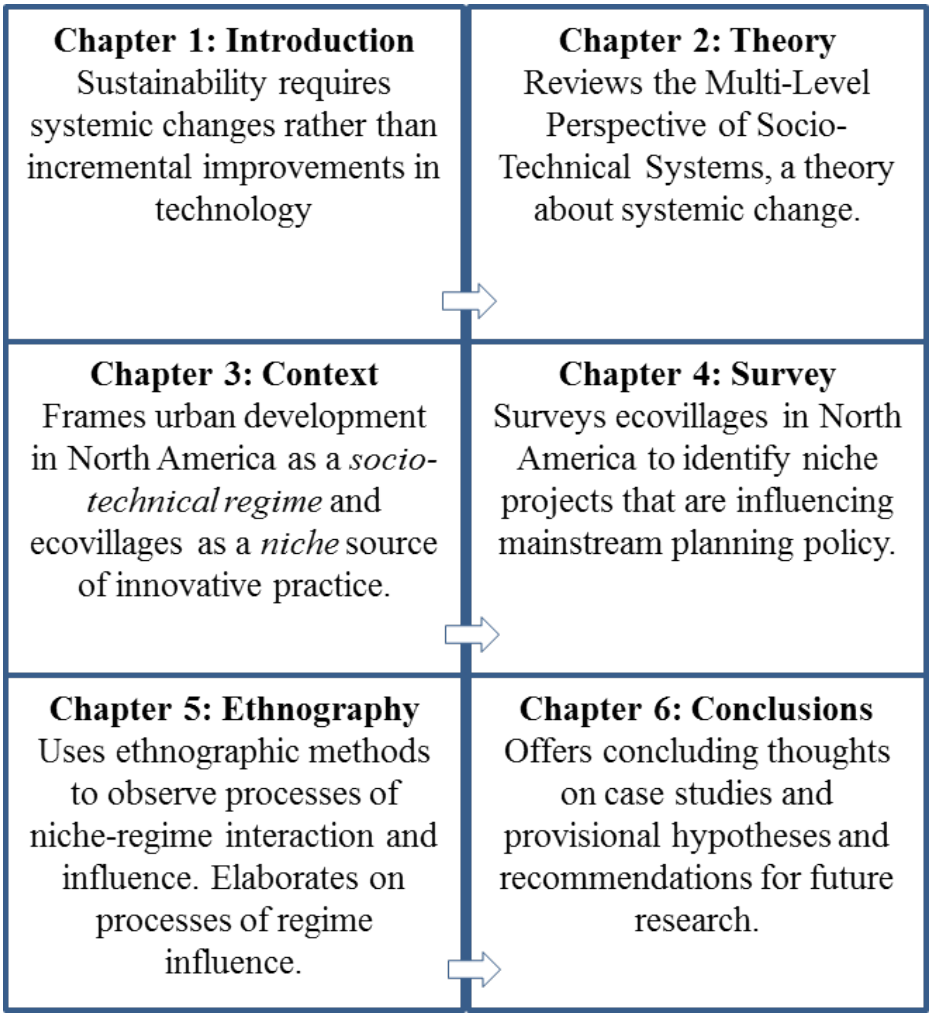

Figure 1: Summary of Chapters

Chapter Two: Understanding and Shaping Regime Change

Theories of Socio-Technical Systems

Introduction

The previous chapter claims that solving the "wicked" problems of sustainability will require changes in whole systems rather than isolated improvements in technology and resource efficiency. This chapter reviews the Multi-Level Perspective of Socio-Technical Systems (MLP), a theoretical framework that explains how whole systems change over time. Large, complex systems like transportation, food production, sanitation, or energy production do not change quickly or easily. They are effectively 'stuck' in a tangle of mutually-reinforcing social and technological structures called *socio-technical regimes.* The MLP and several associated theories explain the circumstances under which socio-technical regimes change.

Section One of this chapter outlines the ontological assumptions of the MLP. I trace the roots of this theory from evolutionary economics and constructivist/interpretivist theories of sociology, which departed from equilibrium-based theories of social and economic change in the 1980s. I then detail the three 'levels' of the Multi-Level Perspective—regimes, landscapes, and niches— and review existing empirical research that explains how complex systems have changed (or have begun to change) over time. I discuss the Grassroots Innovation approach, a corollary to the MLP that looks specifically at niche activity at the grassroots level. I conclude Section One by offering a brief case description of Transition Management, a policy application of the MLP in the Netherlands.

Section Two highlights gaps in the socio-technical systems literature. I begin with a discussion of the unaddressed role of planning in the MLP, and I argue that planning has an important role to play in steering regime transition. To date, most empirical research in the MLP

draws from decades-long historical case studies of regime change. I argue that the socio-technical systems literature can benefit from a comparison of multiple contemporary niche projects and that this research can use ethnographic methods to explore the interpretive shifts that occur as the result of social interaction of diverse individuals.

Section One: Roots and Theoretical Constructs

The Multi-Level Perspective of Socio-Technical Systems (MLP) offers an explanation for how socio-technical regimes change over time. The pioneers of the MLP draw from evolutionary economics and constructivist/interpretivist theories of sociology (Geels 2010; Schot 1998; Schot and Geels 2008; see Figure 2) and depart from neoclassical theories of innovation that dominate "uncritically" in the public policy realm (Seyfang 2010; Rees 1995; Rees 1992). The MLP and related theories assume that technological artifacts are inextricable from their social context and that individuals act on their subjective interpretation of the social and material world rather than acting 'rationally' in response to dynamics in market equilibrium. I discuss these assumptions in more detail below.

Critical Assumption 1: Humans are creative agents that act on their subjective interpretation of the world.

Different theoretical frameworks have different ontologies, or assumptions about the subject of change (what is changing) and the causal mechanism of change (who or what is making change happen). Theories of neoclassical economics, which form the basis of the traditional "linear" model of innovation, conceive of individuals and firms as rational, utility-maximizing actors. Under neoclassical theories, the economic decisions of individuals and firms can be explained as a response to the naturally equilibrating forces of (limited) supply and (unlimited) demand. Large social and economic changes, according to neoclassical theory, are well-timed responses to fortuitous and exogenous changes in the market place. Rip and Kemp

(1998) conceive of such changes as an exogenous "cannon ball" that distorts and reorients market behavior.

The role of policy and planning under such assumptions is to remove barriers to the articulation of an equilibrium price in the marketplace. As a result, the remedy to such complex problems as global climate change is to find ways to "get the prices right" such that the market will better signal a *demand* for solutions (Orr 2010; Daly 1996). The MLP approach defers less to market equilibrium and more to human cognition, creativity, path dependency, and the embeddedness of routine. MLP theorists draw from evolutionary economists Nelson and Winter (1982) and Dosi (1982) who broke from the neoclassical legacy by observing that firms and individuals are rationally "bounded"—they have cognitive limits that cannot usefully process all the information needed to interpret the market; that firms and individuals satisfice instead of maximize their utility (Simon 1955); and that firms and individuals are embedded in behavioral "routines" that change rarely and sluggishly (R. R. Nelson and Winter 1982), even when market signals indicate otherwise.

MLP theorists also draw from constructivist/interpretivist theories of sociology that assume that individuals are constantly engaged in inter-subjective sense-making which generally serves to reproduce existing social structures (e.g. routines), but that can change as subjects are introduced to new interpretations of the world (Geels 2010; Hopkins 2001). Charmaz (2006) explains:

> Rather than explaining reality, social constructionists see multiple realities and therefore ask: *What* do people assume is real? *How* do they construct and act on their view of reality? Thus, knowledge—and theories—are situated and located in particular positions, perspectives, and experiences (127).

Geels (2004a) illustrates the age-old debate between structure and agency, which strike a compromise in theories of structuration (e.g. Giddens 1986). He explains that social interaction offers a window through which to understand structural change:

> Actors interact…within the constraints and opportunities of existing structures, at the same time that they act upon and restructure these systems…Through the effects of social interaction, social rule systems as well as social agents are maintained and changed (907).

This ontological combination of evolutionary and constructivist/interpretivist theories posits that socio-technical change is caused by heterogeneous, creative actors (causal agents) embedded in routines that change with the inter-subjective discovery of new meanings and selection of new routines (causal mechanism). In other words, there is a discursive overlap that occurs as diverse actors expose each other to new interpretations of reality.

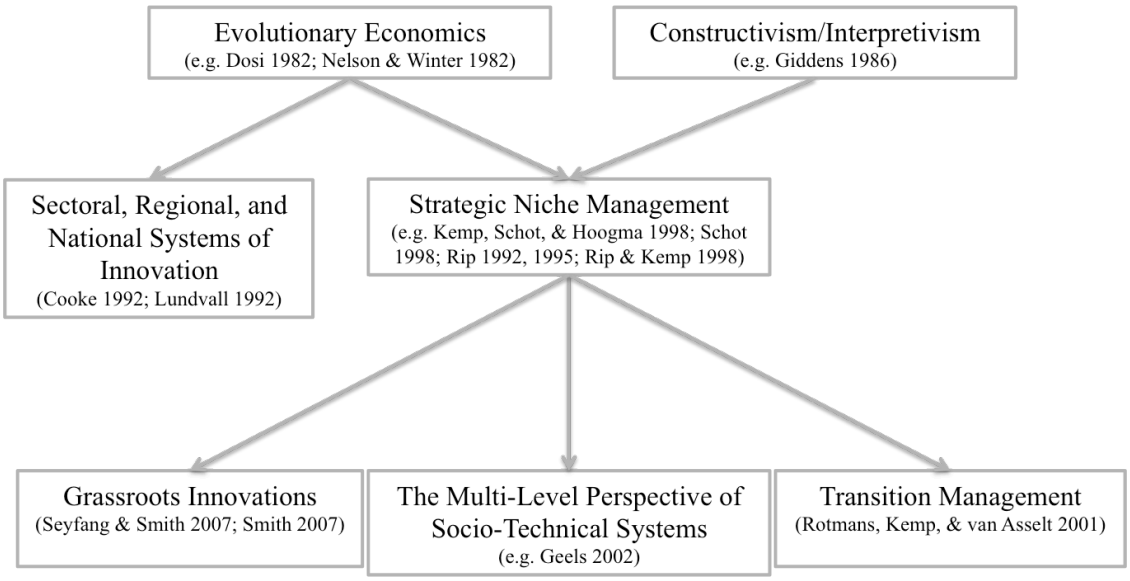

Figure 2: The MLP descends from theories of Evolutionary Economics and Constructivist/Interpretivist theories of Sociology.

Critical Assumption 2: Technology is a socially situated phenomenon. Social scientists have an important role to play in processes of innovation.

Traditional linear-rational models of innovation separate technological artifacts from their social context and frame innovation as an exclusive exercise of the engineering and physical sciences (Shove 1998). As a result, the perceived role of planners and other social scientists in processes of innovation has been to make way for new technology by removing so-called "social

barriers" to innovation (Shove 1998). The MLP, on the other hand, conceives of new technological artifacts as co-evolving *with* social context. This co-evolutionary process is noted as highly path-dependent insofar as emergent technologies depend upon their predecessor technologies. Since existing technologies are embedded in social practice, adopting new technologies requires changes in economic, social, cultural, political, and technological structures (Kemp, Schot, and Hoogma 1998).

Studies that focus on the adoption of new technologies in the public sector reveal that non-economic factors such as comfort and familiarity with the new technology (Kaplan 1999) and political support (Ho and Ni 2004) are often significant barriers to adoption, even when economic feasibility and technological capacity are apparent and well-tested. Technology is frequently invoked in political discourse as a symbol of progress. For example, Rip and Kemp (1998) emphasize the symbolic importance of automobiles in American culture. Cars serve an integral economic function in daily American life, but they can also symbolize freedom, mobility, and independence. American teens experience few moments so symbolically rich as receiving a driver's license and keys to a car, liberating them from the clutches of their parents! Indeed, the automobile and the infrastructure built to accommodate it (roads, highways, gas stations, garages, entire neighborhood grid systems, drive-throughs, etc) have arguably shaped the daily routines of Americans more than any single technological artifact (K. T. Jackson 1985). It is important, therefore, to conceive of technology as both a subject *and* object of social change. As noted, rather than understanding technology as driving social change, theories of socio-technical systems conceive of technology and society as *co-evolutionary*. The MLP aims to understand not only the development of new artifacts (e.g. new energy technology), but also the broader economic, social, and regulatory context that imbue an artifact with practical meaning. This context is labeled the 'socio-technical regime.'

The Multi-Level Perspective: (Meso-Scale) Regimes, (Macro-Scale) Landscapes, and (Mirco-Scale) Niches.

The MLP argues that socio-technical regimes—relatively stable configurations of rules, social networks, and physical structures—resist radical change in a system while allowing for incremental changes that preserve the system. Such stability is critical to the existence of complex systems. Otherwise individuals might have to re-invent the "rules of the game" every day. Imagine, for example, living in a city of one million inhabitants without basic sanitary systems, building codes, spatial planning, law enforcement, and transportation infrastructure. The result might resemble the chaotic industrial cities of the late nineteenth century (e.g. Engels 2003; Hall 1996) prior to the emergence of housing and urban infrastructure socio-technical regime—a complex of laws, infrastructure, modern science, and the imperatives of capitalist production—that resulted in healthier, more habitable twentieth-century cities.

Regimes encourage incremental innovation, but only to the extent that these changes do not violate the regulatory rules (laws, standards, monetary incentives, sanctions), normative rules (values, norms, expectations, codes of conduct), and cognitive rules (priorities, problem framing, heuristics) of the regime (Geels 2004a). Therefore, innovation within regimes tends to be incremental, for example, lowering input costs to increase profits.

Socio-technical regimes have been noted to exist along seven mutually-reinforcing dimensions including: 1) guiding principles; 2) technologies and infrastructure; 3) industrial structure; 4) user relations and markets; 5) policy and regulations; 6) the knowledge base for the regime; and 7) cultural and symbolic meanings (See Figure 3; Kemp, Schot, and Hoogma 1998; Schot 1998; Smith 2007). Their direct and mutual interdependence suggests that one element cannot easily change independently of the others (Geels 2002).

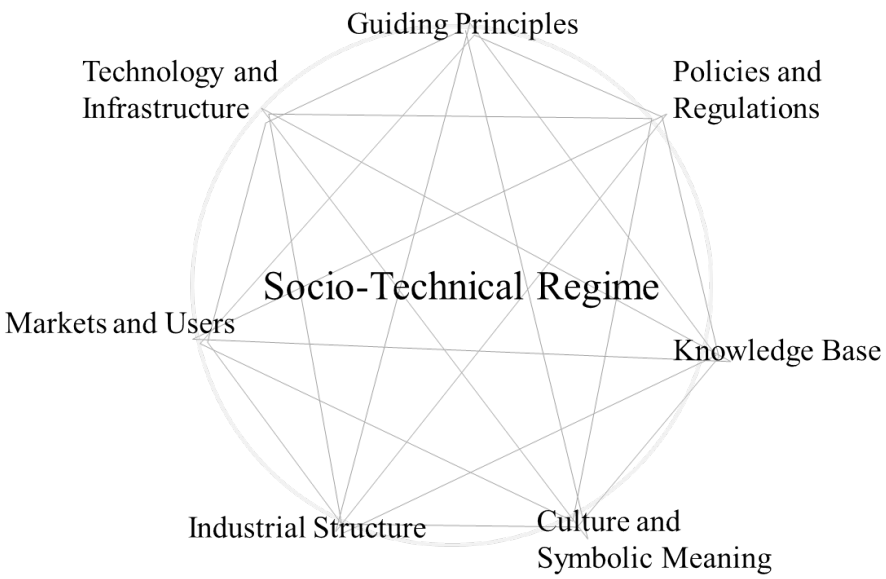

Figure 3: Socio-technical regimes consist of mutually reinforcing social and technological elements that resist radical change in a functional system. Elements of a regime reinforce one another, making regimes very difficult to change unitarily. This diagram draws from Schot (1998) and Geels (2002).

Regimes can be framed and analyzed at multiple geographical scales and exist in nested and overlapping hierarchies (Smith, Stirling, and Berkhout 2005). Urban development in the United States, for example, is a regime-of-regimes, influenced by a mix of national, state, and local laws, existing infrastructure, the planning and architecture professions, financial institutions, local and regional developers, and employers. These are each elements of other regimes, but they converge at the local and regional scale to dictate decisions in the built environment. The nested and overlapping state of regimes demands that any study revolving around regime change, defines the precise regime under question.

Hodson and Marvin (2010) argue that the socio-technical systems perspective can be easily applied to infrastructure systems in metropolitan regions as they face new global challenges in the twenty-first century. Gullberg and Kaijser (2004) combine Urban Regime Theory—which focuses primarily on urban political coalitions (c.f.. Stone 1989) and the Large Technical Systems perspective (LTS), which focuses primarily on the evolution of urban infrastructure (c.f. Hughes 1993), to pioneer a "City Building Regimes (CBR)" perspective. They

explain that a city building regime is, "…a set of actors and the configuration of coordinating mechanisms among them, which produce major changes in the landscapes of buildings and networks in a specific city region at a given time (p. 18)." They use this CBR perspective to explain how major changes in infrastructure networks of the City of Stockholm have evolved as a sequence of stable regimes since World War II. While the authors do not engage directly in dialogue with scholars of socio-technical systems, this perspective aligns very closely with socio-technical systems theory and could benefit from empirical elaboration outside Sweden.

It is easy to imagine how such a regime-oriented perspective can apply to sustainability challenges in the built environment in the US, where decisions are shaped by complex, self-reinforcing elements like land use laws, property rights, existing hard and soft infrastructure networks, standardized Euclidean zoning laws, and historical power dynamics that prioritize the autonomy of local government and imperatives of urban growth (Molotch 1976). (I label this the *urban development regime* and will use this construct in the development of this study—see Chapter Three for more detail). The *Growing Cooler* report by Ewing et al. (2007) details important changes necessary to reduce transportation related carbon emissions in coming decades. Although the report does not specifically employ a socio-technical systems perspective, the authors explain that technological improvements alone—for example in the fuel economy of vehicles and the carbon content of fuel—cannot offset projected increases in carbon emissions that will accompany increases in vehicle miles traveled (VMT). The authors argue that achieving emissions targets will require changes in urban form, residential densities, the location of job centers, transportation infrastructure and the ability to engage in daily life over shorter more walkable or bikeable distances. Achieving emissions targets set by the "Smart Growth" agenda will require much more than changes in planning regulations, instead deeply-guarded economic and moral values that most mainstream Americans are, as of yet, unwilling to relinquish (A. Downs 2005). Multiple physical, cognitive, regulatory, and normative elements—indeed an entire

regime—would have to change in order to transform travel behavior, building density, employment centers, and transit infrastructure networks in most American metropolitan areas.

The Socio-Technical Landscape

As noted, although regimes resist radical changes, the integrity of socio-technical regimes is vulnerable to pressures from the larger ***socio-technical landscape***—exogenous political, economic, demographic, and social forces. Geels & Schot (2007) comment that socio-technical landscapes, "…provide deep-structural gradients of force that make some actions easier than others (403)." Socio-technical landscapes can consist of relatively static elements like climate or legal frameworks; elements that change gradually like road networks or demographics; and dynamic large-scale social phenomena like wars and economic crises that can very quickly influence behavior. Frank W. Geels (2005) illustrates how the long transition from horse-drawn transit to petroleum automobiles as a means of urban transport in the United States was initiated by several converging landscape factors: the cost of feeding, storing, and cleaning up after horses was increasing just as rapid in-migration into cities was prompting reform groups to advocate for the thinning of urban populations by expanding into the suburban fringe. Existing horse-drawn infrastructure transitioned electric street systems, which literally paved the way for individual based vehicular systems. The OPEC oil embargo of 1973 (a geopolitical landscape force) shocked the incumbent energy regime in North America and Europe, and induced a temporary spike in renewable energy research, oil exploration in North America, and an increased interest in mass transit. Demographic shifts, such as the baby boom of the middle twentieth century in the US, have influenced countless economic and social trends, including incentives and pressure to accommodate the housing needs of a growing retirement age population (Hinshaw and Holan 2011; Liebig, Koenig, and Pynoos 2006).

Planners and policy makers are beginning to confront shifts in energy and environmental landscapes that have challenged existing electricity production and transportation regimes. Raven (2006) explains that energy production regimes in the Netherlands began to experiment with integrating small amounts of biomass into coal burners in the middle 1990s as they began to feel the pressure from supra-national and national governments to reduce their greenhouse gas emissions. The integrity of regimes relies upon stable landscape conditions. Dynamics in the landscape result in "tensions and mismatches (Geels 2004a)" within the existing regime (Rip and Kemp 1998) and a window of opportunity for the integration of radically new technological configurations.

Smith, Stirling, and Berkhout (2005) comment that regime change requires "coherently articulated" landscape pressure. They explain, "There is typically no shortage of pressures acting on any given regime, often pushing in opposing directions. In practice is it therefore not simply the existence of such pressures that is decisive. Instead it is what we term the *articulation* of pressures for any given regime transition (p. 1495)." For example, there is currently national-scale activist pressure in the United States to transition away from fossil energy. These pressures are reinforced by the declining price of renewable solar and wind energy. At the same time, there are geopolitical and market pressures to increase fossil energy production and consumption such as domestic natural gas, petroleum from Canadian tar sands, and further deep-sea drilling. Smith et al. comment that articulating these pressures is critical. The scientific basis for climate change, for example, existed long before it was articulated by the Intergovernmental Panel on Climate Change (IPCC) such that lay readers and politicians could understand. The articulation of landscape pressure therefore presents an important role for planning, which I discuss below and highlight in subsequent case studies.

Socio-Technical Niches: Incubating Radical Practice

Novel technological configurations emerge from ***socio-technical niches****,* or protected networks in which societal "rules of the game" are relaxed or rewoven (Geels 2004a; Geels and Schot 2007; Kemp, Schot, and Hoogma 1998). Within these networks, novel and initially unprofitable ideas are sheltered from regime selection pressures like market competition, regulations, and societal norms. The earliest steam ships, for example, were used to deliver mail over relatively short distances. Steamship technology improved in this isolated market and eventually out-performed historically dominant wind-powered vessels (Geels 2002). To continue the example above, the earliest automobiles did not compete with other forms of transportation because they were not understood as a means of urban transportation, but rather as a means of sport and leisure (Geels 2005). These early petroleum vehicles were preferred by sportsmen and pleasure drivers because they could travel faster and further than their electric and steam-powered counterparts. Middle class urban reformers and electric streetcar companies helped transform the street from a primarily social space to a transportation thoroughfare just in time for personalized petroleum vehicles to begin dominating the road in the early twentieth century (*ibid).*

Niches can also serve to buffer politicians from risky experiments that are an important part of innovation. Lovell (2007) illustrates how innovations in energy-efficient housing in the United Kingdom received little support from politicians at first, but received praise once certain experiments demonstrated success. Niches allow for new technologies to demonstrate viability, attract early financial backing, build a constituency, and encourage experiential learning and the institutional adaptations necessary for a more broad application (Kemp, Schot, and Hoogma 1998).

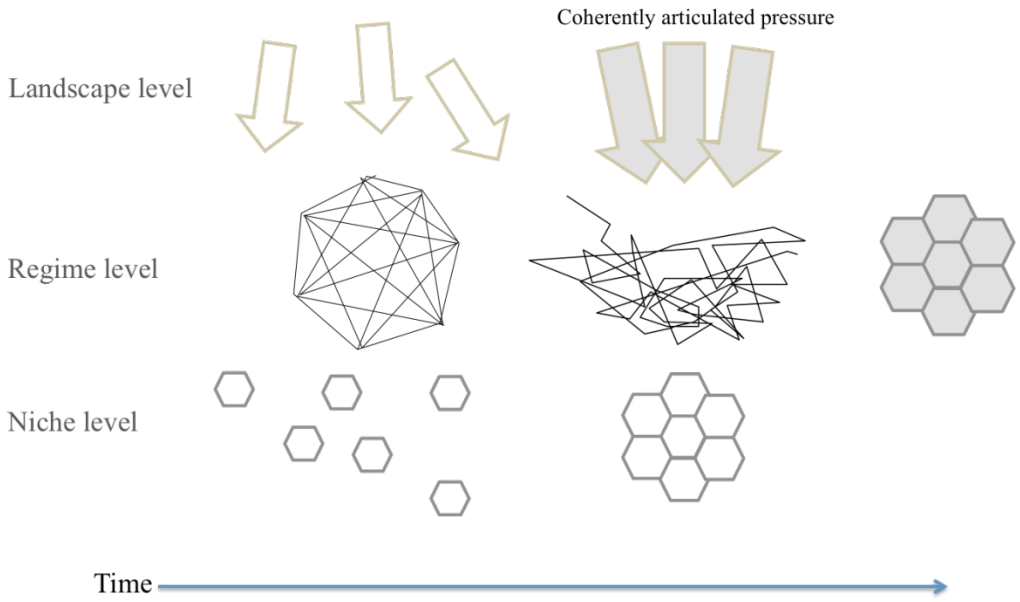

Figure 4: The multi-level perspective of socio-technical systems argues that coherently articulated landscape pressures results in tensions and mismatches in the regime, opening up avenues for the emergence of niche alternatives – while incoherent pressure help to keep regimes stable.

It is important to distinguish a local niche *project* from a global niche: a global niche is an a-spatial network of actors that share cognitive and normative assumptions about emerging practices (Geels and Raven 2006; Schot and Geels 2008). For example, in the chapters that follow, I frame the Global Ecovillage Movement as a global niche with hundreds of constituent niche projects, or individual ecovillage communities. Using this frame, the niche development process can be conceived as operating at two levels. On one level individual local niche projects form in isolation, and over time, niche projects may form a unified global niche by networking, learning from each other, and forming cognitive rules that are well articulated, specific, and stable (Geels and Raven 2006).

Geels and Schot (2007) propose four distinct "transition pathways" (P1-P4) and one "zero proposition" (P0) that vary by the *timing* and *nature* of landscape-regime-niche interactions in terms of transition:

- P0: *Regime reproduction:* If there is no landscape pressure to change despite the existence of radical niche alternatives, then the regime will continue to reproduce itself.
- P1: *Transformation path:* If there is moderate landscape pressure with relatively little adaptive capacity from niches, then the regime will begin to reform itself internally.
- P2: *De-alignment and re-alignment:* If landscape pressure is very strong, regime members will defect, and the regime will erode. If there is not one strong niche present already, multiple niches will emerge and compete for regime dominance.
- P3: *Technological substitution:* If there is heavy landscape pressure *and* a sufficiently developed niche alternative, it will replace the regime.
- P4: *Reconfiguration pathway:* Innovations developed in a niche and are adopted by regime members to resolve 'local problems'. They subsequently grow and overcome regime structures.

Identifying the point at which a transition is complete or whether a regime has 'radically' changed remains unclear. Complete and radical transformation is evident in long historical accounts of regime transition, for example the transition from horse-drawn urban transport to petroleum automobiles (Geels 2005), or the transition from sailing ships to steam-powered ships for transatlantic shipping (Geels 2002). Contemporary accounts of regime transition more closely resemble a *reconfiguration*: they are not complete transitions, although they offer convincing evidence that new practices are becoming more relevant and economically feasible in the mainstream. For example the ongoing (but incomplete) transition away from fossil fuels in the Netherlands (Verbong and Geels 2007), the growing popularity of organic foods in the United Kingdom (Smith 2007), the adoption of solar hot water in Austria (Ornetzeder 2001), or the emergence of wind power in Denmark (Smith 2006). The empirical chapters that follow all focus on the *beginning* of regime transition processes. Even the most 'successful' cases do not illustrate

a complete transition. They do, however, demonstrate the power of grassroots niche experimentation and the circumstances under which urban development regimes begin to adopt practices that might otherwise be dismissed as irrational, unfeasible, or morally questionable.

Grassroots Innovation

The "grassroots innovation" approach retains all the theoretical assumptions of the MLP, but explores niche projects that emerge from grassroots movements. *Grassroots niches* are networks of actors in civil society that form in explicit opposition to incumbent regimes. The grassroots innovation approach re-frames grassroots social movements as important sites of innovation that can inform policy for sustainable development (Seyfang and Smith 2007). Although MLP and other socio-technical systems literature acknowledge the importance of non-market factors in innovation processes, they still proposes that niches evolve sequentially from "technical niches" to more mature "market niches" to "regime shifts" (Schot and Geels 2008). Such a conception continues to privilege the rules of the marketplace over local norms and non-pecuniary values.

Whereas conventional innovation for sustainability remains motivated principally by the signals of the market economy, grassroots niches "…exist within the social economy of community activities and social enterprise (Seyfang and Smith 2007, 591)." Grassroots niches therefore respond primarily to ideology and social need. A grassroots niche might value activities such as local skills training, waste collection, or traditionally unremunerated labor as outcomes that innovators at the regional or national scale see little incentive to achieve, in part because these values are hard to quantify.

This shift in values results in a different, more delicate, resource base. Whereas strategic niches attract direct investment from government and corporate patrons, grassroots niches more often attract financial backing from a "pluralistic" resource base including grant funding, limited commercial activity and social enterprise, in-kind contribution, and volunteers (Seyfang and

Smith 2007). This resource base leaves a grassroots niche vulnerable to such internal challenges as activist burnout, and turnover in volunteers, and external challenges such as fluctuating funding opportunities and shifts in political leadership (*ibid).* Therefore, grassroots niches confront an existential challenge that strategic, government supported niches do not. Additionally, as grassroots niches aim to inspire social benefits that are more difficult to measure, their activity is likely under-documented (Davies 2009).

Grassroots Niches: Intrinsic Benefits and Diffusion Benefits

Grassroots niches offer both "intrinsic" benefits and "diffusion" benefits. ***Intrinsic benefits*** result from the mere existence of a niche, regardless of its influence on the larger regime. For example, grassroots niches may result in better local waste management (Davies 2009), low-carbon housing (Seyfang 2010), organic food production (Smith 2007) as well as skills development for marginalized populations (Davies 2009). Drawing from Church and Elster (2002), Seyfang and Smith (2007) explain that many small local initiatives deliver benefits that remain overlooked by policy makers at larger scales, but that policy makers stand to benefit from techniques pioneered in grassroots movements. Grassroots initiatives can also fill gaps left by "top-down" initiatives, in part because local activists are more familiar with the intricacies of local socio-environmental problems.

Diffusion benefits are changes the niche inspires beyond its conceptual boundaries, either by *replicating* itself across space through additional grassroots initiatives, *scaling-up* its membership beyond a core group of activists, or *translating* its practices and ideals to the market or policy makers (Seyfang 2010; Seyfang and Haxeltine 2012). Grassroots innovation research has documented the *replication* successes of existing grassroots niches (Seyfang 2010; Seyfang and Haxeltine 2012; Smith 2007). Rarer, however, are examples of grassroots niches that have successfully scaled-up their practices or translated niche practices to the incumbent regime. This

dissertation aims, in part, to strengthen the explanatory power of grassroots innovation theory by detailing the mechanisms by which niche projects succeed (and fail) to translate their practices and alternative structures.

The least documented form of diffusion is translation, wherein an incumbent regime adopts practices developed in the grassroots. Smith (2007) explains, "Analysis of niche engagement with incumbent regimes, especially translation of socio-technical practices between the two, is marginal (430)." Grassroots niches that aspire to translate their practices to the mainstream encounter a critical innovation paradox: the more distant (conceptually) a niche is situated from the characteristics of a regime, the more difficultly it will encounter framing its alternative practices as "innovative." Smith (2007) comments:

Paradoxically, a niche in tune with the incumbent system will not demand very great changes in socio-technical practice: whilst radical niches…will not diffuse much at all since they demand too many (structural) changes (430).

A hypothetical niche project that plays by some rules of the regime might fare better in inspiring regime change than a niche actor that retains little resemblance to the regime at all. Smith claims that the most influential grassroots niche can simultaneously innovate and translate its practices to the mainstream. He labels these "intermediate" niches. The properties and dimensions of an "intermediate niche", however, remain relatively undetailed. While Smith offers evidence of two instances that have had mediocre success at innovation and translation, innovation research has yet to explore niche/regime dynamics at a larger scale, nor has it provided evidence for the existence of effective intermediate niches. Smith concludes:

> The literature on green niches must pay greater attention to niche-regime interaction… further case studies may reveal additional translation processes and interactions. One of the limitations of the inductive approach taken here is that generalizations must be made with considerable caveats (447).

Section Two: The Role of Planning and Theoretical Gaps

While the MLP and the Grassroots Innovation approach have been applied to many cases involving innovation in the built environment (e.g. Smith 2007; Seyfang 2010; Smith 2006; Geels and Raven 2006; Ornetzeder 2001; Hodson and Marvin 2010), few cases have directly considered the planning profession. Of course, the role of planners in the MLP depends upon how one conceives of planners more broadly. I argue below that the rational-comprehensive planning model offers little overlap with the MLP, as it generally serves to reinforce existing power structures and operates on different ontological assumptions. Communicative/collaborative planning, on the other hand, aligns well with the assumptions of the MLP, and can engage regime transition by facilitating the exchange of knowledge between regime incumbents and niche actors.

The MLP can also benefit from an elaboration of cases including cases in North America, a diversification of research methods including both large-sample survey methods and contextual ethnographic methods; and a renewed ontological focus on the cognitive frames of individuals, and how these frames change with exposure to heterogeneous actors.

What is the role of planning and planners in the MLP?

Planners and policy-makers hardly play a creative role in traditional linear theories of technological innovation. Their prescribed role is to remove 'social barriers' to innovation in the marketplace (Shove 1998). The MLP is attractive to social science disciplines, in part, because it offers social scientists an affirmative role to play in innovation processes. Technological artifacts, according to the MLP, co-evolve *with* normative, cognitive, and regulatory structures (Geels 2002). How the planning discipline fits into the MLP, however, depends on upon how one frames the role of planning and planners in society.

The rational-comprehensive planning model (RCPM) understands planners as objective analysts of information and, very often, stewards of the state interests (e.g. Banfield 1959; for additional commentary see Dalton 1986; Baum 1996; Brooks 2002; Healey 1997; Friedmann 1987). Such a model posits that planners can help policy makers arrive at optimal ends given sufficient information. This perspective contradicts the evolutionary and interpretivist foundations of the MLP, which posit that what is "optimal" and "true" changes as heterogeneous and creative agents engage in inter-subjective sense-making (Geels 2010). The hypothetical 'expert' planning analyst need not draw from diverse knowledge sources, and need not make sense with anyone or anything other than existing rules and rational premises. Planning scholar John Friedmann (1987) explains that systems analysts apply a highly technical, systematic approach to planning, and in so doing "…look to the confirmation and reproduction of existing relationships of power in society…they address their work to those who are in power and see their primary mission as serving the state (11)."If rational planners exist in the MLP, they are synonymous with the socio-technical regime, and are likely working to conserve regime elements by re-affirming its belief structures.

Planners have also been conceived of as playing an advocacy role for marginalized groups in society (Davidoff 1965; Harwood 2003). Insofar as socio-technical niches exist in the margins or the grassroots, advocacy planners can help draw attention to the injustices of the socio-technical regime on behalf of marginalized or niche actors. To date, socio-technical systems scholarship pays little attention to social injustice, although some (Avelino 2009) highlight power imbalances as obstacles to Transition Management. Most socio-technical niches in MLP literature consist of actors who willingly operate outside the mainstream, so the extent to which advocacy planning can inspire processes of socio-technical regime change is as of yet unexplored. Such an exploration may be worthwhile, however.

If we understand planning as a communicative/collaborative act, and planners as facilitators of collaboration, then planning stands to play a critical role in regime transition processes. Healey (1997) argues that planning ought to approach knowledge as socially constructed and context-specific. Planners ought to make space for diverse constituents to construct knowledge together. Healey's collaborative planning process requires the direct interaction of stakeholders in a forum that allows constituents to reformulate meaning. Such a process also offers the ancillary benefit of building trust amongst diverse stakeholders. The knowledge that the participants create exists *amongst* them instead of being imposed upon them from a rational practitioner. Niche actors that operate under different "rules of the game" can offer knowledge that deviates from and challenges regime standards.

Similarly, communicative action planning (Innes and Booher 2004; Innes 1998) positions the planner as a facilitator of information exchange rather than an objective producer of knowledge. Explains Innes (1998),

> "…in communicative planning, information becomes gradually embedded in the understandings of the actors in the community, through processes in which participants, including planners, collectively create meanings (53)."

Therefore, a planner can play an integral role in the MLP by including "niche" actors in decision-making processes, generating knowledge through collaboration, and allowing for inter-subjective sense-making that might challenge the orthodoxies of regimes.

Plans also have a potentially important role to play in articulating coherent socio-technical landscape pressure. Regimes face pressure to change all the time, but pressure may come from a diversity of directions and result in zero net change. Smith, Stirling, and Berkhout (2005) comment, "The public realm is crowded with interests (industry, civil society and government), each with different ideas and visions about what their sectional and collective futures ought to be... (1494)." The coherence of diverse political, economic, demographic, and climatic landscape pressures lies far outside the control of any individual, but the articulation of

landscape pressures is precisely the role of the planning profession. Environmental pressures stemming from global climate change have likely existed for decades, but pressure to respond to it was not well articulated until the first assessment report from the Intergovernmental Panel on Climate Change (Smith, Stirling, and Berkhout 2005). Plans explicate the pressures to which organizational entities respond, and offer signals to other actors in the same system:

> Plans affect the world by organizing information about relationships among actions and relationships of these actions to intentions and consequences. This information affects beliefs and attitudes about the state of the world, and in this way plans affect deliberative behavior, decision-making, and action. (Hopkins and Alexander 2009, (471)

In other words, a plan signals that not only are organizations experiencing exogenous landscape pressure, but that they may be willing to act on that pressure. A climate action plan issued by a city or region might signal a friendlier regulatory atmosphere for innovative "green" homebuilders, especially if plans are consistent within a single region. There is much potential for future scholarship to explore the role of plans and planners in regime transition processes.

Socio-technical systems literature must build a more robust body of empirical evidence

The explanatory power of a theory depends, in part, upon the *stability* of empirical confirmation—a status notoriously difficult to achieve in studies of innovation (G. W. Downs and Mohr 1976). Most MLP empirical research consists of single historical cases studies, which have great potential to illuminate the details of social processes (Flyvbjerg 2006) but cannot offer the same verification power of large-sample statistical studies. Regime transition is rare, hard to predict, and rather slow. Most complete transitions endure for a generation and many innovative ideas fail to emerge past the niche stage. Dutch planners anticipate that major environmental

transitions require a generation, or *at least* twenty-five years (Martens and Rotmans 2005) and that trajectories are sluggish and uncertain (Verbong and Geels 2007).

As a result, socio-technical systems literature suffers from a shortage of case studies by which theory can be confirmed or denied. This is, in part, because of the theory's relative youth, but this shortcoming could also be addressed by different methodological approaches. While historical case studies are critical for this body of theory, future work may benefit from the use of ethnographic methods to examine on-going transition processes (e.g. Bos and Grin 2008; Seyfang 2010). Genus and Coles (2008) comment that much of the MLP historical analysis relies upon, "…a small number of quite recent accounts of the topic in question, themselves based on secondary data, rather than on documents contemporaneous with the historical period being studied (pg. 1441)." Future research might engage multiple similar niche and on-going projects at the same time, and compare their relative ability to influence regime actors and structures.

How does regime transition work in North America?

The majority of empirical MLP research examines historical regime transition processes in the Netherlands and the United Kingdom. Future work will benefit from a geographical elaboration of the theory. Landscape pressure varies from context to context. Demographic, climatic, economic, and political shifts may influence regimes differently in different nations. The Netherlands, from which the MLP originates, is a small, densely populated (245 people per square mile) nation of over 16 million human residents, 11 million pigs, over a million sheep, 3.8 million cows, 86 million poultry, and 9 million automobiles (Johnson 2008). This density surely yields landscape pressure for environmental planning that is unparalleled in the United States. The validity of the MLP can be strengthened if it succeeds in explaining transition processes in diverse locations.

MLP scholarship can better explore shifts in the cognitive frames of individuals.

Socio-technical systems research could address multiple empirical shortcomings by researching change that occurs at the level of the individual. This point is well understood. Geels (2005) acknowledges that studies of the MLP, "…need to be filled in with more detailed actor-related patterns. The increasing support and involvement of actors is important to get the bandwagon going and stimulate diffusion and breakthrough (692)." Genus and Coles (2008) recommend adopting an approach that shows, "…a concern for actors and alternative representations that could otherwise remain silent, for untidiness and flexibility of interpretation, and for a self-critical attitude on the part of researchers (1442)." Instead of painting regime transitions in century-long historical episodes that occurred over a hundred years ago, socio-technical change may be better represented by ethnographic evidence collected *in situ*, as the regime is changing. This will solve the issues of methodological transparency and data availability discussed above.

Bos and Grin (2008) offer an exemplary case study of attempted (and failed) regime change in Dutch pig husbandry. The study engages contemporary, first-hand sources to demonstrate obstacles to effective regime transition. Rather than analyzing historical accounts of technological artifacts, the study acknowledges that change occurs (or doesn't occur) in the interpretation of individual regime actors, embracing the interpretivist/constructivist ontology that Geels (2010) champions. Seyfang (2010) also engages in first-hand observation, in-depth semi-structured interviews, and documentary analysis of a grassroots sustainable housing niche in the United States. The study demonstrates regulatory and normative obstacles impeding the incorporation of innovative building practices into the existing housing regime. Future studies ought not shy away from failed transitions or transitions struggling to escape the niche phase.

Next steps

If the planning discipline is interested in achieving sustainability goals, it must challenge the rules, social networks, and physical structures that protect existing un-sustainable practices.

The MLP and associated theories of socio-technical systems offer a framework for structural change and the potentially important role planner have to play in it.

A better understanding of how these large systems change over time can benefit from research that pays attention to how cognitive frames change. If, indeed, the MLP is a constructivist/intepretivist model (Geels 2010), then research should adopt the perspective of individuals as the level of analysis. How do new interpretations change the trajectory of a regime? The MLP has relied heavily upon historical case studies. These cases have helped to enrich the framework. Now it is time to challenge this framework by testing it on ongoing transition processes and niche experiments. What types of grassroots experiments are engaging and influencing regime incumbents (e.g. policy makers) well? How can researchers compare multiple niche experiments at once? What is the role of the public sector in transition management?

In the following chapter, I define and frame the "urban development socio-technical regime"—a set of rules, networks, and physical structures that encourages certain decisions in the built environment, but discourage the systemic changes necessary to achieve sustainable levels of consumption. I juxtapose this regime with the Global Ecovillage Movement, a network of intentional communities that have chosen to withdraw from mainstream urban development regimes, and employ alternative socio-technical practices that facilitate remarkably lower ecological footprints without penalty to quality of life.

Chapter Three: Context and Theoretical Framing

"Combining a supportive social environment with a low-impact lifestyle, ecovillages are consciously seeking to birth new ways of living that transcend the modern dichotomies of urban vs. rural settlements, private vs. public spheres, culture vs. nature, local vs. global, expert vs. layperson, affluence vs. poverty, and mind vs. body. In this sense they represent a post-modernist perspective, but one that seeks to construct a viable alternative rather than merely a deconstruction of modernity." –Karen Litfin (2009, 127)

Introduction

In the previous chapter I reviewed the Multi-Level Perspective (MLP) of Socio-Technical Systems and its corollary, Grassroots Innovations (GI). I argued that the MLP and GI are potentially useful theories for the planning discipline, especially given the holistic and system-wide changes necessary to achieve the goals of the sustainability agenda. In this chapter, I draw from this body of theory to claim that urban development in the United States can be conceived of as the product of an "urban development socio-technical regime" that shapes decision-making in the built environment. This regime is founded on principles, processes, and resources that have natural limits, with damaging repercussions if they are exceeded. As we approach these limits, it has become apparent that urban development in North America is unsustainable. Of course, the urban planning discipline is embedded in this regime, and it has begun to offer remedies to the social, environmental and economic consequences of the regime's contradictions. Many of these solutions fall under the Sustainable Development umbrella. While Sustainable Development remedies may indeed delay the dis-integration of this regime or temper its downfall in certain places, the North American urban development socio-technical regime will eventually collapse or—more optimistically—transition to a new regime based on new principles, processes, and resources.

In Section One of this chapter, I construct the North American urban development socio-technical regime. Urban development decisions in democratic nations are rarely the result of unitary agents: they are shaped by interacting political, regulatory, economic, normative, and

physical structures. While regime structures vary by region, there are relatively consistent structural elements that reinforce current unsustainable urban development in North America. I draw from academic planning literature and contemporary documents of the planning profession (e.g. Planning Magazine and PAS reports) to illustrate the mutually reinforcing elements of the North American urban development socio-technical regime (which I also refer to as "the regime" or "the mainstream")

In Section Two of this chapter I contrast mainstream urban development against the Global Ecovillage Movement, which I frame as a grassroots socio-technical niche that has withdrawn—in some cases physically—from the regime to experiment with construction, transportation, energy production, land use, and governance practices that prioritize lower resource consumption, ecosystem conservation, and social cooperation. Ecovillages are full-featured, human-scale settlements that are ideologically dedicated to low-impact living. The Global Ecovillage Movement descends from a 300 year legacy of North American intentional communities (Brown 2002a), the missions of which range from ecological, to philosophical, to spiritual, to economical, or some combination thereof (Kanter 1972; Meijering, Huigen, and Van Hoven 2007). It might be easy to conceive of ecovillages as a hangover from the hippie communities of the 1960s and '70s, and indeed a few contemporary ecovillages are direct descendants of self-proclaimed hippie communes (e.g. The Farm Community, Summertown, Tennessee), but ecovillages are working hard to shed a reputation characterized by an anything-goes lifestyle that more often resulted in the *collapse* of community than any enduring ideal (Matthews 2010). Contemporary ecovillages have typically formed in response to the inadequacies of government sustainability initiatives in the late twentieth- and early twenty-first centuries (Dawson 2006), and many have learned from the shortcomings of intentional communities in the middle twentieth century. Their members consist of a diverse demographic: idealistic youth, middle class professionals, and earnest retirees interested in "pushing the edge"

environmentally and living in supportive communities (see Chapter Five). The existence of the internet has enhanced their networking, recruitment, and economic subsistence capabilities to an extent that has allowed them to grow from a smattering of disconnected projects to a network that is forming a more unified global niche without conceding their local ecological particularities (Litfin 2009; Trainer 2000).

Ecovillages are by no means the only grassroots socio-technical niche, nor the only niche formed in opposition to existing urban development processes (see, for example, Seyfang and Haxeltine 2012). Yet ecovillages offer a discrete space in which *physical* alternatives— energy infrastructure, agriculture, housing, technology, transportation, water, and sanitary systems— can be tested alongside *social* alternatives like consensus governance and the cooperative ownership of capital. Housing alternatives that are too economically risky for developers, too experimental for municipal zoning codes, or too "messy" for residents accustomed to the order and anonymity of a twentieth-century neighborhood, might, in the near future, serve as practical and convenient solutions amidst economic, social, and ecological crises.

Why certain ecovillages are influencing structural changes in the mainstream is the central focus of this part of my dissertation. This niche-regime interaction can help illuminate the dynamics of socio-technical regime change and position planners to help achieve sustainability goals. I detail the elements of the North American urban development socio-technical regime below.

Section One: The Urban Development Socio-Technical Regime

The previous chapter explains how socio-technical regimes are rules, physical structures, and social networks that allow for incremental changes in a system but resist radical change. Regimes consist of mutually reinforcing elements: guiding principles, technology and infrastructure, policy and regulations, industrial structure, markets and user relations, knowledge base, and culture and symbolic meaning (Schot 1998). Major change in any one of these elements

is resisted by the other elements. Thus, regime change requires change in all or many elements. In the section below, I discuss each of these elements with respect to North American urban development. I argue that urban development is guided principally by a growth imperative Capitalist growth is characterized and reinforced by physical infrastructure that favors automobile transportation and global resource extraction, regions that are functionally and politically fragmented; a comprehensive-rational knowledge base, a symbolic narrative called "The American Dream," and an industrial structure that favors large developers and economies of scale. All of these structural elements overlap and reinforce each other. Changing one in any radical fashion would require major changes in all or some of the others. They can therefore be conceived as a single, urban development regime entity. I discuss each of these elements below.

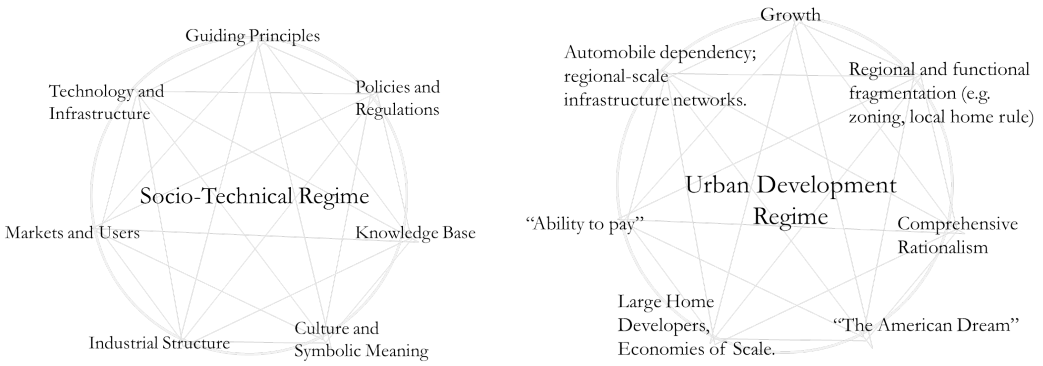

Figure 5: The North American urban development socio-technical regime structures decision-making in the built environment. The guiding principle of growth, for example, reinforces and is reinforced by "regional and functional fragmentation"

The North American Urban Development Regime is guided by principles of capitalist growth. This is physically unsustainable.

Modern urban development processes are guided foremost by principles of capitalist growth. Other principles like public health, social equity, and environmental protection all emerged as qualifiers to growth in the past two centuries. Even private property rights, which are upheld by sections of the fifth and fourteenth amendment of the US constitution, were trumped by economic growth in the 2005 Supreme Court decision *Kelo v. The City of New London,* which

affirmed that the state may use its eminent domain powers to take property for purposes of economic development. Early spatial planning emerged to protect and perpetuate capitalist growth as it confronted its own unintended environmental and social consequences (Harvey 1996; Foglesong 1986). Riddell (2004) explains:

> The unhealthy cities which the Industrial Revolution created were threatening the growth and output of profits, and something had to be done about that. To the extent that rational adjustments were called for, the 'planners' who carried this public health reform into effect were legitimized. In this way planning can be identified, from the end of the nineteenth century, as the handmaiden to capitalism (40).

Growth remains the central guiding principle of urban development in twentieth and twenty-first century North America. Harvey Molotch's (1976) landmark "City as a Growth Machine" essay describes how the promise of growth unites an otherwise competitive and disparate coalition of local elites. The diverse members of this 'growth machine'—including all land owners, business leaders, lawyers, realtors, and the print news media—profit from an ever-growing population, employment base, and tax base and, therefore, from the physical expansion of the community. Local government is the arena in which land-based decisions unite. Reflecting on Molotch's landmark essay twenty years later. Logan, Whaley, and Crowder (1997) explain:

> "[Molotch] made the bold claim that growth policy is not just one of many important facets of local politics, but rather, the guiding concern around which governments are constructed. All other issues, regardless of passions that they may seem to stir up, are of secondary importance (604)."

Jonas and Wilson (1999) claim that while the world has changed in some dramatic ways since Molotch's original work, his basic growth machine thesis prevails at the beginning of the twenty-first century.

In the past five decades, planning jurisdictions across North America have adopted "growth management" strategies to address the unintended consequences of urban expansion. While a small number of communities have attempted to limit growth through relatively black-and-white growth 'controls' (e.g. building permit caps), growth 'management' approaches seek to

shape and accommodate growth allowing new development to proceed while attempting to distill and extract its contradictions (Porter 2007). In other words, today's growth management agenda asks not *whether* growth ought to occur, but rather *how* and *where*. Even the leaders of Midwest Rust Belt Cities—obvious victims of urban expansion and now contraction—continue to champion a vivid pro-growth discourse (D. Wilson and Wouters 2003).

Several authors (Daly 1996; Rees 1995) comment that our collective excitement about growth rests upon a grand myth—a "pre-analytic vision"—that the ecosphere (the earth and all its life-support systems) is a sub-system of the human macro-economy and that humanity is morally superior to non-human life. These authors believe the opposite is true: we are dependent upon earth's systems for survival and humanity is inextricable from the ecosphere. Earth's systems are generally able to regenerate and replenish natural stocks (e.g. forests, fisheries, and aquifers) as does an interest-bearing bank account. So it is sustainable for humans and other species to consume the "interest." But if human consumption exceeds the natural limits of the ecosphere, we begin to draw down the "principle" in the bank account, and it is only a matter of time before we risk running out of natural capital to consume.

By one measure, humanity began drawing down "principle" around 1970, when global human consumption silently and unceremoniously exceeded the total productive and absorptive capacity of the planet (World Wide Fund for Nature 2012). As discussed in Chapter One, global human consumption, measured as our "ecological footprint," has continued to escalate into the twenty-first century such that total human consumption in the year 2008 required 1.52 years worth of the earth's available biocapacity. Global ecological footprint is forecast to soar far beyond sustainable limits as growing populations in countries like China, India, Indonesia, and Brazil move to cities and begin consuming like North Americans (ibid). Of course, there is only one earth from which to draw resources. Throughout human history, competitive societies have engaged in trade or expanded their boundaries, often violently, to extract energy, food, and

material resources in other regions. A truly global economy, however, has no earthly place to expand. As a result communities are beginning to experience the environmental, economic, and social consequences of global-scale resource scarcity and ecosystem collapse.

The North American Urban Development socio-technical regime is defined by a complex web of multiple mutually-reinforcing elements. Defining these elements in terms of sustainability might include the following 4 points.

The Urban Development Regime is Reinforced by…

1. **Automobile infrastructure and global resource extraction apparatus**

Twentieth-century North American settlements have co-evolved with the automobile. The US Census estimates that in 2009, 90 percent of all commuters *drove* to work; 79.5 percent *drove alone* (US Census Bureau 2009). The majority of Americans have driven to work since 1960, and this proportion has increased every decade since. This high percentage of solo commuters is due in part to suburban development patterns that are so diffuse and homogenous that they leave residents no option but to drive in order to meet their daily needs (Ewing et al. 2007). Kenneth T. Jackson (1985) documents the ascent of the automobile in American society, and how regional and local building practices began to accommodate cars as early as the late 1920s. Between 1950 and 1980 as the population of the USA increased 50 percent, the number of automobiles increased 200 percent (K. T. Jackson 1985). Since 1980, the total number of vehicle miles traveled (VMT) has increased three times faster than the total population of the United States. Annual per capita VMT in the United States has more than doubled in the past fifty years, from 4,008 in 1960 to 9,705 in 2009 (US Department of Transportation 2012).

Today, decisions in the built environment are dominated by the automobile and its associated infrastructure. The US Interstate Highways System—the largest peacetime public investment in history—opened up access to entire new land markets, giving rise to a new ring of

suburban development. Features of the urban built environment that North Americans now take for granted—limited access freeways, wide streets, prominent garages, parking lots, strip malls, motels, gas stations, drive-throughs—were invented to accommodate motor vehicles (K. T. Jackson 1985). Despite decades of independent attempts to spark a transition away from petroleum-based vehicles, 93 percent of all transportation activity in the United States remains fueled by petroleum, and transportation represents 71 percent of total petroleum consumption (US Energy Information Administration 2011a). Consequently, transportation accounted for 30.5 percent of total carbon dioxide emissions in the United States in 2010 (US Environmental Protection Agency 2012). Only electricity generation is responsible for more atmospheric carbon dioxide (*ibid)*.

North American urban development also relies heavily upon infrastructure systems that require the extraction, delivery, and consumption of resources over very long distances. The energy and water we consume, and the wastes we generate travel hundreds or thousands of miles from source to sink. These processes are facilitated by large, regional-scale infrastructure systems. These systems facilitate urban growth, and the development of entire metropolitan regions in ecological regions (e.g. watersheds, climate zones, soils regions) that cannot independently support large, dense populations of American consumers. For example, the Colorado River basin—home to such sprawling regions as Phoenix and Los Vegas—regularly overdraws the volume of naturally replenished freshwater in its watershed. Larson, Gustafson, and Hirt (2009) explain, "In metropolitan Phoenix…the proliferation of hyper-green golf courses, human-made lakes, and well-watered lawns sustains a historic pattern of perpetuating an artificially lush oasis in defiance of the native Sonoran Desert ecosystem (108). Regions across the United States have begun to engage in legal disputes over access to limited regional water sources (e.g. *South Carolina v. North Carolina (2009); Arizona v. California (multiple cases between 1962 and 2000); disputes amongst Florida, Alabama, and Georgia recently denied a*

supreme court hearing in 2012). Anticipating a nation-wide shortage of freshwater, governors in the Great Lakes region secured control of its freshwater resources in 2008, through the Great Lakes Basin Compact, which is secured by federal law.

Our electricity systems require that energy sources (primarily coal, natural gas, and uranium) travel long distances before they are converted into electricity and transmitted once again to homes, offices, and industries. The consequences of this sprawling system are economically and environmentally costly. In the United States in 2011, about two-thirds of electricity consumed came from the burning of fossil fuels, including 42 percent from coal, 25 percent from natural gas, and a small fraction from petroleum. The remaining one-third comes from nuclear fission (19 percent) and renewable sources like hydroelectricity, solar, geothermal, and wind (13 percent) (US Energy Information Administration 2011b). About 72.5 percent of all coal consumed in the United States is transported by rail, which requires the consumption of diesel fuel. Wyoming, the state that produces the most coal by far, is also home to the fewest number of people. This entire system—extraction, transportation, conversion, and combustion—requires energy and is itself a hazardous undertaking. A detailed illustration of the costs and hazards of a dispersed energy system is beyond the scope of this paper. Yet such a system is unquestionably the norm in North America—we rely on energy, resources, and waste systems from far away.

2. Modern land use policies and politically fragmented regions.

Auto-oriented urban and suburban growth is reinforced and codified by contemporary zoning ordinances. The first comprehensive zoning ordinance was issued by New York City in 1916. It limited the height of skyscrapers, segregated incompatible land uses, and divided the entire city into four zoning districts: residential, commercial, "unrestricted," and "undetermined." The legality of zoning and the public regulation of private land were cemented in the landmark

1926 US Supreme Court Case *Euclid, Ohio v. Amber Realty,* and the state's power to regulate land use has expanded since. In the 1920s, the US Department of Commerce published the *Standard Zoning Enabling Act* (SZEA) and *A Standard City Planning Enabling Act* (SCPEA) and by 1930 forty-seven states had passed legislation enabling their local municipalities to use zoning to regulate land (Meck, Wack, and Zimet 2000).

Save some exceptional cities (e.g. Houston), the practice of zoning is effectively ubiquitous in urban and suburban communities today. Contemporary zoning categories dictate not only permitted land uses and height limitations, but building setbacks, floor-to-area ratio (FAR), open space requirements (OSR), signage, landscaping, and minimum parking requirements. Shoup (2001) explains that planners rely neither on theory nor data to determine minimum parking requirements; rather, planners tend to copy practices of nearby cities or consult engineering manuals developed using specious data, under the assumption that all parking is free. Existing zoning practices, therefore, result in an unsubstantiated glut of free parking, which further stimulates the demand for vehicle travel, increases the cost of road maintenance, and dilutes land use density.

If the original intention of zoning was to segregate incompatible land uses, then it has certainly succeeded. But perhaps it has gone too far. Zoning practice has been linked repeatedly to sprawl development (Pendall 1999; Kunstler 1993; A. C. Nelson et al. 2004; Talen 2002; E. Hall 2006); social exclusion (Pendall 2000; Chakraborty et al. 2009; Rothwell and Massey 2009); and continues to restrict the installation of local renewable electricity sources (Sussman 2008)[4].

The regulation of urban development is also politically and geographically fragmented. This leads to land use decisions that conflict with the spatial boundaries of natural systems and

[4] Although a recent PAS report (Rynne et al. 2011) details regulatory strategies to accommodate wind power.

leads municipalities to compete for land resources. Land use decisions in the United States tend to be made at the local municipal scale due to state-granted home-rule powers. With several exceptions (most notably Portland Metro), regional planning authorities are advisory bodies with little legal mandate to regulate land use. Research by Carruthers (2003) and Carruthers and Ulfarsson (2002) illustrate how fragmented, localized land use planning has a significant and positive effect on outward growth that increases in power with distance from the urban core. When land authority is split amongst individual municipalities, communities act in their own self-interest, focusing on "fiscally desirable" forms of development (e.g. converting forests and farmland into taxable urban land uses).

3. A rational-comprehensive knowledge base.

Zoning, regional-scale public infrastructure, the interstate highway system, and gridded streets are the product of a centralized and expert-driven rational-comprehensive epistemology (Scott 1999) that persists despite decades of criticism from planning theorists. Such a model relies upon the functional separation of otherwise very complex phenomena such that they can be categorized and centrally controlled (ibid). The same logic that separated humanity from nature, masculine from feminine, and places of work from places of residence allows for the functional separation and control of land uses.

Centralized rationality assumes that goals, alternatives, actions, and optimal consequences can be determined and executed given sufficient information about the world. It extends the scientific method from controlled laboratory experiments to decision-making in the built environment. New Zealand planning scholar (Riddell 2004) highlights the early appeal of the rational-comprehensive planning model and its connection to land-holding interests in the twenty-first century:

> Out of World War II there followed the behavioural refinements of operations research, systems analysis and scientific management, mainly to cut down on time losses and fiscal

> costs. Their techniques were followed in turn by the also empiricist 'social impact assessment' and 'environmental impact abatement' procedures. The carry-over to contemporary urban planning is a replica, repeating and reproducing what has gone on before. This is apparent with procedures that which endorse the status quo…it can be seen that nineteenth and twentieth centuries have been, and largely in the twenty-first century to continue to be, identifiable with formula-growth models, the trend being set by developers and landowners rather than the identification of settlement roles and community needs (55).

This model has not prevailed unscathed. For decades, planning and public policy scholars have subjected the rational-comprehensive model to a barrage of critique. Lindblom (1959) illustrates how the expanse of information necessary to make a truly rational decision is humanly impossible and that policy makers tend to "muddle through" decisions incrementally (see also Behn's (1988) "groping along model"). Flyvberg's (1998) oft-cited case study of planning in Aalborg, Denmark highlights how "rational" planning is ultimately used to legitimate existing power structures. Since the middle twentieth century, planners have tinkered with the rational model, offering variations on a theme that continues to fall short of expectations by ignoring the inherently non-rational reality of politics and the complexity of contemporary communities. Nevertheless, Brooks (2002) explains "Much like the creatures in horror movies, rationality is dead—but keeps showing up in public places. Despite its purported flaws, rationality is still the dominant paradigm in planning practice, and therefore continues to deserve careful scrutiny (81)."

Environmental scholarship has long critiqued the narrow focus of the scientific method in decision-making about the built environment. Environmental scholar David Orr (1994) explains, "The problem with scientific fundamentalism is that it is not scientific enough. It is rather a narrow-gauge view of things that is ironically unskeptical, which is to say, unscientific, about science itself and the larger social, political, economic, and ecological conditions that permit science to flourish in the first place (45)." Orr's perspective unites with Warren (1996), who details the oppressive conceptual framework that justifies the "twin and interconnected

dominations of women and nature (19)." Oppressive conceptual frameworks are supported by a logic of domination which posits that the subordination of nature is morally justified by humanity's ability to consciously manipulate the environment. This logic is extended to women in Western societies, who are often associated with the spiritual-natural realm, whereas men are associated with the human-physical realm. Plante (1991) suggests that there is important overlap between feminist and bioregional epistemologies, which elevate the importance of contextual and experiential knowledge in decision-making about the built environment.

4. A symbolic "American Dream" narrative, and an industrial structure that favors large home builders and economies of scale.

Perhaps no single image is more emblematic of contemporary American urban development as is the single family dwelling. The detached single-family house is a central fixture in the "American Dream," a contested and evolving narrative to be sure, but one that projects detached single-family home ownership as an aspiration alongside such virtues as independence and social mobility. Dolores Hayden (2002) details how utopian visions in American have evolved from images of new civilizations, cities, and towns (social units) to the detached single-family "dream" house. She explains that after World War Two:

> The dream house replaced the ideal city as the spatial representation of American hopes for the good life. It not only triumphed over the model town, the dream house also prevailed over two other models of housing, one based on efficient collective consumption of scarce resources, the other based on the model neighborhood (55).

The vast majority of dwellings in the United States are owner-occupied, detached single-family units. In each decade since 1940, detached single-family dwellings have constituted between 60 and 70 percent of all new housing construction[5] and their median floor area increased 42 percent between 1972 and 2010 (see Figure 2). Since the 1950 census, the majority of housing units in

[5] http://www.census.gov/hhes/www/housing/census/historic/units.html

the United States have been owner-occupied. Today, owner-occupied housing units constitute about 66 percent of all housing units in the United States.

Single-family home ownership is a virtue reinforced by an array of federal programs that expand debt financing to low and middle income households. Prior to the early 1930s, home loans were inaccessible typical Americans: they required 6 to 7 percent interest payments, paid back over ten to fifteen years (Hall 2002). New Deal Programs like the Home Owners Loan Corporation (HOLC) and the Federal Housing Authority (FHA) insured private mortgages, freeing banks to lend to a broader income range. Such programs, however, excluded African American and other ethnic neighborhoods until the practice of redlining was outlawed by the Community Reinvestment Act of 1975.

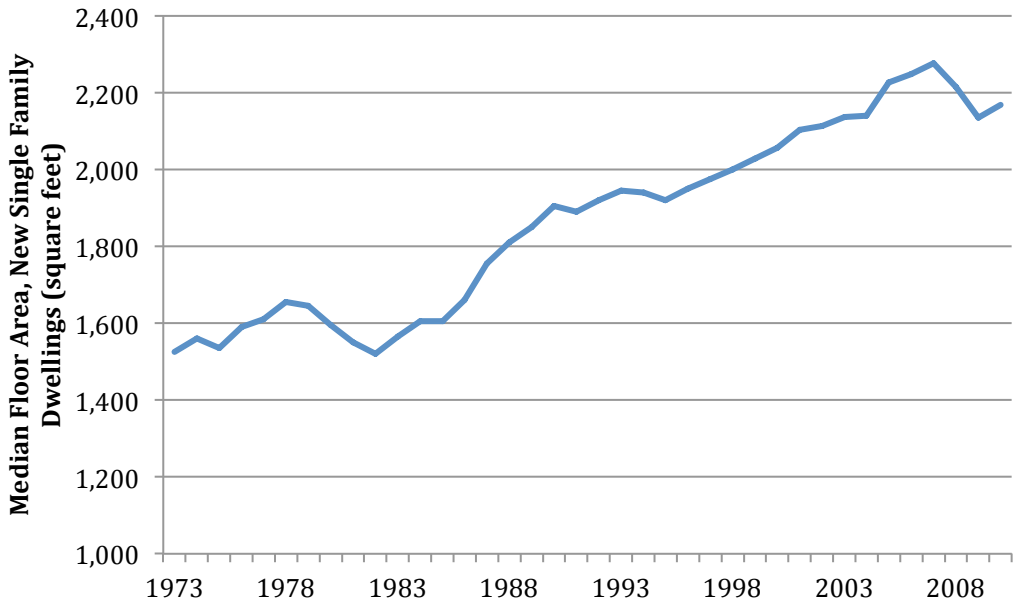

Figure 6: Median Square Feet of Floor Area in New Single-Family Houses (1973-2010). Source: US Census. Data accessed at http://www.census.gov/const/C25Ann/sftotalmedavgsqft.pdf on January 30, 2013.

The vast majority of homes built in the Unites States are constructed by professional housing developers at economies of scale. Homeowners rarely live in homes they have built themselves. This has been true since the middle 1970s (see Figure 7), and likely many decades

prior. According to the US Census Bureau, about two-thirds of American homes are "built for sale," meaning that individuals purchase the physical house and the land beneath it from a housing developer as a package. A relatively small proportion (17.6 percent) of homes are built by a contractor on land already owned by the future homeowner, and an even small proportion (11.7 percent) is "owner built."

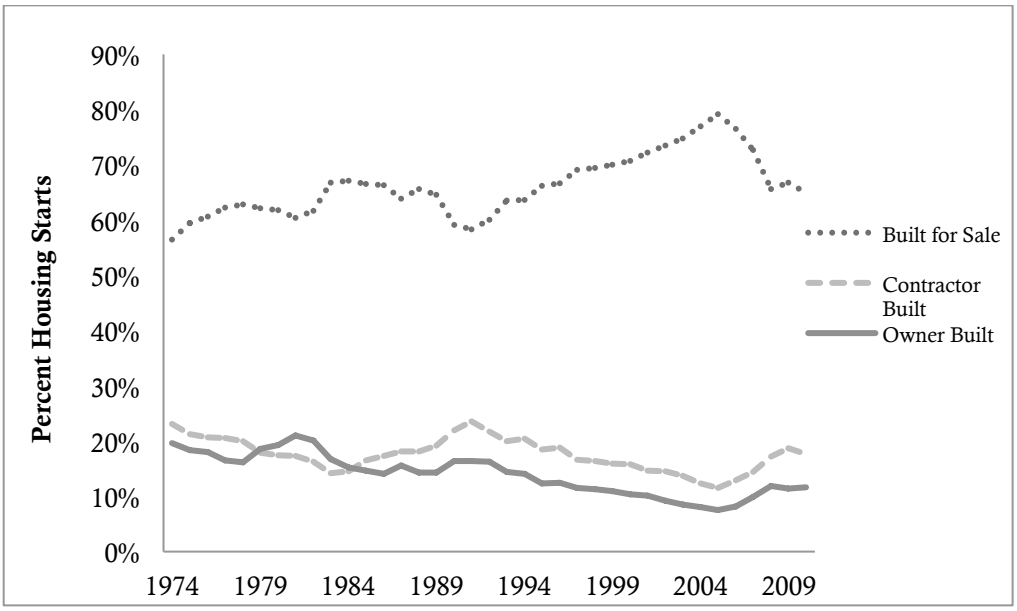

Figure 7: Owner-Built Homes on the Decline. New Privately Owned Housing Units in the USA by "Purpose of Construction" 1974-2010. Source: US Census Bureau. Table Q1.

Checkoway (1980) documents the institutional history of post-World War Two home production, finding that "...the key decisions in postwar suburbanization were made by large operators and powerful economic institutions supported by federal government programs (p.22)." Migration to the suburbs had begun decades prior, but it was in the years following World War Two that home builders developed the capacity to apply mass production methods to residential construction. Prior to the end of the war, home building was dominated by small local firms. "The typical small builder," explains Checkoway, "could not employ a permanent labour force, develop a research staff, bargain for materials in volume at lower cost, or buy a substantial area of land for large-scale development (p.23)." Between 1938 and 1959 the proportion of homes built

by “large builders” jumped from 5 percent to 69 percent. Large builders were able to achieve economies of scale due to government subsidies, more specialized labor, government research laboratories that worked to make advances in material and equipment, and of course, large tracts of land made accessible by interstate highways and other new public thoroughfares.

Summary

The North American Urban Development socio-technical regime is defined by multiple mutually-reinforcing elements. Radically changing one element of this regime is difficult without encountering resistance from the others. This regime of unsustainable urban development is reinforced by regulatory and normative rules plus generations of physical infrastructure that render a radical reorientation very difficult. The regime is propelled foremost by principles of capitalist growth and coalition of actors that profit from the physical expansion of cities. Over the past 150 years, planning principles like social equity and public health have emerged as remedies to growth’s contradictions. These social and environmental contradictions have been ‘fixed’ by zoning and regulatory approaches that segregate land uses, lower urban densities, and mandate ample ‘free’ parking. This, of course, has reinforced auto-mobility. American cities and regions have co-evolved with automobile infrastructure and rely upon energy and resource imported from thousands of miles away. The planning necessary to extract and supply these resources and uphold the segregation of land uses has embraced the assumptions of comprehensive rationalism, which endures despite critique from the planning academy. In the process, both a highly symbolic “American Dream” narrative and a home-building industry oriented around the construction of single-family homes render detached single-family homes a practically inevitable option for American homebuyers.

Below I present what I label the *ecovillage socio-technical niche.* This niche has formed in direct opposition to the regime described above, adopting principles of low-impact living,

bioregionalism, experiential learning, collectivism, and human-scaled design. Such a niche is possible because ecovillages withdraw, to varying extents, from the mainstream.

Section Two: The Ecovillage Niche

Ecovillages are intentional communities dedicated to demonstrating low-impact lifestyles. They exist in urban, suburban, and rural areas, on six continents, in both the global 'north' and 'south'. Since the early 1990s, a network of ecovillages has begun to form a loosely confederated "global knowledge community" as a "…conscious and pragmatic response to the material and ideational crisis of modernity" (Litfin 2009, 126). The movement is both global and intensely local as individual communities take advantage of a growing global network to recruit, educate, and advocate while focusing on the conservation of local and bio-regional ecosystems.

Multiple authors (Dawson 2006; Trainer 2000; Christian 2003; Lockyer 2007) trace the origins of the contemporary ecovillage movement to a 1991 report drafted by American community activists Robert and Diane Gilman. The report, entitled *Ecovillages and Sustainable Communities* defines an ecovillage as a:

> ...human-scale, full-featured human settlement in which human activities are harmlessly integrated into the natural world in a way that is supportive of healthy human development and can successfully be continued into the indefinite future (Gilman 1991).

The Gilman definition remains the most commonly cited definition of an ecovillage, but the movement has earned additional definitions in the past two decades. Author and Global Ecovillage Network (GEN) President Jonathan Dawson (2006) defines ecovillages as:

> Private citizens' initiatives in which the communitarian impulse is of central importance, that are seeking to win back some measure of control over community resources, that have a strong shared values base (often referred to as 'spirituality') and that act as centers of research, demonstration, and (in most cases) training (36).

The GEN website offers the following definition:

> …urban or rural communities of people, who strive to integrate a supportive social environment with a low-impact way of life. To achieve this, they integrate various aspects of ecological design, permaculture, ecological building, green production, alternative energy, community building practices, and much more (GEN).

Other authors are tepid about assigning a definition, as there is no central entity responsible for bestowing 'ecovillage' status, and many intentional communities that do not consider themselves ecovillages are exemplars of ecologically-conscious living (Schaub 2012). Nevertheless, it is important to situate ecovillages within the larger intentional communities movement and amongst other eco-developments. This will help bound ecovillages, diverse as they may be.

The precise number of ecovillages world-wide is hard to pinpoint. There are a number of likely reasons that maintaining a consistent count of ecovillages is difficult: the movement is not centrally managed; there is no official "membership" to which communities subscribe; many ecovillages are made up of several smaller "sub-communities" which have their own rules, websites, and social organizations; and the vast majority of ecovillage initiatives dissolve in early formation stages (Christian 2003). The total number of existing ecovillages has likely been overestimated in the past (Lockyer 2007), but most in the movement agree that the total number of ecovillage initiatives has grown in recent decades, and that there are hundreds on the North American continent and thousands world-wide (R. Jackson 2004).

In the United States, many ecovillages exist as both a land-owning entity (e.g. a home owners association or community land trust) and an educational/outreach entity (often a 501c3 non-profit) (Christian 2003). In addition to building community for the fulfillment of individual member-residents, ecovillages see themselves as responsible for demonstrating more sustainable ways of living to the rest of the world. A brief perusal of ecovillage websites reveals a common two-part mission that includes 1) *building* a sustainable physical and/or social community; and 2) *demonstrate* sustainable living through education, advocacy, and research. While the specific

wording of individual mission statements varies from ecovillage to ecovillage, they include these two objectives. Dancing Rabbit, for example, aspires to:

1) *To create a society, the size of a small town or village, made up of individuals and communities of various sizes and social structures, which allows and encourages its members to live sustainably* [building]; and

2) *To encourage this sustainable society to grow to have the size and recognition necessary to have an influence on the global community by example, education, and research* [demonstrating][6].

A similar two-part mission emerges on websites across the ecovillage movement. Earthaven Ecovillage aspires to, "…create a village which is a living laboratory and educational seedbank for a sustainable human future[7]." Los Angeles Eco-Village defines itself as "… a demonstration of sustainable community development that shares its processes, strategies and techniques with others through tours, talks, workshops, conferences, public advocacy, and other media[8]." As the survey in Chapter Four reveals, the vast majority of ecovillages have some outreach or educational apparatus. Such educational missions are often supported by a non-profit organization.

If ecovillages dedicated themselves to *building* but not *demonstrating*, their relevance to the planning and public policy disciplines—save their rejection of conventionally planned communities—would be relatively limited. But their aggressive engagement with the mainstream through their websites, educational programs, outreach, and advocacy provide an opening for partnership with planners interested in achieving goals similar to ecovillages.

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[6] Dancing Rabbit Ecovillage Website, "Mission Statement" can be retrieved at <http://www.dancingrabbit.org/about-dancing-rabbit-ecovillage/vision/mission-statement/#.UFaPvBjjbXc>

[7] Earthaven Ecovillage Website, "Mission and Goals" can be retrieved at <http://www.earthaven.org/mission-and-goals/.>

[8] LA Eco-Village Blog, "About LA Eco-Village" can be retrieved at <http://laecovillage.wordpress.com/about/>

Ecovillages are Intentional Communities

Contemporary ecovillages distinguish themselves as one chapter in a 300-year legacy of intentional communities on the North American continent (Brown 2002b) and a world-wide history of intentional communities that stretches at least as far back as Pythagoras' *Homakoeion* circa 525 B.C., and perhaps as far back as Jewish monastic groups 6,000 years ago (Lockyer 2007; Metcalf 2004). In the early twenty-first century there exist thousands of intentional communities world-wide and multiple *types* of intentional communities on the North American continent. Many of them are united by the Fellowship for Intentional Communities, whose directory classifies intentional communities as either "ecovillages," "communes," "co-ops," "cohousing," or "Christian." Drawing from a number of studies on intentional community Meijering et al. (2007) list seven characteristics of intentional communities, including: 1) No bonds by family relationships only; 2) a minimum of three to five adult members; 3) members join voluntarily; 4) geographical and psychological separation from mainstream society; 5) a common ideology that is adhered to by all members; and 6) sharing of (a part of) one's property. The authors then classify intentional communities in North America and Europe along locational, ideological, economic, and social dimensions. Based on a survey of 496 intentional communities, they distinguish four community types: "ecological," "religious," "communal," and "practical". "Ecological" communities—under which ecovillages presumably fall—are characterized by their remote rural locations, ecologically-oriented ideology, relatively self-reliant economy, and a mix of internal and external social connections (as opposed to an insular community). These ideal types are not mutually exclusive. Ecovillages can certainly incorporate communal, religious, and practical elements, and have formed in urban and suburban as well as rural areas. In the empirical portions of this dissertation, I explore the advantages and challenges of ecovillages situated in urban versus rural areas. More important is the relative weight given to these dimensions. Ecovillages may include religious or spiritual elements, but these elements are rarely prerequisites for membership as is the case with contemporary Amish communities or historic

Shaker communities (Manzella 2010). I include in the "ecovillage" category intentional communities that explicitly prioritize ecological imperatives, regardless of their spiritual, economic, and geographic properties.

What Ecovillages are not…

Ecovillages and developer-led eco communities

Ecovillages are not "developer-led eco communities"—profit-motivated projects over which residents have little to no involvement in design or construction (Dawson 2006). Examples of developer-led eco communities include urban projects like Beddington Zero-Energy Development (BedZED) in South London, Hammarby Sjöstad in Stockholm, Sweden, or suburban low-impact subdivisions like Prairie Crossing in Lake County, Illinois. These projects are important environmental initiatives and there is evidence that they have influenced urban development regimes (Smith 2007), but these and similar projects were initiated by professional property developers and therefore remain outside the ecovillage grassroots niche. Ecovillages are also **not** neo-traditional ("new urbanist") neighborhoods, which aspire to reduce vehicle miles traveled and land consumption—and by logical extension greenhouse gas emissions—through more compact and mixed-use neighborhood design. While these developments feature energy and resource conserving features, their inhabitants purchase or rent space as they would any space in the common housing market, and the settlements themselves have no ideological objective to which residents adhere.

Ecovillages and gated communities

Geographer Adrian Parr (2009) contrasts ecovillages and gated residential communities. While both are intentional communities insofar as their inhabitants create self-imposed rules and have made very deliberate choices about their living environments, they represent polar opposite perspectives about conviviality and conflict resolution. Contrasting ecovillages and gated communities serves well to distinguish ecovillages from a what has become the epitome of modern American residential development (Blakely and Snyder 1999). For over a century,

modern planning has employed "invisible" legal, economic, and regulatory barriers to segregate American cities by race, ethnicity, income, and land use function (Anderson 1992; Pattillo 2008). Gated communities add a securitized wall to the block flow of bodies and the exchange of capital across neighborhood lines. Parr elaborates:

> If gated communities attempt to resolve the struggle indicative of diverse economic and racial groups living together in an urban context by privatizing and militarizing social life, the ecovillage endeavors to embrace these contradictions as a way of life and source of conflict resolution…the ecovillage…advances another way of life, one that is premised upon conflict resolution, social consensus achieved through inclusive discourse, and a profound respect for the environment and local economy (64).

Low (2003) explains how the detailed rules governing public behavior in gated communities result in a "moral minimalism" that effectively relieves neighbors from interacting face-to-face, even under conflict. Conflicts are resolved by strict covenants and fines, and outsiders are shunned. While ecovillages also have detailed covenants and membership criteria, social governance within ecovillages *requires* face-to-face interaction and cooperation. In fact, I argue in subsequent case studies that ecovillages are able to thrive at lower levels of consumption *because* individuals invest heavily in social capital and interpersonal communication skills.

Ecovillages and cohousing

Dawson (2006) also draws a line between ecovillages and *cohousing* developments, which share many of the same social and physical cooperative structures as ecovillages, but are designed and constructed by professionals from outside the community[9], and intended as a relatively 'mainstream' housing option. The line between ecovillages and cohousing communities is porous, however, as many self-described ecovillages (e.g. Eco-Village at Ithaca in Tompkins County, New York; Coho Ecovillage in Corvallis, Oregon; Yarrow Ecovillage in British Columbia) employ cohousing models. Many cohousing projects are built for principally

[9] This is in contrast to communities that have attracted architects, designers, and builders as members who subsequently help fellow community members design and construct their own homes.

"practical" purposes, yet other cohousing projects are ideologically motivated projects with active educational non-profits, in which member-residents play important participatory roles designing, constructing, and governing their neighborhood. I include such communities in my definition of ecovillages.

Other uses of the ecovillage label

In recent years, the phrase "ecovillage" has diffused beyond the grassroots, into neighborhood-scale redevelopment initiatives sponsored by local governments and housing corporations. In 2006, the City of Minneapolis and housing non-profit *Project for Pride in Living (PPL)* launched the "Hawthorn EcoVillage," a housing redevelopment project in a low-income Minneapolis neighborhood. While the project boasts some green features (e.g. native vegetation and plans for "sustainable green development"), its explicit objective is to reduce crime and poverty in the neighborhood. The PPLs project description reads:

> *The Hawthorne EcoVillage development represents shared a vision* [sic] *among Hawthorne neighborhood residents and leaders, community agencies and the City to respond pro-actively to area toughest issues: crime, poverty, rising foreclosure rates and vacant housing, unemployment, and overall resident health*[10].

The phrase "ecovillage" has also been used to as a label for pavilions at music and crafts festivals in which vendors sell "earth-friendly" products[11]. To be sure, the diffusion of the word "ecovillage" is a topic that deserves further attention and could indicate some influence of the global ecovillage movement, but such projects are different from grassroots community initiatives that prioritize low-impact living.

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[10] Project for Pride in Living website <http://www.ppl-inc.org/housing/development/large-scale-community-impact/hawthorne-ecovillage.> Accessed 14 September 2012.

[11] For example, the website for Alton Illinois' "Earthtones Festival" on September 15, 2012 boasts, "The park grounds will be transformed into an eco-village where you'll find over 50 booths filled with conservation exhibits, Earth-friendly products and services, and nature craft vendors…" ("Mississippi Earthtones Festival" 2012)

Ecovillages and the hippie discourse

Ecovillages are **not "**hippie communes." While the roots of contemporary ecovillages are often traced to alternative lifestyle communities of the 1960s and '70s (Trainer 2000; Parr 2009), ecovillage residents are quick to disassociate themselves from the lackadaisical and morally provocative images of the hippie movement in popular culture, whether or not they comport with historical reality. In the past ten years, newspapers and other mainstream media outlets have framed ecovillage residents as earnest, hardworking, and refreshingly different from a presumed "hippie" image:

The Gazette (Montreal), August 2009

> While touring an ecovillage here, a few features you might expect from a rural communal dwelling are noticeably absent: no hippies farming in the nude and no daisy chains or peaceniks in tie-dyed clothes smoking weed (Crawford 2009).

USA Today, August 2007

> These days, dope-smoking hippies are out. Environmentally conscious living for people of all ages is the new ethos. Even the label "communes" has fallen from favor. Call them 'intentional communities (Keen 2007)'[12].

A headline from *The Washington Post*, November 2006

> Another Way; A band of idealists in the mountains of North Carolina is trying to build a low-energy lifestyle. But must we all live like hippies in the woods to make a difference (Achenbach 2006)?

Anthropologist Joshua Lockyer (2007) explains that the images commonly associated with intentional communities, "…are not accurate representations of the diverse kinds of people and social arrangements that characterize intentional communities or a long history of intentional

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[12] Perhaps a better contemporary term for "communes" is an "income sharing community." Ecovillages and intentional communities commonly exercise collective ownership of resources (e.g. land, buildings, electricity infrastructure). Some also pool large portions of their income. The extent to which resources and income are shared varies across the intentional community movement.

communities around the world that scholars of intentional community have documented (p. 26)." Contemporary intentional communities have learned from many of the failures of their predecessors by improving specifically upon social governance, conflict resolution practices, and member screening, and ecovillages have adopted an explicit orientation toward environmental and resource conservation issues unprecedented in the history of intentional communities (*ibid).* In my interviews and casual conversations with ecovillage residents, I found that individuals occasionally used the term "hippie" and "communard" in humorous self-reference but were otherwise quick to distance themselves from the "hippie" concept. One member-resident explained how the founders of Dancing Rabbit Ecovillage foresaw that their project could be misunderstood as a "hippie commune" by neighboring rural residents, and worked hard to establish a good rapport with them prior to building on the land. This hard work has helped the community avoid the negative connotations associated with an earlier hippie movement:

> *…this place could have easily been labeled as a, y'know, a hippie commune or whatever and probably still is referred to as that, but I don't get the sense that there's fear about what goes on here. It's different.*

Are Ecovillages Utopian?

Authors across the ecovillage movement offer divergent opinions about whether or not ecovillages are an example of "utopian" communities (Lockyer 2007; Manzella 2010). If we understand *utopia* as a morally inspired fantasy (Greek translation: *no place*), then ecovillages are most certainly not utopian. Many ideas in urban planning have, indeed, started off as utopian. For example, Ebenezer Howard's Garden City—a vision that combined the best physical and social elements of urban and rural living at the end of the nineteenth century and likely inspired the future of suburbia—was arguably utopian (Fishman 1982). Letchworth and the suburban communities that sought to distance themselves from the ills of industrializing cities, are not. Most ecovillages have mission statements, bold visions, and high aspirations. It could be argued that ecovillages are utopian because they commonly—although not always—separate themselves physically from mainstream urban and suburban places (Meijering, Huigen, and Van Hoven

2007). Although this argument is specious, since we do not consider suburban gated communities "utopian" despite their very deliberate physical isolation and array of strict physical and social covenants.

Perhaps a more appropriate label for ecovillages is what sociologist Erik Olin Wright (2010) calls a *real* utopia,"…grounded in the belief that what is pragmatically possible is not fixed independently of our imaginations, but is itself shaped by our visions (4)." Ecovillages may be bold, ideological, and experimental, but case studies later in this dissertation reveal that they are by no means oblivious to reality. Ecovillages are as a rule, working to demonstrate the feasibility of environmentally low-impact and socially supportive community to a regime built upon un-sustainable consumption and social isolation.

Ecovillages and the Mainstream

As discussed in Chapter Two, grassroots niches form in opposition to a regime and incubate alternative socio-technical practices that might not survive the economic, regulatory, or normative pressure of the mainstream. The ecovillage movement and its component ecovillage projects (individual communities) fit this theoretical construct very closely.

Existing scholarship conceives of ecovillages and the global ecovillage movement as developing *outside* but *in parallel* with the mainstream, borrowing an anarchist strategy called "prefiguring" in which alternative social structures develop alongside old structures, rather than attempting to overthrow or reform them (Litfin 2009; Trainer 2000). While several self-defined ecovillages have settled in urban areas, many settle in sparse rural regions to avoid the high land costs, land use regulations, and NIMBYism that would likely inhibit experimentation with buildings and infrastructure in the mainstream (Christian 2003; Meijering, Huigen, and Van Hoven 2007).

As a practical alternative to mainstream human settlements, ecovillages transcend "the politics of protest" commonly employed by radical environmental groups (Dawson 2006). The approach is admittedly "bottom-up" but it is not purely *de*constructive protest movement; it intends to demonstrate practicable alternatives to mainstream urban settlement. In recent years, several mainstream voices have begun to notice: Multiple authors list ecovillages as indicators of smart sustainability practice in urban areas (Hempel 1999; Portney 2003; Parr 2009); in 1998 the United Nations HABITAT program ranked the Findhorn Foundation Ecovillage (Scotland) amongst the top 100 best practices in models of sustainable living, and in 2000 the Global Ecovillage Network received United Nations Economic and Social Council (ECOSOC) consultative status, which entitles them to regular participation at ECOSOC meetings. A recent Reuters article entitled *Eco-commune Flourishes as Greek Economy Withers* describes how the crumbling economic conditions in the debt-ridden Mediterranean country have made ecovillage living more "practical" and attractive:

> With Greece's economy in freefall, nearly one in four out of work and the desperate jobless turning to the land to survive, the group's focus on growing their own produce and cutting down their reliance on money and a bankrupt state suddenly make practical sense to many Greeks - and some are now turning to the vegan commune for advice (Babington and Papadimas 2012).

The scenario fits the MLP well, as acute macro-economic landscape pressure has rendered a once "ridiculous" project relatively attractive to young Greek citizens.

Ecovillages as a Grassroots Socio-Technical Niche

Ecovillages fit the theoretical characteristics of a grassroots socio-technical niche: they are working to build practical alternatives to mainstream urban development and operate to varying extents outside the rules and regulations of the mainstream. Based on the assumptions outlined Chapter Two, we would expect ecovillages to influence change in socio-technical regime under certain conditions. Specifically, according to Smith (2007), the most influential

ecovillages—the ecovillages *translating* their practices to the mainstream—are those that are neither too radical nor too similar to the urban development mainstream.

The following chapter tests this relationship. Employing a social survey, I score ecovillages in North America along two dimensions: "regime distance" and "regime influence," and hypothesize that the ecovillages with the highest "regime influence" score are neither the most "radical" nor the most "mainstream" communities. I draw from the characteristics of mainstream development in this chapter to develop the "regime distance" index and from anecdotes of influential ecovillages to construct the "regime influence" index.

Chapter Four: Ecovillage Survey

A Snapshot of the Ecovillage Movement in North America

Introduction

This chapter uses a survey instrument to identify which ecovillages are translating their practices into local policy. Such an understanding can help direct more detailed studies about grassroots innovation processes and help policy makers better understand and shape regime transition. I hypothesize that the most "influential" niche projects are neither those that deviate most radically from the urban development socio-technical regime nor those that closely resemble this regime, but rather those that share some elements of the regime and deviate from others (see Figure 8). In other words, the ecovillages that demonstrate the most "radical" guiding principles, technology and infrastructure, markets and user relations, industrial structure, policy and regulations, knowledge base, and symbolic meanings (Schot 1998) are not the same ecovillage projects interfacing with regime structures directly, although they may be influencing the growth of the ecovillage niche and thus influencing innovation processes through more diffuse means (i.e. niche replication).

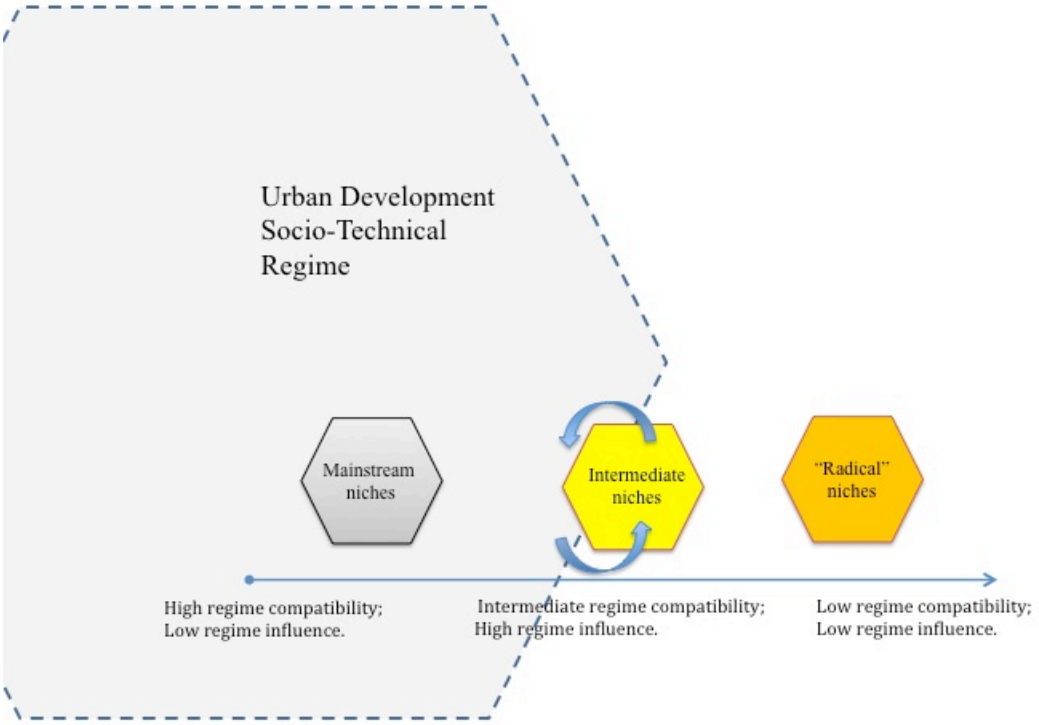

Figure 8: Smith (2007) hypothesizes that "intermediately" situated niches are best able to translate innovative practices to incumbent regimes. Niche projects that are too conceptually distant from the regime will have little direct influence on regime structures.

Survey Methods

I test this hypothesis by constructing two indices: the 'regime distance' index and the 'regime influence' index. The regime distance index measures the extent to which an ecovillage defies conventions of 'mainstream' urban development outlined in Chapter Three. The hypothetical ecovillage *most* distant from the regime is situated on land that is collectively owned; generates 100 percent of its electricity, water, and food on-site; has zero privately owned vehicles; is situated far away from modern urban infrastructure (as proxied by distance to a transit stop); lives in buildings constructed exclusively by ecovillage member-residents; believes to a 'great' extent in principles of permaculture; and manages all of its human excrement on-site. The maximum regime distance score is 9.

Table 1: Regime Distance and Regime Influence Variables (grayed variables excluded from analysis)

REGIME DISTANCE INDEX (gray text→ variable eliminated from final calculation)	"Full Point" Condition (variable type)
Check the box that best characterizes the OWNERSHIP STRUCTURE of your community's land.	Any choice but sole proprietorship (nominal)
About what percentage of ELECTRICITY currently consumed in your community is generated on your community's property?	81-100 percent (ordinal)
About what percentage of WATER currently consumed in your community is harvested on your community's property through sources like rain, wells, or surface water? (Check one)	81-100 percent (ordinal)
About what percentage of individuals living in your community own personal AUTOMOBILES that they keep on community property?	0-20 percent (ordinal)
In the following seasons, approximately what percentage of the FOOD consumed in your community is grown on your community's property?	81-100 percent in all four seasons (ordinal)
How far away is your community from the nearest rail or bus TRANSIT stop?	5 miles or more (ordinal)
Approximately what percentage of the LABOR used to construct the buildings in your community was of individuals who were members, residents, or long-term guests of your community?	81-100 percent (ordinal)
To what extent do you agree with the following statement: "Homes in my community all look the same."	Strongly disagree (ordinal)
Which of the following best describes the ZONING CATEGORY designated on your community's land by county or city government? (Check one)	No zoning, or a customized zoning (e.g. PUD) (nominal)
To what extent do you agree with the following statement: "When making building decisions in my community, land-use regulations like zoning or subdivision regulations restrict our ability to build what we want."	Strongly disagree (ordinal)
To what extent do you agree with the following statement: "Permaculture and ecological design principles are important when making building decisions in my community."	Strongly agree (ordinal)
Which of the following practices does your community use to manage HUMAN EXCREMENT? (Check all that apply)	Any choice but municipal sewerage or septic tank (nominal)

Table 1 (cont.)

REGIME INFLUENCE INDEX (gray text→ variable eliminated from final calculation)	"Full Point" Condition
Does your community engage in OUTREACH or EDUCATION efforts? If so, please describe these efforts and their targeted audience below.	Yes (nominal/binary)
Below is a list of groups that may or may not have an opinion about your community [local elected officials; local non-elected officials; non-ecovillage neighbors; local news media]. Select the extent to which these groups have a "favorable" opinion of your community.	Very favorable for all groups (ordinal)
In the past year, about how often have elected or non-elected government officials contacted your community seeking advice about land-use, buildings, infrastructure, or community development?	Very often (ordinal)
Has your community ever partnered with local government officials on long-range plans for your city, county, or regional district?	Yes (nominal/binary)
Have local government officials ever changed the zoning category of your community's land from one zoning category to another EXISTING zoning category in order to accommodate your community?	Yes (nominal/binary)
To your knowledge, have local government officials ever created a NEW zoning category or amended subdivision regulations in order to better accommodate your community?	Yes (nominal/binary)

Each variable was awarded anywhere from a full (1) point or some proportion of that point based on an ordinal scale. For example, respondents were asked: "About what percentage of ELECTRICITY currently consumed in your community is generated on your community's property?" Respondents were offered options of 0-20 percent "Almost none"; 21-40 percent "Very little"; 41-60 percent "About half"; 61-80 "Most"; and 81-100 "Almost all". Respondents that checked the 81-100 percent category received a full ELECTRICITY point. Respondents that checked the 0-20 percent category received zero points for this category. The FOOD category averaged the scores for food production in each season (Spring, Summer, Winter, Fall), which is why the final regime distance score is not a multiple of 0.25.

'Regime Distance' Variables Eliminated from Analysis

Three regime distance variables included in the survey were ultimately excluded from analysis (they are *grayed* in Table 1). One question asked, *To what extent do you agree with the following statement: 'Homes in my community all look the same.'* This question was intended to contrast the custom-built homes of more radical ecovillages with model homes built at economies of scale in the mainstream. While this is still an important variable[13] in retrospect the question was worded too subjectively. Respondents could have been gauging *similarity* or *difference* based on relatively superficial characteristics of homes (e.g. paint color) rather than floor plan and footprints, which is what the question should have gauged more specifically.

Questions about municipal zoning of the ecovillage's land were also excluded from the 'regime distance' scale. While zoning is an important indication of the urban development socio-technical regime, zoning *change* was a factor in the dependent 'regime influence' variable. Including zoning as a part of both the 'regime distance' and 'regime influence' scale would have confounded the two scales. Additionally, zoning is a reflection of the regime rather than of any conscious decision that has been made by the niche project. It is less an indicator of the niche project's conceptual distance from the mainstream as it is a reflection of the context itself.

The *regime influence* scale is a composite of several indicators of niche project's interaction with local planning authorities as proxy for the larger socio-technical regime. Socio-technical regimes consist of multiple institutions and this survey could hypothetically gauge an ecovillages' interaction with a diversity of regime actors (e.g. housing developers, financiers, home owners, utilities), but as urban development is very heavily influenced by local and regional

[13] Chapter Five discussion how EcoVillage at Ithaca decided to use five different floor plans when constructing its first neighborhood. This assured city planners that their plans were predictable.

governance processes and policy makers are assigned to a fixed place in space (whereas housing developers are not), this survey focuses on an ecovillages' interaction with elected and non-elected policy makers as an indicator of influence.

Hypothetically, the most locally *influential* ecovillage engages in outreach or educational efforts, has partnered with government officials on long range plans for their city, county, or regional district (in Canada), has been solicited by policy makers for advice on building, land use, or sustainability matters; local government has changed zoning (e.g. a map amendment) to accommodate the community, and local government has created *new* land use regulations to accommodate the community and/or subsequent communities. In recent years, multiple ecovillages have succeeded in achieving such local policy changes. EcoVillage at Ithaca—which I detail in Chapter Five—has partnered with regional planners on multiple local foods and climate initiatives, including the development of Pedestrian Neighborhood Zoning which draws explicitly from the 'lessons learned' in the ecovillage. In October 2010, Three Groves Ecovillage influenced the passage of an "Ecovillage Zoning Amendment" in London Grove Township, Pennsylvania[14]. Yarrow Ecovillage in Chilliwack, British Columbia has effectively partnered with its local jurisdiction to redevelop an abandoned rural town center. The regime influence scale is inspired by accounts of these ecovillages and several others.

Each of these regime influence variables contributes either one point or zero points toward the raw regime influence score. The raw score (5 points maximum) is then multiplied by the log of the number of years the community has existed (REGIME_INFLUENCE*LOG_AGE) to arrive at the regime influence score. This step attempts to control for "friendly" local regime contexts that accept an ecovillage project inherently—without exceptions. In other words,

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[14]See the Three Groves Ecovillage Website: http://www.threegrovesecovillage.org/2010/10/ecovillage-zoning-amended-passed-hurrah.html. Accessed February 19, 2013.

multiplying the regime influence score by the log of its age prevents a one-year old project from appearing influential. This step was added to the process after the responses of several young communities revealed what appeared to be very high influence on their local governments. In those cases it was questionable questionable, however, whether the community has inspired policy change or whether the local context was friendly to the idea of ecovillage development in the first place (e.g. the ecovillage was founded by members of the county board).

One variable was excluded from the regime influence scale prior to analysis (it is *grayed* in Table 1). This variable asked respondents the extent to which they perceive they were "favored" by elected officials, non-elected officials, neighbors, and local media. While this variable elicited very informative open-ended comments, the results were ultimately too subjective. In retrospect, the question should have asked about specific episodes or somehow elicited a more objective account of "favorability" between the ecovillage and its local jurisdiction (e.g. "Has your ecovillage been featured favorably in local media within the last year?).

It is critical to note that the regime influence scale only measures one dimension of an ecovillage's total influence. It is entirely possible, for example, that an ecovillage has influenced other niche actors and niche projects tremendously through educational and outreach materials without directly influencing its surrounding jurisdiction. This is likely the case in rural contexts where, for example, there is little regulatory regime with which to interact in the first place.

Survey Pre-Test

Prior to disseminating the surveys across North America, I conducted a pre-test amongst members of three ecovillages where I had conducted preliminary observational research (Dancing Rabbit Ecovillage, Earthaven Ecovillage, and Ananda Liina Ecovillage). As I was relatively familiar with these communities, I was able to assess the validity of responses and whether

responses were internally consistent *within* each ecovillage. The findings of the pretest resulted in several changes in wording and question formatting. For example, questions about "zoning" seemed to elicit unacceptably variable responses and I discovered that this was likely because respondents confused the ecovillage's internal zoning rules with municipal zoning. Other changes included offering a five-point rather than a four-point scale for ordinal answers and allowing individuals to enter a range for questions such as community adult population. This feature accommodated the seasonal fluctuation of the population in ecovillages, which tend to attract visitors and interns over the summer.

The pre-test also confirmed that the response of any individual could effectively represent their entire community. Ecovillage residents are uncommonly aware of the infrastructure and social systems that support them from day to day. The questions in the survey focus on elements of day-to-day life that almost any individual can access. The full pre-test report can be found in Appendix A.

Survey Frame

A comprehensive survey frame was developed from the member directories of the Global Ecovillage Network (GEN) and the Fellowship for Intentional Communities (FIC). Meijering, Huigen, and Van Hoven (2007) develop a survey frame of intentional communities (including ecovillages) in "the western world," by drawing from several similar online databases and soliciting other academic geographers to elaborate on their existing list. While their strategy may have resulted in a larger survey frame, drawing from these databases alone results in a more consistent and replicable survey frame. Ecovillages are included in the survey frame if they satisfy the following criteria:

1. **The community is located in the United States or Canada.**
2. **The community is "established" rather than "forming."** Many ecovillages register on the GEN and FIC websites to recruit new members or raise interest in a community before a

physical community is actually formed. I considered a community "established" if their directory profile or website offered evidence for the existence of physical community (e.g. land, structures, residents on-site).

3. **The community is ideologically motivated by ecological or environmental imperatives.** Communities listed on the GEN (the Global *Ecovillage* Network) website met the "ecological" criterion implicitly. The FIC website is a hub for all types of intentional communities and "ecovillages" is one category that communities can self-select. In included self-selected ecovillages as well as other several additional communities whose mission statements or websites expressed an interested in environmental projects.
4. **The community has at least five adult members.** Meijering et al (2007) consider three to five unrelated adults a threshold for inclusion in the "community" category.

One hundred forty-nine (149) communities were identified that fit all of these criteria, of which one hundred thirty-four (134) ecovillages displayed either a valid e-mail or mailing address. Communities with a valid e-mail address (n=110) received an e-mail with a link to an online questionnaire and a follow-up e-mail one week later. The remaining communities (n=24) received the same introductory letter in the mail with the survey link written in the letter. Two weeks after initial contact, all communities with a valid postal address that had yet to respond were mailed a survey package with a paper questionnaire and a pre-stamped/pre-addressed return envelope. Communities *without* a postal address were e-mailed the link to the digital survey a final time. After these attempts to contact communities, it became apparent that several communities in the frame had ceased to exist, or changed location as evidenced by returned mail. I discuss some additional challenges to surveying the ecovillage movement in the "discussion" section below.

Survey Results

Fifty-four (54) communities completed the survey, but eight (8) of these 54 surveys were excluded from analysis due to insufficient adult population (less than five adult members), yielding 46 total valid responses. Each survey was intended to be filled out by only one community member, similar to Meijering, Huigen, and Van Hoven (2007). Given unlimited time and resources, the survey would be administered to multiple random members of each community to ensure a valid representation.

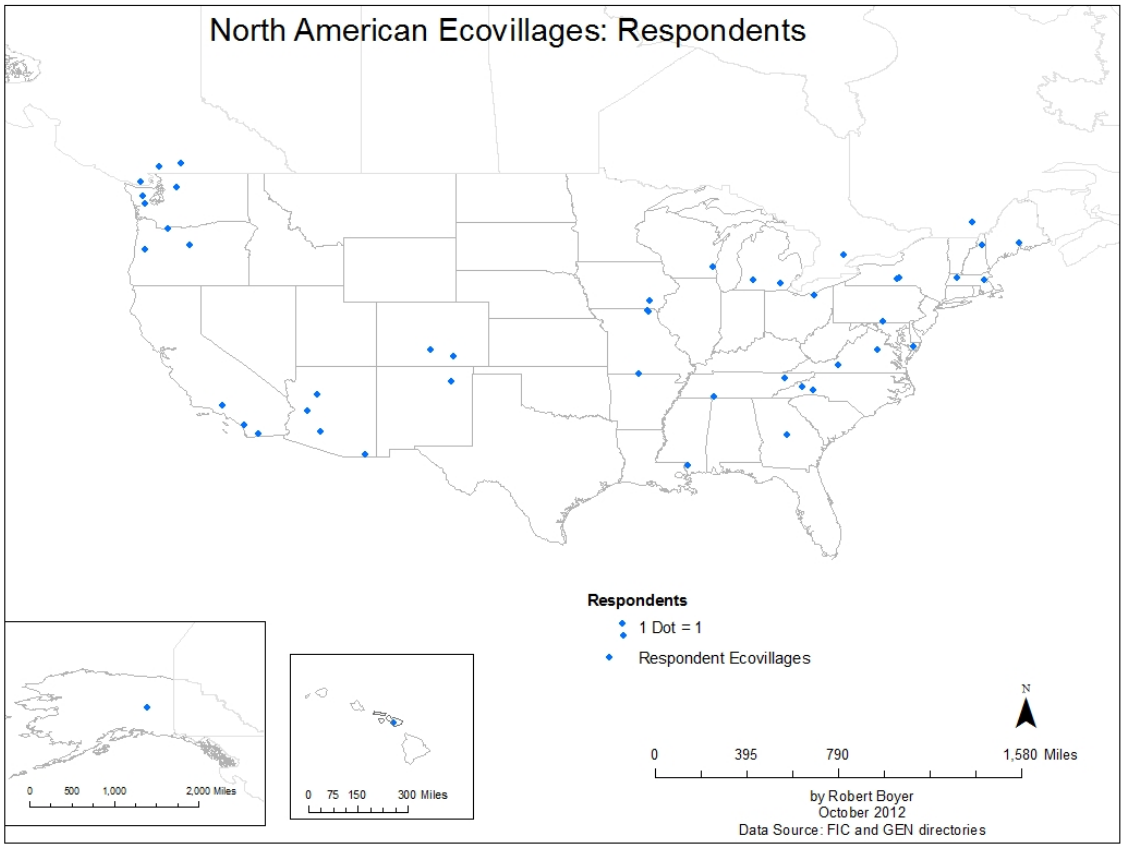

Figure 9: A map of North American ecovillage in the survey frame.

Summary Statistics

Of the 46 valid responses (N=46), the average respondent is 52 years old and has lived in their community between 10 and 11 years. Most respondents (61 percent) were community founders and just over half (56 percent) were male. The mean number of years since community

founding (community age) is 16 years, but this mean is skewed positively by several ecovillages founded in the 1970s. The median age of 12 years old is a better representative of the entire sample. The mean community adult population is 33.7, but again, this figure is positively skewed by five communities with 60 members or more, including two with 100 or more. Most communities have between five and 15 members and there is a positive and significant correlation ($r=0.519$, $p=0.000$) between a community's adult population and the number of years since its founding. In other words, younger communities tend to be smaller.

Table 2: Summary Statistics, Respondent and Community Characteristics

Respondent and Community Characteristics (n=46)	Mean	Median	Std Dev
Respondent Age (years)	52.0	56	13.8
Respondent Tenure in Community	10.5	7	9.3
Age of Community (years since founding)	16.0	12	11.1
Community Population (adult)	33.7	13	35.2
Community Population (youth)	7.7	3	10.6
Percent female respondents	44		
Percent respondents who are community founders	61		

Regime Distance and Regime Influence Scores

The mean *regime distance* score was 3.73 (median=3.8) out of a maximum possible 9 points. Distance scores ranged from 0.22 to 7.25, but clustered around the mean with 74 percent of all ecovillages falling within one standard deviation of the mean regime distance score.

Table 3: Summary Statistics, Regime Distance and Influence

Index	Min	Max	Mean	Median	Standard Deviation
Regime Distance Score	0.22	7.25	3.73	3.80	1.70
Regime Influence Score	0.00	5.78	1.73	1.34	1.44

The mean *regime influence* score was 1.73 (median=1.34). Regime influence was calculated by multiplying the total number of regime influence points by the log of the community's age in years. No ecovillage scored all five *regime influence* points, but several scored four points. The majority of ecovillages (58.6 percent) scored 1 point or less, all of which earned a single point for having an educational or outreach program. In other words, the majority of ecovillages have neither advised nor collaborated with local government, nor have they inspired changes in local policy. These 'low regime influence' communities spanned the range of *regime distance* scores, from the least distant (most proximal) to the most distant. Overall, the distribution of scores fall under an inverse U-shape curve.

As hypothesized, the most influential ecovillages—the niche projects that have interacted most with local policy makers—are *not* the communities that have deviated most from the mainstream. In fact, all the communities that scored higher that one standard deviation above the mean *influence* score (what I will henceforth call "influential communities") scored within one standard deviation of the mean *distance* score. It appears, therefore that relative "intermediacy" is a necessary but insufficient condition for direct niche influence on the local urban development regime. This supports Smith's (2007) claim that the most radical niche projects are unlikely to

translate their innovations directly to the regime.

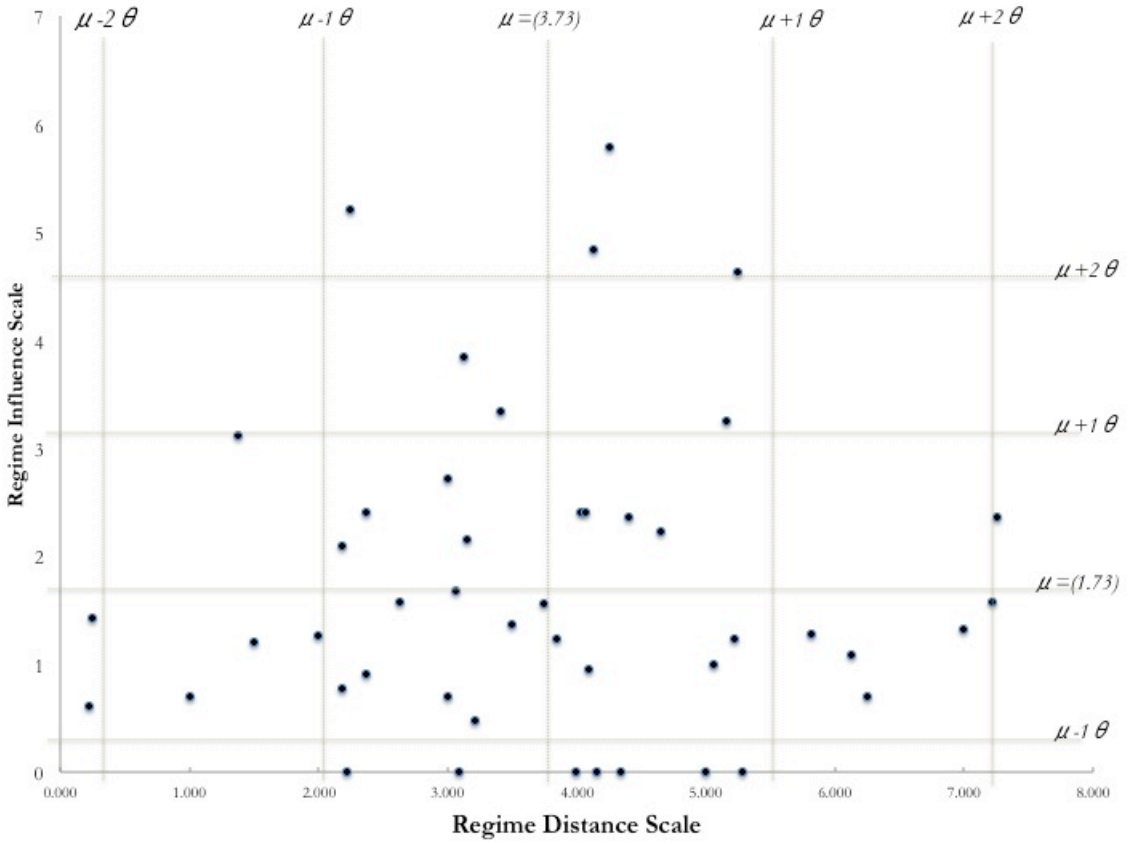

Figure 10: The most "influential" niche projects tend to cluster around the mean "distance" score. There is no overlap between "radical" communities and "influential" communities. These results support Adrian Smith's (2007) claim that "intermediacy" is an important condition for the translation of innovative practices developed in grassroots niches.

Characteristics of "Influential" Ecovillages

When "influential" communities are pooled as a single class, their average scores in almost all of the "distance" component variables are not significantly different from "non-influential" communities as determined by a simple difference of means t-test. For example, the average "electricity distance" score of influential communities (0.136 out of a possible 1.0) is not significantly different (p=0.20) than the average electricity score of non-influential communities (0.289). Similarly, the mean scores of the WATER, AUTOMOBILES, distance to TRANSIT, FOOD, LABOR, and PERMACULTURE variables for influential ecovillages were statistically

indistinguishable from all other ecovillages. There was a significant difference in the HUMAN EXCREMENT variable, however. This is likely because there is zero variation amongst influential communities in this category. Influential communities averaged a "human excrement" score of 0.00, indicating that all of these communities manage human excrement through municipal systems or on-site septic systems. The average population of influential communities (58.64) appears much larger than the average population of non-influential communities (24.14), however the variation within these groups eliminates any statistical significance. The "influential" group contains both very large ecovillages (population=210) and very small ecovillages (population=5). Therefore, none of the *regime distance* variables in this survey can explain *regime influence* independently. This is unsurprising, as *regime distance* is a composite of these variables and it was hypothesized that influential communities would yield an "intermediate" regime distance score. Explaining the influence of these communities affirmatively will require more in-depth analysis.

Table 4: Most Influential Communities

Community Name	Location	Yr. formed	Adult POP	Acres	Influence *(LOG_AGE)	Regime Distance
Cite Ecologique de Ham-Nord	Centre-du-Quebec, QC	1984	79	700	5.789	4.250
EcoVillage at Ithaca	Tompkins Co., NY	1992	100	175	5.204	2.250
The Farm	Lewis Co., TN	1971	210	1750	4.838	4.125
Breitenbush Hot Springs	Marion Co., OR	1977	70	154	4.632	5.250
Los Angeles Eco-Village	Los Angeles, CA	1993	40	11	3.836	3.125
OUR Ecovillage	Swanigan Lake, BC	1999	16	25	3.342	3.406
Arcosanti	Yavapai Co., AZ	1970	56	4060	3.246	5.156
Mean, influential communities		1984	81.50	982.14	4.41	3.94
Mean, all other communities		1998	24.78	165.73	1.32	3.79
Difference of means		14	56.72	816.42	3.10	0.15
Diff of means (p-value)		*0.011**	*0.067*	*0.159*	*.000***	*0.630*

Discussion

Challenges to Surveying the Ecovillage Movement

The relatively low survey response rate of 30 percent (46 out of 149) would be discouraging to this study were it not for some of the supplementary correspondence initiated by surveyed communities. Several non-respondents offered written explanations for why they could not complete the survey. These explanations support claims by Seyfang and Smith (2007) that grassroots niche projects devote the majority of their time and resources to maintaining their mere existence. These comments, which I received over e-mail without solicitation, reveal a sort of fatigued desperation that is common in early stages of ecovillage development (Christian 2003). For example:

- *One of the most difficult things about living here is the balance of how much energy we put in to people who want to study us, ask for help from us, etc... and our daily lives. Part of me wishes I had time to spread the word and help other find this great way of living... but then the part of me that had 3 young kids and a full time volunteer job running an ecovillage needs time too. I apologize if our lack of cooperation is viewed as disinterest or unwelcomness. We're just tired.*

- *I received your survey this weekend, but unfortunately [our ecovillage] never got off the ground...After about a year of planning meetings, our group just didn't have the funds to move forward with our idea for an urban ecovillage. We disbanded in early 2008, just months before the economy's collapse.*

- *Currently our community is in hiatus and we're not sure it will re-coalesce...We tried the experiment for 6 years and now are changing course. Should I fill out your survey?*

Surveying the ecovillage movement—and possibly other grassroots projects—is difficult because the ecovillage movement is a "global knowledge community" (Litfin 2009) made of thousands of local initiatives with no official membership criteria or central leadership. No comprehensive data frame exists. While the total number of existing ecovillages has likely been overestimated in the past (Lockyer 2007), writers within the movement agree that the total number has grown in recent decades and that there are thousands world-wide—for example as

many as 11,000 in the Sarvodaya network in Sri Lanka (Litfin 2009). Nevertheless, a precise estimate of the number of ecovillages either in the world or North America has yet to emerge. While organizations like the Global Ecovillage Network (GEN) and Fellowship for Intentional Community (FIC) serve as important information hubs and likely provide the most comprehensive list of existing intentional communities, the data on these digital hubs rely heavily on self-reporting, which results in inconsistently formatted data collected at haphazard times. There is an enormous diversity of self-declared ecovillages ranging in membership from several members to several *hundred* members and from very rural to very urban; and many entries in the aforementioned directories violate the definition of ecovillages proposed by leading thinkers and authors of the ecovillage movement (e.g. Dawson 2006; Christian 2003; Gilman 1991).

Even if the ecovillage movement were centrally managed, keeping track of the status of communities would likely require regular and proactive data collection as the vast majority of start-up ecovillages fail in their early existence. Author Diana Leafe Christian (2003) estimates that 90 percent of ecovillage initiatives fail as they confront unexpected financial, legal, and interpersonal issues amongst founders. Amassing the capital, leadership, and legal capacity to move forward with an ecovillage project generally takes *years*, and the project remains vulnerable to member burnout, especially in initial start-up phases. The approach taken in this study attempts to balance parsimony, research expenses, and survey validity by surveying one member of each community.

Evidence for Niche *Replication*: Almost all ecovillages have educational or outreach apparatus.

Niche replication occurs when a niche project diffuses its innovative practices *within* the global niche, and is the most heavily documented mechanism by which grassroots niches diffuse their innovations (Seyfang 2010; Seyfang and Smith 2007; Church and Elster 2002). Nearly all—approximately 93 percent—of responding ecovillages engage in some sort of educational programming or outreach. Some educational programs explicitly target individuals interested in

ecovillage membership while other programs appeal to a more general audience. Education and outreach range from rather passive information dissemination on websites and through occasional tours to publications, workshops, and internships administered by a registered educational non-profit organizations. The open comments detail some of the more formalized apparatus:

- *Our nonprofit founding organization is now called the Institute for Urban Ecovillages. We sponsor public talks, workshops, participate in conferences, fairs, do public advocacy, etc. One of our public interest purposes is to expand public awareness about more sustainable urban living patterns.*

- *We have a 501c3 that organizes educational classes and events. In addition, we have tours regularly for the general public. Also, many individuals have private apprentices.*

- *We run a "sustainability series" of educational workshops. The target audience is expected to be the same as our target membership: people with a homesteading interest. Topic range includes fiber (spinning, knitting), food (cheesemaking, sprouting, root cellaring), fuel (coppice, small-scale alcohol production), and others (soapmaking, masonry).*

- *We organize tours, we welcome interns with different learning programs, keep websites updated, sell eco-friendly products. We operate a B&B to welcome visitors. We welcome anybody, but usually, our guests or interns are interested because they care about the safeguard of the environment.*

There is preliminary evidence to suggest that several veteran ecovillages are 'clearing a path' for younger ecovillages in their spatial proximity. For example, Red Earth Farms, founded in 2005 in Scotland County, Missouri, is located on a rural property adjacent to Dancing Rabbit Ecovillage, which formed in 1997. White Hawk Ecovillage, founded in 2004 in Tompkins County, New York, lies several miles away from Ecovillage at Ithaca, formed in 1992. The Villages at Crest Mountain, established in 2008 in Woodfin, North Carolina, is located in the same county as Earthaven Ecovillage, which formed in 1995. Further in-depth research may reveal the extent to which these older ecovillages have re-shaped the regime to allow for the emergence of additional ecovillages. It is easily conceivable, for example, that EcoVillage at Ithaca's early presence in Tompkins County has eased the development approval process for White Hawk.

Future studies should investigate the influence that veteran communities have had on the formation of communities both inside and outside their spatial proximity. Such studies might involve in-depth ethnographic analysis or entail network analysis that traces the influence of individual ecovillages within the larger ecovillage and environmental movement.

"Settling in" and "warming up"

The results of this survey hint at two phenomena that demand further, more detailed attention in subsequent grassroots innovation research. I label these phenomena "settling in" and "warming up." The responses of certain ecovillages to this survey suggest that their relationship with local policy makers and neighbors is dynamic and can assume either of the two trajectories. "Settling in" occurs when an ecovillage overcomes the regulatory and normative barriers to establishment and reaches a sort of equilibrium relationship with local officials. Sometimes communities feel they have been well assisted by planners and policy makers. Others express that their development proposals have been delayed or that they feel antagonized by the approval process. Nevertheless, once an agreement is reached, the niche and regime reach a steady state, effectively freezing the potential for innovation. Comments that hint at this phenomenon include:

- *Our local township was originally hostile to the community request for the wastewater treatment facility and the road (unpaved) to the housing cluster. We also had to have a modification to cluster 14 houses on 5 acres which was initially frowned upon. It took 6 years to get the local approval, partially due to the Department of Environmental Protection to agree to the wastewater facility.*

- *We have a good working relationship with local government officials because we try to follow their zoning rules. We'd have preferred more latitude and perhaps a new zoning category but chose not to wait for that change.*

- *The state had a way we could circumvent the towns zoning laws. We followed the state system. So we are outside the local zoning, but exactly within the state over-ride system.*

- With regard to the "favorability" scale: *In the beginning all of these were very unfavorable. Gradually they became more favorable. Now, there are some favorable, a few unfavorable but most are just neutral in my opinion.*

The phenomenon of "warming up" occurs when regime members begin to view the niche project more favorably, due in part to exposure and interaction with the project.

- *The more people have interacted with us directly the more positive their opinion in general.*
- *A new local law was passed describing particular zoning characteristics that supported the intent of our community.*
- One of the most "influential" ecovillages commented: *[The founding members] have invested a lot in building relationships with local authorities and this has paid off.*

"Warming up" involves the regime responding more favorably to the niche project over time and exposure to new practices, and may be an early sign of regime *transition*. I am hopeful that more detailed investigation and more time will reveal the relationship between these phenomenon and long-term sustainability outcomes.

Concluding Thoughts

Achieving sustainability goals will require a major reorientation of the social and technological elements of current urban development regimes. Such change faces resistance from a complex of mutually reinforcing rules and physical structures, or socio-technical regimes. While planners and policy makers have been well aware of the un-sustainability of urban development patterns for decades, reorienting such systems is a massive challenge; these systems cannot change one component at a time. Grassroots socio-technical niches offer spaces in which actors can reweave "rules of the game" and offer holistic alternatives to regime practices. This study has specifically examined ecovillages in North America as a source of more sustainable energy, transportation, and housing production solutions. The existence of such communities offers hope for a more sustainable development model: several projects have influenced planning policy, but most remain in the margins of society where they can avoid the structural barriers

alternative technological practices that consume fewer resources and meet human needs affordably. While most ecovillages do not influence policy directly, the projects that have influenced local planning policy through advising policy makers or inspiring the creation of new zoning categories seem to share characteristics of both the mainstream and the radical grassroots, which allows them to bend the rules of the regime without breaking them.

The remainder of this dissertation is dedicated to in-depth contextual research that explores the social processes that allow certain ecovillages to influence public policy better than others. It appears that certain niche projects inspire processes of "warming up" whereby regime actors (i.e. planners) begin to understand the utility of ecovillage projects over time. These influential projects seem to play by *some* but not every rule of the regime. Subsequent research should look at which rules are 'bendable' versus 'breakable' and which rules of the urban development regime too sacred to be bent at early stages of innovation.

Chapter Five: Case Study Selection and Methodology

Introduction

The previous chapter uses a cross sectional approach to test and ultimately support a claim by Smith (2007) that grassroots niche projects are most influential when they are intermediate, neither too radically different nor too characteristically similar to the socio-technical regime they prefigure. It is within this intermediate range that projects might most successfully translate novel practices to the mainstream. While these results present a compelling snapshot of ecovillage activity in North America, they stimulate additional questions that require more in-depth, contextual observation. For example, what are the dynamics of intermediacy? How does an ecovillage's relative "influence" and "distance" change over time, and how does a grassroots niche reach an "intermediate" state? Open survey comments hint that intermediacy may be the result of "settling in" and "warming up" whereby an ecovillage project plays by the rules of the regime and concedes some of its original goals and, in doing so, secures a safe space to experiment. Over time, regime incumbents (e.g. planners and policy makers) may begin to "warm up" to the idea of the ecovillage and adopt some of its practices into the mainstream. Might these phenomena be two sides of the same coin? In other words, is regime transition a matter both of niche projects settling in and of regime contexts warming up?

I explore these questions in three ethnographic case studies at three niche projects: Dancing Rabbit Ecovillage (Scotland County, Missouri), EcoVillage at Ithaca (Town of Ithaca, New York), and Los Angeles Eco-Village (Los Angeles, California). I employ Flyvbjerg's (2006) maximum variation case selection strategy and an array of qualitative methods to elaborate on the phenomenon of intermediacy and processes of settling in and warming up. Although I do not claim to generate new grounded theory *per se,* I borrow from grounded theory methodology (GTM) to make sense of alternative social structures in ecovillages, and how these structures vary across influential and non-influential ecovillages.

I contend that "intermediacy" is a liminal status. It is not the midpoint between "radical" and "conventional" but a part of both at once. Intermediate ecovillages exist both inside and outside the rules of urban development. They do not start out as intermediate, however. They earn this status by bending the rules of the regime without breaking them. This requires that niche actors "master the system" and work to build social connections with regime actors. Regime transition begins when the conceptual boundaries between niche actors and regime actors begin to break down, allowing more and more individuals to serve as "double agents" in both the niche and the regime. It is through recurring social interaction with niche actors that regime actors begin to conceive of the niche as "innovative." In the case of EcoVillage at Ithaca, this niche-regime partnership has co-evolved with exogenous (landscape) opportunities, in the form of federal grants that have sparked an array of educational and environmental programs in Tompkins County. This process resembles the co-creation of meaning present in theories of communicative action (c.f. Innes 1998) and dialogical planning (c.f. Stein and Harper 2011).

Before diving into these case studies, I detail why these particular cases serve to illustrate intermediacy well, as well as the research methods I use to compare them.

Case Studies: A Transparadigmatic and Transdisciplinary Heuristic

Case studies have received an abundance of attention from planning and social science scholars in recent decades. Robert K. Yin (2008) explains that "A case study is an empirical inquiry that investigates a contemporary phenomenon within its real life context, especially when the boundaries between phenomenon and context are not clearly evident (18)." Such a frame is particularly useful for planning scholars, for whom an understanding of context is critical, if not itself the object of inquiry. In recent decades, the planning discipline has devoted itself to addressing "wicked problems" (Rittel and Webber 1973) which are, by definition, impossible to

define out of context[15]. It makes sense, therefore, to employ research methodologies that don't aspire to extract a phenomenon from its social, temporal, and spatial context.

Danish planning scholar Flyvbjerg (2006) defends the "case study method" against positivist critics who challenge the explanatory power of small sample research. He argues that while "rule-based" positivist knowledge ought not be dismissed entirely, context-dependent knowledge is critical to the development of "expertise" in a field:

> It is only because of experience with cases that one can at all move from being a beginner to being an expert. If people were exclusively trained in context-independent knowledge and rules, that is, the kind of knowledge that forms the basis of textbooks and computers, they would remain at the beginner's level in the learning process (222).

Case studies help researchers develop a "nuanced view of reality" and inoculate academics from straying down "blind alleys, where the effect and usefulness of research becomes unclear and untested (223)." Flyvbjerg explains that even a single case can enrich our understanding of a phenomenon, but case selection is critical. He offers four different case selection strategies:

- **Extreme cases** illustrate a phenomenon in an especially dramatic way by activating more actors and more basic mechanisms (e.g. a case that illustrates rapid, 100% regime transition, from suburbia to "eco-topia.")
- **Maximum variation cases**: three to four cases that vary significantly in some important dimension but hold relatively constant in others (e.g. holding age and stability of ecovillages constant, we observe differences in the degree of regime influence);
- **Critical cases** use "most likely" or "least likely" contexts to falsify or confirm a hypothesis (e.g. if regime transition can happen here (in an unlikely context), then it can

[15] According to Rittel and Webber (1973) "wicked problems" are defined by their context. For example, the appropriate response to "sprawl" ought to vary from region to region because there are many *types* of sprawl (Ewing, Pendall, and Chen 2002). Both Los Angeles and St. Louis are "sprawling" but urban growth in Los Angeles is happening in a qualitatively different way than in St. Louis. The solution to sprawl, therefore, depends on the context.

probably happen anywhere*;* OR if regime transition is not happening here (in a likely context), then it probably isn't happening anywhere) and;

- **Paradigmatic cases** that serve as a metaphor for society at-large (e.g. this example of regime transition symbolizes historical shifts throughout American history).

In this study, I employ Flyvbjerg's (2006) maximum variation case selection. Since my objective is to explore the properties of "intermediacy" and how this results in regime transition, it is important to select cases that model this phenomenon and contrast them with cases that do not. I therefore compare two "intermediately" situated ecovillages that scored high on the influence scale in my survey results (EcoVillage at Ithaca, Los Angeles Eco-Village) and one "radical" ecovillage that scores relatively low on the influence scale (Dancing Rabbit Ecovillage).

Despite some critical differences, these three ecovillages are all enduring, stable, founded within a few years of each other and share multiple internal features. Enduring ecovillages are rare. Christian (2003) explains that the vast majority (as many as 90 percent) of intentional community initiatives fail prior to purchasing land, often due to the social dynamics of would-be founders. Others (Seyfang and Smith 2007) discuss how grassroots projects tend to confront harsh existential threats in their early years, and thus devote proportionately of their resources to mere survival than to achieving their mission. Dancing Rabbit (DR), EcoVillage at Ithaca (EVI), and Los Angeles Eco-Village (LAEV) were all conceived within a few years of each other, between 1989 and 1992. Although it took Dancing Rabbit several years to find and purchase land, its founders had begun to recruit members and create community bylaws around the same time that the founders of EVI and LAEV were doing the same. Each has survived the fragile embryonic stages that grassroots projects encounter, and all have begun to devote time and resources to external missions. Each also has a strong web presence. (See Table 5: Similarities and differences across ecovillages**.**)

In interviews, community residents describes their membership as currently "stable," contrasting it to earlier years when the departure of critical individuals would have resulted in the collapse of the project. They are all regularly featured in *Communities* magazine, other online publications about the ecovillage movement, and national news media. Each of these communities leads regularly scheduled tours and has the infrastructure to accommodate long-term guests. This was of practical importance for conducting the participant observation portion in each of the three ecovillages.

Each of these ecovillages employs consensus decision-making, whereby major decisions require the consent of all members present (although DR is exploring alternatives to consensus as of this writing). Each community also appoints committees for more intensive decision-making. Despite existing in very different urban/rural settings, each community's land is controlled by one (or multiple) community land trusts from which members lease space. Each community is also home to a 501(c)3 educational non-profit organization responsible for outreach and (to varying degrees) fundraising.

The endurance and stability of these three communities offer a fair comparison and the opportunity to examine regime influence across cases. Each has endured long enough and achieved the stability necessary to devote resources to its external mission. It would be impractical to compare a 20 year-old ecovillage to a neophyte community that is unlikely to have established the physical and social stability necessary to look outward or begin changing regime structures.

Table 5: Similarities and differences across ecovillages.

Ecovillage	Dancing Rabbit Ecovillage (DR)	EcoVillage at Ithaca (EVI)	Los Angeles Eco-Village (LAEV)
Location	Scotland County, MO	Town of Ithaca, NY	Los Angeles, CA
Setting	Rural	Suburban	Urban
Regime Distance	Radical	Intermediate	Intermediate
High Influence?	No	Yes	Yes
Project Initiated	1992	1989	1992
Land Purchased	1997	1992	1993
Adult Members	61	100	31
Website	www.dancingrabbit.org	www.ecovillageithaca.org	www.laecovillage.org
Non-Profit Organization	Dancing Rabbit Inc.	Cooperative Resources and Services Project (CRSP)	Center for Sustainability Education (EVI-CSE)
Land Ownership	Dancing Rabbit Land Trust (DRLT)	Five non-profit land-holding entities	Beverly-Vermont Community Land Trust (BVCLT)
Building ownership	Mostly individual building ownership	Individual building ownership	Cooperative building ownership
Membership Roots	Extra-regional	Local, Regional, Extra-regional	Local, Regional
Regular Tours	Yes	Yes	Yes
Buildings	New construction	New construction	Adaptive re-use
Construction Labor	Exclusively community residents	Self-built with professional consultation	Built in 1922
Governance	Consensus with committees	Consensus with committees	Consensus with committees
Income strategy	Mostly on-site, very low cost of living	Mix of on-site and off-site	Mix of on-site and off-site

Table 5 (cont.)

Food Strategy	Personal and cooperative gardens, potlucks, regional bulk food distributor, food co-ops	Personal gardens, on-site CSA, regular community and neighborhood potlucks	Small cooperative gardens and fruit trees; on-site food co-op.
Electricity Strategy	Net *exporter* of electricity; solar photovoltaics and micro-wind; grid tie	About 60% electricity generated on-site with solar photovoltaics; grid tie	Small electricity projects on-site from solar (PVs); grid tie
Transportation Strategy	Dancing Rabbit Vehicle Cooperative. Three (soon four) vehicles, most needs met on-site	Individual automobiles, some informal car sharing, many needs met on-site	Mixed strategy in a "transit rich" neighborhood, many needs met on site
Water Strategy	Primarily rain harvesting; county water available	Municipal water	Municipal water
Automobile ownership	No private vehicles; 3 cooperatively owned cars	Individual car ownership.	Mix of strategies. Easy access to transit
Excrement disposal	Humanure	Municipal system, composting toilets permitted	Municipal system

Methodology: Using Grounded Theory Methodology to Understand Intermediacy

Geels (2010) claims that the multi-level perspective of socio-technical systems (MLP) is a "middle range" theory that fits under broader evolutionary and interpretivist ontologies. Chapter Two of this dissertation details how the MLP sees "creative and heterogeneous actors" as the causal agents and social interaction as the causal mechanism of structural change. Individuals are "rationally bounded," and have diverse needs, wants, and positionatlities. Individual action is informed by interpretations of *what is real*, and "structure" is the result of overlapping interpretive realities. As a brief and poignant example: The members of Dancing Rabbit Ecovillage manage their excrement through a "humanure" system—effectively a network of five-gallon buckets or "humeys" capped with a toilet seat. Each week, the buckets are collected by a

community member and the "contributions" are deposited in a "humey pile" that sits undisturbed for about two years, or enough time to decompose into organic fertilizer. The process is sanitary and safe if managed correctly (Jenkins 2005). To most individuals in the modern mainstream, however, such a process violates innumerable normative, cognitive, and regulatory rules. We conceive of excrement as "waste" and we are taught from an early age to flush the toilet and watch it disappear. To a member of Dancing Rabbit Ecovillage, however, human excrement is a "contribution" rather than a waste, and a "humey pile" is a resource rather than a nuisance. This new interpretive reality results in a number of new routines and structures that I detail in the case studies that follow.

As interpretive reality is constructed and reinforced through language (Charmaz 2006) it makes sense to adopt a research methodology that frames language as a *tool* and dialogue as a *creative act*, rather than as a reflection of some objective reality. I therefore draw heavily from constructivist/interpretivist branches of Grounded Theory Methodology (GTM) to explore the cognitive realities of ecovillage niche actors and the niche-regime interactions that make niche interpretations of reality salient in the mainstream. While I do not aspire to develop grounded theory *per se,* such an approach is useful for elaborating on emerging concepts in socio-technical systems literature. Grounded theory methodology is an *ab*ductive model of inquiry. Rather than testing a hypothesis derived from existing theory, GTM continuously builds and tests hypotheses constructed from empirical observation. Implicit in GTM is the need for new "mid-level" theories—explanations, interpretations, and justifications (Glaser and Strauss 1967). My intention is not to test the Multi-Level Perspective of Socio-Technical Systems, but rather to elaborate relatively unexplored phenomenon within this larger framework. I therefore employ GTM to begin to explain and interpret concepts such as "intermediacy," "settling in," and "warming up."

A GTM study typically begins with some basic questions. I ask: **What are the properties of "intermediacy:" Why are some ecovillages able to translate their novel**

structures to the mainstream, while others are not? I began to explore these questions by collecting data at "intermediately" situated ecovillage sites—EcoVillage at Ithaca and Los Angeles Eco-Village—and comparing them with a "radical" and less influential site—Dancing Rabbit. As I will explain in the section below, on-site data collection included participant observation and semi-structured interviews. GTM is not necessarily a linear process. Rather it weaves data collection and analysis to allow for theoretical sampling (Strauss and Corbin 1998). Therefore I would transcribe interviews as soon as possible after the interview. After transcribing an interview, I began "open" coding. Open coding of qualitative data proceeds line-by-line, or sometimes word-by-word, ensuring that the analysis remains loyal to the data, rather than the preconceptions of the researcher (ibid). Open coding leads to *axial* coding involving the properties and dimensions of larger *conceptual categories.* Coding focuses on what the words *do* and thus codes and categories tend to take the gerund (a verbal noun ending in -ing) form. For example, if an interview subject were to say, "Since giving birth to [my son], I've gone to fewer and fewer community meetings," I might code this line as *adapting to life course changes,* and/or *reconciling personal and community needs.* After coding multiple interview transcriptions a small number of important conceptual categories begin to emerge. Some of the conceptual categories that emerged from early interviews and field observations included

- *getting 'squeezed out' of the mainstream*
- *re-learning to live together*
- *adapting to life course changes*
- *balancing personal, community, and global needs*
- *serving as an example*
- *interfacing with the mainstream*

These categories form the loose structure of the case studies that follow. Strauss and Corbin (2003) explain that data collection and analysis continues until a cateory can be described fully in

terms of its properties and dimensions and approaches a point at which additional data offer no additional insights or contradictions. This point is known as "conceptual saturation." When categories and concepts are fully developed, the researcher can propose a provisional hypothesis that implies relationships between categories. For example, the Dancing Rabbit case study that follows, I hypothesize that:

> ***Lower, more sustainable levels of resource consumption at Dancing Rabbit Ecovillage are achieved through "radical participatory democracy." When individuals are open to their own needs and the needs of others through good intra- and inter-personal communication, they are able to share space, time, resources, and energy, reducing the need for individual or household consumption (e.g. buying personal vehicles, using their own kitchen).***

The research process then continues much like a deductive study (Strauss and Corbin 2003): the provisional hypothesis is tested and challenged by further data collection. It can be adjusted and re-tested as new data is collected. The concept of **radical participatory democracy** emerged through interviews and observation conducted at Dancing Rabbit, but further data collection at other communities affirmed this concept and helped me understand that the income earning strategies of niche actors are an important and unforeseen variable in the regime transition process. At EcoVillage at Ithaca and Los Angeles Eco-Village (the less "radical" ecovillages), individual members are drawn out of their community by their day to day "income work". This leaves them less time to invest in "good intra- and inter-personal communication" skills that facilitate the sharing of capital resources like cars, buildings, and laundry machines, but it does allow them to build connections with institutional actors in the mainstream. My case studies adopt these assumptions and rely heavily upon the spoken and written language employed by ecovillage resident-members to illustrate their own experience, and the language of regime

agents, including planners, politicians, and local media, to explain the relationship between the ecovillage and its local context.

Data Collection: Participant Observation, Semi-Structured Interviews, and Extant Documents

In 2010 and 2011, I spent a total of 18 weeks living and working in Dancing Rabbit Ecovillage (Scotland County, Missouri) and Earthaven Ecovillage (Bumcombe and Rutherford Counties, North Carolina). Both communities were formed in the middle 1990s by a group of private individuals who pooled their resources to purchase underused, rural land. Each project has grown to over 50 adult members, and each envision growing large enough to support a diverse internal economy. Dancing Rabbit's 280 acres lie on a former pig farm, where members have since planted tens of thousands of trees and conserved the majority of land from intensive agriculture. Earthaven's 320 acres lie in second-growth forest in a river valley of the Blue Mountain range, where the community's founders spent much of the first two years carefully selecting and clearing patches of forest for development and agriculture. Both communities are legally organized around cooperative land ownership structures (a community land trust, and home owners association respectively) and each have a non-profit organization responsible for education and outreach. While these communities are unique in many ways, their similarities for the purpose of this dissertation outweigh their differences. I therefore present only the case of Dancing Rabbit, where I spent more time as a participant observer, and where I had time to conduct more interviews. My experience at Earthaven was invaluable, and data from Earthaven confirms most, if not all, of my observations at Dancing Rabbit.

I lived for 12 weeks over two summers at Dancing Rabbit Ecovillage (DR), engaged in routines similar to ecovillage member-residents. In the summer of 2010 I was hired to help add on to an existing 250 square-foot home owned by a young family of three. In these weeks, I

helped with the project by raising the posts and beams, assembling the roof, and preparing lumber for re-use. The "ecological covenants" at DR permit builders to use only recycled or locally sourced lumber, and forbid gas-powered tools. Whereas conventional home construction uses unscathed, ready-to-use lumber, I spent about one-quarter of my days removing nails from used two-by-twelve beams that had been extracted from a barn demolition in the region. Cloudy days hindered solar energy collection and prevented us from using some of the more energy-demanding electric tools, rain halted construction completely, and sunny days often exceeded 90 degrees (F) in the insufferable Missouri humidity. The project moved slow—as ecovillage construction often does— but over two years later, the addition is nearly complete, and I'm thrilled that I might be able to see a fully functional and enclosed home on my next visit.

In exchange for my construction labor, plus some work in the family's garden, a weekly cook shift and assorted other chores, the family provided three daily meals, a raised tent platform, wireless internet, access to the community's Common House, and candid answers to my questions. I kept a journal, attended weekly community meetings and social events, and grew generally more curious about other ecovillages in the US and abroad. In six weeks, all the electricity I consumed came from roof-mounted solar photovoltaic panels, and all the water I consumed came from rainwater cisterns below my feet. Never before had been more aware of my electricity consumption. I ate my meals in comfortable, unique buildings in which "climate control" consisted of opening and closing windows at the right time, and allowing the thermal mass of the building to store the heat and 'coolth' of the days and nights. Much of my food came from gardens one hundred feet from my tent. I quickly grew accustomed to the humanure system, to which I gladly contributed the byproduct of my meals. In six weeks, I rode in a motor vehicle exactly three times. I was made mindful of nearly every consumption choice, and learned quickly to live without ice, television, flush toilets, and other seemingly mundane perks of twenty-first century America.

I returned to DR in the summer of 2011, this time as an intern for the Milkweed Mercantile Eco Inn (henceforth "the Mercantile"), and with a more detailed research agenda. Similar to the previous summer, most of my days were shaped by my work duties, which consisted of dish washing, meal preparation, and some small construction and marketing projects. I conducted interviews when the Mercantile was not occupied with guests, which tended to be midday on weekdays. Similar to the previous summer, I slept on a tent platform a short walk from my place of work and ate my meals at the Mercantile, with B&B guests and the innkeepers. Both summers offered me opportunities to attend "work parties"—intermittent calls for community-wide help on tasks that require a lot of hands. Often this is a wall raising, or some task that can be accomplished relatively quickly with the help of many. I was also required to attend to "clean shift" duties in the community's central common house once every few weeks.

In late 2012 and early 2013, I visited EcoVillage at Ithaca and Los Angeles Eco-Village, respectively. I spent just under one week in each community. At EVI, I lived in a guest room attached to one of the community's two common houses. Living in this space allowed me to interact with residents throughout the week. In addition to multiple interviews, I engaged in constant informal conversations as individuals went about their daily routines. I also attended multiple community and neighborhood meals and volunteered for cook shifts at each of them. This allowed me both to engage in similar routines as ecovillage members and chat informally about their experiences moving into and living in the community.

At LAEV, I stayed on one member's couch, and was allowed to wander freely throughout the common spaces of the buildings controlled by the ecovillage. I interviewed several of the veteran members on-site and arranged for telephone interviews with several others. EVI and LAEV offered dramatically different social atmospheres than Dancing Rabbit or Earthaven, in part because members of the relatively urban communities spent much of their day at off-site jobs. While living in these communities, I found myself using 'business hours' to write memos

and learn about the region, in part because interviews were hard to schedule during the day. In contrast, members at relatively rural communities tend to spend time working on-site, building homes, and working in gardens. During the summer, individuals tend to rest during the hottest parts of the day and I was able to schedule interviews at this time. The dwelling structures at Dancing Rabbit are also very small, and individuals make use of common spaces for many tasks (e.g. internet access, laundry, cooking, socializing) that mainstream North Americans complete in the isolation of their home.

Semi-Structured Interviews

I collected most data from semi-structured interviews with members who had lived at least six months in their community.[16] Interviews typically lasted one hour. I also conducted multiple telephone interviews with local planners and ecovillage board members who did not live on-site. In selecting interview subjects, I attempted to balance gender, community tenure, age, and marital status, but also relied heavily on referrals from prior interviews to select interview subjects strategically. In grounded theory methodology, such strategic selection of interview subjects is called "theoretical sampling" (Corbin and Strauss 2007) and is informed by the emerging theory. The process is intentionally non-random; rather it looks to diverse sources to challenge and enrich emerging concepts. For example, when I discovered that one young woman's routine was highly influenced by her child's needs, I intentionally sought an interview with a childless man to explore what elements shape his routine for juxtaposition. I found he had considerably more time to devote to non-remunerated community-centered activities like leading tours, serving on committees, and monitoring energy in community buildings. Recruiting for interviews was often as simple as approaching individuals in person and requesting an hour of

[16] I have concealed the identity of interview subjects by assigning them pseudonyms. I do not, however, conceal the identities of ecovillage members when quoting their published material.

their time. I conducted the majority of interviews in individuals' homes, but many individuals preferred to be interviewed in a common space. At Dancing Rabbit, for example, many individuals preferred to meet me at my place of work—the bed and breakfast—because it was a comfortable and relatively cool place to sit during the hot summer.

In all, I conducted 36 interviews with ecovillage members. While each conversation was unique, I structured all interviews around several anchor questions. I initiated each interview by soliciting an 'arrival story:' T*ell me how you ended up at [your community].* Rubin and Rubin (2005) distinguish "narratives" from "stories" in qualitative interviews. A narrative is a one-time recollection of events of the past. It may be rough and incomplete as individuals must simultaneously explain an event and mine their own memory. A story, on the other hand, is a ready-to-use account that has been recited and refined and may offer a broader lesson. Moving to an ecovillage is an unconventional and profound lifestyle choice in 21st Century North America. Ecovillage residents have likely explained how they discovered and arrived at their respective homes to family, friends, fellow community members, the media, tourists, interns, and other researchers. Therefore this question serves two purposes: It eases subjects into the interview with some "familiar ground" and also reveals how ecovillage members conceive of the "regime" from which they've withdrawn.

I asked each interview subject to *walk me through a typical day* and a *typical week.* I was most interested in daily and weekly routines and how these routines involved responsibility toward themselves, their household unit, their community, and the world at-large. I found early in the research process, that living in an ecovillage involves constant negotiations amongst household, community, and perceived global needs, and that individuals balance and re-balance these priorities differently in different communities. As a matter of subsistence, Dancing Rabbit Members devote relatively more time to their community, while the relatively urban communities are able to devote more of their time to their household in the form of income work.

I asked each individual to *tell me about [their community's] relationship with its neighbors*. I left this question intentionally vague, interested in what individuals conceived of as "neighbors." At Dancing Rabbit, 'neighbors' span Scotland County, including nearby intentional communities, Mennonite neighbors, and non-Mennonite residents on farms and in Memphis, Missouri, the county seat. At EVI and LAEV, neighbors are situated more closely in space. LAEV's 'neighbors' are businesses, schools, and residents of diverse age, race, and family composition. LAEV has integrated this diversity and complexity of its surroundings into its vision for sustainability.

I also asked what individuals saw as *the role of [their community]* beyond their community's boundaries. While very few individuals recited their community's mission statement verbatim, almost everyone stressed the importance of their ecovillage as a "demonstration". This question inevitably led to more detailed discussion about initiatives that have resulted from community partnerships, and the ecovillage's role as an incubator for change in the mainstream. I detail these initiatives in each case study.

Extant Documents

Each community has a website and, in the case of EVI and LAEV, a wealth of material published by individual members. I used these sources to complement interview and observational data. Much of EVI's history, for example, is detailed in books published by the community's founder. I draw heavily from this source. It the EVI and LAEV cases, I also draw heavily upon government documents and websites to illustrate the ecovillages' influence on the mainstream. I also use secondary and external sources like news media, and other academic research that has taken place in these communities to confirm and supplement the primary data collected inside the communities.

Case Study Structure

As discussed above, the following case studies are designed to understand intermediacy, and the phenomena of settling in and warming up. I am interested in how an ecovillage's conceptual distance from the mainstream is associated with its ability to influence urban development structures and how this distance changes over time. Each of these cases begins with a brief founding history, including a discussion of the context in which the ecovillage has chosen to settle. I then discuss the ecovillage's existing conditions, legal structure, member recruitment, economic subsistence strategies, and finally, its interaction with the mainstream. I offer brief conclusions at the end of each case study and more global conclusions in the following chapter.

Case Study: Dancing Rabbit Ecovillage

We are the Municipality

Abstract

Dancing Rabbit Ecovillage was conceived in 1992 by a small group of Stanford University students as an attempt to 1) realize ecological ideals outside the regulatory, economic, and moral structures of the mainstream; and 2) influence a broad audience through outreach and education. In fifteen years, Dancing Rabbit has grown to over sixty member-residents of diverse ages in rural northeast Missouri. Its members live at an estimated 10 percent the ecological footprint and a fraction of the income of the average American. They achieve such a lifestyle by substituting financial and physical capital with social and natural capital. Rather than purchase and outsource their basic needs from private and public entities, 'Rabbits' meet many of their nutritional, shelter, and hygienic needs on-site through a multitude of cooperative structures. Such a lifestyle requires a rare investment in social and communication skills and an attention to natural cycles that contemporary urban and suburban inhabitants tend to overlook. I label this uncommon and active investment in community life "radical participatory democracy." While Dancing Rabbit has inspired countless individuals through on-site educational programs, its website, and its coverage in the media, its withdrawal from urban development regime structures precludes processes of niche *translation* described by Seyfang and Smith (2007). In other words, while Dancing Rabbit may indeed be influencing regime change through "niche replication,"—whereby individuals replicate practices outside the project—it is hard to measure how its practices are emerging as part of larger regime structures. As the community grows and landscape pressures for regime transition increases, it may find avenues through which to influence mainstream structures.

...we're not just running our lives and taking care of our family. We're building a village and administering and running a municipality collectively. –Dancing Rabbit Member

Introduction

In the spring of 1992, a small group of idealistic Stanford University undergraduates decided to form an "eco-town." Like generations of communitarians before them, the group of six would eventually pool its resources, leave their home, and attempt to re-build society as a reflection of their ideals. They would do so on a depleted, 280-acre former pig farm in rural northeast Missouri. Fifteen years after the founders purchased land in 1997, the population of Dancing Rabbit Ecovillage (DR) is ten times larger than its founding group and growing fast: When I first visited DR in June of 2010, it was home to 34 adult member-residents and 11 children. At the time of this writing—December of 2012—there are 61 adult member-residents and 16 children. Each summer the community swells with interns, visitors, and bed-n-breakfast guests; the land swells with prairie grasses and wildflowers; the air swells with punishing Missouri humidity, and gardens swell with spinach, kale, garlic, beets, onions, cucumbers, herbs, and tomatoes. As winter approaches, the population, the prairie, the Missouri air, and the gardens all thin, and families huddle around wood stoves in cozy dwellings built almost entirely of locally-sourced and recycled materials.

In fifteen years, Dancing Rabbit Ecovillage has managed to demonstrate the feasibility of a lifestyle that consumes an estimated 10 percent of the resources of the average American, without deprivation or hyper-modern technology. Most of the materials used by the community are purchased off-the-shelf or harvested from the land beneath their feet, and many of their techniques have been applied for decades or centuries. It is by social mechanisms—new rules and routines—and a heightened awareness of natural cycles that Rabbits are able to reduce their footprint. The entire village currently shares three bio-diesel automobiles, and with some exceptions, private vehicles are not permitted on-site. The community is tied to the electricity grid, but remains a net exporter of electricity generated by on-site photovoltaic panels and small

wind turbines. All organic waste—from food scraps to human excrement—is composted and recycled on-site. Mindful building design reduces the energy load for interior lighting and heating such that one household of five spends "anywhere from $20 to $150 a year on heat" depending on outdoor temperatures and winter sunlight. Sweat equity, small homes, and cooperatively owned land reduce the price of housing an order of magnitude (or two) below market rates. The vast majority of "Rabbits" live at income levels far below the federal poverty line[17], but Dancing Rabbit members are far from impoverished as the cost of living at DR is shaved away by cooperation and resource efficiency.

I claim in the case study below that Dancing Rabbit is able to achieve remarkable energy and resource savings *and* meet their nutritional, material, and hygienic needs by replacing financial and built capital with natural and social capital. In contemporary urban North America, most households purchase their basic needs from private enterprises, semi-public utilities, and municipalities in exchange for cash, or debt. We assume toilet will flush, the lights will turn on, the shower will be hot, and the trash will disappear so long as we pay the bills. Dancing Rabbit members produce, manage, and share many of the goods and services that mainstream households outsource as individual units, and do so with acute awareness of the origin of resources and destination of wastes. This system is possible due to an uncommon investment in cooperation and communication I label "radical participatory democracy."

Modern cities and regions are forged on the functional separation of the government vs. the governed, professionals vs. laity, the home vs. the workplace, productive work vs. reproductive work, masculine vs. feminine, the public vs. the private sphere, and humanity vs.

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[17] The median annual household income at Dancing Rabbit is, at most, $4,000. The federal poverty line is $23,050 for a household of four; $11,170 for an individual. US Department of Health and Human Services, 2012 Poverty Guidelines. Can be accessed at <http://aspe.hhs.gov/poverty/12poverty.shtml>>.

nature (Scott 1999; Warren 2000). Dancing Rabbit—an explicitly feminist community—is working to defy these dualisms. The Dancing Rabbit "municipality" and its citizens are virtually congruent. Decision-making, regulation, maintenance, and conflict resolution are a part of daily and weekly life for the residents themselves. Residents invest very heavily in social skills like non-violent communication and meeting facilitation that help the community work positively and proactively through conflict, rather than resorting to isolation or gridlock. Of course, the results of this experiment are imperfect: Some buildings do not function as expected, every year some Rabbits leave, and consensus-based decision-making is less and less feasible in a growing community. Like any community, there is still conflict, fatigue, isolation, and power imbalances. But DR is intriguing *because* of mindful experimentation and what it can teach the mainstream about low-impact living.

This experimentation is possible because of the project's physical and conceptual withdrawal from the urban development socio-technical regime. While DR remains connected, in many ways, to the modern macro-economy—through the internet and regional food systems for example—its founders chose to build DR on cheap, unregulated land so it could experiment with new types of housing, transportation, energy, and food production rules. Dancing Rabbit's founders chose to build a project in a setting that required minimal 'settling in' and in a place where there are few—if any—regime structures present to 'warm up.' I claim below that while DR has inspired a wide and growing audience, its direct influence on public sustainability initiatives is diffuse, and difficult to measure. Indeed, the community is inspiring individuals world-wide through its internship programs, its website, and its coverage on reality TV shows and news media, but its influence on society is through processes of niche *replication* rather than niche *translation* (Seyfang and Smith 2007). As socio-technical landscape pressure increases, however, the salience of Dancing Rabbit's experimentation may grow in urban and suburban areas.

Dancing Rabbit Origins: Synergy Cooperative, Stanford University

Dancing Rabbit was conceived by a small group of Stanford University undergraduates who lived together in the student cooperative, Synergy. The idea for a full-scaled "eco-town" began ruminating amongst a trio of cooperative residents some time in 1992, and they presented the idea at a San Francisco Bay Area Earth Day fair in April of 1993. The small group had to register a name, and settled tentatively on "Dancing Rabbit" as a literary reference to a passage about the Treaty of Dancing Rabbit Creek from William Least Heat-Moon's *Blue Highways: A Journey into America* (1982). The group had no intention of keeping this name, but by the time they had created a manifesto, a logo, posters, pamphlets, and an e-mail address (still relatively rare in 1993), they had effectively rendered the temporary name irreversible.

Between 1994 and 1995, the group hosted potlucks and information sessions in the Bay Area. Eventually, a small core decided to move-in together in a Berkeley to focus on writing bylaws and searching for land. Most of the founding group wanted to remain in Northern California or Oregon, on a rural site with the "freedom to experiment." They realized quickly, however, that settling in the Pacific Northwest was impossible as zoning and building regulations in rural California and Oregon made experimentation costly. Explains founder Tony Sirna:

> *In any rural area the zoning would have prevented us from building more than two homes per forty acres without doing a planned-unit development, which would have involved working for years with city hall to do it. That could have been great, but it wasn't what we were gonna do.*

Several tough meetings later, the group expanded its search eastward, but lost "two or three core members" who had no intention of leaving the region.

From that point forward, the potential land had to fit three criteria: low-cost, un-regulated (minimal zoning and building codes), and close to an existing intentional community. The group ultimately chose to move to northeast Missouri because of its proximity to Sand Hill Farm—a small organic farming community established in the 1970s. Founder Cecil Scheib was impressed

by Sand Hill on his nation-wide tour of ecovillages the year prior, and Sand Hill members were willing to host the DR founders until they found their own land. The group spent much of the next year making phone calls to the owners of parcels within a three-mile radius of Sand Hill. By the time the group found its 280-acre future home, incorporated their non-profit organization, and secured loans from close friends and family, it was October of 1997.

The initial years at DR were arduous and fragile. The site was effectively treeless, its soil overworked, and the three buildings on the land were unsuitable for human shelter. Even with land in their possession, the six DR founders had to live in a rented doublewide trailer adjacent to the property. Early members recall constant meetings that endured for hours at a time. Explains one early member:

> *Probably the first four years we would have three meetings a week. And usually they'd be 2.5 to three hours long. We'd have to do an hour of check-ins* [a convention discussed below] *and then two hours of meetings because there was so much to cover. And as we've gotten bigger, and there have been more people to take on responsibility, we've been able to shift responsibility onto committees who do a lot of that leg-work and bring it back to the group.*

Early members ate nearly every meal together, and immersed themselves in constant emotional and physical work, planting trees on the land, demolishing abandoned structures in the region for structural wood, beginning construction dwellings, and earning some income from online work at the end of the day. By the time the founding group was able to recruit and retain anyone new, its population had been whittled down to three.

Dancing Rabbit, 2013

Fifteen years later, the population of Dancing Rabbit is considerably larger and more diverse. Day-to-day life at DR is no longer dedicated to erecting a village from the ground up, and this has allowed for the matriculation of families with children, individuals on the verge of retirement, and members with little prior experience living in an intentional community. Aerial images of the village (see Figure 11 & Figure 12) reveal a settlement pattern that defies modern

neighborhood and city planning conventions. Absent is the familiar orthogonal gridded street pattern, paved right-of-ways, or the neat separation of residential, commercial, recreational, and agricultural land uses. Gardens, prairie grasses, and piles of building supplies fill the space between dwelling structures. The village is human-scaled and built for pedestrian circulation. The few existing gravel paths allow for the occasional automobile to enter and drop off construction materials, but so rare is the passing vehicle at DR that children are safe to explore with little regard for "crossing the street".

Figure 11: Dancing Rabbit Ecovillage lies on a 280-acre parcel in rural northeast Missouri. Its built structures are currently clustered in the southeast corner of the property.

Dancing Rabbit Ecovillage.
Image Source: Google Earth
January 15, 2013
By Robert H. Boyer

500 feet

1. Common House
2. Milkweed Mercantile Bed n' Breakfast Inn
3. Machine Shed and BEDR solar array
4. Future Community Building Site
5. Constructed Wetland
6. "La Casa de Cultura" Multi-purpose hall.
7. Parking Lot
8. The "Old Pond"

Figure 12: An aerial image of Dancing Rabbit Ecovillage, 2012.

Legal Stucture

Legally, the community consists of Dancing Rabbit Inc. (a 501c3 educational non-profit) and Dancing Rabbit Land Trust (a 501c2 community land trust). Each has its own board of directors composed principally of current and former ecovillage members. Its year-round inhabitants include 35 *members*, 26 non-member *residents*, and 16 children. *Members* pay dues, can block consensus votes, and can build structures on lots they lease from Dancing Rabbit Land Trust (DRLT). Individual lease holders do not own the land, but they do own all the built improvements on their warren; *Residents* can reside on the land, but do not pay dues, count in consensus votes, and are not permitted to own or build permanent structures. Residency is a trial period that allows both potential and current members to weight the appropriateness of an individual's future membership. After six months and no more than two years of residency an

individual can begin the membership application process. All members and residents can join cooperatives, serve on committees, and contribute to community meetings.

Similar to the other ecovillages studied in this dissertation, Dancing Rabbit is attempting to influence the mainstream by offering a living example from which outsiders can learn. Its mission is two-fold:

1. To create a society, the size of a small town or village, made up of individuals and communities of various sizes and social structures, which allows and encourages its members to live sustainably; and
2. To encourage this sustainable society to grow to have the size and recognition necessary to have an influence on the global community by example, education, and research (www.dancingrabbit.org).

While the vast majority of DR's 280 acres remains undeveloped, there are now about two dozen permanent dwellings suitable for year-round occupancy, a common house, a regulation-sized ultimate Frisbee field, several fruit tree orchards, personal gardens, a dance hall, a garage, and a four-room bed-n'-breakfast inn. During the summer, a consistent string of artists and performers pass through the community, and the community has hosted several resident artists in the past. The ecovillage administers an intensive visitor program, dozens of internships, a blues dancing festival, and in the summer of 2013 it will inaugurate its first five-week Ecovillage Education seminar.

Trajectory to Dancing Rabbit: "Defectors" and "Lifers"

Moving to Dancing Rabbit is an act of extraordinary agency. For most, it is a life-altering choice. Whereas members of urban and suburban ecovillages (e.g. Los Angeles Eco-Village and EcoVillage at Ithaca) more often relocate from within the region or state and can keep their day-

to-day income jobs, choosing to live at DR very often requires major lifestyle changes and the conscious development of new skills. Amongst this diverse and growing membership there are two common narrative types that characterize any individual's path to membership at DR. I label these types mainstream defectors (defectors) and life-long communitarians (lifers). Defectors are DR members who have moved from outside the intentional communities movement, having been "squeezed out" of their previous lives in urban and suburban neighborhoods. They feel like moral outsiders in their jobs and/or their neighborhoods despite having achieved what they once envisioned as success. Most share concerns about environmental issues to some degree, but find that their physical and social surroundings inhibit them from "pushing the edge." Notably, as of 2012, only one of DR's adult members is a native Missourian, yet even he discovered DR while living in California. Most have moved hundreds of miles from their previous home to resettle in a county of less than 5,000 residents. When prompted, "Tell me how you ended up living at Dancing Rabbit," their answers reveal many of the normative and physical elements of their previous urban and suburban communities that drive them to seek a community where there is more consistency between their daily lives and their ideals. One veteran member, Regina, who arrived at DR in the late 1990s, explains:

> *I was living in Washington DC, working for the federal government. It was pretty horrible and miserable… and I couldn't even get my co-workers to leave the recycling outside of the trashcan so I could take it down the hall to recycle. Like, that was a big deal. The fact that I was a vegetarian was the weirdest thing in the world to them, and I was like: 'if* this *makes me the weirdest person in the room, this is not where I should be…' It made me crazy. So I was, like, 'I have to do something different' and I looked on the internet…and I found Dancing Rabbit Ecovillage.*

Another member, Oren, explains how he and his wife felt isolated and judged in their suburban community because of seemingly inoffensive choices around the house like mowing the lawn less frequently, growing a garden, and recycling:

> *We didn't use pesticides [on the lawn]. We belonged to an organic CSA, we grew vegetables in the backyard instead of flowers. And we didn't fit in. The neighbors didn't like us. We'd bring out five or six recycling bins and one small garbage can every week. And*

> *everyone else would have, y'know, three or four big garbage cans and maybe no recycling bin. And I remember a neighbor multiple times offered to pay to have professionals come and take care of our lawn for us. Y'know she also cut coupons out of the paper for pesticides.*

Matilda describes how she and her family felt socially and spatially isolated in their neighborhood despite having achieved the "American Dream." Interacting with friends required extra effort and long drives:

> *I ended up at Dancing Rabbit because I was living the American Dream. I had a three-bedroom, two bath, three kids, two-car garage, two cars, and a husband in [a medium sized college city] and I felt pretty isolated. I had neighbors but I didn't really know them. And I had friends but they didn't live close. They lived twenty miles away, each of them. So we would have play dates and they were very scheduled and that's when you saw your friends and it was just, it felt like there was a disconnection socially. And as far as ecologically I was doing things like composting and gardening and recycling but I wanted to push the edge.*

Raymond, a member in his mid 60s, chose to move to DR after working deliberately for years to lower his ecological footprint while living in Houston, Texas. After reading *Our Ecological Footprint* by Mathis Wackernagel and William Rees (1996) and attending a talk by Wackernagel, he simplified his diet and began to walk up to 13 miles at a time to pick up groceries. He explains that he could have purchased a bicycle, but that "biking was suicide" in Houston. Ultimately, he found that living in Houston—"the belly of the beast"—prohibited him from lowering his impact any further, and chose to continue pursuing his goal at Dancing Rabbit.

These experiences illustrate some of the structural barriers to achieving low-impact lifestyles in urban and suburban places. Both Regina and Oren paid social costs for acting (or attempting to act) on their environmental ideals. They felt morally isolated by their peers for actions like recycling and gardening, which they themselves found relatively mundane. Maltida had to drive very far to maintain her few friendships and felt that such a lifestyle inhibited her from "pushing the edge" environmentally. Raymond's case demonstrates the physical barriers to lowering one's ecological footprint in a region built explicitly for automobiles. Moving to DR removed many of these social and physical barriers to low-impact living.

Other DR members explain that they knew from a young age that they belonged in an intentional community, either because the concept was part of their upbringing or because their formal schooling presented a lifestyle they found financially and ideologically constraining. Rather than discovering intentional community after a life in the mainstream, the concept of communitarian living is relatively second-nature to lifers. Explains one young member:

> *When I was sixteen I dropped out of high school and I was very familiar already with the ideas of un-schooling and so [moving to an intentional community] was a very conscious decision. I didn't want to just be biding my time for the next two years. I wanted to be more in control of my own life and was fortunate enough to have parents that supported that.*

Another "lifer" explains that the intentional communities movement was part of her family upbringing:

> *I was first introduced to community when I was pretty young. I had aunts and uncles. I had family that was part of the kibbutz movement in Israel and I thought that that just made sense, to live with other people, raise your children with other people, um share in the task. I didn't know why people would not want to live that way and I started checking out communities when I was fifteen years old.*

One young member describes how, after studying construction management as an undergraduate, he opted to find a job outside of the "rat race," where most of his classmates were seeking jobs at construction firms:

> *So after I graduated, most of my classmates went on to get jobs with big construction firms and project managers and [that was] more stress than I really wanted in my life. And, in the meantime I was also looking for an alternative lifestyle and wanted to get away from the rat race, or whatever we call it, and try to get away from spending money and all that good stuff. Just a simpler lifestyle. And I did some searching on Google and found [an internship at Dancing Rabbit].*

Similarly, one veteran member explains that he was exposed to "alternative cultures" as a young skateboarder in suburban Detroit, and long aspired to live and work in a community of close friends. What is common amongst all types is a physical withdrawal from a life in mainstream urban and suburban places and their associated social and economic lifestyles. But Dancing Rabbit is not a rule-free community. It is forging a principled and structured alternative to the mainstream. Intentional communities of the past have struggled to strike a balance between

laissez faire on one hand and complete autocracy, on the other. Matthews (2010) documents how Drop City, the first "hippie commune" offered a similar escape from the mainstream, but imploded after two years, due in part to lack of structure or member selection criteria. Kanter (1972) explores intentional communities throughout American history and how their submission to individual charismatic leaders contributed to their decline. Dancing Rabbit and other contemporary intentional communities have learned from the unraveling of intentional communities of the middle twentieth century (Lockyer 2007). DR's rules revolve around principles, rather than personalities, and offer enough flexibility for adaptation and inclusion of diverse individuals. An exploration of DR's six ecological covenants offers a comprehensive summary of the rules that distinguish Dancing Rabbit from mainstream human settlements.

New Rules of the Game: The Six Ecological Covenants

Socio-technical niches are spaces in which new "rules of the game" allow agents to safely experiment with new social and technological structures (Kemp, Schot, and Hoogma 1998). Life at Dancing Rabbit is heavily shaped by six ecological covenants that directly address global issues of energy, resources, and ecological systems. Although they are not the only rules at Dancing Rabbit, they are as close to sacred as anything in the community. They form the equivalent of the Dancing Rabbit constitution, and while they have changed subtly in fifteen years, they change very rarely. Their elaboration illustrates how DR distinguishes itself from mainstream North American living.

1. *Dancing Rabbit members will not use personal motorized vehicles, or store them on Dancing Rabbit property.*

While Dancing Rabbit is situated only two miles from the small town of Rutledge (population 106) and about thirteen miles from the county seat, Memphis, Missouri (population

1,822), DR's location offers very little in terms of conveniently located employment opportunities. The nearest metropolitan center, Iowa City, is located 125 miles away, and even commuting to Kirksville—the site of Truman State University—requires a two-hour round trip. Fortunately, DR members have found ways to subsist with relatively little cash income, and what income they *do* earn is most often earned over the internet or through seasonal work outside the community. One particularly entrepreneurial member explained, "I have ten jobs," including two online businesses and multiple small remunerated duties inside the community. Several members leave the community for months at a time as an element of their online job or part of a seasonal job (e.g. construction work, lab research, or soil analysis), and return to DR for the majority of the year to focus on their homes, gardens, and community. One couple started the Milkweed Mercantile Eco Bed 'n' Breakfast, where guests can stay and attend practical workshops ranging from food canning to straw bale construction. Two women have started a regional midwifery business that requires only intermittent travel outside the village. Several members have drawn from their experience building their own homes to start independent design/build companies, which also offer temporary work to other members and residents.

While most are able to earn some income on-site, DR members make regular trips into Memphis, Missouri, Kirksville, Missouri, and Quincy, Illinois to purchase building supplies, borrow library books, receive medical attention, see movies, or for any number of reasons. For these trips, automobiles are imperative as cycling or walking would take days and the region has no public transit system. Even still, the average DR member drives 9 percent the annual number miles of the average American[18]. Trips within the region are completed in one of DR's three cooperatively owned vehicles. Currently the Dancing Rabbit Vehicle Cooperative (DRVC) owns two Volkswagen Jettas and one Ford F-350 pickup truck. All run on biodiesel. Coop members are

[18] See Appendix B, Dancing Rabbit Resource Use 2011.

charged 60 cents per mile, which covers fuel, insurance, and maintenance. The cost of driving and general vehicle use is further minimized by ride-sharing and multi-purpose trips, which are facilitated by weekly vehicle cooperative meetings (see below).

2. *At Dancing Rabbit, fossil fuels will not be applied to the following uses: powering vehicles, space-heating and -cooling, refrigeration, and heating domestic water.*

While DR households commonly use propane gas for cooking, other household energy needs are met by a combination of locally generated electricity and mindful design. Dwellings at DR are typically very small, well insulated, and designed to take advantage of natural temperature and sunlight cycles. Many homes at DR are simple cabins: small spaces for sleeping and personal storage. One member, for example, converted an abandoned school bus into a comfortable studio apartment heated by an attached greenhouse and insulated with packed wool and an earth berm. Another member has chosen to build his "Shanty" by accumulating recycled materials over time. Other members have chosen to build relatively larger homes, with up to three bedrooms, but even the largest homes use regionally sourced materials and are designed to take advantage of sunlight. During the coldest winter months, most members can heat their entire dwelling with a small wood-burning stove and passive solar heating.

Figure 13: A small cabin dwelling at Dancing Rabbit.

Figure 14: This larger timber-framed and straw bale dwelling (under construction in this image) is the home of a family with three children. Its interior footprint is smaller than a conventional home with the same exterior footprint, as straw bale insulation results in very thick walls.

Figure 15: This "win-door" allows warm air from a greenhouse to heat this building's interior in the winter.

Missouri summers are typically hot and very humid. Achieving a cool indoor climate requires some simple changes in routine. During summer evenings, households open their windows to let in cool air. In the morning, as the temperature begins to rise, Rabbits close windows and lower window shades to trap in the cool air from the evening and block the sunlight. The building's insulation maintains a comfortable temperature differential for most of the day. Clever roof design also blocks direct sunlight during the summer and invites light in during the winter when the sun is lower on the horizon Still, the mid-continent humidity remains a major challenge to some Rabbits. One member described how tolerating the midsummer humidity is one of the major obstacles to attracting a mainstream following. Our interview took place on one of the hottest days in July. He explained: *We've gotta find some kind of solution, dehumidification, or something. We've gotta find a way to make this a little more humanly tolerable because y'know the majority of Americans are not willing to go back to this.*

Members routinely choose to build small homes because they can access cooperatively owned laundry facilities, showers, toilets, and social space in the DR Common House. Smaller spaces require much less energy to heat and cool. The new Community Building (under

construction at the time of the writing) will expand DRs cooperatively owned space and afford present and future DR members even more spatial efficiency. The common house is also home to a shared kitchen that is used by one of several food cooperatives and by the community-at large during larger events.

Figure 16: The Dancing Rabbit Common House contains a variety of shared facilities including an office, showers, toilets, a library, a kitchen, a children's play room, and a large multi-purpose meeting/dining space. A large solar oven (front) can be used to cook food without added energy on sunny days.

Figure 17: A rendering of the future "Community Building." Its designers intend for it to achieve Living Building Challenge standards. Source: http://www.greencommunitybuilding.com.

3. *All gardening, landscaping, horticulture, silviculture and agriculture conducted on Dancing Rabbit property must conform to the standards as set by OCIA for organic procedures and*

processing. In addition, no petrochemical biocides may be used or stored on DR property for household or other purposes.

Depending on the season, DR cultivates 21-50 percent of its food from gardens and orchards on-site. Common crops include garlic, onions, kale, white beans, tomatoes, an assortment of herbs, pears, apples, and silver maples (for the creation of sorghum). While several young members have expressed intentions of growing cereal crops 'on farm,' to date DR imports most of its caloric intake through United Natural Foods Inc (UNFI), a distributor specializing in organic and regionally-supplied foods. All on-site food production is conducted without pesticides or herbicides, so residents and interns invest large portions of the growing seasons pulling weeds and planting cover crops to prevent weed growth. The community also generates much of its own organic fertilizer (see covenant six). Food production and consumption is organized around multiple food cooperatives of varying size. Shared kitchen facilities conserve material resources and energy, money, and time, as meal preparation duty rotates throughout the week.

4. *All electricity produced at Dancing Rabbit shall be from sustainable sources. Any electricity imported from off-site shall be balanced by Dancing Rabbit exporting enough on site, sustainably generated electricity, to offset the imported electricity.*

In 2011, Dancing Rabbit members consumed 7.5 percent the electricity (in kilowatt hours per year) of the average American. Until very recently, Dancing Rabbit remained completely disconnected from the electricity grid. All electricity consumed on-site was produced on-site by solar photovoltaic panels (PVs) or small wind turbines. Excess energy was stored in car batteries. In the summer of 2010, the community amended its covenants to allow for a grid tie, but resolved to return *at least* as much electricity to the grid as it consumed. The reason was partially a matter

of better storage: batteries are expensive, toxic, and must be periodically replaced. Another reason was intermittency: Rabbits hope to eventually transition to electric vehicles, and this will require a more consistent source of electricity than solar, which waxes and wanes throughout the day and year.

A third reason is affordability: early Rabbits had to purchase and manage their own electricity systems when they built new homes. Today members can connect to an internal grid administered by Dancing Rabbit's electricity cooperative BEDR (Better Energy for Dancing Rabbit). BEDR generates electricity through a 25kW PV roof-mounted array. Prior to BEDR, members had to invest in individual solar and wind electricity systems, so the cooperative allows new members to construct dwellings without budgeting thousands of dollars and hours of labor into their own electricity systems. The cost of BEDR electricity remains relatively high, however. Subscribers pay $8-10 per month, plus 35 cents per kilowatt hour. In comparison, the average retail price for electricity in Missouri in October 2012 was 9.78 cents per kilowatt hour[19]. Fortunately, the number of large electric appliances is reduced by cooperative ownership and household consumption is reduced by clever design.

5. *No lumber harvested outside of the bioregion, excepting reused and reclaimed lumber, shall be used for construction at Dancing Rabbit.*

The founders of DR purchased a parcel with only a few trees, and spent years planting thousands more. Some buildings at DR have used local and regional lumber as framing, but most lumber used for construction is salvaged from demolition projects in the region. Fortunately for Dancing Rabbit, there are a growing number of abandoned farmsteads in northeast Missouri. As an intern on one natural building project, I spent several hours of most days prying rusty nails from old

[19] US Energy Information Administration: http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_6_a

lumber and sawing off rotten ends of used two-by-twelve beams. Homes at DR are rountinely built using cob—a mix of sand, clay, and straw—and straw bales. The former can be harvested directly from the clay soil on DR property. The later is harvested as a waste product of wheat production, and is often available from farmers in the region.

6. *Waste disposal systems at Dancing Rabbit shall reclaim organic and recyclable materials.*

In 2011, the average Rabbit produced about 26 percent the amount of household waste as the average American[20]. Food cooperatives at DR tend to buy items in bulk, reducing the amount of food containers that might normally fill trashcans. The community also administers its own recycling system, sorting glass, plastic, aluminum, tin, paper and transporting it periodically by truck to a recycling center in Quincy, Illinois. Organic food waste and human excrement is all composted on-site, closing nutrient loops that modern waste management has interrupted. Food waste is composted and reintegrated into farming soil within months. Human excrement is managed through a "humanure" (human + manure) system. DR members and residents "contribute" their excrement plus a scoop of wood shavings into any of several five-gallon buckets. The wood shavings offer organic material to fuel composting processes and, remarkably, absorb odor. The buckets—which are housed in private closets and fitted with a toilet seat—are dispersed throughout the community and collected by a rotation of community members on a weekly basis. The contents are deposited into a strategically positioned "humey" pile. After two years and mindful management, humanure can be safely re-integrated into the soil. For ecovillage guests, the Milkweed Mercantile uses a commercial-scale Phoenix Composting Toilet system[21], which replicates the humanure system in an underground container rather than five-gallon

[20] Based on an internal assessment of Dancing Rabbit resource consumption. See Appendix B.

[21] http://www.compostingtoilet.com/.

buckets. Rabbits generally opt to apply humanure to fruit trees and flowers, rather than directly to crops.

There is neither a "water covenant" nor a village-wide water system at DR. The community has access to the county water source, but most households opt to collect, store, and filter rainwater for daily use. The community has a constructed wetland for filtering gray water, and the humanure system eliminates

Integrated Systems

How DR achieves these covenants illustrates the important interconnections of these various systems. Rather than isolate waste management and food systems, as do modern urban and suburban jurisdictions, DR attempts to close the loop in the organic cycle by integrating gardening and composting systems. Rather than conceiving electricity systems as distinct and external to housing construction, DR designs homes and chooses material to minimize electricity and heating demands and are thus able to meet demands through a relatively small, simple system. *All* of these systems—transportation, energy production, food production, waste management, and construction—are integrated into the daily social lives of DR members and residents. As discussed above, many of the ecological savings achieved by DR members are the result of cooperative structures that share the costs of capital and labor. Rabbits are able to live at low consumption levels because they share resources and reduce demand, but resource sharing is not an *inherent* skill. Dancing Rabbit members and residents *practice* sharing and cooperation skills. Over time, the community has developed social conventions that allow individuals to live collectively without sacrificing individuality. I discuss these cooperative structures below.

We Are the Municipality: Radical Participatory Democracy

While individuals commonly move to Dancing Rabbit hoping to achieve simplicity and control over their life, many find that life 'in community' is far more hectic than they anticipated. Dancing Rabbit is able to achieve low-consumption living without sacrifice to quality of life

because individuals devote much of their time and energy to many and diffuse entities in the community. It is a remarkable balancing act. One member explains that her busy routine at Dancing Rabbit is 'inescapable,' whereas she could conceivably 'escape' from her different roles in an urban setting. At DR, she plays an active role in enforcing and crafting the rules to which she and her neighbors are subject from day to day:

> *Being at DR, I think I'm busier that I'd ever been. I used to have leisure time. I don't know what that is anymore. And I think that's because living in the same place where I have my business, where I'm also intimately involved in the structure of where I'm living, it's so multi-faceted there's no way to escape it. So I'm always there. I'm always on. I'm always thinking about it. In [my former home in a major metropolitan region], I paid my rent. Someone else took care of everything. I didn't care. I could call the police if the neighbor's dog was bad. I could call the landlord. Whatever. I didn't have to deal with any of it. And here, we're not only dealing with it, we're designing it.*

Such a routine demands detailed scheduling. In interviews, members comment on the relative importance of time management in community. One member compares his busy professional life prior to Dancing Rabbit to his new more complex schedule. Whereas life in the mainstream entailed only home life and work life, his new routine requires him to play manifold "roles." His explanation is worth quoting at-length:

> *…when I worked seventy hours a week and I had eleven clients and four employees and managed myriad details across multiple clients I never needed much in the way of a day planner. Just a wall calendar was ample for both [my wife and I] to share. Here, we both have our own highly detailed planners and we rely on them. It's crazy because there's so much overlap and interconnection and different roles that we play depending on the context. It's vital otherwise it's too easy to drop the ball and lose things because we're not just running our lives and taking care of our family. We're building a village and we are administering and running a municipality collectively. And so all of that work, even though it's on a volunteer basis, most of it has to be done somehow.*

A large portion of day-to-day life at DR is devoted explicitly to maintaining relationships. The schedules of members and residents are pocked with regular check-ins, co-counseling sessions, women's groups, men's groups, and other meetings with the express or ancillary purpose of supporting friends and neighbors emotionally. As an intern for two summers, I participated in regular "check-ins" myself. It is common for project managers to administer check-ins amongst a work crew. Different individuals practice check-ins differently, but they are often administered

prior to more formal business meetings and one version offers space for individuals to verbalize **p**hysical, **i**ntellectual, **e**motional, and **s**piritual needs ("PIES"), without time restrictions and without interruptions. As my experience illustrates below, check-ins can be reweave social connections that might otherwise remain severed, and their importance is paramount in a community that relies upon close cooperation.

Checking in with Shane

In my first summer as an intern, I spent most daylight hours alongside another intern named Shane (a pseudonym). Aside from arriving at DR on the same day, Shane and I shared little in common. He was fifteen years my senior, a combat veteran, and a former construction manager. I was a life-long student with exactly one year of "construction" experience in junior high shop class. Every day, Shane and I shared breakfast, lunch, and dinner with a side of contemptuous silence. By my recollection, most of our conversation consisted of complaints, critiques, and sarcasm. I sensed he was very frustrated with my inexperience. At one point, after I committed what I saw as a small but honest mistake, he dismissed me from the worksite explaining that he would rather work alone. It didn't help that our third co-intern was a shy French student with next to little English skills and only a bit more construction experience than I. We worked outside, in Missouri's worst July humidity and 100+ degree heat. Most of the time, we used hand tools to chip-chip-chip away at (very hard) Osage branches. Our progress was slow and our patience wore thin. In the evenings I was happy to avoid Shane, and spent time with other interns and young residents. I dreaded that he might befriend someone in the group and taint my evenings as well, but avoiding anyone in such a small community is next to impossible. As co-workers, such a relationship was neither productive nor sustainable.

About one month into our project, our supervisors—a young couple—decided to administer a routine five-way check-in. They initiated the process, individually verbalizing some of the burdens and joys of raising a small child, of administering a

building project, and managing their other relationships in the community. They expressed their gratitude to the other interns and me, and how much they had learned from us. I expressed my excitement about living and working at Dancing Rabbit, how impressed I was with our French co-worker's English language progress, but also my frank frustrations with the project, and especially those related to my impasse with Shane. I expressed how I was impressed with his construction skills and his intense work ethic, but I was disappointed we had set off on the wrong foot. I also explained that I could understand how a builder with his experience might find working with relative novices very frustrating. When it was Shane's turn to speak, I learned not only of his frustrations with slow progress and his stress related to a recent family emergency, but he also admitted—very sincerely—that he admired me very much for my ability to connect with members of the community, and wished he could do so himself. I was shocked. Indeed, I had been trained over the years to build rapport in community settings, as both a student and a former camp counselor. I worked very hard and very deliberately to build friendships in the community. But I didn't think he noticed or cared. His compliment was uplifting to me. While Shane and I never became close friends, I'm convinced we shared more empathy for each other after the check-in, and it allowed me to focus on completing the project rather than on calculating how to avoid confrontation with my co-worker.

Check-ins are a fixture in the life of Dancing Rabbit members. While I experienced check-ins as a member of a work crew, others begin each day by 'checking-in' with their spouse or partner over breakfast. Others have weekly check-in appointments with friends, and others administer check-ins on a more *ad hoc* basis. Many do both. Such practices allow for an emotional transparency that is uncommon in the mainstream. Understanding ones emotions and perceiving the emotions of others is

an important aspect of daily life at Dancing Rabbit. One member found such transparency surprising and refreshing when he moved to DR:

> *If somebody was upset, they didn't stuff it. It came out. They'd show it, and it was dealt with. It was okay to say, 'Y'know I understand that you're in a hurry or whatever, but this just really caught me the wrong way and I'm feeling a little upset about it, and so, I'm hoping that maybe you'll think about that before you do it again.' It was powerful.*

A member of Earthaven Ecovillage, in which members also engage in check-ins and a similar practice called "heart-shares", explains how she was surprised to encounter the emotional openness of her community shortly after moving in:

> *I thought, 'check-ins? What's up with that?' I mean why can't we just wait for a problem and just take care of it in the moment? Well those check-ins are a really important piece because my culture pattern was to repress, to separate myself, to manage internally any kind of conflict that was going on and not always to address it. So heart shares and check-ins were a way to speak to what's alive and true in the moment and pull stuff from underneath the carpet as it was.*

This emotional transparency is enhanced by a practice called non-violent communication (NCV), a learned skill in which Rabbits invest heavily. The practice requires deliberate emotional self-awareness, empathy for others, and honest self-expression. NVC would likely prevail unnoticed to an unprompted or untrained listener. The speech practice involves a shift inwards, to the emotions of the speaker. I recall vividly how the use of NVC affected me in my first month at DR. In the summer of 2010, one veteran member, Shirley, left her home under the temporary care of a young resident while leaving the community for medical treatment. When she returned, she found her self-built house in disarray. The week prior, a group of young residents and interns—myself included—had taken advantage of the empty space for a small party. We neglected to clean up the mess. At the first community meeting after Shirley's return, she announced, "I was very saddened to arrive home and find empty beer bottles and dirty dishes all over the house. Anyone is welcome inside my home, and I trusted that in my absence, it would be cared for. I expect that in the future visitors care for my home as if it were their own." Her message was

short, clear, and extremely powerful. Instead of accusing or blaming, her speech focused on how the event affected *her*. We had betrayed her trust and caused her sadness. It was a situation I wanted very to remedy very quickly, and I apologized to her personally. By choosing to express her own emotions it invited the 'offenders' an opportunity to rectify the situation without feeling attacked or damaged.

Sunday Meetings and Business Meetings

For several hours every Sunday, DR members and residents actively engage in the social and physical maintenance of the ecovillage. It is by no means the only time in the week when such investment occurs—committee meetings and interpersonal meetings occur throughout the week—but Sunday afternoons are designated for meetings of the whole. At 12:30, after the 'clean team' has purged the common house of a week's worth of mess, members and residents re-arrange the chairs of the grand room into a loose circle and begin the "Sunday meeting." The Sunday meeting is a fixture in the often hectic routine of DR members. The ritual takes no more than 45 minutes and the entire meeting is actually a cluster of several meetings that flow directly into one another. All members, residents, visitors, and interns are invited to attend and participate in the Sunday meeting. There is very little debate and almost no voting, which are both reserved for longer, more exclusive "business meetings." Before the meeting begins neighbors exchange hugs, kitchen tools, and books. Children climb over couches and into the laps of their (much older) friends. Some bring knitting projects and vegetables to slice, but most carry notebooks and personal planners. The room scrambles to choose a facilitator and a scribe, and then, open announcements begin. Attendees raise their hand, are recognized by the facilitator, and have a moment to make an uninterrupted announcement. It is a space for airing general requests and notices:

- *Leila and Frank are hosting a work party Tuesday morning, 8AM.*

- *Selena is missing a knife.*
- *There will be a work party immediately after the meeting to fix 'the rut' in the road leading up to the DR entrance.*
- *Volunteers are needed to help cook for the visitor session on Tuesday morning.*
- *There are lots of general voicemail inquiries about DR on the answering machine. Volunteers are needed to help reply.*
- *Big John and Tanya are hosting a work party, Wednesday 9AM. Wear boots. Come dressed for cob stomping.*
- *Star lost a yellow Frisbee. Please return if found.*
- *Steven is looking for a 'strong rope.'*

When general announcements conclude, the meeting moves into a list of visitors coming on and off 'the farm.'

- *Regina's friend Beth and her two children are arriving Monday and staying through Saturday.*
- *Kathleen, the new Skyhouse "wexer" arrives Tuesday afternoon*
- *Tanya will be leaving on Friday, will be gone for several weeks.*

Then the meeting moves in a segment called "the WIP"—the week in preview. The WIP is an opportunity for the entire community to synchronize calendars. The items listed are a combination of weekly routine events and other more spontaneous events. Ultimate Frisbee games, the Tuesday potluck dinner, song circles, and committee meetings appear as permanent fixtures on the calendar throughout the year.

After the WIP, the meeting shifts specifically to the week's automobile use. As discussed above, the entire community shares three cooperatively owned vehicles. Part of each Sunday meeting is devoted to announcing *when*, *where*, *how long,* and *by whom* each vehicle will be used

during the week. Any member of DRVC can reserve a car at any point during the week by signing a clipboard in the common house, but the Sunday meeting allows for the sharing of information that facilitates remarkably low vehicle miles traveled. Explains Oren:

> *Often we'll find out [at a Sunday meeting] if someone is going into town on a certain day. You might call the hardware store and say I need, this, this, and this, pay for it over the phone and have that other person pick it up when they're in town, and I'll do that for others.*

On the whole, the system works very well. The average Dancing Rabbit member-resident drives only nine percent the number of miles and consumes only seven percent the volume of motor fuel as the average American[22]. Oren continues,

> *...what a relief it is to go from having to drive everywhere [prior to life at DR] to, ironically enough, being here practically in the middle of nowhere where you'd think you have to drive for anything and I get in my car once every few weeks… And there are days when [the cars] don't get used.*

Toward the end of the Sunday meetings, the facilitator will announce next week's 'clean team'—the rotating group responsible for cleaning the common house at the end of the week—, the individual responsible for writing the village's weekly column in the local *Memphis Democrat,* the individuals on "humey duty"—a small rotating team response for collecting and emptying humanure buckets throughout the village—and ask for any last-minute announcements.

Business Meetings

After the Sunday meeting adjourns, the community may reconvene for a business meeting. Business meetings are a space for deliberation and decision-making. In the community's first fifteen years, it has employed a consensus decision-making structure[23]. Consensus decisions

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[22] Based on an internal assessment of Dancing Rabbit resource consumption. See Appendix B.

[23] A specific committee at DR began exploring alternatives to consensus decision-making years ago, and the community will likely transition away from a consensus as the community grows in population.

do not require unanimous support—members can abstain or "stand aside" and let a motion pass—but any full member can "block" a motion, delaying or stopping the decision. The power to block a decision is reserved to members only. While the WIP is congenial and quick, the business meeting is a space reserved for conflicting perspectives and debate. Members are encouraged to express their emotions frankly and openly. I had the opportunity to attend a business meeting revolving around car insurance. The vehicle cooperative, which includes most DR members, was struggling to decide whether and how it should accept rate increases brought on by young members or individuals with a bad driving record. The issue emerged as a teen raised in the community approached driving age and wished to use the cooperative vehicles himself. Was the cooperative willing to pay for the large and imminent insurance rate increases when a sixteen year-old joined the coop? Should the teen (or his parents) make up for the difference by paying more, or should the rate increase be absorbed by the entire cooperative?

Business meetings are facilitated by a trained community member, responsible for summarizing, steering, and setting the ground rules for discussion. The facilitators of this particular meeting spent the first 20 minutes "filtering" the discussion, having spent the previous week speaking one-on-one with different stakeholders. They admitted they were "exhausted" from the process. The meeting touched on a grand variety of topics: insurance rates, the neurological development of teenage drivers, different child-rearing philosophies, intergenerational justice, interpersonal tensions, automobile culture, and even the morality of insurance. Advocates of each perspective provided passionate and personal pleas. Members expressed very raw and open emotions, but members were also explicitly aware of each others' perspective. At one point, a father entrenched strongly at one extreme of the argument repeated, almost verbatim, the perspective of another individual with the opposing perspective. Such "reflection" is a learned technique, and it ensures that members listen and know they are heard.

The community was not able to resolve this dilemma by the end of the ninety-minute meeting. They would continue to debate the topic for over a year[24]. Yet even in the midst of an emotional debate, the gathering concluded with a reflexive dialogue about the meeting itself: How did members think the meeting went? In a mainstream municipal hearing such an undertaking might seem like a bizarre waste of time. Such open and emotional self-expression and reflexivity is discouraged in municipal hearings, which have received criticism for their intimidating, expert-driven, and one-sided dialogue (Innes and Booher 2004; Lowry, Adler, and Milner 1997; Halvorsen 2001).

Committees

As the community grows, more and more detailed decision-making has been delegated to volunteer committees made of 2-4 community members. Committees are formed and assigned each year at DR's annual winter retreat. There are about a dozen committees currently, and the most active committees meet for several hours each week. Some committees focus on common municipal functions: the land use committee is responsible for planning how land on DRs 280 acre property will be used, including which areas of the property will be "opened-up" for neighborhood development. A warren & siting committee acts as an internal building and zoning committee. Many DR members are excited to experiment with building design; the warren and siting committee offers expertise to new builders, ensuring that structures are safe and resource efficient. A decision-making process committee has invested time in researching alternatives to consensus processes that are both inclusive and time-efficient. Other committees focus on guiding new residents through the membership application process, coordinating visitors, maintaining the cooperative vehicles, conflict, debt, and the community website. An oversight team or "O.T." is

[24] The vehicle co-op ultimately resolved to switch from a "family" insurance plan to a "commercial fleet" insurance plan, which is less sensitive to the age of drivers. Premiums for the entire co-op increased $100, rather than $8,000 as was projected with the family plan.

responsible for setting the agenda of business meetings and making sure that communities initiatives don't "slip through the cracks."

Scotland County, Missouri

Dancing Rabbit founders were as attracted to Scotland County for what it *didn't have* (namely zoning and building codes) as for what it *did* have (Sand Hill Farm and cheap land for sale). Its population of 4,843 concentrates in the county seat, Memphis, but it is otherwise spread across very small towns and rural properties. All 2,369 housing units in the county are classified by US Census Bureau as 'rural'[25]. In 2010, the county was home to 123 commercial establishments, 65 percent of which had 4 employees or fewer, and only one establishment with over 100 employees[26].

In interviews, Rabbits distinguish three types of Scotland County neighbors: Tri-Communitarians, Mennonites, and non-Mennonites. Tri-Communitarians include residents of Dancing Rabbit, Red Earth Farms and Sand Hill Farm. Members of these smaller communities participate in daily and weekly life at Dancing Rabbit. It is not uncommon for Red Earth and Sand Hill members to attend Sunday meetings, Ultimate Frisbee games, and other social events. Each Tuesday, the three communities meet for a potluck dinner. Each summer, the Tri-Communities form an Ultimate Frisbee team and compete together in the state-wide "Show-Me State Games." When I asked DR members about their relationships with "neighbors", several had trouble conceiving of Red Earth and Sand Hill as neighbors at all, considering them as part of the same community within the larger region.

Local Mennonites are socially, economically, and philosophically distinct from individuals in the Tri-Communities. The first Old Order Mennonite families arrived in Scotland

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[25] US Census Bureau, 2010 Census, Summary File 1, Urban and Rural.

[26] US Census Bureau, 2010 County Business Patterns.

County in 1973, and began purchasing land from aging farmers whose children were beginning to opt for educational and economic opportunities outside the region. Since the mid 1970s, the Mennonite population has grown steadily as a proportion of Scotland County's total population (interview with Dancing Rabbit Member). Dancing Rabbit and the neighboring Mennonite families have a happy mutual tolerance: DR members and residents regularly patronize Zimmerman's general store—a business owned by a Mennonite family in nearby Rutledge. DR members also contract with Mennonite construction businesses for quick projects that require large construction equipment. For the most part, however, the Tri-Communities and their Mennonite neighbors respect each other from afar. One DR member explains:

> *We get along with the Mennonites pretty well. Within limits. They're not gonna come hang out here. You're not gonna see any young Mennonite people hang out at DR or visit the Mercantile. They still stick together, and so, every once in a while a Mennonite family will come on a tour and usually it's someone we know through the store [Zimmerman's]… They don't understand a lot of what we're doing or why we would choose to, but not understanding and not choosing to do it yourself is different than being against.*

Dancing Rabbit Members also seemed to have achieved a friendly co-existence with non-Mennonite neighbors. Several neighbors are regular visitors to the community, and one couple regularly visits the Milkweed Mercantile for beers and pizza. The DR founders worked hard to keep an open dialogue with neighbors to dispel fleeting rumors of cults and nudist colonies, and most current misunderstandings to date involve individuals with little direct exposure to the community.

Inspiration Through Digital Media and Educational Programs or "Niche Replication"

Since DR's founding, the community has relied upon the internet as a virtual bridge to individuals and institutions outside the region. It is the medium by which DR has recruited most of its members and visitors. Nearly every community member I interviewed described how their journey to Dancing Rabbit began with an internet search. When I interviewed the individual responsible for general correspondence, she explained that many interns and visitors had

discovered the community through a member's blog. It is difficult to imagine DR's trajectory if its early members were not capable of building a website at the dawn of the internet age. As discussed above, DR members and residents rely heavily upon the internet for their economic subsistence. The community also relies very heavily upon the internet for *internal* communication. One member estimates that "Eight to ninety percent of DR business [e.g. communication regarding community-wide affairs] is done via e-mail." Founder Tony Sirna explains how DR's use of the internet for economic purposes has grown while his personal use of the internet for social reasons has declined:

> *I think we're very dependent on it socially, economically, for recruitment, and research. Being able to find, y'know, technologies and material and all of these things. And I think we've been getting more dependent on it as time has gone on. In some ways less socially. I think when we first moved here, there were days when I got a lot of my social needs met with friends who were far away. And that's less true now. But in terms of recruitment, there were actually people that wrote us paper letters at first. There's no one who does that anymore.*

Dancing Rabbit has also attracted attention from news and entertainment media[27]. Outside of the communities or sustainability movement, however, most media attention has highlighted the project's novelty or quirkiness—albeit in a positive light—rather than its potential as a practical alternative to existing urban development processes. An April 2012 CNN travel section article featured Dancing Rabbit as one of the "5 great spots for dropping off the grid[28]" and a February 2012 article in Forbes featured one DR dwelling an article entitled, "Homes made from wacky materials.[29]" The community was featured briefly on Comedy Central's Daily Show, on which comedian Lewis Black mocked DR's humanure system. DR has also been featured on St. Louis

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[27] Dancing Rabbit's Media Page offers a comprehensive list of articles that feature DR: http://www.dancingrabbit.org/about-dancing-rabbit-ecovillage/press/media-coverage/

[28] http://www.cnn.com/2012/04/17/travel/off-grid-destinations/index.html

[29] http://www.forbes.com/sites/marcellefischler/2012/02/10/homes-made-from-wacky-materials/

local news and the reality TV show "30 Days" which challenged two city-dwellers to struggle off the grid for a month.

Dancing Rabbit's founders and former members have continued to pursue environmental initiatives upon leaving the community. Founder Cecil Scheib was hired as New York University's first sustainability director and led an aggressive effort to reduce the university's total greenhouse gas emissions 30 percent—six years ahead of schedule[30]. Early Member Jeffery McIntire-Strasburg founded Sustainablog (sustainablog.org), a popular website for sustainability initiatives that regularly features Dancing Rabbit. The community is featured regularly in *Communities* magazine, a publication of the Fellowship for Intentional Community. In my two summers at the community, I befriended multiple guests in the midst of founding intentional communities themselves, including the founder of Bloomington Cooperative Plots, in Bloomington, Indiana[31].

It is through its on-site educational and experiential programs, however, that Dancing Rabbit likely exerts the most influence on non-residents. Each summer, DR hosts four three-week visitor sessions beginning in mid-April and ending in mid-September. The program invites 8-12 individuals to experience Dancing Rabbit for a modest $100-$300 sliding-scale fee. The visitor program is an immersive experience designed, in part, to attract potential members. Visitors spend from one to three weeks living on-site (often in tents), attending seminars, workshops, and work parties. It is not uncommon for visitors to apply for residency at the end of their stay and/or extend their stay through a longer work-exchange opportunity. It was through a work exchange opportunity (posted on the internet) that I was able to spend time in the community. Seyfang (2010) details the process of niche "replication" whereby the lessons of grassroots projects are

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[30] http://www.nyu.edu/alumni.magazine/issue18/18_square_environment.html

[31] Bloomington Cooperative Plots (http://btowncooperativeplots.dwiel.net/)

diffused by "key actors" and through trade publications. It is clear that Dancing Rabbit is firmly engaged in niche replication processes, and extent to which the experience of individual members has influenced regime structures is a topic that demands further investigation. But as Seyfang (2010) explains, the process of replication requires continual recruitment and education and is relatively slow compared to structure-wide changes implicit in niche translation.

Conclusion

In the past fifteen years, Dancing Rabbit has grown from a small group of ideological students, to a village of over 60 adult members living at a fraction of the ecological footprint of the average American. By locating outside the regulatory, economic, and normative reach of the of the socio-technical urban development regime, it has been able to experiment with new rules that emphasize energy and resource conservation. They have managed to keep consumption low by sharing resources through a lattice of cooperative structures and investment in non-violent communication practices.

The results of the experiment are ever-evolving, and it will be fascinating to monitor the quantitative and qualitative changes at Dancing Rabbit in the coming decades. DR remains dedicated to its six ecological covenants, but daily life at DR has changed in some important ways since its early members shared every meal and engaged in grueling daily physical and emotional work. While DR members remain keenly aware of the sources and sinks of daily resource consumption, the community has also established systems that allow individuals to specialize in their own niche. For example, whereas early members often built individual electricity systems, the presence of a new electricity cooperative—BEDR—allows individuals to enter the community and plug-in to an internal grid without having to manage their own systems. Whereas founding members were involved in every community-wide decision and spent hours in meetings, DR has transferred detailed decision-making to committees, and is set to transition away from consensus decision-making in the near future. Whether the new system involves a

"village council" or some other representative structure, it is likely that individuals will be less engaged in the minutia of village-wide decisions. It will be fascinating, then, to witness how the concept of "radical participatory democracy" transforms as the village grows and diversifies.

The case of Dancing Rabbit Ecovillage illustrates that social cooperation in the twenty-first century is a learned skill. Residents invest time and money into learning non-violent communication, meeting facilitation, and meeting participation. They actively listen to the physical, intellectual, emotional, and spiritual needs of their neighbors. They serve voluntarily on committees, and willingly forego opportunities the opportunity to earn full. This allows sixty adults to share three automobiles, one laundry machine, one dryer, a handful of showers, and relatively little sheltered space. While some of these practices may be difficult to package and transplant into cities and suburbs, it may benefit policy makers to begin investing in *social* tools as in parallel with physical tools as a means of achieving climate, energy, and conservation goals.

Discussions of sustainability in the urban planning discipline often distinguish amongst social equity, ecological, and economic development as competing priorities in the public sphere (Campbell 1996), and as general guidelines for a sustainable approach to local governance (Saha and Paterson 2008). This case study reveals how ecological and social imperatives can be mutually reinforcing, rather than competing. The members of Dancing Rabbit are able to live at drastically lower levels of resource and energy consumption (an ecological value) as a result of cooperative social mechanisms (a social value) that facilitate successful resource sharing. Members and residents of Dancing Rabbit forego income-earning jobs (an economic value) and instead invest time and energy in the people and the physical community around them.

Dancing Rabbit's withdrawal from elements of mainstream urban and regional development (e.g. land use regulations, competitive land markets, municipal electricity and water systems, auto-oriented transportation systems, normative beliefs about "the good life") facilitate

low resource consumption, but also preclude Dancing Rabbit from influencing local and regional policy through processes of niche translation. The founders of Dancing Rabbit sought land situated outside the urban development socio-technical regime, and as a result they have built a community that meets the shelter, hygienic, and nutritional needs of its residents at a fraction of the energy and resource consumption.

It is hard to imagine most suburban and urban dwellers accepting the tenets of Dancing Rabbit's lifestyle immediately. The DR lifestyle is a radical re-imagination of the role of a citizen in the twenty-first century. DR member-residents invest in their neighbors and the non-human environment to an extent that North American mainstream-dwellers would likely find inconvenient and irrational. Save a drastic shock in the socio-technical landscape—for example a drastic economic or resource shock— it is hard to imagine the masses willingly adopting such a lifestyle.

But such "shocking" scenarios are becoming increasingly commonplace. An August 2012 article in Reuters explores how one Greek "eco-commune" founded in 2010 has transitioned from a "crazy" idea, to an appealing living option for young Greeks confronting a nation-wide economic crisis. The article explains, "The commune is one of several ecological initiatives that have benefitted as the debt crisis forces Greeks to rethink their way of life-especially the big-spending, consumerist urban lifestyle partly blamed for bringing Greece into the brink (Babington and Papadimas 2012). The article even employs the discourse of Socio-Technical Systems literature, labeling the ecovillage project as one of many "niche initiatives" that has engaged the Greek mainstream more so than the "green growth" agenda pushed by former Greek Prime Minister George Papandreou.

It is not hard to imagine how a combination of devastating weather, national security, or economic crises could force large numbers of Americans into situations that challenge the logic

of widely accepted residential lifestyles. In recent years, every region of the United States has been challenged by either economic (e.g. the foreclosure crisis) or climatic disasters (drought and hurricanes) that have devastated entire communities, forced thousands out of their home, and shut off the electricity—at least temporarily. It may behoove public entities to explore neighborhood and regional scale solutions that rely less upon imported financial and physical capital and more upon cooperative structures and locally harvested materials and energy. As Dancing Rabbit grows and landscape pressures increase, the community may find more direct pathways to niche translation.

Case Study: EcoVillage at Ithaca

Inspiring Energy and Environmental Transition in Tompkins County, New York.

Abstract

EcoVillage at Ithaca formed after a 3,000-mile march to raise public awareness about environmental issues in 1990. It has since grown into a permanent 160-member cohousing community two miles outside the City of Ithaca, New York. In just over two decades the ecovillage has co-evolved with region-wide sustainability initiatives and county climate planning. It is both a beneficiary and catalyst of sustainability-oriented efforts that have attracted recognition and grant funding from numerous federal agencies. EcoVillage at Ithaca offers an alternative, yet practicable, urban development model that facilitates low-impact (40 percent the ecological footprint of the average American) lifestyles. The project is situated "intermediately" relative to the urban development mainstream and the radical grassroots, and this property has allowed it to translate its innovations to public institutions in the region. This study affirms Smith's (2007) argument about the ability of intermediately situated grassroots niche projects to influence change in socio-technical regimes. It also offers an example of collaborative planning in which the overlap of diverse knowledge sets and the co-production of new knowledge has benefitted an entire region.

"For the gung-ho environmentalist who wants to do more than write letters and recycle, a movement taking shape in Ithaca promises a more responsible way of life. A group of activists is cooking up plans for a new community of up to 500 people on 300 acres, a community that would shun automobiles, fossil fuels and other conspicuous-consumption features of the modern mainstream." –Lillie Wilson, The Post Standard (Syracuse), August 28, 1991.

"By leveraging a local success story, we can show the way for new residential development to achieve remarkable energy savings as much as 80% lower than typical development. We hope to demonstrate how similar results can be achieved as these lessons are transferred to mainstream development." –Ed Marx, Commissioner of Planning and Sustainability, Tompkins County, New York. April 2011.

Introduction

The founders of EcoVillage at Ithaca (EVI) may have started as a group of "gung-ho environmentalists," but two decades later, this initiative has blossomed into two (soon to be three) cohousing communities with a total of 160 residents (and growing), and is amongst the most enduring and exemplary projects in the contemporary ecovillage movement (Dawson 2006). That Tompkins County, New York—in which EVI is situated—has adopted ambitious climate and sustainability planning initiatives could be easily written off as a coincidence in a historically progressive region, but a quick glance at county planning documents reveals how EVI has inspired county climate planning initiatives directly. In just over two decades, EVI's non-profit arm, EcoVillage at Ithaca-Center for Sustainability Education (EVI-CSE), has partnered with regional actors to earn grants from the National Science Foundation, the US Department of Agriculture, the Environmental Protection Agency, and other local foundations to support sustainability-oriented projects. Its first cohousing neighborhood won a Building Innovation for Home Ownership Award from the US Department of Housing and Urban Development (HUD). It has forged educational partnerships with Cornell University, Ithaca College, and Tompkins-Cortland Community College, started a local farming education center, houses two community supported agriculture businesses (CSAs), has collaborated with and/or helped found a dozen local non-profits, and invited a long list of nationally-acclaimed lecturers to the region. The ecovillage

attracts 1,000+ yearly visitors, who can stay in one of the community's three privately run bed & breakfast establishments and patronize multiple on-site businesses.

EcoVillage at Ithaca has served as a niche space for an alternative urban development model that practitioners can "point to" and replicate. In 2011, Tompkins County (in partnership with EVI-CSE) was one community amongst fifty US jurisdictions to be recognized by the United States Environmental Protection Agency as a Climate Showcase Community and awarded a grant to implement multiple low-carbon development projects inspired by EVIs cohousing model. This recent success is the tip of a sustainability initiative iceberg.

EVI is both the *beneficiary* and *catalyst* of diverse institutional relationships in the region. Its success and the success of regional sustainability initiatives is the result of an evolving system of public, private, and non-profit actors. The ecovillage started as a grassroots project that very quickly built connections with institutions in the mainstream via its non-profit arm, and has used its growing influence to launch an abundance of local and regional initiatives since. These relationships—intersecting locally, but leveraging resources at the local, state, and federal level—form a network with multiple overlapping goals and the capacity to see these goals to fruition. At the time of this writing, Tompkins County, the Town of Ithaca, and the City of Ithaca (all distinct municipal authorities) are pursuing ambitious climate change mitigation and energy transition plans. The region is home to multiple sustainability-oriented non-profits, many of which are connected, formally and informally, to institutions of higher learning. The *coherency* of these initiatives within the region results in strong, unidirectional landscape pressure for change (Smith, Stirling, and Berkhout 2005).

I claim that EVIs influence is possible because of its *intermediacy* relative to the mainstream and the radical grassroots (e.g. Smith 2007). In chapter 4, survey results of the ecovillage movement in North America offered evidence for phenomena of "settling in" and

"warming up" whereby grassroots niche projects adjust to their surrounding regime context, and subsequently influence changes in that context by re-weaving the "rules of the game." EcoVillage at Ithaca and its regional context illustrate these phenomena well. The ecovillage exists in a liminal space, *bending* conventions of the urban development socio-technical regime without *shattering* them.

Early in its existence, EVI made multiple compromises to "fit in" the Ithaca region, but it challenges conventions of mainstream urban development that planners and policy makers have since supported and attempted to replicate. It is situated spatially on land that is outside Ithaca's city center, but not *too far* that it precludes daily commuting; it is decidedly a "middle-class" community but it is by no means opulent; its neighborhoods resemble conventional North American subdivisions in some ways, but deviate from the norm in many others; automobiles are allowed on-site, but ride-sharing is encouraged and many individuals choose to work out of on-site offices; EVI residents technically acted as a the developers of their own homes, but did so under the close supervision of design/build experts; some households choose to participate in regular community meals while others choose to cook and eat meals as nuclear families. The case study that follows details many of the ways in which EVI models intermediacy, and I argue that this property has allowed it to remain in a realm of appropriateness while challenging the urban development socio-technical regime, develop links with important mainstream institutions, and propel a region-wide climate and energy policy transition in Ithaca, New York.

To illustrate this, I draw from hours of on-site and telephone interviews with community members and local officials, newspaper articles, community newsletters, and material authored and published by community members themselves. I begin with a brief history of EVI, its legal structure, and the conventions that allow it to inspire innovation by existing simultaneously inside *and* outside the urban development mainstream. I then detail the institutional partnerships that

have co-evolved with EVI in the last twenty years, and the many overlapping sustainability initiatives that have emerged from this innovation system.

EVI Origins: Forged from Worn Soles

Joan Bokaer and Liz Walker, the founders of EcoVillage at Ithaca, met at a 1985 national meeting of the *Interhelp Network*, an organization founded in the early 1980s as a response to the social-psychological tensions sparked by the escalation of the nuclear arms race (www.interhelpnetwork.org; Senders 1994). Bokaer, an inspirational orator and anti-nuclear activist, caught Walker's attention while delivering a speech on the increasing influence of the religious right in international relations. Walker introduced herself and volunteered to help Bokaer begin a new grassroots organization to take her talk around the country. Several years later, in 1989, Bokaer solicited Walker's to organize a new nine-month long project: the Global Walk for a Livable World. The march would raise awareness about environmental issues on a 3,000-mile walk across the continental United States. Bokaer secured early sponsorship from the Center for Religion, Ethnics, and Social Policy (CRESP)—now the Center for Transformative Action (CTA)—an independent non-profit organization housed on the Cornell University campus that has, since 1971, served as an "incubator for aspiring social enterprises ("About Us" 2012)."

After a year of planning, the Global Walk embarked with about 150 participants from six different countries (Walker 2005). The march started in Santa Monica, California February 1, 1990 and ended nine months later at the United Nations headquarters in New York City. It attracted activists, students, retired academics, lawyers, Buddhist monks, Christian clergy, Navajo tribesmen, and several children including Walker's two young boys. The group stopped at schools, town squares, and the offices of congressional representatives, setting up "Livable World" fairs (Walker 2005, 8) to engage the media, young people, and the general public about global issues like deforestation, acid rain, consumerist lifestyles, and environmentalism writ-large. A Washington Post article described the group's endeavors living on a limited budget,

sleeping in small tents, cooking vegetarian meals out of a trailer, dodging aggressive drivers and navigating a sticky misunderstanding with a property owner in West Virginia. The article explains, "They have shared their message with thousands of students along the way. At least one baby has been conceived. One couple got married. And about 40 of those in the group have gone nearly 3,000 miles… (O'Harrow 1990)."

As the Global Walk meandered eastward across the country, it passed through multiple intentional communities and the "walkers" compared notes on many of the consensus and communication skills used in sedentary intentional communities. Walker (2005) comments, "We were a traveling community that invented how to live together as we went along (p. 9)." It was an appropriate training ground for the community that would emerge in its wake.

The ecovillage vision and envisioning retreat

In her 2005 book, Walker recalls that Bokaer first expressed her vision for an ecovillage on the leg of the Global Walk just outside St. Louis. She was inspired in part by the intentional communities they had passed through along the way, and by Kathryn McCamant and Charles Durrett's 1989 book, *Cohousing: A Contemporary Approach to Housing Ourselves.* (For a more detailed description of cohousing, see Chapter 3). An *Epoch Times* book review quotes Bokaer, who explains that her inspiration for EVI also emerged from her experience passing through conventionally-built American cities:

> As I walked, I looked at each city on the way, and felt the urge to redesign each, according to ecological principles of design. Half-way across America, around St. Louis, I decided that I wanted to build a city (Daniels-Ramanujan 2006).

When the Global Walk concluded in New York City in the fall of 1990, Walker returned to San Francisco and Bokaer returned home to Ithaca, New York where she spent six months promoting the EcoVillage concept at churches and local gatherings (L. Wilson 1991). It was near Ithaca the following summer that the two reunited to assemble support for what would eventually evolve

into EcoVillage at Ithaca. Bokaer and Walker hosted a five-day "envisioning retreat" which attracted about one hundred supporters from across the nation. Many participants slept in tents in a field outside the City of Ithaca, and the group used the same trailer they had used during the Global Walk to cook and serve food to the participants. The EVI "Lessons Learned" document frames the meeting as if it were a rehearsal for a future, more permanent, community (Walker 2012). This event spawned a core group of enthusiastic supporters who formed action committees, and laid the philosophical foundations for what would grow into an ecovillage.

Choosing Land: Not Too Urban. Not Too Rural.

Where the community chose to settle was likely one of the first "intermediate" choices that would enable the community to both deviate from *and* connect to the Ithaca region at the same time. The land search committee entertained three potential parcels: an old gun factory in the center of the City of Ithaca; a 176-acre former farm 2.5 miles outside the city; and a rural site about ten miles outside the city that a donor was willing to hand the group, effectively for free. The urban option was quickly rejected because it would preclude agriculture. The "free" rural site, while economically attractive, would require long commutes for future members if they intended to work in the city. Ultimately, the group agreed on the site just outside the city for its balance of open space, rich farming soil, beautiful views, and relative proximity to the city center. Bokaer and Walker were able to solicit $400,000 in loans to purchase the land, and by June of 1992 the group had registered formally as a non-profit organization and secured ownership of the parcel.

Prior to EVI's purchase, the 176-acre hillside parcel was platted to accommodate a 100-unit residential subdivision called Rose Hill (Moos et al. 2006). This original plan would have consisted primarily of 1-acre residential lots, curvilinear internal streets, and consumed about 90 percent of the parcel for urban residential uses (homes, paved streets, sidewalks, private yards, etc.), leaving a meager 10 percent as open space. When the developer encountered financial

difficulties and the property was acquired by EVI, the parcel's fate turned inside out: today only about 10 percent of the property is devoted to urban uses. By clustering the buildings densely and eliminating internal roads, driveways, and paved sidewalks, the community (when complete) will consist of nearly the equivalent number of dwelling units (100) on a fraction of the land. The majority of the land is likely to remain in its "natural" state or used for agriculture, and at least 55 acres will be held permanently as a conservation easement under the supervision of the Fingerlakes Land Trust.

Leveraging Local and National Social Capital

Very early in EVIs existence, its founders forged critical connections to the fertile social, intellectual, and financial capital of the region. The beginning chapters of Walker's 2005 book list expert after local expert that the young community engaged for advice on community design, conflict resolution, energy technologies, and the legal structuring of their community. The early land use planning committee, for example, consisted of, "…two local architects…a landscape architect, a biologist, several Cornell graduate students, and a sprinkling of future village residents (Walker 2005, 24)." The land use planning process eventually opened up to a community-wide charrette that took advantage of Cornell University ecologists, landscape architects, and the director of a local land trust. The community was also able to access local donors to help purchase land, and took advantage of pro-bono legal work.

Throughout EVIs early years, it fulfilled its non-profit educational mission by inviting nationally-renowned guest speakers to Ithaca. Speakers like Richard Register—founder of EcoCity Builders—provided practical lessons for the growing intentional community, but would also swing through Cornell and Ithaca College classrooms and other free community forums. These talks served both to educate the public and publicize the efforts of EVI throughout the Ithaca region. Amongst these guests were Kathryn McCamant and Charles Durrett, whose published work on cohousing inspired Bokaer's vision for EVI in the first place.

Middle-Class, Child-Friendly, and Relatively Locally Rooted.

Prior to laying out plans for the first neighborhood, the community agreed that it would aspire toward a "middle class" membership. This was not a light decision, and resulted in multiple board members and potential residents abandoning the project. Walker (2005) explains:

> Some people felt strongly about offering housing to anyone, regardless of their ability to pay. Others held the view that since most new housing in the US served the middle class, it was here that we could exert our strongest influence. We hoped to lead by example, and model a new direction in housing…Over a very difficult six-month period, we made a key decision: We were aiming to reach middle class Americans (56-57).

Indeed, housing values and living costs at EVI are firmly middle class. According to a 2011 assessment completed by EVI resident Richard W. Franke[32], a four-bedroom, 1,642 square-foot home in the FRoG neighborhood cost $157,047.38 ($95.64 per square foot) to build in 1996. Adjusted for inflation, that same house would cost $233,533.72 ($141.00 per square foot) to build in 2012. At the time of this writing (December 2012), there are three homes for sale in EVI with three-bedrooms, two-bedrooms, and one-bedroom[33]. All are duplexes. Their asking prices posted on the EVI website are $220,000; $250,000; and $133,000 respectively. The median value of owner-occupied housing units in Tompkins County between 2007-2011 was $165,900[34] and the mean asking price of "townhouses or other attached units" was $339,479 in 2009 ("Tompkins County, New York (NY)" 2012). Members of each neighborhood must also pay maintenance fees and contribute to a reserve fund for their neighborhood (about $6,400 per year for a 4-bedroom house in FRoG) and for the entire village ($609.24 per year). Combined with "other costs" during 2010, the "Total Coop Living Costs for Maintenance, Repair, and Incidental Charges" for a 4-

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[32] Franke, Richard W. "How Much Does it Cost to Live at EVI?" Updated September 20, 2011. See Appendix C.

[33] Homes for sale and rentals can be accessed at http://ecovillageithaca.org/evi/index.php?option=com_content&view=article&id=62&Itemid=72

[34] U. S. Census Bureau, American Community Survey, 5-Year Estimates. Median Value of Specified Owner-Occupied Housing Units. 2007-2011.

bedroom household in FRoG sums up to $7,676.34. It is difficult to imagine even the highest-income earning household of Dancing Rabbit Ecovillage (~ $15,000) subsisting economically at EVI, but EVIs proximity to the economic center of the region offers easy commuting access to income-earning wages.

According to the accounts of several members and a survey administered to the ecovillage in 2002[35], about one-third of EVIs adult population does not have an income earning job because they are willfully unemployed, looking for work, or retired. EVI has attracted numerous retirees looking to live in smaller homes and socially active neighborhoods. The current TREE website presents profiles of its future members, including a diversity of household compositions: families with young children, individuals of diverse ages, and couples that are either retired or anticipating retirement in the coming years. For example, one profile reads:

> A primary aim is to live in retirement more simply and economically – selling our century-old, 3-story Pittsburgh home and moving into a much smaller space…Wallace, a retired English professor, is eager to perfect his astronomy skills in the dark skies at Ecovillage. Shannon, a retired attorney, is optimistic about finding a choral group with which to make music ("Meet Our Members" 2012).

About another one-third commutes to a job off-site, very commonly—but not exclusively—at Cornell University or Ithaca College. During my visit, I encountered physicians, attorneys, and multiple university instructors who commute into the city regularly.

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[35] "FRoG Demographic Survey 2002" can be accessed at the EVI website: http://ecovillageithaca.org/evi/index.php?option=com_docman&task=cat_view&gid=40&Itemid=83.

Yet another third of the community is employed on-site, working at an assortment of at-home businesses, online businesses, and offices inside both of the EVI common houses[36]. One business, Hands on Gourds (http://www.handsongourds.com), crafts decorations out of gourds grown on the EVI property. This business is currently in the process of moving from the owner's residence to an on-site workshop. There are three Bed n' Breakfast establishments. The two on-site CSAs—Westhaven Farm and Kestrel Perch Berries—generate income for their owners. One individual is a life-long homebuilder and has drawn from his building experience at EVI to start a green construction consultancy, and helped manage design and construction at Whitehawk Ecovillage in the neighboring Town of Danby.

There is an unmistakable youth presence at EVI. Children mark the community with small bicycles, playground equipment, outdoor toys, and playrooms in each common house. The youth at EVI form over one-third of the community's total population (about 60 out of 160), and many families moved to EVI specifically because of its youth-friendly atmosphere. Indeed, arriving at the EVI property is a bit like arriving at the summer camp where I spent much of my childhood, with its long gravel road, abundant open fields, scenic views, and large, naturally lit dining spaces. Multiple residents explained that the child-friendly atmosphere was an important attraction when making the decision to move to EVI. One mother of two explained that she moved with her family from the Bay Area in order to escape an atmosphere where the main concern was "paying your mortgage." She and her husband visited several ecovillages, but found the abundance of children at EVI appealing for their own two children.

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[36] A list of on-site businesses is accessible on the EVI website as of 2 December 2012: http://ecovillageithaca.org/evi/index.php?option=com_content&view=article&id=56&Itemid=64.

EVI has also attracted a membership with relatively local roots compared to the more radical ecovillages in this study. According to a survey administered by the community in 2002[37], 59 percent of FRoG residents lived somewhere in New York State prior to moving to EVI, and 46 percent moved from either Ithaca or somewhere else in upstate New York. In contrast, *very* few Dancing Rabbit residents lived in Missouri prior to relocating the community, and similarly few Earthaven residents lived in North Carolina.

Navigating and Pioneering New Regulatory Terrain: Cohousing and the Town of Ithaca.

EVIs founding group found McCamant and Durrett's (1988) cohousing model very attractive. It included clustered housing, open space, shared facilities, walkability, social cohesion, and a middle class appeal. Yet cohousing was a novel concept in the United States in the early 1990s. Despite the Ithaca region's progressive politics and EVIs growing institutional connections, there remained some skepticism about a residential development model with little regulatory precedent. The inhibitions about cohousing seem to have stemmed both from normative uncertainties about collectivist living styles and the physical properties of cohousing. Indeed, up to that point, the group that would become EcoVillage at Ithaca had succeeded at attracting attention through dramatic, if inspiring, means; walking 3,000 miles and setting up large temporary camps on vacant land. Socio-technical regimes are meant to *reduce* dramatic surprises, so it is fitting that early EVI efforts encountered some resistance. One early member recalls:

> *I felt that we were treated quite differently than regular development projects. One of the reasons I'm able to say that is that the architect who was both our builder and development manager had spent 20 years doing development projects in Ithaca and he*

[37] The "FRoG Demographic Survey, April 2002" as well as multiple other community documents can be accessed on the EVI homepage. URL: http://ecovillageithaca.org/evi/index.php?option=com_docman&task=cat_view&gid=40&Itemid=83.

> *felt that our project was being treated quite differently. This was back in 1991 when we started the project from scratch and at that time cohousing had barely been introduced in the USA. Most people had never heard the term. People certainly hadn't heard the term "ecovillage." I think there was a certain fear on the part of some of the local people, not just local government people but also surrounding residents that they were worried about us being a bunch of hippies on the hill. They were also worried about us being a bunch of yuppies on the hill. So we kinda got it from both ends.*

This member explains that public officials and neighbors expressed "fear," "worry," and unfamiliarity with their ambitions. The group's petition also was also publicly opposed by a neighbor upset by the likely changes in the scenic view of Ithaca's West Hill. In over twenty years, however, EVI has dispelled much of the skepticism and "hippie/yuppie" associations that may have existed in the early 1990s. Today EVI has two cohousing neighborhoods, FRoG (First Residential Group) and SONG (SecOnd Neighborhod Group), and has begun to build a third, TREE (Third Residential Ecovillage Experience). They were each built several years apart, with construction beginning: in 1996, 2002, and 2012 respectively. EVI is situated in the planning jurisdiction of the Town of Ithaca, so it is through the Town Board and its Planning Board—not the City of Ithaca or Tompkins County—that EVI must receive zoning and building approval. This process is one of the major existential obstacles to intentional communities, especially in their early stages (Christian 2003), but after completing the first neighborhood, EVI resolved many of the town's initial reservations. One resident explains:

> *…back twenty years ago when EcoVillage got started, this whole concept of cohousing was very new to the US, so there weren't many examples, and no examples around this area. None that people knew of or could point to. And so it was all just a brand new idea. And by the time the second neighborhood got going in 2000 the town [of Ithaca] and all the town staff and planning board members had the experience of the first neighborhood, so they knew what they were getting. Some people might have originally feared that it was just a group of hippies, y'know trying to create this cult on the hill or something. But once you have something built and actually walk around it and meet the people here, I think the fear level decreased as well.*

In multiple interviews, EVI residents and town officials explained that many of the concerns raised by municipal government during the development of the first neighborhood

subsided by the time the second neighborhood submitted its proposal to the town board. This is likely the result of two coinciding phenomena: The first affirms many of the constructivist arguments for socio-technical change, namely that individuals are motivated as much, or more, by *experience* and *familiarity* with a new concept than by any rational cost-benefit analysis (Kaplan 1999; Geels 2010; Rotmans, Kemp, and Asselt 2001). When EVI submitted its plans for FRoG, for example, the Town of Ithaca demanded that all its buildings connect to municipal sewer and water as if they were conventional residential buildings. Homes in the FRoG neighborhood were forbidden from installing composting toilets, and homes were not built to accommodate on-site electricity, in part because on-site solar electricity was prohibitively expensive, since at the time there were no tax rebates or incentives. As one resident explained, "[The town]didn't know if we were gonna be living in teepees or what," so they required that the community comply with all standard building codes. Once the town had an example they could "point to" many of their concerns dissolved. The success of EVI's first neighborhood offered public officials some security that the subsequent project would also succeed and by the time the second neighborhood project submitted its plans, town officials were more willing to let EVI residents experiment with customized floor plans and composting toilets were allowed as long as each home also had a toilet connected to city sewer infrastructure.

The second possible reason EVI has experienced less resistance from elected officials and neighbors is a region-wide political shift to the left. The City of Ithaca and Tompkins County have a renowned history of progressive politics. Tompkins County, New York has voted for the Democratic presidential candidate in every election since 1984 and in the last three presidential elections, Tompkins has voted proportionately *more* Democratic than any county in New York State outside New York City. In the 2000 presidential election even Green Party Candidate Ralph Nader received more votes from the City of Ithaca than then did Republican candidate George W. Bush. The seven-member Ithaca Town Board is currently *all* Democrats, and no Republican has

even run for Town Board since 1993 ("Tompkins County, New York, Board of Elections" 2012)[38]. When EVI was founded, however, the board had recently transitioned from heavy Republican control. In fact, the Republican Party retained near unanimous control of the town council and town supervisor position throughout the 1970s and 80s. The shift from a Republican-controlled town to a Democratic-controlled has been abrupt and complete. A similar shift has occurred throughout Tompkins County over the past twenty years. What caused this shift? One Ithaca Town Board member explains that as the City of Ithaca's population began to outgrow its physical boundaries, more and more Democratic voters settled into the towns and rural areas of the county. Ironically, then, urban expansion has likely contributed to relatively progressive politics in Tompkins County.

The Town Board is emphatically in support of EVI today. The board includes one EVI resident, and the chair of the town Planning Board serves also as the current chair of EVIs non-profit board of directors. Nevertheless, the town must balance its ideological support for EVI with the practical realities of a growing residential development project. While it has afforded EVI more flexibility in its construction techniques in its second and third neighborhoods, it has also demanded that the ecovillage install more sophisticated fire protection infrastructure. One resident and EVI board member comments,

> *…nowadays most of the folks who are connected to the town planning board are up on sustainability and they think what we're doing up here is great, but in other ways it's become more difficult because we're becoming bigger and so they're asking more of us than they would of a small development.*

[38] Tompkins County election results for all levels of local government can be accessed at the board of elections web page: http://www.tompkins-co.org/boe/Additional_Information/Past_Results_files/Past_Results.htm.

Legitimacy Under the Law: A Patchwork of Legal and Landholding Entities.

Twenty years after its founding, EVIs 176-acre property is actually five distinct parcels, owned by multiple non-profit land holding entities. These include:

- **EcoVillage Cohousing Cooperative, Inc**. **(EVCC)** owns the 5. acres upon which the first neighborhood, FRoG, is situated.
- **EcoVillage SONG Cooperative, Inc. (EVSC)** leases the 5. acres upon which the second neighborhood, SONG, is situated. This parcel is *owned* by EVI, Inc. (see below), but it is leased for 99 years to the SONG cooperative. The buildings are, in-turn, leased to individual home owners by this cooperative.
- **EcoVillage at Ithaca Village Association (EVIVA)** owns 19 acres of land including community infrastructure that is shared by all neighborhoods. The cooperative is responsible for maintaining the community's single road, parking areas, sewer lines, and the pond.
- **Third Residential EcoVillage Experience (TREE),** LLC owns 5 acres on which the 40 unit third neighborhood is being built. This neighborhood will become a NYS housing cooperative once the buildings are completed.
- **EVI, Inc**. owns the remaining 142 acres. This land is designated for educational and agricultural purposes and includes two working farms (see Figure 18)

Figure 18: An aerial image of the SONG (left) and FRoG (right) neighborhood. Each neighborhood has 30 dwellings plus one common house. SONG dwellings appear larger from the sky, as some buildings are vertically stacked duplexes. SONG dwellings are larger, on average, than FRoG dwellings.

Another way to conceptualize EcoVillage at Ithaca is two groups of organizations: one group dedicated to residential functions and another group dedicated to outreach work (see Figure 19). Of course there is important overlap of these groups. Member-residents of the ecovillage are voting members of EVI, Inc. and make up one-third of its board of directors. The land owned by EVI, Inc. is effectively the backyard of the EVI residents. Perhaps most critically, the "lessons" imparted by the educational non-profit derive from the experiences and experimentation occurring on-site and inside the neighborhoods.

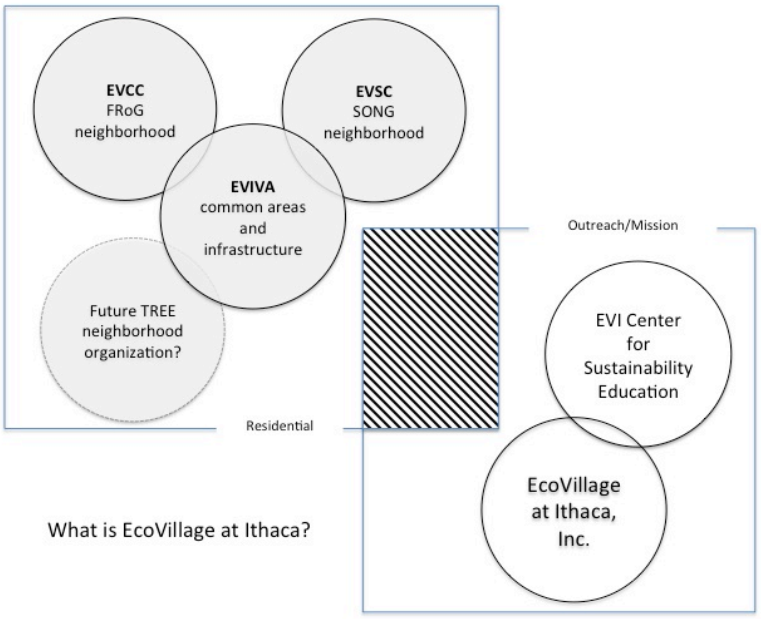

Figure 19: EcoVillage at Ithaca can be conceived as two overlapping groups of organizations. A group that maintains a residential development, and a group responsible for outreach and education.

This multitude of organizational structures reflects the multi-functional nature of the community as well as the organization's ambiguity under the law. There is no single, all-encompassing legal vehicle for its many activities. In a 2002 EVI newsletter, community member and local attorney Bill Goodman explains:

> One of the reasons for creating so many different entities is our need to satisfy the requirements of other parties, including the Town of Ithaca, the NY Attorney General's Office, banks and insurance companies. Because this project is so unusual, we have had to create a complex framework to fit both our needs and the expectations of the legal and financial worlds (Goodman 2002, 13).

This legal and organizational complexity is a reflection of an urban development regime that has evolved to accommodate individual land ownership and segregated land uses (Scott 1999; Riddell 2004). Early zoning codes, for example, were developed precisely to segregate residential and commercial land uses (Jacobs 1985). In the urban mainstream, a residential lot, its built improvements, and much of the infrastructure leading to the house are owned by a private individual. In fact, one of the regulatory challenges to building a cohousing community is

interacting with a *collective* of developers instead of a single, legally responsible developer. Explained one county planning official:

> *The ownership model raised questions for folks. It's a little different when you're dealing with a group of people. Most local planning entities are used to working a developer, an application, a builder that is responsible for everything… Developers struggle with aspects of it—it's not what they're used to doing.*

FRoG and SONG Neighborhoods

Today, EcoVillage at Ithaca consists of two cohousing neighborhoods, with a third under construction at the time of this writing. Each of the two existing neighborhoods includes 30 duplexes plus a common house, and each neighborhood occupies about five acres of land, including gardens and open space. The homes of both neighborhoods are arranged in two meandering rows that run east-west and enclose an interior courtyard. While the two neighborhoods are situated very close to one another—separated only by a small creek bed—it is immediately apparent that FRoG and SONG are meant to be distinct social spaces. The homes are arranged to encourage interaction within their respective neighborhoods, however the design is not so restricting as to isolate the neighborhoods from each other: a walk from the western-most edge of SONG to the eastern-most edge of FRoG is less than a quarter mile.

In some ways, the neighborhoods at EVI resemble conventional North American subdivisions. Unlike the experimental, locally sourced, and highly customized construction techniques at Dancing Rabbit or Earthaven Ecovillages, the homes at EVI were built following design standards that result in relatively consistent-looking dwellings with nearly every amenity of a contemporary North American home. Dwellings in FRoG come in five models ranging from 922 square-foot one-bedroom homes to 1,642 square-foot five-bedrooms homes. Three units are specially designed for individuals with mobility difficulties. FRoG dwellings are connected to municipal water, sanitary, and electrical systems like any conventional home in the Town of

Ithaca. Every home has fully-equipped bathrooms with flush toilets, sinks, and warm showers. A walk through an EVI home reveals recognizable kitchen appliances, desktop computers, electric lighting, and warmly decorated interiors.

Figure 20: The FRoG neighborhood.

But FRoG homes defy several conventions of modern North American residential development. Firstly, EVI residents acted as the developers of their own homes. This is very rare in the USA today. In 1996, when FRoG was built, exactly two-thirds (66.67 percent) of all new homes in the US were "built for sale," meaning the land and the building were sold to the occupant as an off-the-shelf package by a developer[39]. In the same year, about 18.7 percent of new homes were "contractor built" and 12.4 percent were "owner built" (Figure 21). The homes at EVI technically fall under the last category: each housing cooperative served as its own developer and general

[39] United States Bureau of the Census (2010). *Table Q1. New Privately Owned Housing Units Started in the United States by Intent and Design.* Accessed December 9, 2012 at << http://www.census.gov/const/startsusintenta.pdf>>

contractor, making critical decisions by group consensus. Yet each neighborhood also enlisted the management expertise of professional designers and builders. FRoG and TREE residents hired an outside builder and architect, while SONG residents adopted a variety of approaches and contributed relatively more sweat-equity into their own homes.

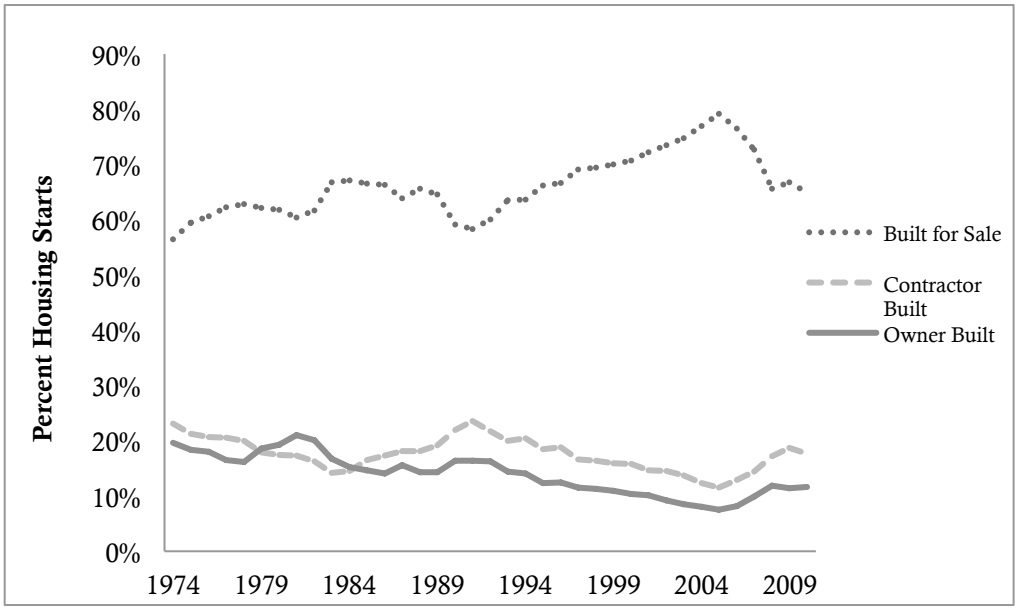

Figure 21: Owner-Built Homes on the Decline. New Privately Owned Housing Units in the USA by "Purpose of Construction" 1974-2010. Source: US Census Bureau. Table Q1.

EVI homes are also much smaller than the average American single-family dwelling. The average FRoG dwelling is 1,228 square-feet. In 1996, when FRoG was under construction, the mean floor area of a newly constructed single-family home was 2,120 square feet nation-wide and 2,280 square feet in the northeast USA—72 percent and 86 percent larger than the average FRoG home, respectively. In the intervening years, the gap has widened even further: in 2010 the mean floor

area of a completed single-family home was 2,392 square feet nation-wide and 2,613 square-feet in the northeast USA.[40]

This relatively small footprint reduces the amount of extra energy necessary to heat individual homes. FRoG homes were designed to take advantage of the sun's free energy. They have triple-paned south-facing windows that block cold winter air while inviting light and solar infrared (heat energy) inside. Homes have exterior walls insulated with 6-7 inches of dense-pack cellulose made of recycled newspapers. Hot water and space heating is provided by gas boilers that are shared by clusters of 6-8 homes, resulting in a total of four boilers for 30 dwellings. One analysis by the National Association of Home Builders explains, "The homes are so efficient that, even in upstate New York, energy needed for space heating is less than that for domestic hot water ("TechPractices: EcoVillage at Ithaca, Ithaca, New York")." FRoG dwellings have no air conditioning units. The homes are kept cool in relatively mild Upstate New York by blocking summer sunlight with deep roof overhangs, trellises twined with deciduous vines, good ventilation, and vaulted ceilings that act as a cooling stack. Homes at EVI also do not have garages, a similarly rare construction choice for single-family homes built in 1996 and present day (see table 1).

FRoG dwellings are connected to the regional electricity grid, but in late 2011 the neighborhood installed an impressive 50 kilowatt solar photovoltaic array that provides an estimated 60 percent of the neighborhood's electricity needs. The monthly household cost of electricity in FRoG has remained stable and electricity bill payments now fund on-site infrastructure instead of leaking out to an energy company.

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[40] http://www.census.gov/construction/chars/highlights.html

In 1996, the FRoG neighborhood won a Building Innovation for Home Ownership (BIH) award from the US Department of Housing and Urban Development (HUD). The intention of this program is to reward and recognize practical innovation in housing. According to a HUD report, the BIH program was created to:

> …recognize housing projects across America that employ innovative homebuilding technology, design, and development to make home ownership a reality…Eligible projects were those that used generally available, non-experimental technologies and techniques that vary significantly from approaches usually taken in housing construction (Steve Winter Associates, Inc. 1998, 7)."

The program acknowledges that there is a level of deviation from "approaches usually taken in housing construction" that is *innovative* and *significant* but no longer *experimental*. Achieving this practical novelty is the precise purpose of a socio-technical niche (Kemp, Schot, and Hoogma 1998).

Table 6: Comparing FRoG Homes with other Single-Family Construction (1996 and 2010)

	Mean Floor Area (in Square Feet)	Percentage with Central Air Conditioning	Percentage with garages (of any size)
FRoG Homes (built 1996)	**1,228**	**0**	**0**
USA Total (1996)	2,120	81	87
USA Total (2010)	2,392	88	87
Northeast USA (1996)	2,280	64	83
Northeast USA (2010)	2,613	77	82

Source for Garages and Air conditioning: US Bureau of the Census, http://www.census.gov/construction/chars/completed.html. Source of Floor Area: US Bureau of the Census, Median square feet. Average square feet. Median and Average Square Feet of Floor Area in New Single-Family Houses Completed by Location1: www.census.gov/const/C25Ann/sftotalmedavgsqft.pdf

SONG residents chose to have more flexibility in their design than FRoG residents. Individual householders opted to customize their floor plans and materials so long as they followed some basic dimensional guidelines. The neighborhood's design coordinator and current SONG resident, Rod Lambert, explains that amongst the units in SONG are EVIs most affordable, most costly, largest, and smallest dwellings. Several individuals in SONG chose to lower the monetary cost of their homes through sweat-equity, but the overall cost and construction time of SONG exceeded FRoG because the early project was able to take advantage of economies of scale (Walker 2012). Lambert also comments that many residents ended up spending more on their homes as a result of "feature creep," or an accumulation of pricey appliances and materials that was likely avoided in FRoG because the neighborhood purchased materials together and emphasized uniform design and construction.

SONG dwellings were also afforded more flexibility with regard to utility connections. While each house was required to install at least one sewer connection, they were not forbidden from installing composting toilets. A brief walk through the neighborhood reveals that 14 out of 30 SONG roofs are adorned with solar photovoltaic panels, which state and federal subsidies had rendered more affordable in the years between FRoGs and SONGs construction. On a tour around the community, one SONG resident explained to me that subsidies cut the cost of her home's solar panels from $14,000 to $4,000, and that many families in SONG are net *providers* of electricity to the grid. At the end of the year, these households receive a check from the energy utility for their contribution.

Figure 22: A view down the central courtyard of SONG. Most homes in this neighborhood are vertical duplexes. All homes cluster around a central open space and a common house. About one-half of the SONG homes are equipped with roof-mounted solar photovoltaic panels.

A 2006 study by Markus Moos et al. compared the per capita ecological footprint of EVI (both FRoG and SONG) against a hypothetical neo-traditional (also known as "New Urbanist") site on the same property and a hypothetical "conventional" residential development that followed the original 1988 Rose Hill plans (Moos et al. 2006). Using regional and national average consumption rates to estimate the consumption of hypothetical residents, the authors conclude that the average ecological footprint of an EVI resident is 10.5 global acres, compared to 17.0 global acres in the neo-traditional development and 18.6 global acres in the Rose Hill development. They explain that this lower footprint is the combined result of socio-behavioral habits, the physical design of the community, and self-selection that has resulted in conservation-minded residents in the first place.

The residents of FRoG and SONG share at least two weekly "community meals" and one neighborhood meal, served in the common houses and prepared by a rotating list of volunteer chefs and assistants. Group meal preparation is one of several ways an individual can fulfill their expected—but unenforced (Holleman 2011)—2-4 hours of weekly service to the community. Residents can also volunteer to clean up after a meal. As a guest in the FRoG common house, I witnessed multiple individuals fulfilling their service hours by helping to maintain the building. One man took responsibility for watering the indoor plants. One elderly woman explained that she had arranged with the community to help with lighter tasks in the common house, like dusting and cleaning table tops, as most other opportunities were too physically demanding at her age.

Attendance at meals is not obligatory, and one couple expressed to me that their involvement in community-wide events—including group meals—had waned dramatically since having children. Nevertheless, community meals are convenient (a short walk to the common house), can save time and money, and allow for residents to share regular, home-cooked, tasty local food meals.

EVI members may also serve on array of volunteer committees that handle more detailed elements of each cooperative. The FRoG neighborhood, for example, is supported by committees that focus on finance, process steering, the common house, child care, membership, outdoor areas, cooking, and cleaning[41].

Influencing the Mainstream

EVI Center for Sustainability Education (EVI-CSE)

The outreach and educational efforts emerging from EVI are administered by the Center for Sustainability Education (EVI-CSE), a non-profit organization that remains a project partner of Cornell University's Center for Transformative Action (CTA). The CTA board of directors

[41] See "Ecovillage at Ithaca-Organizational Structure" in Appendix D.

oversees multiple initiatives, each with its own advisory board. The advisory board that oversees EVI-CSE is congruent to the board of directors of EVI, Inc. In other words, the same group of individuals serves as two different boards: an advisory board to EVI-CSE under CTA *and* the board of directors to EVI, Inc. Much of EVI's outreach to local planning entities occurs through its non-profit board, the majority of whom are not residents of the ecovillage itself. The individuals serving on the EVI board consist of civic leaders and intellectuals in the Ithaca region. A simple list of the professional and voluntary associations of current and recent board members illustrates the networking potential that has likely facilitated coherency amongst plans for sustainability in the Ithaca region. They include:

- The chair of the Planning Board, Town of Ithaca
- The Deputy Town Supervisor, Town of Ithaca
- The former Sustainability Planner, City of Ithaca
- A former Provost of Ithaca College
- An advisory board member of New Earth Living
- The chair of the Tompkins County Environmental Management Council
- The Co-founder of Local First Ithaca
- Multiple Cornell and Ithaca College faculty members

Only one of these individuals are actually resident-members of the community. They rest remain associated with the community from the outside. Unsurprisingly, board service is reciprocal; EVI member-residents regularly serve on the boards of other local organizations, and individuals at EVI spend a lot of time volunteering for local non-profits. As an educational non-profit, EVI has actively engaged the Ithaca region since its inception. This engagement has served to educate the greater Ithaca community about sustainability issues, but it also stimulated important support for the ecovillage project in its early years.

About ten years after EVIs founding, sustainability activism in Ithaca blossomed. Liz Walker's second book *Choosing a Sustainable Future: Ideas and Inspiration from Ithaca, NY* (Walker 2010) details dozens of private, public, and non-profit initiatives in the region today. Many of these stem from partnerships in which EVI played some important role. One EVI member traces the beginning of the Ithaca's local sustainability movement to the formation of Sustainable Tompkins (www.sustainabletompkins.org), a network of sustainability-oriented initiatives and organizations:

> *[The formation of Sustainable Tompkins] is sort of the whole start of the local movement, back eight, nine years ago. And a number of EcoVillage residents here and a number of people on the non-for-profit board were involved in getting that set up and have been involved over the years.*

Sustainable Tompkins and Ithaca's regional non-profit car-sharing program, Ithaca Carshare (www.ithacacarshare.org), both emerged from a partnership between EVI and Ithaca College after the two received a National Science Foundation grant to teach the "science of sustainability". Today, one EVI resident serves on the board of Sustainable Tompkins, and the 2004 feasibility study that launched Sustainable Tompkins was spearheaded by a coordinating committee that included one official EVI representative and one individual who serves on the EVI board currently (Nicholson 2004). One EVI board member explains that the ecovillage has transitioned from relative insularity to a major community partner in the last decade:

> *When I got to Ithaca ten years ago, there was a sense that [EVI was] a bit more isolated and not necessarily connected with the mainstream of the community and what we've seen under the last ten years is a turning outward to the community, building bridges to the community and really getting integrated into the mainstream.*

In 2010 EVI-CSE initiated the Groundswell Center for Local Food and Farming (Groundswell) with the help of a three-year, $349,873 grant from the US Department of Agriculture's Beginning Farmer and Rancher Development Program. Groundswell is an explicitly regional program as the grant application reads: "The long-term goal of Groundswell's

New Farmer Training Project is to increase the number, diversity, profitability, and environmental sustainability of beginning farmers in our region." In partnership with Cornell University, Cornell Cooperative Extension, and Tompkins-Cortland Community College, Groundswell offers multiple educational programs for aspiring farmers, most of which are administered on EVI property, but with occasional trips to working farms in the region. In its first two years, the program has attracted 250 participants (more than tripling its expected enrollment), 12 percent of which has been people of color (Green 2012). A recent $15,000 grant from the Park Foundation allowed Groundswell to initiate an Enterprise Farm Incubator. The program offers participants "a relatively low-risk entry avenue for new producers" by providing space, marking support, tools, and instruction on EVI property.

If EVI is "building bridges," then Peter Bardaglio is one of its critical bridge builders. In my interviews with community members, many referred to Bardaglio as a "change maker" in the Ithaca region and the larger movement for sustainability education. During his term as Provost of Ithaca College (IC) from 2002-2007, he promoted the campus's sustainability initiative that emerged from ICs and EVI's collaboration. He was also instrumental in securing a grant from the Park Foundation to conduct a feasibility study on creating an EcoVillage Education Center. When Bardaglio stepped down from Ithaca College, EVI asked him to serve on its board. Shortly thereafter, Bardaglio also launched the Tompkins County Climate Protection Initiative (TCCPI), a "multi-sector collaboration" that unites local governmental and non-governmental actors around climate change initiatives. Its list of members is exhaustive, ranging from small grassroots organizations to the Chamber of Commerce[42]. It was during a brainstorming session at the June 2010 TCCPI meeting that Tompkins County Planning Director, Ed Marx, and Bardaglio connected EVIs housing model with a grant opportunity from the US Environmental Protection

[42] To view the full list of TCCPI members, visit http://www.tccpi.org/Members.html.

Agency that has elevated Tompkins County regional planning into the national spotlight (see below).

EPA Climate Showcase Communities Program

The EPAs Climate Show Communities Program was authorized by Congress in 2009 to provide seed money to US jurisdictions and tribal nations engaged in innovative climate change mitigation projects. Since 2010, fifty government entities—serving populations as small as 600 and as large as 6 million—have received grants to initiate local projects with the hope that successful projects will reduce green house gas emissions and, most importantly, spur like-minded jurisdictions to follow suit. The grant application lists six objectives: 1) reduce emissions of greenhouse gases; 2) build capacity within local and tribal agencies to address greenhouse gas emissions within their communities; 3) create meaningful and sustainable programs and management systems to achieve ongoing reductions; 4) link climate change initiatives with broader environmental, economic, and social concerns; 5) build and leverage partnerships across multiple stakeholder groups that facilitate front-end participation by communities impacted by climate change; and 6) create models of success that can be replicated across the nation.

Specific projects vary considerably from place to place, but much of the funding is being used for planning activities. Sacramento County (population 1.38 million), for example, was awarded $486,668 to enhance its "River-Friendly Landscaping (RFL)" program by developing new evaluation tools, establishing new landscaping standards for urban parks, expanding gardener training programs, and promoting the RFL program to the public. The City of Chicago was awarded $500,000 to promote its Chicago Green Healthcare Initiative, which helps area hospitals reduce greenhouse gas emissions and other air pollution through energy efficiency projects. The small town of Hailey, Idaho was awarded $472,429 to implement a comprehensive energy efficiency campaign. The community has used the grant money to incentivize household

energy audits and retrofits, build a LEED certified Green Building Demonstration, start a solid waste diversion program, and train residents to build chicken coops from reclaimed materials.

In 2010, Tompkins County and EVI-CSE co-authored a winning grant proposal entitled *Density that Works: EcoVillage Concepts.* The $375,450 grant supports the development of and the environmental monitoring of three future low-carbon housing projects, the dissemination of lessons from these projects, and the development of a new "Pedestrian Neighborhood Zoning" (PNZ) district inspired by lessons-learned at EVI. The three model housing projects include 1) the new TREE neighborhood at EVI; 2) an infill development in the City of Ithaca; and 3) a residential development on a county-owned parcel in the Town of Ithaca.

The TREE neighborhood

The TREE neighborhood will demonstrate the most energy efficient housing at the EVI site when it is complete. The project plans to achieve German Passiv Haus standards for 25 units, reducing energy consumption 80-90 percent below average American household levels. The 40-unit, 5.0-acre neighborhood will offer 15 units inside a common house, 8 duplex units, and 17 detached single-family dwellings. Units will range from 400 to 1440 square feet. Like FRoG and SONG before it, TREE will have a common house with similar shared facilities. The design of the common house emphasizes wheelchair accessibility and includes an elevator. TREE will follow a design and construction process more similar to FRoG than SONG. It has hired and consulted closely with a professional architect and construction manager, and it will purchase materials together in order to take advantage of economies of scale.The neighborhood is currently a joint venture (JV), and hose members can officially participate in the consensus votes for design, budgeting, and other critical decisions.

The Aurora Street Dwelling Circle pocket neighborhood

The Aurora Street pocket neighborhood project transplants cohousing principles to a compact urban lot in the city center of Ithaca. The project is being developed by Sue Consentini of New Earth Living (www.newearthliving.net) and was designed by Ithaca architect Rob Morache. The five homes (including 2 pre-existing structures) in the "Dwelling Circle" will share a biomass boiler for electricity, solar hot water panels, solar photovoltaics, gardens, a common house, garages, and bike repair facilities. An Ithaca.com article from August of 2012 frames the Dwelling Circle as a "new style" of living, that allows residents to live ecologically without sacrificing "modern" living in the city:

> A new style of living is coming to Ithaca, allowing those who wish to reduce their ecological footprint but still enjoy the modern style of living to exist comfortably in the city. ("Aurora Street Pocket Neighborhood Development Underway in Ithaca" 2012)

All units for the Dwelling Circle have been sold, and construction began in June 2012.

Tompkins County-owned Parcel

The third project involves the development of a 25.5-acre county-owned property located in the Town of Ithaca. The request for proposal (RFP) for the development explicitly states that residential development on the parcel should comport with the lessons learned at EcoVillage at Ithaca, and the later half of the RFP is a document composed by Liz Walker and EVI-CSE to convey these lessons[43]. The parcel is located in the planning jurisdiction of the Town of Ithaca. Therefore, the entire development process must receive approval from the Town of Ithaca Board. The expectation, however, is that the project will receive approval as a Planned Development Zone (PDZ)—a convention similar to a planned unit development (PUD)—while testing elements

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[43] This RFP document is available as of December 2012 on the Tompkins County Planning Department website, and can be downloaded here: http://www.tompkins-co.org/planning/documents/RFPCountyLandWestHillFinal.pdf.

of Pedestrian Neighborhood Zoning (PNZ), a zoning category that county planners are sketching in collaboration with EVI and the Aurora Pocket Neighborhood (see below).

While existing zoning on the county-owned parcel permits only 35 housing units, the county plans to submit a PDZ application that would double the number of permitted units. Units will be clustered at an average density of 10 units per acre, leave 70 percent of the site undeveloped, and demonstrate energy and water savings comparable to EVI homes (Planning Department 2012b). The proposal also contains elements to ensure affordability and accessibility.

Pedestrian Neighborhood Zoning (PNZ)

Finally, the CSC grant supports the development of Pedestrian Neighborhood Zoning (PNZ), a zoning category that attempts to codify the physical and social elements of EVI. From the outset, the PNZ draft proposal juxtaposes itself against an auto-oriented status quo: "The purpose of this proposed regulation is to promote higher density, energy-conscious, people-centered development within the existing framework of predominantly automobile-centered zoning (Planning Department 2012a, 1)." The proposed zoning category, which is expected to evolve into an official overlay district, draws explicitly from successes at EVI to prescribe such elements as pedestrian orientation, high interpersonal interaction, car-free public space, a permeable (non-gated) boundary, land preservation, increased overall density, residential governance, peripheral and limited parking, etc. The existence of such a zoning category will likely expedite future cohousing and cluster development projects, and may serve as an accessible tool for enacting more sustainable development practices.

When EVI and Tompkins County received the CSC grant, politicians at all levels expressed their excitement and support for the initiative. US Senator Kristen Gillibrand: "Leaders in Tompkins County are helping lead the way on initiatives to cut pollution, improve the air we

breathe and the water we drink…" US Congressman Maurice Hinchey—who wrote a letter in support of the grant: "Tompkins County continues to establish itself as one of the most environmentally friendly progressive communities in America." Ithaca Town Supervisor Herb Engman: "We are thrilled to part of this exciting project. EcoVillage has been an important part of the Town of Ithaca for nearly twenty years. We look forward to using the lessons learned there to make future development more sustainable." (Tompkins County, New York 2012).

Sustainability and Climate Planning Coherency in the Ithaca Region

The active non-profit community in the Ithaca region is complemented by strong signals from public authorities for energy and climate innovation. Tompkins County is not facing any acute climate change emergencies: it is far from shorelines that might be inundated by rising sea levels and it is unlikely to confront threats to its fresh water supply in coming decades, even under strong climate change scenarios (Roy et al. 2012). Yet the county has dedicated itself to climate mitigation and adaptation. In April of 2011 leaders from Tompkins County, the City of Ithaca, and the Town of Ithaca held a joint press conference to announce a united "green front" against climate change (Stern 2011). Much like neighboring households can reduce their energy burden by space and capital resources, neighboring communities can help each other achieve overlapping environmental goals by investing in shared energy-efficient facilities. From a socio-technical systems perspective it is clear that these distinct municipal authorities are offering coherently articulated landscape pressure (Smith, Stirling, and Berkhout 2005) for change in their region.

Each of these municipal authorities has passed ambitious greenhouse gas reduction goals and has taken detailed steps to achieve them. Tompkins County, the City of Ithaca, and the Town of Ithaca, have all signed the Climate Smart Communities Pledge, a New York State-administered program to help reduce local greenhouse gas (GHG) emissions. These communities

plus the Town of Dryden (to the east of Ithaca) are all members of ICLEI-Local Governments for Sustainability. The Mayor of Ithaca, Carolyn Peterson, has signed the US Conference of Mayors Climate Protection Agreement. Furthermore, all regionally-based institutes of higher learning—the principle economic and GHG emitting sector in Tompkins County—are dedicated to climate change mitigation and local sustainability.

In 2008, Tompkins County updated its 2005 comprehensive plan by adding an "Energy and Climate" strategy that aims to reduce county-wide GHG emissions to 80 percent of 2008 levels by 2050. The County has published a "2020 Energy Strategy" that offers specific, detailed actions aimed at achieving an interim goal of 20 percent 2008 emissions levels by 2020 (Planning Department 2010). A large portion of this goal was achieved when Cornell University shut down its aging coal-fired power plant in 2011 and switched to a combined heat and power (CHP) system, which runs more efficiently on natural gas and oil. Local reductions are expected to come from such programs as the Property Assessed Clean Energy (PACE) program, which helps individual homeowners reduce domestic energy consumption. This initiative is especially important given that over one quarter of Tompkins' housing stock was constructed prior to 1939[44]. The County has worked since 2002 to reduce emissions from its government operations, and indeed government emissions fell 4 percent between 2002 and 2006, and 10.7 percent between 2006 and 2008 due in large part to building retrofits (ibid). The Tompkins County Regional airport is also engaged in a pioneer Green Master Plan program sponsored by the Federal Avian Administration.

The Town of Ithaca has adopted goals to reduce its government-sector GHG emissions 80 percent below 2009 levels by 2050, with an interim goal of 30 percent reductions in 2009

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[44] US Bureau of the Census. American Community Survey 1-Year Estimates. 2011. Selected Housing Characteristics for Tompkins County, New York.

levels by 2020. This goal does not include community-wide emissions, but these goals will likely emerge from the Town's current comprehensive planning process. Similarly, in 2006, the City of Ithaca published its local action plan to reduce government-sector emissions 20 percent 2001 levels by 2016.

Summary

It is difficult to discern the causal links in a system with so many overlapping agents, but it is clear that EVI and its non-profit EVI-CSE have played an important role in stimulating an agenda for climate mitigation and policy innovation in Tompkins County, New York. EVI started as a grassroots project that has evolved into an important experimental space in a region working hard to transition away from fossil energy sources. From early in its existence, EVI worked to connect to mainstream institutions in the region while striving to demonstrate the feasibility of a lower-consumption lifestyle. The project was boosted by its early association with the Cornell's Center for Transformative Action (CTA), and its early members worked hard to disseminate the community's message through guest speakers and educational seminars. Although EVIs cohousing model was received with early skepticism, EVI was able to transcend many of the normative and regulatory barriers through the act of building a successful, energy saving alternative. This would have likely been more difficult in a very rural place or a parcel in the city's center: its semi-urban location allowed it enough freedom to deviate from conventional suburban development, yet enough proximity for its members to stay connected to the economic and social center of the region. Now that policy makers have a feasible example of cohousing they can "point to," subsequent projects at EVI have received less resistance from municipal boards, and Tompkins County is codifying its model in zoning legislation.

EVI is an intentional community into which middle class professionals have integrated very easily. The community offers many opportunities to live at lower ecological impacts with changes in routine that do not inhibit full-time employment or contemporary household utilities.

Housing units at EVI are in many ways very similar to conventional single-family homes, yet they save energy and preserve ecological systems through clever design. Individuals played any number of roles in the design and construction of their homes: some built their homes from the ground-up, others participated in early decisions and little more. Families can opt to participate in community meals or eat as a nuclear family. Members are highly encouraged to contribute 2-4 hours of community service per week, but they are not forced to.

Relatively few individuals living at EVI are actively involved in EVI-CSEs outreach activities. By one member's estimate, only 15-20 percent of residents are individually engaged in regional partnerships. EVI's non-profit organization employs only one full-time executive director plus multiple part-time staff members. Yet EVI-CSE has built a very strong network amongst public, private, and non-profit institutions in the region. This is due, in part, to its powerful example, but also because of its well-connected Board of Directors. In partnership with universities and local government officials, EVI has successfully applied to federal, state, and local grants that support educational programming and the evolution of citizens groups that unite around sustainability issues. Tompkins County, the City of Ithaca, and the Town of the Ithaca are all heavily invested in climate mitigation planning, and it is in part because county planners were engaged in one multi-sector organization, TCCPI, that EVI and Tompkins County engaged an opportunity to compose an award-winning Climate Showcase Communities grant.

Conclusion

Smith (2007) hypothesizes that niche-based innovation processes are stimulated, in part, by socio-technical niche projects that are simultaneously in-tune with *and* in defiance of the socio-technical regime it prefigures. These so-called "intermediate" niches are able to *innovate* and *translate* at the same time. This case study illustrates one such intermediate niche project, and offers details about how the property of intermediacy evolves with regime dynamics. EVI did not start "in tune" with the incumbent urban development socio-technical regime. Its founders were

seasoned social activists who chose to walk 3,000 miles across the country, raising awareness about issues that were just beginning to enter public consciousness in 1989. They adopted a housing model that was effectively unprecedented in North America and confronted a lot of initial skepticism and tension from neighbors. Early in the community's existence, however, it made an explicit decision to attract "middle class" members and to adhere to the building regulations dictated by the Town of Ithaca. These decisions were not ideal to all of EVIs early members, and resulted in multiple defectors. It chose to settle relatively close to the city of Ithaca, but far enough so that it would have the freedom to grow food and experiment with alternative housing types. When EVI's first neighborhood succeeded, and public officials could "point to" a working model of cohousing, elements of the urban development regime began to "warm up" to the idea. All the while, EVI built working partnerships with institutions of higher education in the region.

EVI has networked, to a large extent, through its board of directors. It has forged relationships with county planning officials through its co-membership in non-profit multi-sectoral citizens groups (e.g. TCCPI and Sustainable Tompkins). Recently, EVI and Tompkins County have received recognition and funding to collaborate on several climate demonstration projects. This successful partnership is due to a situation in which diverse stakeholders exchanged information—county planners shared information about the EPA Climate Showcase Communities Program, and EVI has shared information with the county about their working model. This co-production of knowledge resembles Healey's (1997) model of collaborative planning and Stein and Harper's (2011) dialogical innovation process.

Smith, Stirling, and Berkhout (2005) explain that the governance of socio-technical regime transition requires "coherently articulated" landscape pressure plus adaptive capacity to change. This case study illustrates the co-dependence of these forces—they are co-evolutionary and systemic. The ongoing energy and environmental regime transition in Tompkins County is

the result of niche and landscape forces that are highly integrated: county planners and town board members serve on the board of directors of grassroots organizations, and grassroots activists serve on the board of directors of local developers. It is difficult to discern where the regime actors stop and niche actors start. Indeed, the landscape pressure to change in Tompkins County draws from some exogenous elements—namely federal grants that legitimate and stimulate innovative activity—but it is unclear whether Tompkins County, the City of Ithaca, and the Town of Ithaca have endorsed sustainability initiatives *because* of the region's citizen-based sustainability activism or whether citizen-based sustainability activism has emerged because of coherent signals from public agencies.

Case Study: Los Angeles Eco-Village

Sustainable Community from the Urban Grassroots

Abstract

The Los Angeles Eco-Village (LAEV) is a hub of social and environmental activism in the heart of the second-largest metropolitan area in the United States. The project was established in 1992 as an attempt to heal a neighborhood damaged physically and socially by the Los Angeles riots. Today, LAEV serves as both a demonstration of sustainable community and an incubator of multiple grassroots initiatives near the boundary of Koreatown and Rampart Village, about two miles northwest of downtown LA. LAEV's history and vision is inextricable from its immediate urban surroundings. It attempts to demonstrate a pedestrian-centered, cooperative lifestyle in a city built to accommodate the automobile (Jackson 1985). In nearly twenty years, the project has created a rare cooperative and ecologically-oriented space while partnering with municipal authorities and other local non-profits to transform infrastructure and land uses in its own two-block neighborhood. The two-block project has erected fruit trees, vegetable gardens, compost bins, and small workspaces in the alleys and courtyards surrounding several old apartment buildings, replacing space typically used by vehicles with space for food and economic production. The community continues to push for alternative (to automobile) transportation and local food initiatives city-wide. Whereas Dancing Rabbit Ecovillage demonstrates the possibilities of low-impact living outside the rules, networks, and physical structures of mainstream urban development regimes, and EcoVillage at Ithaca demonstrates how practices within ecovillages can be translated to regional-scale policy, LAEV serves as a model from which planners, policy makers and sustainability advocates can draw to spur regime transition in dense metropolitan areas.

"As experiments in futuristic living go, the Los Angeles Eco-Village isn't as dramatic as the controversial Biosphere 2 terrarium, but the small demonstration project offers hopeful lessons in building cooperative, self-reliant neighborhoods."—Jake Doherty, *The Los Angeles Times*, Community News: Mid-City, October 1994.

"*Rural ecovillages are certainly also needed, but mainstream city dwellers rarely see them. And even if they did, most need tangible urban examples to imagine how they, too, could live more sustainably, and without leaving home*." –Lois Arkin, *Communities Magazine*, Winter 2005, p.47

Introduction

Ecovillages commonly settle in sparsely populated regions with cheap land, minimal land use regulations, and few neighbors (Meijering, Huigen, and Van Hoven 2007). It is in this setting that they can best experiment with low-impact construction, design, and food production practices. While rural ecovillage projects are not oblivious to world beyond their boundaries, the Dancing Rabbit case study illustrates how its rural location and its radical departure from mainstream building conventions may preclude direct translation of low-impact practices to policy.

The following case study highlights Los Angeles Eco-Village (LAEV), a cooperative project that has settled very deliberately in the middle of the neighborhood its aspires to transform. LAEV formed in response to the social and economic devastation of the 1992 Los Angeles riots. While global environmental sustainability remains an important guiding principle to LAEV members, the project is focused primarily on building a full-featured, human-scale, and permanently affordable community in the middle of a metropolis whose name has grown synonymous with the worst social, economic, and environmental symptoms of global capitalism. Many of the entrepreneurial projects that started inside the ecovillage have radiated throughout the city. Other projects remain intentionally and intensely local. They range from the city-wide *CicLAvia* to free weekly music lessons in public right-of-way.

LAEV has chosen to struggle with the contradictions of social equity, economic development, and ecological sustainability present in a dense urban environment. Whereas Dancing Rabbit and EcoVillage at Ithaca were effectively able to start "fresh" on open land and with self-selecting members, LAEV has built a community in a neighborhood with building codes, long-time tenants, enduring political tensions, historic buildings, and existing urban infrastructure. The ecovillage is subject to municipal inspections as is any rental property in Los Angeles, and its leaders are in perpetual negotiations with the Los Angeles Unified School District about land uses in the neighborhood. Its struggles more closely resemble the struggles that planners in existing urban and suburban areas are likely to face in the coming decades.

In some ways, LAEV demonstrates an *intermediacy* similar to EcoVillage at Ithaca: Individuals can participate as members of the ecovillage without abandoning their full-time income jobs; members have access to grid electricity, water, and sewerage, but have begun to experiment with some off-the-grid options; members have the option (but no obligation) to devote large amounts of their time to cooperative pursuits like meeting facilitation and committee membership. In other ways, however, the community's place in space leaves it no choice but to remain in constant communication with the socio-technical regime it prefigures. In fact, the actual boundaries of the ecovillage remain a contested topic, even amongst the ecovillage members. In this respect, its experience offers a more realistic picture of a sustainability transition processes in urban places. This transition is at one time slow and complex and at the same time abundantly hopeful and illustrative of how urban sustainability can unfold.

Founding and Early History: Healing the Neighborhood

The Los Angeles Eco-Village started as an initiative of the Cooperative Resources and Services Project (CRSP, pronounced "crisp"), a non-profit organization founded in 1980 by Lois Arkin. Arkin, a self-described "co-op junkie," started CRSP as an organization to support and

grow cooperative initiatives in Los Angeles. In its early years, the organization hosted fairs and fundraisers for a general constituency, but around 1983 Arkin began to envision creating a "neighborhood of co-ops" that would allow individuals to access multiple overlapping co-ops in the same space. Between 1986 and 1991, Arkin and CRSP focused almost exclusively upon acquiring and preparing land for what they labeled an "ecological urban village." The intended site for this project was the top of a closed public landfill in the Montecito Heights neighborhood several miles east of where the ecovillage lies today. As the landfill's contents were primarily construction debris, it was presumably safe to inhabit. The three-acre hilltop would serve as the community center, and members would use the hill's terraces for garden space. A fifty-member volunteer planning group, including a professional architect, prepared a feasibility study for the city, worked regularly to update city planning department about their intentions, and successfully petitioned the city to remove the landfill parcel from public auction (Arkin 1992). Renderings of the project appear in *Sustainable Cities: Concepts and Strategies for Eco-City Development* (Walter, Arkin, and Crenshaw 1992), a book co-edited by Arkin and awarded by the Los Angeles Section of the American Planning Association. This hilltop project, however, would never break ground.

The 1992 Los Angeles riots changed CRSP's plans abruptly. CRSP headquarters was located in the northwest corner of Koreatown: a neighborhood of increasing conflict between an upwardly mobile Korean merchant class and LAs systematically impoverished African American community. On April 29, 1992, citywide racial tensions erupted into six days of civil unrest following the acquittal of four Los Angeles police officers charged with assaulting African-American truck driver, Rodney King. A home video of the event shows an unarmed King being struck with batons and tazed repeatedly while attempting to crawl away from a group of white officers. Within hours of the officers' acquittal, riots erupted throughout South-Central Los Angeles and Koreatown, resulting in 53 deaths, 16,000 arrests, and $1 billion in property damage

(S. Wilson 2012; Crogan 2002). The Los Angeles Police Department was desperately unprepared for the widespread violence, and summoned the assistance of 4,000 National Guard troops (Sears 2000). Koreatown experienced some of the worst damage. Entire blocks burned to the ground, and the lack of sufficient police presence prompted Korean business owners to enlist to the protection of armed Korean and Korean-American volunteers.

CRSP's headquarters survived the riots, but it was situated only blocks away from several major fires and sustained a small fire on its front stoop. The event influenced Arkin and CRSP to abandon the Montecito Heights project and reorient its efforts to the organization's immediate surroundings where Arkin had resided more than 13 years (see Koennen 1994, E5). Arkin explains, after six months of discussion the CRSP organizing committee "decided we needed to retrofit this neighborhood instead of start a sexy million-dollar project." The group inaugurated Los Angeles Eco-Village on January 1, 1993, by "hitting the streets" and introducing themselves to neighbors, and neighbors to one another. The first goal was to inspire a sense of safety and neighborly presence, and the strategy succeeded in engaging youth (or "junior eco-villagers") in neighborhood gardening efforts. Engaging adults, however, was more challenging at first, as there was a relatively high turnover rate in the neighborhood and adults in the neighborhood rarely stayed for more than five years. The Summer 1993 issue of CRSPs *LA Eco-Village and Co-op Newsletter* explains, "The years of work and studies on the old landfill were not lost nor wasted," The group of organizers had learned a lot about urban development processes in their preparation, and saw that they could transplant many of their ideas to an urban infill project.

Los Angeles Eco-Village, 2013

In the twenty years since LAEV's inauguration, the community has secured a stable membership and multiple residential buildings at the intersection of Bimini Place and White House Place. The LAEV website explains:

> *The LA Eco-Village is a demonstration of sustainable community development. We share our processes, strategies and techniques with others through tours, talks, workshops, conferences, public advocacy and the media*[45].

While its mission very closely resembles the mission statements of the other ecovillages in this dissertation, LAEV distinguishes itself from rural and suburban ecovillage projects in some important ways. For one, it lies in a dense and ethnically diverse neighborhood. The 2010 Census estimates that the ethnic constitution of the ZIP code containing LAEV (90004) is 51.4 percent Hispanic or Latino, 16.8 percent White, 3.2 percent Black or African-American, and 26.6 percent Asian, amongst small percentages of others (Table 7: Racial Composition by Place, 2010.). Just over 57 percent of the ZIP code was born outside the United States. As one ecovillage resident explained to me, "We live in a neighborhood with no majority language."

Table 7: Racial Composition by Place, 2010.

Ethnicity and Race	United States (%)	Los Angeles city (%)	90004 ZIP Code (%)
Hispanic or Latino	16.3	51.5	51.4
Not Hispanic or Latino			
White	63.7	28.7	16.8
Black or African-American	12.2	9.2	3.2
American Indian	0.7	0.2	0.2
Asian	4.7	11.1	26.6
Ntv Hawaiian/ Pacific Islander	0.2	0.1	0.1
Some Other race	0.2	0.3	0.3
Two or More races	1.9	2.0	1.4

Source: US Bureau of the Census, 2010 Decennial Census

[45] http://laecovillage.org/home/about-2/. Accessed February 7, 2013.

The ethnic diversity of the neighborhood is matched by a diversity of land uses. The cluster of buildings owned by LAEV lie on the same block as a car repair business, a rehabilitation center, a non-profit community center, an adult learning center, and the property abuts a strip mall filled with grocery stories, an auto supply chain, restaurants, and private offices. A brief walk around the block reveals Korean, Thai, Filipino, and Spanish signage, mixed amongst national fast-food chains. The sounds of a neighboring elementary school—including the bell, loudspeaker, and playing children—are audible from inside LAEV's buildings. On a clear day facing east out of a second-story window, one can see miles of mid-rise buildings, streetlights, telephone wires, the Hollywood Freeway, the skyscrapers of Downtown Los Angeles, and the San Gabriel Mountain Range.

An assortment of gates, fences, and metal partitions fill the neighborhood, distinguishing one parcel from another. Even LAEV's main building, the Bimini Apartments, lies inside a locked steel gate. One resident explains that while there has been discussion about removing the gate from the property, residents are inclined to leave the doors to their individual apartment units un-locked during the day, and remain judicious about who enters the building and wanders around.

Multiple residents describe the neighborhood as "transit rich." Indeed, the ecovillage lies less than ½ mile from the Beverly/Vermont subway station and less than one mile from the Wilshire/Vermont subway station, offering easy access to two fixed-rail transit lines and multiple bus stops. Just over twenty-three percent of the residents in LAEV's ZIP code take public transportation to work: this is more than double the rate of Los Angeles residents at-large and more than quadruple the rate of US residents (see Table 8).

Table 8: Mode of Transportation to Work by Place of Residence

Mode of Transportation	United States (%)	City of Los Angeles (%)	90004 ZIP Code (contains LAEV) (%)
Drove Alone	76.1	67.2	57.0
Carpooled	10.2	10.5	10.5
Public Transportation	5.0	11.0	23.3
Walked	2.8	3.7	1.7
Other means	1.7	2.3	1.6
Worked at Home	4.2	5.3	5.8

Source: US Bureau of the Census, American Community Survey, 2007-2011 Selected Economic Characteristics.

LAEV is also distinct from the other ecovillages in this dissertation for its retrofit buildings, all constructed in 1922. Whereas EcoVillage at Ithaca and Dancing Rabbit Ecovillage have experimented with construction, siting, and building techniques, LAEV members have had to build their community within the constraints of existing structures and limited open space. Residents at Dancing Rabbit and EcoVillage at Ithaca tend to live in single-family dwellings while sharing facilities in a centralized common house. As of the time of this writing, LAEV members share three buildings total. While individuals and families at LAEV occupy separate apartment units, there is no separate common house, but rather common units within the same shared structure. It is difficult to draw a definitive spatial boundary around LAEV. Although Arkin considers LAEV the "two block" neighborhood adjacent to Bimini Place and White House Place and the ecovillage has engaged in projects throughout these two blocks, there are individuals in the neighborhood and within the LAEV buildings who do not self-identify members of the LAEV intentional community. Thus, the Los Angeles Eco-Village intentional

community exists as a *both* a core of dedicated members living together in a cooperative space, *and* an aspiration to extend this membership to individuals and physical structures in the entire two-block neighborhood.

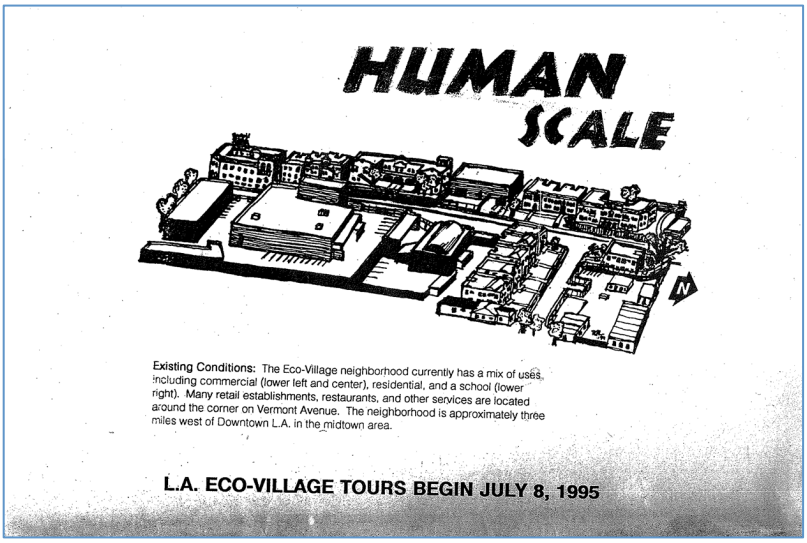

Figure 23: A scan of the back cover of the Spring 1995 edition of the *Neighborhood News* published by CRSP depicts the two-block neighborhood LAEV is attempting to transform. Bimini Place runs north-south (left-right) and White House Place runs east-west coming to a dead end in the foreground of the image. The original CRSP headquarters is depicted on the northeast corner of the two streets. Today this lot is being prepared for a learning garden. The caption below the image reads: *The Eco-Village neighborhood currently has a mix of uses, including commercial (lower left and center), residential, and s coal (lower right). Many retail establishments, restaurants, and other services are located around the corner on Vermont Avenue. The neighborhood is approximately three miles west of Downtown L.A. in the midtown area.*

LAEV's three buildings—all at the Bimini/White House intersection—are inhabited by a mix of intentional community ("co-op") members and tenants who have not elected to be part of the ecovillage. CRSP purchased the 40-unit Bimini Apartments building in 1996 with loans from CRSP's ecological revolving loan fund (ELF), a system that collects loans from friends, allies, and relatives of the project and pays back interest at 2.5 percent over 18 months, 3 years, 5 years, or 10 years[46]. Instead of evicting the incumbent tenants, CRSP allowed them to stay in their units,

[46] Ecological Revolving Loan Fund. Accessible at http://laecovillage.org/crsp/ecological-revolving-loan-fund/. Accessed on February 9, 2013.

and several remain today. As one member described, "CRSP's value system didn't allow them to kick people out." Additionally, explains one veteran member, "Some of the [existing tenants] were rooted in the neighborhood and had some level of community among themselves. That was seen as valuable." When CRSP purchased the building, as many as half of the units were unoccupied and/or legally uninhabitable. The community has invested heavily in repairing these units, and the building is approaching full occupancy today. In 1999, CRSP purchased the eight-unit apartment building to the south of its first building, and in 2011 it purchased the four-unit building on the southeast corner of the Bimini/White House intersection. In early years, the ecovillage experienced a high level of turnover including, for example, students that could only dedicate two years to living in the apartments and would leave after graduation. Today, the project is attracting residents with intentions to stay for the indefinite future.

Legal Structure: The Non-profit, the Co-op, and the Community Land Trust

As of 2012, LAEV consists of three legal entities:

- The Cooperative Resources and Services Project (CRSP), a 501c3 non-profit;
- Urban Soil Tierra Urbana (USTU), a limited equity housing cooperative); and
- The Beverly-Vermont Community Land Trust (BVCLT).

While at one point CRSP was the legal owners of the buildings and the land, it recently transfered ownership of the buildings to USTU and the land to BVCLT. BVCLT's is dedicated to "creating pedestrian-centered neighborhoods emphasizing affordable housing, work and recreational spaces that are economically and socially sustainable, and that integrate urban living with nature."[47] Its mission extends beyond the two-block ecovillage neighborhood, aspiring to secure permanent affordable and low-impact housing in the vicinity of the Beverly/Vermont transit stop. BVCLT and CRSP co-purchased a third building in 2011: a four-unit complex, on the southeast corner of Bimini and White House Place. The building is colloquially called "the four-plex."

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[47] BVCLT website: http://urbansoil.net/wiki.cgi/The_Beverly_Vermont_Community_Land_Trust.

The buildings owned by USTU are inhabited by a mix of ecovillage members and tenants with no connection to the intentional community. Approximately forty percent of the inhabitants of USTU buildings are *owner members*, official board members and shareholders of the housing cooperative. About twenty percent are *renter members* who participate in meetings and are participants of the cooperative in every sense except being official share holders. An individual must remain a renter member for one year before they are eligible to become an owner member through a consensus vote of existing owner members. New owner-members are also charged a nominal, one-time fee that goes toward the cost of their share in the cooperative. The remaining forty percent of building inhabitants are either *long-term* (26.9 percent) or *short-term* (13.5 percent) *renters* (See Table 9). Long-term renters are individuals who lived in the Bimini Apartments prior to CRSPs acquisition of the building in 1996. Short-term renters may be exploring membership, but have agreed to limit their stay unless they eventually transition to membership status. USTU uses consensus decision-making, and all owner members and renter members may participate and vote in consensus meetings. In some circumstances—generally surrounding legal and budgetary measures—only owner members may "block" a consensus vote.

Table 9: Apartment units and inhabitants, Los Angeles Eco-Village, 2013

Inhabitant Status	Residents		Units	
	Number	Percent	Number	Percent
Long-term renters	14	26.9	10	21.3
Short-term renters	7	13.5	6	12.8
Renter members	21	40.4	17	36.2
Owner members	10	19.2	9	19.1
Common units			3	6.4
Vacant units			2	4.3
Total	52		47	

Source: E-mail correspondence with LAEV Building Manager, February 1, 2013.

There is no legal entity with the name "Los Angeles Eco-Village," and one member commented that this has led to some confusion about what the community's name actually encompasses. All three organizations have a distinct board of directors and membership structure, although there is considerable overlap amongst them. USTU (colloquially "the co-op") is governed by its owner members. The BVCLT board of directors consists of one-third ecovillage "lessee representatives" who reside on land trust property; one-third "general representatives" that live in the neighborhood; and one-third "public representatives" living at-large in the Los Angeles region. CRSP is directed by Lois Arkin and governed by a small board of directors consisting of former community members and local officials[48].

The ecovillage, including all three organizations, holds Monday night meetings. Official board meetings take place on the first Monday of each month and resemble most other meetings with the exception of some additional formalities. Meeting agendas are assembled and facilitated by two individuals selected from amongst a group of about a dozen trained volunteers.

On-Site Initiatives

The three small lots on which LAEV is located offer an uncommon diversity of land uses for property in a dense urban center. It is a fascinating attempt at creating a "full-featured" and "human-scale settlement" (Gilman 1991), without the space and flexibility of a rural parcel. The five parcels upon which LAEV's oldest two buildings sit are zoned "C2 Commercial," which permits a variety of uses including limited manufacturing, retail, and a range of residential uses[49]. The project has taken advantage of this flexibility. While the LAEV building interiors consist

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[48] CRSP Board of Directors can be accessed at http://laecovillage.org/crsp/board/. Accessed January 31, 2013.

[49] Generalized Summary of Zoning Regulations, City of Los Angeles. Can be accessed online at http://cityplanning.lacity.org/zone_code/Appendices/sum_of_zone.pdf as of February 7, 2013.

primarily of small apartment units connected to every conventional utility—grid electricity, sewer, gas, and water— the common spaces offer an assortment of agricultural, residential, and small commercial uses.

The LAEV parcels are inundated with fresh growing food. Even in January it is evident that the community is devoted to experimenting with urban food production. A quick walk around the property reveals oranges, lemons, bananas, kale, onions, artichokes, and an abundance of herbs growing from trees and from raised beds in the alleys, front yards, and courtyards of the property. The courtyard of the Bimini Apartments is surprisingly fecund, filled with personal gardens and a small chicken coup. In the alley that separates the community's two oldest residential structures, avocados regularly fall from the sky. Watch out! This food production is complemented by active composting, which takes place in bins around the property, but also in the margins of the long alley on the building's western edge. Composting also reduces the amount of trash the community produces. One veteran member explained that when she arrived at the ecovillage in 1998, Bimini Apartments produced two full dumpsters of trash each week at 60 percent occupancy . Now, at nearly full occupancy the building fills five to six recycle bins, and rarely fills an entire dumpster.

Figure 24: A compost pit in the back alley of the Bimini Apartments.

In a 2010 interview, Arkin explains that as many as twelve individuals meet their livelihood needs on the property (Collette 2010). The community has converted several garages behind the Bimini Terraces (the 8-unit building) into on-site workshops. One garage is devoted to the community's tool shed, from which members can borrow donated hand tools. Another garage serves as a bicycle repair shop. Yet another garage serves as an art studio administered by an ecovillage member who hosts weekly community art events and workshops[50].

Several rooms inside the 40-unit building are designated for community use. The foyer of the Bimini Apartments contains multiple couches, a book case containing a small library of official LAEV meeting minutes and documents, a table of reading materials related to ecovillages and local cooperative ventures, and a "free table" covered in used items (e.g. clothing, kitchen appliances, books) that individuals have decided to give away. A former one-unit apartment on

[50] More details about this project are available here: http://theforeverdoorproject.com/TheForeverDoorProject/Welcome.html. Accessed on Feburary 7, 2013.

the second floor serves as a "community room" where weekly meetings take place and guests can access a small kitchen. On the first floor, residents can access a bicycle storage room and the bulk food room, the home of LAEV's "food lobby."

The Food Lobby

The food lobby is a food co-op formed by LAEV members, but open to subscribers from outside the intentional community[51]. Members of the food co-op can order weekly produce boxes, which are delivered on Sunday afternoons. While produce deliveries operate similarly to a CSA (community supported agriculture) initiative, customers need not subscribe for a full growing season to participate. Members are also eligible to order and purchase bulk foods delivered by a regional distributor. While members do not have to pay a membership fee *per se*, they are asked to work monthly shifts of 1.5 to 2 hours, helping to unload and sell food on Sundays.

Figure 25: The community's bicycle room.

[51] www.foodlobby.org. Accessed February 7, 2013.

Figure 26: The bulk food room, home of the "Food Lobby".

Figure 27: Gardens in the Bimini Apartments courtyard.

Exterior Spaces

LAEV's long-term plans involve converting the public alley on the south side of the property from an empty concrete thoroughfare into a multi-functional pedestrian promenade. It is currently bound on one side by a gate made of welded bicycle parts. The colorful gate was assembled with used bicycle parts by participants in a neighborhood welding workshop.

Figure 28: The gate on at the south of the Bimini Terrace property is made of welded bicycle parts. The gate was assembled as part of a neighborhood welding workshop.

Membership

Most LAEV members lived in Los Angeles prior to moving to LAEV. In this respect its membership more closely resembles the regionally-rooted members of EcoVillage at Ithaca than members of Dancing Rabbit Ecovillage who have almost all relocated from different regions of the USA. LAEV members commonly discover the ecovillage while living and working in Los Angeles, in part because the process by which an individual becomes a member demands that they live nearby. Whereas moving to a rural ecovillage commonly involves deliberate decisions to leave existing homes and careers, one LAEV member described her transition to ecovillage life as "accidental." After her landlord evicted her from an apartment in a coastal neighborhood of Los Angeles, a friend offered her a temporary room at the ecovillage, and she settled in the 40-unit Bimini Apartments building with no intention of staying permanently. Over time, however, she found herself satisfied with the location and the safety of living in an intentional community. She explains:

> *It felt safe. You knew your community. I don't think I would have felt as comfortable living in any kind of random apartment building in Los Angeles...there's a level of comfort living 'in community' where people are supposed to get to know each other.*

Her explanation calls into relief the anonymity of urban living. Individuals living in a conventional rental apartment do not commonly have social obligations to their neighbors. They are not "supposed" to know each other, despite sharing walls, ceilings, and floors. Another individual expresses how his trajectory was similarly fortuitous. He was made aware of the ecovillage about one year prior to making the move. When his lease expired on his existing apartment, he decided relocate to LAEV:

> *I was working at a peace and justice lobby grassroots organization in 2001, and someone that was working there lived here and told me about it. I was already interested in a lot of the different elements of what I saw was going on here—knowing your neighbors, growing food on-site, living around people who were interested in a sustainable way to live.*

That individuals are able to move into the ecovillage without separating themselves from work in the region allows for a balancing of internal and external work that adds to the richness and influence of the community.

Balancing Internal and External Initiatives

Members balance their time between on-site internal initiatives and off-site external work. This balance delivers important social benefits to the ecovillage in addition to the more apparent economic benefits. One member expressed satisfaction for being appreciated for her "external" work in a non-profit environmental justice organization. She explains:

> *There are advantages and disadvantages [of having members that focus on external initiatives]. If we're committed to doing this other [external] work it's a lot of time and energy, so we have limited time to do stuff internally, but I think it adds to the richness of the experience.*

This sentiment was echoed by multiple interview subjects. Ecovillage members are united by their ideological support for social justice and environmental initiatives. Members invest time and resources in city-wide projects that are not officially connected to the ecovillage, but receive moral and sometimes financial support from their fellow community members. For example, one

member, who has started a solar panel installation company, was able to experiment for the first time with energy infrastructure on the apartments of fellow LAEV residents. Veteran ecovillage member Julio Santizo is the director of the annual Eco-Maya festival, a two-day long event that highlights the overlapping values of Maya culture and global environmentalism. The event attracts thousands of attendees and vendors from across the city, and has thrived as a result of support from LAEV, the Rampart Village neighborhood association, and a local city council member. In turn, the festival has attracted positive media attention to the ecovillage and the neighborhood.

While several members of the ecovillage are able to earn their income with small on-site businesses, others are dedicated to careers off-site. The community is home to an assortment of professionals including attorneys, computer technicians, electricians, activists, and entrepreneurs. One young member, Angel Orozco, is the founder of Cafecito Organico, an artisan coffee chain that imports beans from sustainable Latin American farms, and has recently expanded to four locations in Southern California. Whereas maintaining a radical rural community like Dancing Rabbit requires the day-to-day investment of its members, LAEV members do not have to invest quite so much time into maintaining the roof over their heads and can more easily access maintenance professionals (e.g. plumbers and electricians) if necessary. LAEV's access to a multitude of transportation options affords individuals relative autonomy when making day-to-day transportation decisions. In contrast, Dancing Rabbit's vehicle cooperative requires that members communicate with each other throughout the week to meet their transportation needs. Urban living requires relatively more engagement in the cash economy, and relatively less sweat equity and social cooperation, as is necessary in an off-the-grid rural community built from scratch.

The internal/external balance of LAEV has allowed the community to radiate into the Los Angeles region. Members have used external networks to transform their own neighborhood and

used internal connections to further their individual activist projects. Multiple members also serve on local government boards and committees, which has helped the ecovillage navigate political processes and stimulate physical changes to the neighborhood. The community built a strong rapport with the city's planning office in its early days while preparing the Montecito Heights project, and was able to gain official recognition in the housing element of the city's 1998-2005 General Plan. Under the subheading of "L.A. Ecovillage Demonstration Project" the General Plan directs the Community Redevelopment Agency to, "Continue the development of the two-block demonstration neighborhood to model sustainable community development in which physical and economic pursuits are integrated for long-term health (City of Los Angeles 2002)." Currently, one member serves on the Rampart Village Neighborhood Council, other members have served as staff members of local city council members, and the ecovillage is listed as a "community resource" on the Wilshire Center/Koreatown Community Redevelopment Authority (CRA) website[52]. Its enduring presence in the neighborhood has resulted in lasting and prominent physical changes.

Transforming Neighborhood Land Use and Infrastructure

Streetscaping: Safe, Beautiful, and Edible

Perhaps the most iconic image associated with Los Angeles Eco-Village is the brightly decorated pavement at the intersection of Bimini and White House Place. The street infrastructure has been altered to enhance pedestrian safety through double-wide sidewalks and "bulb-outs" that reduce the distance a pedestrian has to cross at the intersection. The bright colors, wide sidewalks, and bulb-outs all serve to increase the visual complexity of the road, and thus, reduce driving

[52] The "community resources" section of the CRA/LA website can be access here: http://www.crala.org/internet-site/Projects/Wilshire_Center/community_resources.cfm. Accessed February 9, 2013.

speed. Additionally, the sidewalks on the east side of Bimini Place have been retrofitted with permeable pavement to reduce storm water runoff, and the city has allowed the ecovillage to plant macadamia trees in the right-of-way. Both the permeable sidewalk pavement and edible street trees are the first of their kind in the City of Los Angeles. These changes have been accomplished through the Shared Streets program administered by the Metropolitan Transportation Authority (Metro). The program funds projects in the LA region through a competitive application process. LAEV accessed $250,000 from with the help of one veteran member who had worked closely with municipal government for years and was able navigate the application process (Rosenblatt and Arkin 2008). While happy with the changes, Lois Arkin explains the project is not quite complete, and should be enhanced by more permanent impediments to car traffic:

> *What they did was [insufficient] for $250,000. What I really tried to influence them to do was to actually make a slow street because that's what Bimini Place is supposed to be, a slow street! But what we know from research everywhere is that if you want to make a slow street, you've got to put objects in the street. You have to make it complex. You have to constantly change it so that drivers can't see more than 200 feet in front of them...If you stand at one end of our street you can see the full one thousand feet of our block, so I knew from the beginning that this was not a very good plan. But you do what you can. You keep the peace. And what I call it is "Phase One" of Bimini and White House Place becoming car-free streets.*

Arkin's description illustrates the process of "settling in," insofar as the community is "doing what it can" and "keeping the peace" rather than initiate a project it knows will fall short of municipal approval. But their success has also inspired some "warming up." The ribbon cutting for the shared streets project was attended by City Council President—and 2013 mayoral candidate—Eric Garcetti, plus department heads from CALTRANS (The State of California), Los Angeles Department of Transportation (LADOT), and Metro.

Figure 29: On March 28, 2008, City Council President Eric Garcetti inaugurated the "East Hollywood Shared Street Project" outside Los Angeles Eco-Village. Lois Arkin (LAEV founder) appears on the right side of the image. Photo courtesy of Damien Newton.

Figure 30: The intersection of Bimini and White House. Colorful pavement and bulb-outs enhance pedestrian safety.

The Bimini Slough Ecological Park

LAEV has also contributed to small changes in neighborhood land use, including the Bimini Slough Ecology Park, at Bimini Place and Second Street. LAEV and its surrounding

neighborhood are built on land that used to be the western edge of the City of Los Angeles. At that time, rainwater would filter into the Bimini Slough—a depression in the landscape that filtered and channeled water into the water table. Over a century of urban development has paved over the slough, impeding the natural filtration process. The Bimini Slough Ecology Park is an attempt to restore a small segment of this natural system and add park space to a neighborhood with desperately little park space per capita (Loukaitou-Sideris 2006). In 2004, the Bresee Foundation—a neighborhood non-profit serving low-income youth and families—partnered with LAEV to close off a segment of Second Street to automobile traffic. The foundation solicited $750,000 from the city, the state, and the Metropolitan Water District to build a 20,000 square foot bio-swale and playground (Rosenblatt and Arkin 2008). It is owned and operated by the Bresee Foundation, but remains open to the public.

The Ecovillage versus Los Angeles Unified School District

CRSP's original home, the property on which Lois Arkin lived for thirteen years prior to the formation of Los Angeles Eco-Village, is owned by the Los Angeles Unified School District (LAUSD). With more than 640,000 students and over 1,000 public and charter schools, LAUSD is the second-largest school district in the United States, and a major land owner in the Los Angeles urban region. In 2007, the ecovillage learned of that LAUSD planned to construct a 1,000-student elementary school in the lot immediately across the street from the Bimini Apartments. One member narrates:

> *The LA school district was going to destroy all the housing on White House Place to build a school. While we completely understood the need to address school crowding, this was not an acceptable proposal because there is just an incredible scarcity of affordable housing and a number of community members who lived down the street. So we fought to preserve the housing and also helped to find alternatives for the school district. Ultimately were able to find a mutually agreeable solution that moved the school a few blocks away…We were also able to preserve the corner for a learning garden.*

The school construction would have demolished forty units of affordable housing, and effectively destroyed the community's vision for a mixed-use pedestrian-oriented neighborhood. The

rationale for an additional school in the neighborhood was "questionable," explained one resident. An *Ecovillage News* article elaborates that an additional neighborhood elementary school:

> …might have seemed reasonable if Los Angeles needed more schools, since after all, who can argue with the needs of children? But the number of children in this part of Los Angeles is declining, and many local schools have empty seats. Furthermore, a new LAUSD elementary school opened in 2006 one block away, and two new elementary schools recently opened about 15 blocks away—all with some empty seats ("L.A. Eco-Village Stops Bulldozers!" 2008).

The ecovillage mobilized a letter writing campaign, an online petition, and massive attendance at public hearings to gain the attention of local policy makers and ultimately convinced LAUSD to choose an alternative neighboring site one block to the north, thus preserving the affordable housing, and maintain the pedestrian nature of the neighborhood. At the same time, the community has partnered with LAUSD to convert one corner of the land into a student-oriented learning garden, which is currently being prepared for the 2013 growing season. For better or for worse, the school district has since built a 137 car parking lot on the proposed site.

Incubating City-Wide Initiatives

In addition to projects based in the neighborhood, LAEV and CRSP have incubated multiple grassroots initiatives that have since become projects with a city-wide (and sometimes region-wide) footprint.

Bicycle Kitchen

The Bicycle Kitchen started in 2002 as a kind gesture of ecovillage member and bike messenger, Jimmy Lizama. Lizama wanted to offer community members a venue where they could learn how to fix their own bikes, and made himself available on Tuesdays and Thursdays in what is now LAEV's bulk food room. The small bi-weekly project grew so popular that the event had to be moved out of the kitchen and into the streets. By 2004, Lizama and small group of ecovillage members formed an independent non-profit called "Bicycle Kitchen[53]," which now

[53] http://bicyclekitchen.com/

operates out of its own storefront and has spurred a wealth of similar volunteer bicycle maintenance initiatives in Southern California with names like "Bikerowave[54]" and "Bike Oven[55]."

CicLAvia

Ecovillage members were also instrumental in importing the Ciclovía concept from Bogotá, Colombia to the streets of Los Angeles. The Bogotá Ciclovía ("bike path" in Spanish) is a weekly city-sponsored event that closes off major city streets to automobile traffic and invites residents on bicycles, skateboards, or other non-motorized vehicles to parade through the city. The now weekly event was started by social activists in Bogotá in the middle 1970s as a response to the congestion, pollution, and crime of urban thoroughfares. In subsequent decades, cities around the world—including dozens of cities in the USA—have initiated their own versions of the Ciclovía.

After visiting Bogotá and experiencing Ciclovía in 2008, LAEV residents Bobby Gadda and Adonia Lugo decided to import the tradition to the city of Los Angeles. The couple had only recently moved into the ecovillage, and one of their new neighbors suggested that they propose the idea at a Los Angeles County Bikes Coalition meeting. With the help of several like-minded organizers, including other ecovillage members with important connections to city planning staff, the small group attracted the attention of Mayor Antonio Villaraigosa, who became the project's most powerful champion(Hillel 2012). On October 10, 2010, the city closed off seven miles of arterial streets, stretching from East Hollywood to Downtown, and hosted the first CicLAvia event. In subsequent years, the CicLAvia non-profit has collaborated with the city to host five total CicLAvias, each attracting hundreds of thousands of Angelenos. The CicLAvia organization

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[54] http://bikerowave.org/

[55] http://bikeoven.com/

has raised hundreds of thousands of dollars in private donations and in November 2012, a near unanimous Los Angeles City Council authorized $950,000 in transportation funding to support CicLAvia in fiscal year 2012-13. Council bill number 12-1593 reads, "With over 100,000 in attendance at each event, CicLAvia continues to bring together residents of all ages to the streets of Los Angeles. The goals of the event are to promote open space, public transportation, public health, and community and economic development.[56]" In 2013, the city will co-sponsor three CicLAvia events on several new routes, and the non-profit organization has begun planning for monthly events in the near future.

Conclusions

This case study demonstrates, firstly, that socio-technical landscape pressure is locally variable; that is, the impetus for "sustainability" in the heart of Koreatown in 1992 was different from impetus for "sustainability" to the founders of Dancing Rabbit Ecovillage and EcoVillage at Ithaca. The 1992 Los Angeles riots represented a tearing of the structures that ensure the basic peace and stability of day-to-day life in urban places. It also signaled a more chronic problem of social isolation and the limitations of public services during a crisis. Landscape pressure to change was violent, sudden, and local. Los Angeles Eco-Village emerged as a response to this structural dis-integration and has chosen to work within existing structures to influence neighborhood-scale change. It has begun to transform a two-block neighborhood without evicting or alienating long-time residents, or profiting off dynamics in land value. Its members are active inside the ecovillage, but also throughout the city and many of these external initiatives have thrived because LAEV served as an incubation space and a forum of social connections.

It is interesting to ponder how LAEV's history might have unfolded had CRSP pursued its original vision atop the former public landfill east of Downtown LA. Clearly, this space would

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[56] Can be accessed online at http://clkrep.lacity.org/onlinedocs/2012/12-1593_ca_11-16-12.pdf. Accessed February 9, 2013.

have afforded the project more freedom to experiment with construction and urban design, and perhaps high-tech energy and water systems. It wouldn't have had to accommodate existing building tenants, struggle with the Los Angeles Unified School District, devote resources to repairing an old building, or petition the city to improve existing infrastructure to achieve a low-impact, pedestrian-friendly neighborhood. Its designers could have easily segregated land uses, placing residential and commercial uses on the hilltop, and agricultural uses on its the terraces. When CRSP decided to settle in Koreatown, however, it accepted an array of challenges that most contemporary ecovillages (and most historic intentional communities) avoid. Rather than start from scratch on untouched land, its vision has co-evolved with all the complexities of an existing multi-ethnic neighborhood. LAEV's struggles reflect the challenges that planners and sustainability advocates are more likely to face in coming decades: How can we grow more food in the middle of the city? What social and economic conflicts will we encounter as we attempt to transform an urban landscape built for cars into one that accommodates bicycles and pedestrians? How can the city engage in radical transition without gentrification and social marginalization? How can planners encourage alternative (to automobile) transportation without forcing commuters to abandon a form of transportation that is still necessary for economic subsistence in the USA? How can planners foster creativity and innovation without "picking winners?" How can individuals balance their personal needs with the needs of their community?

Los Angeles Eco-Village has not spurred a city-wide transition (yet). It is not an exemplar of energy and resource efficiency like Dancing Rabbit Ecovillage. Indeed, it has chosen a much more complex challenge of building a community that values and facilitates cooperation amidst physical and social structures that discourage it. In recent years, it has formalized these cooperative structures through the Urban Soil /Tierra Urbana Limited Equity Housing Cooperative and the Beverly Vermont Community Land Trust. It has attracted a dedicated membership and continues to build strong relationships with institutions in the City of

Los Angeles. It will be fascinating to see how the project and its surrounding neighborhood evolve in the years to come.

Chapter Six: Conclusions

This chapter synthesizes and discusses the theoretical implications of this dissertation. I suggest that future studies of grassroots niches explore spatial relationships between niche projects and regimes, the internal/external time balance of niche actors, and the relative income of niche actors. I discuss how the ecovillages studied in this dissertation have exercised influence at different geographical scales and hypothesize how these different scales of influence might lead to further structural change. I conclude by suggesting future research projects that lead logically from this dissertation, and touch on implications for the planning discipline. I argue that ultimately, the systemic changes necessary for achieving sustainability goals may be best understood through a pragmatic lens, by which planners can begin to integrate bold grassroots practices in to local and regional urban development processes.

Intermediacy, Settling In, and Warming Up

Dancing Rabbit Ecovillage (DR), EcoVillage at Ithaca (EVI), and Los Angeles Eco-Village (LAEV) all began as grassroots projects with aspirations to serve as practical, more sustainable alternatives to mainstream urban development. EVI began as the "Global Walk for a Livable World" and sought to implement its cooperative ideals near Ithaca, New York. LAEV emerged from the Cooperative Resources and Service Project (CRSP) to build sustainable community in a neighborhood torn apart physically and socially by the Los Angeles riots. Dancing Rabbit was conceived by a small group of idealistic Stanford University students who sought to demonstrate the feasibility of low-impact living in an experimental rural setting. The early histories of these three cases are consistent with theories of grassroots innovation. Each confronted and survived the existential obstacles that ecovillages (Christian 2003) and other grassroots niche projects (Seyfang and Smith 2007) encounter in their infant stages. In over a decade, each project has attracted a stable, active membership, demonstrated a diversity of energy

and resource-saving practices, and has engaged the mainstream through niche replication strategies such as websites, educational programs, and tours.

The survey in Chapter Four classified EVI and LAEV as 'intermediately' situated and 'influential', while identifying DR as 'radically' situated and relatively less influential (i.e. not translating its practices directly to the mainstream). The survey also offered qualitative evidence that 'intermediacy' is a necessary but insufficient property of 'influential' niche projects. The in-depth case studies in Chapter Five enrich these survey results by illustrating that 'regime distance' is a dynamic property: EVI and LAEV communities *became* intermediate through 'settling in' to their respective regime contexts.

'Settling in' involves deliberately reflecting some elements of the regime. It is an intentional transition from a 'realm of possibility' to a 'realm of probability.' Settling-in signals a willingness to accept the practical realities of engaging in dialogue with an urban development regime. EVI founders could have established a radical project similar to Dancing Rabbit on donated rural land far away from the City of Ithaca, but they decided to attract middle class members, decided to settle just outside the region's urban center**,** decided to comply with land development regulations of the Town of Ithaca, and decided to hire an experienced design/build consultant rather than design and build their dwellings independently. LAEV decided to settle in the heart of a complex urban neighborhood, rather than an open hilltop, and decided not to expel existing residents from the two-block neighborhood they sought to transform. These decisions have required both LAEV and EVI to negotiate with local institutions to achieve its vision, and this negotiation continues today.

'Settling in' buffers the niche's normative, cognitive, and regulatory deviations from the regime while setting a stage on which it can demonstrate its innovative practices. Given enough time, mainstream regime actors may identify the benefits of associating with niche projects, and

the lines between niche and regime activity begin to dissolve. Members of the EVI board of directors, for example, are simultaneously champions of the niche project while serving in important urban development regime positions. LAEV members work on the staff of city council members, serve on neighborhood boards, and have initiated highly visible social activist projects. The community has appeared in the housing element of Los Angeles' General Plan, and has received municipal backing for its infrastructure projects.

Regime actors and institutions may also begin to associate and adopt elements of the niche. I label this 'warming up,' or the early signs of transition. While none of these cases illustrate a complete regime transition (the structures of mainstream urban development remain intact) they signal the beginning of regime change that may not have occurred if not for the existence of the niche project.

In a review of the proximity and innovation literature geographer Ron Boschma (2005) highlights five 'dimensions' of proximity amongst organizational elements in economic systems. He illustrates how economic geography literature has emphasized the benefits of embeddedness for economic actors, but that very high embeddedness temper innovation and result in lock-in. Firms must therefore strike a balance between embeddedness and openness, or find an intermediate state that draws on existing and novel relationships. Boschma asserts that there are five types of proximity: cognitive, organizational, social, institutional, and geographical. Each type of proximity facilitates the transfer of tacit (un-codified) knowledge amongst firms, and it is apparent that there is a similar transfer of knowledge amongst the niche projects and their respective regime contexts in this dissertation. In the below, I explicate how each ecovillage models (or fails to model) 'settling in' and how each regime context models (or fails to model) the process of 'warming up' along these five proximity dimensions.

Ecovillage at Ithaca models settling-in along all five proximity dimensions. Consequently it has inspired processes of warming-up along similar dimensions. Los Angeles Eco-Village has also settled-in along all five dimensions, but has not inspired the similar processes of warming as has EcoVillage at Ithaca. This is perhaps because LAEV has taken on some very complex and specific challenges in its region. Settling-in has been a cumbersome process. LAEV has had to tailor its physical plans and its conception of "sustainability" to fit a specific two-block neighborhood, and be careful not to marginalize or expel the existing diverse membership. It also had to work with existing neighborhood housing and infrastructure. It could not experiment with building practices or design to the same extent that EVI could. EVI looked to inspire an entire region, so it had generally more flexibility in both a spatial and conceptual sense. EVI's members did not have to accommodate existing neighborhood residents or work around existing infrastructure. As a result, EVI could offer an innovation in housing and urban development that was effectively nascent in the United States.

Dancing Rabbit has settled-in cognitively, but its geographic distance prevents its members from settling-in socially, institutionally, or organizationally with any specific regime. Connections that DR members make with the outside world are to diffuse regions. Their influence, therefore, remains diffuse. Dancing Rabbit is an example of what is 'possible' and while it is very inspiring, its 'diffusion benefits' consist primarily of niche replication on a person-by-person level. So far, there is little evidence that DR has inspired processes of 'warming up,' but that does not mean it is impossible. The community could conceivably inspire policy makers and subsequently structural changes from afar, but the MLP predicts that this change will require stronger, more coherently articulated pressure from the macro-scale socio-technical landscape.

Table 10: EcoVillage at Ithaca/Ithaca New York Region

Dimensions of Proximity	Settling-In	Warming-Up
Cognitive	Founders of EVI worked hard to connect with the region through co-sponsoring lectures, hosting workshops, leading tours, and monitoring and publishing information about their environmental systems.	Tompkins County has used EVI's "Lessons Learned" document as a guide to future development. EVI and municipal authorities collaborating on mutually beneficial grants conceiving of co-housing and local food production as a regional asset.
Social	Founders made an early, but difficult, decision to build a "middle class" community that could influence future housing production. Many niche actors re-located to the ecovillage from inside the region, retaining family and social ties.	EVI very well known in the Ithaca region. EVI community members retain friendships and kinship ties to individuals in the 'mainstream.'
Organizational	Niche actors are members of local non-profit boards and environmental organizations	Local planners and policy makers join EVI-CSE board of directors
Institutional	Followed zoning and land development 'rules of the game,' made some compromises about on-site infrastructure, employed a professional design/build consultant	Local planning and zoning authorities offer EVI more flexibility on its second neighborhood, Tompkins County drafting zoning that replicates EVI lessons learned document.
Spatial/Geographical	Regional scope; Located on the 'urban edge,' within easy commuting distance but far enough from the urban center to experiment with building and agriculture. Settled into an entire region.	Smaller co-housing replicating the EVI model appearing in downtown Ithaca, other similar sites appearing in the region

Table 11: Los Angeles Eco-Village / Koreatown, Los Angeles, CA

Dimensions of Proximity	Settling-In	Warming-Up
Cognitive	Addressed specific "community sustainability" needs in the Koreatown neighborhood rather than more global sustainability needs. The organization and its individual members hold regular tours, fairs, and workshops open to the public.	Recognized in the housing element of the Los Angeles General Plan; Secured funding for neighborhood street infrastructure projects; publication recognized by the local American Planning Association Chapter.
Social	Worked hard to reach out to neighbors by "hitting the streets," was careful not to expel existing residents; workshops and music lessons open to neighbors	Has befriended city council representative and mayoral candidate Eric Garcetti; has earned trust amongst existing neighborhood residents.
Organizational	Developed close connections with planners early on; several niche actors on local neighborhood development boards; some employed by City Council members.	
Institutional	Has a legal educational non-profit and land holding entity. Followed zoning rules, but has worked hard for changes to pedestrian infrastructure in the neighborhood.	The city partnered with LAEV to apply for regional transportation funds that have been used to improve pedestrian infrastructure in the neighborhood.
Spatial/Geographical	Local scope; Moved from a vacant hilltop in Montecito Heights to Koreatown, where it has retrofit an existing block. Settled-in to a specific neighborhood.	Several initiatives started inside the ecovillage have radiated throughout Southern California.

Table 12: Dancing Rabbit Ecovillage/Scotland County, MO

Dimensions of Proximity	Settling-In	Warming-Up
Cognitive	Holds tours, workshops, internships accessible to individuals willing to travel from far away. Has an active web presence.	Has earned attention from some media outlets and the Global Ecovillage Movement.
Social	Niche actors moved from far away. Most existing social ties are outside the region. Worked hard to demystify reputation in the region, and has remained friendly with non-ecovillage neighbors.	Periodic visits from Scotland County neighbors.
Organizational	Seeks to limit interaction with urban development regime.	N/A
Institutional	Has a legal educational non-profit and land holding entity. Avoids institutional restrictions of physical development.	N/A
Spatial/Geographical	Global scope; Very deliberately chose to settle far from the urban/regional mainstream. Takes advantage of web technology to stay connected economically.	Community has expanded physically, and has spurred the development of a neighboring intentional community, Red Earth Farms.

Drawing from the empirical observation in these three case studies, I offer a summary of the properties and dimensions of "intermediacy" below (see Table 13). Intermediacy, as defined along the 'Regime Distance' index in Chapter 4 is a necessary but insufficient condition for influence on a regime. Influence through niche-to-regime translation is the result of *settling in* and consequent *warming up*. In other words, niche projects that become intermediate by adapting to the realities of a local regime context are able to inspire processes of warming up. Both settling in and warming up can be conceived along Boschma's (2005) dimensions of proximity: cognitive, social, institutional, organizational, and geographical. There are important overlaps in these five dimensions. For example, geographical distance seems to play a role Dancing Rabbit's relative inability to connect socially, institutionally, and organizationally with a specific regime context.

Table 13: Properties and Dimensions of Intermediacy

Dimensions of Intermediacy	Properties of Intermediacy: Settling-In	Properties of Intermediacy: Warming-Up
Agents (Who does it?)	Grassroots niche actors (Ecovillage member-residents; Ecovillage organizations)	Regime actors (planners, politicians, construction companies)
Cognitive (Knowledge overlap)	Sponsoring tours, workshops, internships, and publications that communicate niche lessons to the public	Recognizing 'lessons learned' in policy documents and news media; attending tours, workshops, internships on-site
Social (Friendship, kinship, and trust)	Recruiting members with social, professional, and kinship ties to the actors in the regime; Recruiting members that reflect the socio-economic mainstream; Building social ties with regime actors	Befriending niche actors; Seeking political support.
Organizational (Co-membership in organizations)	Devoting time or resources to non-profit organizations or government boards outside the niche project	Joining niche project governing boards; co-sponsoring projects with niche actors
Institutional (Following similar rules)	Registering as a legal educational and/or land holding entity; adhering to urban development 'rules of the game'	Amending policy or funding projects inspired by niche activity.
Geographic (Sharing similar physical space)	Settling close to an urban center, within close commuting distance to regional employment centers	Transplanting niche lessons or experiments to physical spaces in the mainstream; "Strategic Niche Management"

Calibrating the Regime Distance Scale: Considering Space, Time, and Income

Existing case studies of socio-technical regime transition do not commonly consider the physical distance between niche projects and the socio-technical regimes they prefigure. This is because most case studies look at global niches throughout history rather than multiple niche projects at once; *and* because the socio-technical systems under investigation are often a-spatial or spatially diffuse. For example, Smith's (2007) case study of the organic foods grassroots niche in the United Kingdom does and probably could not feasibly measure the spatial proximity of demonstration farms or "back to the land" experiments from the mainstream food regime because the food regime is spatially diffuse.

The case studies in this dissertation, however, reveal that there are important spatial interactions between the urban development socio-technical regime and ecovillage niche projects. The ability of a project to deviate from the regime and/or 'settle in' is, in part, a factor of its place in space. While the outcomes of each case study are the product of complex and interrelated variables, the spatial provenance of each niche project played an important role its interaction with urban development regime elements.

EVI's founders entertained three potential sites: an abandoned warehouse in the city center, a donated rural parcel ten miles outside the city, and a parcel on the city's edge. The first two options offered different advantages, but the later 'urban edge' option allowed community members to both experiment with housing and agriculture *and* commute to full-time jobs in the region's employment center. Its decision to recruit 'middle class' members occurred around the same time it decided to settle within close commuting distance to the city. These two are deliberate attempts to remain engaged with mainstream institutions. Its proximity to the City of Ithaca also allows policy makers, university administrators, and tourists to experience the project first-hand. This has led to strategic, mutually beneficial partnerships and the dissolution of

normative and cognitive barriers that might otherwise relegate an ecovillage to the margins of society.

After the Los Angeles riots, Los Angeles Eco-Village decided to root itself in the heart of Koreatown, purchase existing buildings, and embrace the incumbent social, political, and physical complexities of its two-block neighborhood. Its original plans atop an old landfill would have afforded it some of the experimental freedom that DR and EVI found on their sites. These plans may have also distanced the ecovillage from policy makers and neighborhood groups that have since associated themselves with the project. LAEV's Koreatown location required it to collaborate with city planners, city council members, and the Los Angeles Unified School District, and it has worked hard to transform the existing infrastructure through neighborhood organizing and strategic partnerships. It is also situated within close proximity of multiple transit nodes, which allows members to live car-free in a car-dominated metropolitan region.

Dancing Rabbit engaged in a year-long search to find a low-cost, unregulated parcel. Its remote, rural location is an attempt to *avoid* urban development regime interactions, and establish itself in contradistinction to mainstream urban development. This has allowed for experimentation that would be impossible at EVI and LAEV, but its place in space requires that most members divide their activities between the ecovillage project and income-earning activities far outside the region, accessed over the internet. While an exceptional few DR members have found ways to earn income in the rural region, the community subsists by sharing resources and keeping its living costs very low. Many of DR's current members who once led seemingly mainstream lives have defected very intentionally from these lifestyles, moving hundreds or thousands of miles away from their previous homes to live in the ecovillage. While they have not cut themselves off from the mainstream completely, they budget their time and energy toward internal community functions.

While it is clear that a niche's project's spatial proximity to the socio-technical regime is an important factor in its ability to settle in and warm up, such a variable would be complicated to operationalize in a survey like the one used in Chapter Four. These three niche projects are located in such qualitatively different settings that a simple bird's eye 'distance from the city center' variable would not sufficiently capture the complex spatial relationship between niche project and regime. Such factors as travel time to work and school and access to transit would also have to be considered.

Regime distance could also be captured by measuring the *amount of time* niche actors devote to niche-*internal* activities versus niche-*external* activities. Time budgeting emerged as an important factor in the relative ability of a niche project to influence the mainstream. This, of course, is likely related to spatial factors. From this perspective a distance analysis might prove slightly different, although in the cases of EVI and DR the outcomes would be similar. EVI's residents maintain jobs and social connections in the City of Ithaca, Town of Ithaca, and Tompkins County. They serve on non-profit boards, work as municipal employees, and maintain institutional relationships with major employers in the region. In the past twenty years, EVI has attracted a board of directors that is a veritable *who's who* of urban development in the Ithaca region. While DR's members do have income jobs, these jobs tend to be part-time and accessed over the internet. DR members devote a relatively large amount of their time to niche-internal initiatives, while its influence on the outside world is through individuals who have chosen to visit the website or the ecovillage itself. Their board of directors does not include individuals outside the ecovillage movement, let alone individuals throughout Scotland County.

Future studies of niche-regime interactions ought to inquire into how and where niche actors budget their time. Do niche actors devote relatively more of their waking hours to niche-internal activities (e.g. members of Dancing Rabbit), to some balance of internal and external

initiatives (e.g. members of EcoVillage at Ithaca and Los Angeles Eco-Village), or to initiatives physically and economically *external* to the niche?

Future studies may also consider income-earning strategies as a factor in regime distance. On average, members of Dancing Rabbit earn wages far below the federal poverty line and subsist by pooling resources and keep living costs low. Their low-impact, low-consumption lifestyle would be very difficult in a world where individuals have to pay market rates for housing, transportation, and utilities. Meanwhile, the relatively high income of EVI residents facilitates their participation in the housing market and the ownership of household vehicles.

Of course, physical distance, time investment, and income are interrelated and overlapping variables. It would be difficult to isolate the effect of any one of these variables out of context. Such is the difficulty of using reductionist research methods to describe phenomena that are very complex and context dependent. It is also the principle reason why—at this point—large scale cross sectional survey tools (similar to the one used in this analysis – see Chapter Four) might be better suited for identifying informative cases than for serving as an accurate representation of niche-regime interaction. Future research may accumulate the empirical knowledge necessary to design a survey tool that internalizes the complexities discussed in the case studies of Chapter Five. Until then, research on niche-regime interactions should embrace contextual complexity and find innovative ways to compare and archive contextual observations.

Influence at Varying Geographic 'Scales of Influence'

The case studies in this dissertation show that different niche projects exercise influence at different geographic *scales*. EVI has influenced policy at the regional scale in a relatively small metropolitan region. LAEV has influenced policy at the neighborhood scale and is beginning to connect with larger, city-wide policy makers in Los Angeles. Dancing Rabbit has influenced

individuals within the global ecovillage niche. If these patterns of influence persist, what might the future hold?

If EVI is influencing policy in Ithaca and Tompkins County, could these practices scale-up; to cities; or regions of a larger size? DiMaggio and Powell (1983) argue that over time, institutions within the same organizational field (e.g. local planning offices) begin to resemble each other, and that institutional diversity is the exception rather than the rule. They label this phenomenon *institutional isomorphism* and distinguish three types: 1) *coercive* isomorphism whereby organizations are forced by higher bureaucratic levels or persuaded in order to demonstrate legitimacy to patron organizations; 2) *mimetic* isomorphism whereby organizations adopt new forms under circumstances of rapid change, ambiguity, or uncertainty. This involves the intentional or unintentional "modeling" of seemingly successful organizations; and 3) *normative* isomorphism that results from professionalization and legitimization of a field, often as a result of professional organizations (e.g. the American Planning Association), or recruitment from similar universities and programs. Is it possible that 'niche' innovations can work their way up the institutional ladder and influence more broad institutional change? Could *mimetic isomorphism* result in the spread of ecovillage niche practices and structures? The EPA's Climate Showcase Communities (EPA-CSC) program has invested tax dollars into the possibility. As discussed in Chapter Five, EPA-CSC has recognized and supported the partnership between EVI and Tompkins County as well as fifty exemplary local and regional climate initiatives across the USA. The program website reads, "EPA can help your community learn from these pilot projects [e.g. the EVI-Tompkins County partnership] and replicate their successes through peer exchange, training, and technical support (US EPA 2013)."

Similarly, if LAEV is influencing physical and social changes in its own neighborhood, could neighborhood-scale change diffuse to other neighborhoods in Los Angeles, or perhaps to the city at-large? This prospect is amplified by the mayoral candidacy of LA city council member

Eric Garcetti, who has befriended and patronized the ecovillage in recent years. So LAEV's lessons might spread by *coercive isomorphisms*—instituted by the larger city on its constituent neighborhoods—or by *mimetic isomorphism* whereby neighborhood organizations replicate the successes of LAEV in its small neighborhood.

And while Dancing Rabbit Ecovillage is not translating its practices *directly* to regime incumbents, could it be inspiring and instructing other relatively "intermediate" ecovillages, which in turn translate innovative practices to their respective regions, cities, and neighborhoods? This dissertation did not measure the influence that ecovillages exercise amongst one another, nor did it measure collateral learning, the influence that ecovillages exercise through the visitors and interns that return to their homes outside ecovillages and apply their new skills in a non-ecovillage setting.

My experience living and working in ecovillages leads me to believe that there are important relationships *amongst* ecovillages (within the global niche) that deserve further investigation. While living at Dancing Rabbit, for example, I met multiple individuals interested in founding their own ecovillage. One of these individuals has since started a project in the City of Bloomington, Indiana. This project, called Bloomington Cooperative Plots[57], worked closely with planners, politicians, and neighbors for years on a planned unit development that received unanimous approval from Bloomington's city council. The municipality signed off on many of the agricultural, construction, and energy production amenities of rural ecovillages. One of the founders of Dancing Rabbit Ecovillage has advanced energy efficiency in the dorms of the New York University, helping the campus surpass its energy goals several years ahead of schedule. Other individuals apply the skills they learn as interns and visitors at ecovillages in their home

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[57] Bloomington Cooperative Plots: http://btowncooperativeplots.dwiel.net/. Accessed March 1, 2013.

towns and households. These examples of *niche replication* are encouraging, to be sure, but they are also very difficult to measure because they are very diffuse. Figure 31 illustrates some hypothetical scenarios about how ecovillage practices may diffuse far beyond their project boundaries.

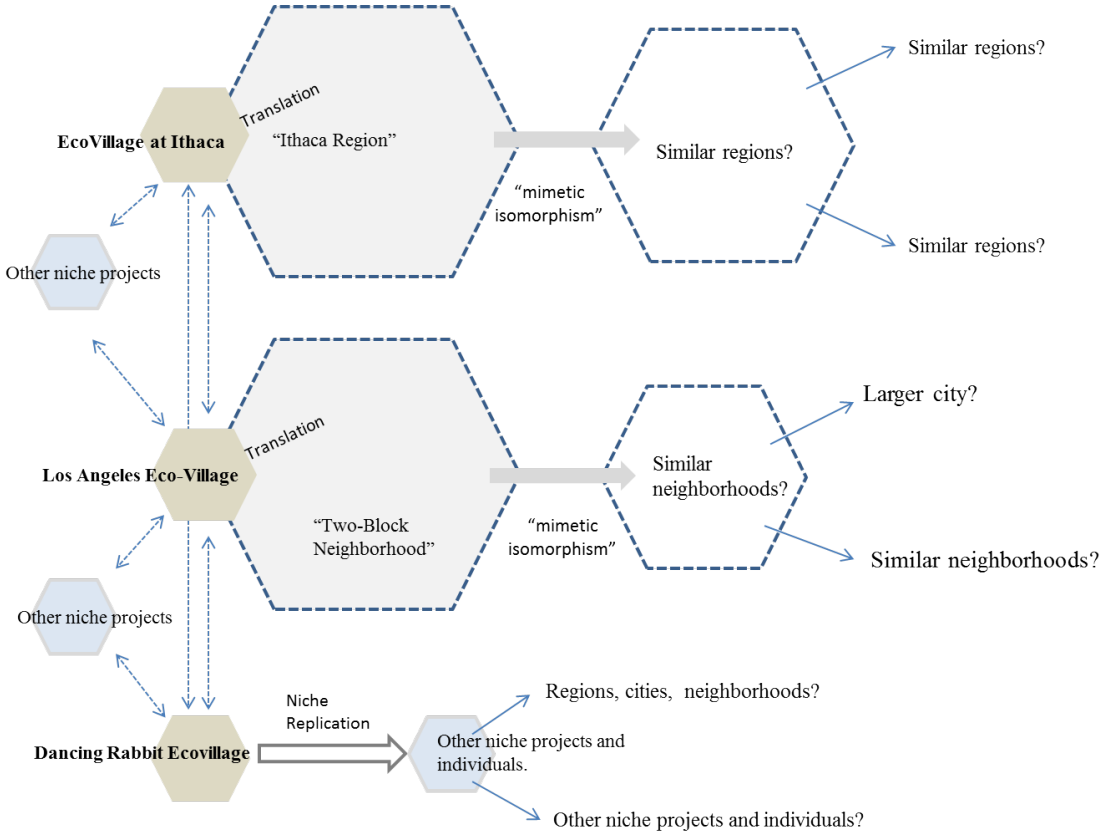

Figure 31: A hypothetical model for translation, scaling-up, and replication of ecovillage practices. Each grassroots niche project has exercised influence at different geographical scales. Can the influence of niche projects extend beyond their immediate environment through niche replication, scaling-up, and further translation?

Engaging the Variation of Niche Projects

This dissertation reveals the variation *amongst* grassroots niche projects in their local regime context. Previous studies of grassroots socio-technical niches (Seyfang and Smith 2007; Smith 2007; Smith 2006; Ornetzeder 2001; Seyfang and Haxeltine 2012) tend to either aggregate

similar niche projects into a one global niche and examine its interface with the regime *or* examine one historical niche project in isolation. This dissertation examined the variation amongst existing grassroots niches (ecovillage projects) within the same global niche (the ecovillage movement) and asked why certain niche projects engage their local regime contexts to a greater extent than others. I found that the influence of a niche project is the result of delicate balance *reflecting* and *rejecting* regime elements. Regime actors and institutions are unlikely to be hooked or swayed by experiments that are too conceptually or normatively distant. While this study examines ecovillage projects, there are a number of other niche projects that subsequent research can engage. For example, the LAEV case study revealed a network of bicycle cooperatives in southern California. This regional network is part of a growing nation-wide network of bicycle cooperatives[58]. Bicycle cooperatives can be conceived as a grassroots niche as they promote a marginalized mode of transportation (especially in Los Angeles) and offer a safe space that facilitates learning-by-doing. Future studies might investigate how bicycle cooperatives are influencing mainstream planning policy and/or travel behavior in the mainstream.

The case studies in the previous chapter also suggest that landscape pressure varies geographically, and urban planning has played a role in articulating it in the case of EVI. Whereas existing MLP literature tends to frame the socio-technical landscape as a series of 'push' factors (e.g. overcrowding in urban cores (Geels 2005); scientific revelations of the health issues associated with pesticides (Smith 2007); energy scarcity and government pressure to transition away from fossil fuels (Verbong and Geels 2007)), the niche-regime partnership between EcoVillage at Ithaca and Tompkins County was 'pulled' by grant opportunities from federal agencies. Landscape pressure for change was articulated by a coalition of planners and non-profit

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[58] See, for example, the Co-Cycle Project website: www.co-cycle.coop. Accessed February 28th, 2013.

actors all explicitly (through published plans) interested in addressing climate and energy issues in their region. In Los Angeles, landscape pressure for change more closely resembled 'push' factors, and while the causes of the Los Angeles Riots may be diffuse and systemic, the pressures were articulated very locally, in specific neighborhoods of the city. This resulted in 'tensions and mismatches' (Geels 2004b), making way for Los Angeles Ecovillage.

Both the quantitative and qualitative elements in this dissertation offer evidence in support of Smith's (2007) claim that niches must resemble the regime they prefigure in *some* ways if it is to translate its practices to the regime. The concept of intermediacy and the dynamic processes of settling in and warming up conform with interpretivist theories of social change, whereby structures begin to shift with individual conceptions of what is *real.* Niche activists (e.g. ecovillage members) can benefit from this knowledge and better position themselves to influence mainstream structures.

How can planning professionals benefit from such knowledge?

If planners are interested in guiding systemic change, they ought to seek diverse interpretations of reality fostered in socio-technical niches. Niches are simply networks of actors that play by different 'rules of the game;' they need not be entire "full-featured, human-scale" ecovillages. Cities and regions are likely filled with such networks; the challenge is identifying and engaging them in collaborative regional planning. While planners need not transplant niche practices directly into their cities and regions, they can support and participate in forums in which niche actors are willing participants. The Tompkins County Climate Planning Initiative (TCCPI) allowed regional planners to interface with EVI board members and collaborate to secure federal funding to expand housing and climate change projects. This non-profit organization was open to a diversity of local actors loosely organized to explore climate-oriented solutions. TCCPI includes city and county planners as equals amongst a breadth of other public, private, and non-

profit actors. So, while *planners* remain agents of their respective jurisdiction, the process of *planning* (the exchange of information about interdependent actions) is not controlled by municipal planners alone.

The image of the planner as an objective, rational analyst is static, lonely, and abstract. No such planner exists. Even the most rational planner has to get 'data' from somewhere outside the planning office. *Choosing* data is a subjective act and it ought to be explicit. As Shoup (2001) illustrates with parking regulations, sometimes data sources can be cloaked in rationality despite their arbitrary or specious formulation. Whether data is generated by elements of the socio-technical regime, forged in dialogue with niche actors, or mined directly from experience in niche environments, planners ought to be clear about the information they use.

Future Regime Transition Scholarship

Planning scholarship ought to further examine the relationship between public policy makers and grassroots initiatives for sustainability. How can planners integrate grassroots initiatives into a policy framework? Can professional planners simultaneously represent existing urban regimes and radical grassroots alternatives? In which cases have grassroots initiatives succeeded in influencing official plans and mainstream urban practice? In which cases have they *failed* despite the efforts of planners? Planners play a role in shaping public discourse (Tett and Wolfe 1991) and can help to reframe grassroots initiatives as valuable, innovative niches instead of fringe activity. They can also begin to reconceive of cities and regions as multi-level, dynamic systems in which social policy plans an important role in innovation.

Using the Climate Showcase Communities Program to Compare 'Innovative' Contexts

Do cities learn by example? Or do they change under pressure? Or both? The Climate Showcase Communities program is built on the assumption that cities will learn from one another. The validity of this assumption demands further investigation. Where do policy makers

look for exemplary policies? Do university regions look specifically to other university regions? Do metropolitan core cities only look to other core cities? How do policy makers decide what is an appropriate comparison? If cities *do* learn by example, then the ecovillage movement need not act as a strong global niche to influence national-scale transition—they can concentrate their efforts at the local and regional scale, influence their immediate jurisdictions, and hope that other municipalities and regions take notice. Geels (2011) suggests that cities themselves can act as a beacon to other cities, or they can act as part of a change regime themselves—the CSC program offers an opportunity to test these contentions in the future.

The Climate Showcase Communities program also offers a new data frame for the exploration and comparison of innovative contexts. The program tags fifty exemplary policy approaches to climate change mitigation. Why have innovative initiatives thrived in these contexts? Can the Multi-Level Perspective or some other niche-based theory explain the emergence of innovative policies?

Exploring the Connection between Social Cooperation and Resource Savings

The Dancing Rabbit case revealed important relationships between investment in cooperative skills and resource savings. 'Rabbits' are able to share capital resources like cars, common space, kitchens, showers, and laundry machines through social processes that require an uncommon investment in communication skills and community processes. Does such a relationship exist outside ecovillages? Are cities and regions that are more 'neighborly' and more 'cooperative' better able to adapt to environmental and economic crises? Should planners interested in sustainability pursue better forums for communication as a means to better resource sharing? Eric Klinenberg's "social autopsy" of the 1995 heat wave in Chicago revealed that poor neighborhoods suffered fewer heat-related fatalities if they had a tighter 'neighborhood ecology' with more "eyes on the street" and pedestrian-friendly infrastructure that facilitated neighborly

interaction. Each case study in this dissertation offers evidence that social cooperation is also critical to lower resource consumption. It might be surmised that social cooperation is then critical for adapting to environmental shocks and mitigating environmental damage. What can planners and policy-makers do to improve cooperative and communicative skills in their jurisdiction in order to improve social cooperation? What policy and structures can planners begin to pursue to make such communication easier?

Socio-Technical Systems and Sustainable Development

It is beyond question that local and regional planners in the United States (and elsewhere) are interested in sustainability but if policy makers aspire to address the "wicked" problems implied by the sustainability agenda, they cannot treat sustainability as if it were a technological problem or just another goal within the same old planning framework. This dissertation argues that if planners want to achieve ambitious climate change and conservation goals, they should probably focus less on *sustaining* and more on *changing* the regime structures that make urban places unsustainable.

Unsustainable urban development processes are the outcome of recalcitrant socio-technical regimes. These regimes will not change without sufficient pressure from the larger socio-technical landscape and alternatives developed in niches. Planners can help articulate landscape pressure and nurture niche alternatives, but this requires a shift in our thinking about 'planning'; from planners as experts, analysts, and advisers, to planners as connectors, communicators, and facilitators, and planning as something that happens amongst heterogeneous and creative actors rather than purely amongst bureaucrats and elected officials.

Fortunately, many of the most creative solutions to our environmental problems already exist in grassroots niche projects, spearheaded by intrinsically motivated individuals. Local planners can take advantage of these "actual existing sustainabilities (Krueger and Agyeman

2005)" by taking pragmatic steps to integrate grassroots sustainable practices into the mainstream, or at least begin to conceive of them as important sites of innovation. First steps may include actions as simple as engaging in grassroots initiatives as part of official policy research, investigating external funding opportunities that support grassroots activity, and supporting forums that allow for networking between grassroots niches and incumbent regime members. This will hopefully lead to more critical evaluations of regulatory barriers (e.g. zoning and building codes) that inhibit the development and articulation of niche alternatives, and to a shift in the rules, networks, and physical infrastructures that guide urban development. Eventually such interaction may influence policy makers to *create* protected spaces within city-limits that allow residents to experience and experiment with alternative practices. Such an effort would resemble a localized Transition Management process. Over time, some of the strange and seemingly irrational practices of grassroots niches may begin to make sense amidst increasing pressure to mitigate and adapt to a rapidly changing planet.

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Appendix A: Survey Pre-Test

Ecovillage Survey Pre-Test Report

Robert Boyer * 26 February 2012

Over the first two weeks of February 2012, I pre-tested a survey instrument in three different intentional communities. The objectives of this pre-test were two-fold: 1) to test the reliability of the survey across residents of the same ecovillage and 2) to test the validity of their responses. The changes inspired by the pre-test have resulted in a final survey that measures the distance *from*- and the influence *of* - a grassroots socio-technical niche on its incumbent socio-technical regime. This study frames North American Ecovillages as a grassroots socio-technical niche and draws from theory outlined principally by Smith (2007). The results of this pre-test articulate several important changes that will be made before distributing the final survey in early March. Printouts of the old and new surveys can be found in the appendix of this report.

The following report explains the purpose of the pre-test, data collection methods, analytical methodology including the construction of the "Regime Distance" and "Regime Influence" scales, pre-test findings, and a summary of changes that will be made to the survey instrument prior to full dissemination to the survey population. I begin with overall purposes and move more specifically to the development and issues with the Regime Distance Scale and Regime Influence Scale, respectively. I discuss the changes I will make to the full-scale survey instrument throughout the report, summarizing changes for each scale in separate sections. I conclude with some thoughts about additional steps to be taken in the final survey process.

PURPOSE OF THE PRE-TEST

Detecting reliability across individual ecovillage residents
To what extent can any one respondent effectively answer for their entire community? Does an individual's responses reflect how the community, as a whole, would respond? Whose responses are most consistent with the community's as a whole? I intend to treat entire communities as one respondent, and request one survey per community. While I expect that some individual community members can provide more accurate information than others, I have limited control over which individual completes the survey and the level of detailed knowledge to which that individual has access. I therefore designed the survey instrument to elicit information that is easily accessible to any active community member. It would be unrealistic, indeed, to expect that any active community member knows the exact capacity of their community's electricity system and its per capita consumption. This detailed information is costly and time consuming to measure, and if it is measured at all, it is probably accessible to a few expert individuals.

A distinguishing characteristic of ecovillage residents, however, is their basic understanding of the systems that mainstream North Americans outsource to utility companies, municipalities, and private companies. Community-wide discussions about electricity consumption and production are common, especially as these resources are often shared amongst households and by the entire community in common spaces. Relative to mainstream North American adults, ecovillage residents are acutely conscious of resource consumption and production. Its efficient undertaking is a part of their daily life. It is a realistic expectation, therefore, that any active ecovillage resident is at least roughly aware of whether, and to what extent, the electricity consumed in-community that is generated on-site. They are also likely aware of the specific infrastructure that generates electricity in their community. Therefore, the survey asks, "*About what percentage of electricity currently consumed in your community is generated on your community's property?*" I expect that most active community members of the same community would offer consistent responses. If I were to find that community members offered inconsistent responses, I would have to reconsider the question wording, question formatting, or the delivery method.

Detecting validity

Does the questionnaire measure what I intend for it to measure? I pre-tested the survey in three communities, all of which I have personally visited or maintained residence. My experience visiting and conducting ethnographic research in these communities inspired the construction of these survey questions in the first place. I therefore anticipated certain answers from these specific respondents. My experience living at Dancing Rabbit, for example, leads me to believe that most, if not all, the electricity consumed in-community is generated on-site and I would expect pre-test responses to reflect this. If the pre-test showed otherwise—for example, that most electricity in Dancing Rabbit is generated off-site—I would either have to rephrase the question or re-examine my presumption about electricity. In fact, responses to this specific question at Dancing Rabbit were both valid and consistent, but the pre-test revealed several validity issues in other questions that led me to make changes in the final survey instrument.

DATA COLLECTION

Surveys were pre-tested in three communities: Dancing Rabbit Ecovillage (Missouri), Earthaven Ecovillage (North Carolina), and Ananda Liina Ecovillage (Illinois). I chose these communities because my experience either living in or visiting each of them allowed me to confirm that the pre-test responses were consistent with my prior observations. I disseminated the surveys at Dancing Rabbit both online via e-mail link and in paper form by hand. Surveys completed by residents of Earthaven and Ananda Liina were all completed online, accessed by e-mail link. Table 1 profiles the survey media and basic demographics of respondents at the three test sites. It should be emphasized that the profile figures in Table 1 are not necessarily representative of their respective communities, but are merely a summary of the individuals who self-selected to assist me with the pre-test.

Table A1: Profiles of pre-test sites and basic respondent demographics

		Survey Medium		Respondent Gender			
Pre-Test Site	Total Completed Surveys (N)	Online	Paper	Women	Men	Average Respondent Age (min, max)	Average Respondent Years in Residence (min, max)
Dancing Rabbit	26	15	11	14	12	40.1 (22, 63)	5.95 (1, 15)
Earthaven	10	10	-	7	3	50.8 (22, 69)	9.40 (1, 17)
Ananda Liina	3	3	-	1	2	38.3 (26, 56)	6.33 (3, 8)

I was able to collect the most responses (N=26) from individuals at Dancing Rabbit, where I traveled for one weekend to solicit participation over the internet and with paper surveys. I collected fewer responses from Earthaven (N=10) and Ananda Liina (N=3), where I was not able to travel to solicit responses in-person. While Ananda Liina is a much smaller community, as suggested by population estimates in the following data, Earthaven's population is almost certainly larger than Dancing Rabbit's. This discrepancy confirms the potency of soliciting survey participation in-person (Dillman et al., 2009). At both Dancing Rabbit and Earthaven, I was able to solicit considerably more responses from women than men. While this may or may not reflect demographic realities in these communities, this outcome did not surprise me. The majority (78 percent) of interview subjects in the ethnographic portion of my research were female. While I have no way to confirm whether the individuals who responded to my survey were likely to be individuals I interviewed, I have had much more luck engaging women than men in my research process. This bias deserves further reflection in methods chapters of my dissertation. Fortunately, there was no statistically discernable difference between the responses of men and women in the pre-test.

Of all respondents in all communities, I was encouraged to find that only one individual failed to complete the questionnaire. This record was eliminated from the analysis.

The non-random selection of respondents is an important caveat to the results that follow. The majority of surveys were completed online, and while my experience leads me to believe that most ecovillage residents have access to the internet and access their e-mail regularly, respondents were individuals that both checked their e-mail, felt compelled to click on the link, and complete the survey. My intention for the final survey—the survey I will send to approximately 160 North American ecovillages—is to solicit a single non-random individual from each community that will provide the most accurate information about their community. Of course, I have little control over which individual is selected, but I can suggest in a cover letter or e-mail that the most 'knowledgeable' or most 'veteran' community member be forwarded the questionnaire under the assumption that a veteran can most accurately answer the factual questions about their community. The results of the pre-test below suggest that even if the most veteran individual is not selected, variation amongst all respondents, self-selected or otherwise, is acceptably small and not associated with length of membership, age, or gender.

Survey Dissemination at Dancing Rabbit: Online and Paper Surveys

I arrived at Dancing Rabbit on Friday evening, February 3rd having sent a pre-notice e-mail to the "members" and "residents" listerv the week prior, informing community members that I was coming to pre-test my survey instrument. On the evening of my arrival, I e-mailed all residents and members a link to the online survey. Within hours, individuals were completing the survey voluntarily. The following morning (about twelve hours after sending out the online survey) I wandered the common areas of the community and to individual households to offer paper surveys to individuals who had yet to complete the online survey. In all the paper survey cases, I handed off a package—including the questionnaire, a brief cover letter, and a pen—and I walked away for fifteen minutes before returning to collect the completed survey. Some individuals offered to return the paper survey to me themselves later in the day.

Survey Dissemination at Earthaven and Ananda Liina

In the case of both Earthaven and Ananda Liina, I included the link to the online survey in an e-mail to a personal contact who proceeded to forward the link to all individuals in their community. I had no control over the individuals to whom my contact disseminated the surveys, although I believe they sent them to comprehensive community e-mail lists.

PRELIMINARY SCALING DESIGN and OVERAL RESULTS

Responses to select questions were designated a certain proportion of one complete "point" that was assigned to each survey respondent's total Regime Distance Score (Distance) and Regime Influence Score (Influence). Each variable and the conditions under which a response receives a full point is summarized in table 2. On the pre-test survey, a community situated the *furthest* distance from the socio-technical urban development regime (regime) will score 14 points, while a community situated completely within the regime will score 0 points. A community with maximum influence will earn 5 total points while a community with zero influence will score zero points.

Table A2: Pre-test survey: Variables, full-point condition, and variable type

Regime Distance Variables

	Variable	Full Point Awarded	Variable Type
1	Electricity	100 percent of electricity generated on-site	Ordinal-Numerical
2	Water	100 percent of water harvested on-site	Ordinal-Numerical
3	Vehicle Cooperatives	Community has a vehicle cooperative	Nominal (Yes/No)
4	Number of Cooperative Vehicles	Community has zero cars per adult resident	Ratio
5	Fuel used in vehicle cooperative	Community uses only non-fossil fuels in its coop vehicles	Nominal
6	Number of personally owned vehicles	Community has zero personal cars per adult resident	Ratio
7	Distance to a public transit stop	Community is situated far (more than five miles) from any transit stop	Ordinal-Numerical
8	Food	Community generates 100 percent of its own food	Ordinal-Numerical
9	Construction labor	Community buildings were constructed only by residents of the community, and contracted labor	Ordinal-Numerical
10	Building uniformity	Community buildings do not all look the same	Ordinal - Attitude
11	Zoning	No zoning	Nominal
12	Zoning restrictiveness	Respondent feels no building restrictions from zoning	Ordinal - Attitude
13	Design standards	Design is highly influenced by permaculture or other ecological values	Ordinal - Attitude
14	Sanitation	Human excrement managed by some means other than sewerage or septic tank	Nominal

Regime Influence Variables

	Variable	Full Point Awarded	Variable Type
1	Perceived as a "good example" by local authorities	"Strongly agree" that local authorities see community as a good example	Ordinal - Attitude
2	Have been solicited for advice by local authorities	Have been solictied, even once, by local authorities for advice on urban development	Nominal (Yes/No)
3	Partnered with local authorities on a long-range planning	Have partnered with local authorities on long-range planning	Nominal (Yes/No)
4	Land has been re-zoned with existing zoning categories	Land has been rezoned using existing zoning codes	Nominal (Yes/No)
5	New zoning has been created to accommodate community	New zoning codes have been created to accommodate the community's plans	Nominal (Yes/No)

Responses to ordinal questions were assigned different proportional point levels. For example a respondent who marked that their community generated 0-25 percent of electricity on-site received 0 points for this category; 26-50 percent received 0.33 a point; 51-75 percent received 0.67 a point; and 76-100 percent received a full point. This scale system will change in the final survey, as explained in the sections below.

The means scores for each community pre-test is reported in Table 3 below. Dancing Rabbit respondents scored a mean of 10.47 out of 14 possible points, placing them furthest from the socio-technical regime compared to the other two tested communities. Dancing Rabbit respondents also demonstrated the highest level of overall variability (standard deviation= 1.10), with scores ranging from 8.43 to 12.74. Dancing Rabbit's lower bound overlapped with Earthaven's upper bound of 8.33.

Table A3: Regime Distance and Regime Influence Scores

		Regime Distance Score (out of 14)				Regime Influence Score (out of 7)			
	(N)	Mean	Min	Max	Std. Deviation	Mean	Min	Max	Std. Deviation
Dancing Rabbit	26	10.47	8.43	12.74	1.10	0.31	0.00	1.50	0.41
Earthaven	10	7.67	6.42	8.33	0.70	0.16	0.00	0.50	0.21
Ananda Liina	3	4.67	3.82	5.5	0.84	0.50	0.50	0.50	0.00

Dancing Rabbit's regime distance scores also demonstrated dramatic variability, ranging from 0 to 1.5 on a 5-point scale. Earthaven and Ananda Liina respondents varied less. Understanding the variability of these composite scores requires a more fine-grained understanding of the variability within individual questionnaire items. Indeed, the data collected from the pre-test reveals some inconsistencies in survey media, vaguely worded questions, and conceptual misinterpretations that I will remedy before disseminating the full survey. Figure 1 (below) displays each response to the pre-test survey. The graph shows all responses from all three communities, the mean value from each community (a transparent circle), and "extreme" values that demonstrate the minimum and maximum possible scores on each scale. These "extreme" values do not represent actual results, but serve as a visual reference. It is clear the community responses cluster in distinct "Distance" regions of the chart, with some overlap between the maximum values of Earthaven and the minimum values of Dancing Rabbit. The sections below explore the root of intra-community variability and strategies I will take to reduce it when distributing the final survey.

RESULTS: Regime Distance Scale

The following section summarizes the results of the survey and the changes I will make to each question. Many questions yielded perfect or near perfect unanimity amongst all members of the same community. I begin by describing these. Questions that showed relative consensus tended to be toward the front of the survey, and this is fitting as more simple questions should appear at the beginning as not to confuse respondents with questions that might require interpretation or opinion. Even some of the questions that solicited unanimous or near unanimous responses will endure small changes in wording or format. Other questions showed more variation in responses within each community. I will also change the wording and format of these questions.

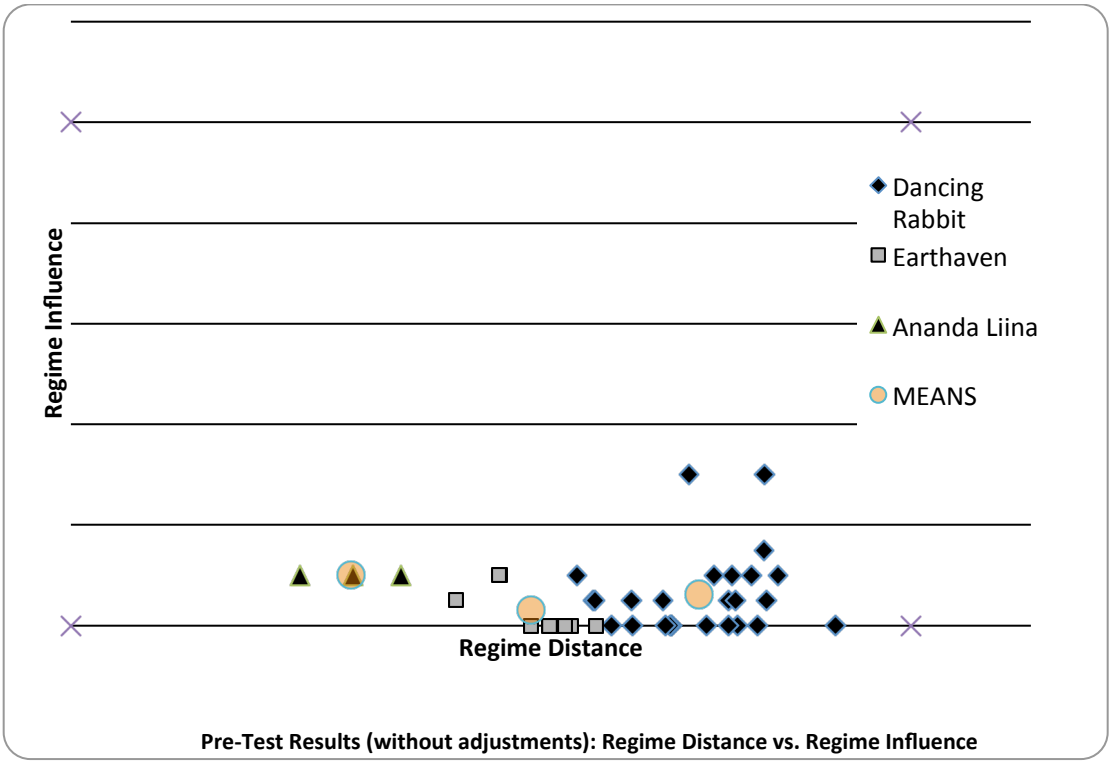


Figure A 1: Responses from three different communities cluster with some overlap between responses from Earthaven and Dancing Rabbit.

Unanimous or near unanimous responses: Regime Distance Scale
Land ownership

Communities returned unanimous results when asked about land ownership structure. All respondents from Dancing Rabbit and Earthaven responded that the ownership structures of their communities were a "land trust" and "home owner's association", respectively. Two out of three Ananda Liina respondents marked that their land was a non-profit corporation while one Ananda Liina respondent marked none of the categories, but offered clarifying comments about how the community was "in transition" toward a new structure.

Electricity

Members of all three communities responded in unison about the proportion of electricity generated on-site, with Dancing Rabbit and Earthaven members all choosing "76 to 100 percent" and all Ananda Liina members choosing "0 to 25 percent." All members of Dancing Rabbit chose "solar photovoltaic panels" and "wind turbines" as on-site electricity sources, and all members of Earthaven chose "hydroelectricity" and "solar photovoltaic" panels as sources in their community. There was one small discrepancy amongst Ananda Liina members, with two choosing "photovoltaic panels" as on-site electricity sources, and one individual choosing the "None" option. It is difficult to interpret what could have caused this single discrepancy.

Vehicle Cooperative

Nearly every respondent from Dancing Rabbit confirmed the presence of a vehicle cooperative. One respondent did not, and I have no evidence to explain this deviation except that this individual misinterpreted the question or skipped it altogether. Quite similarly, Earthaven members confirmed the *absence* of a vehicle cooperative, except for one individual who described an "informal" system of car sharing amongst neighbors. One Ananda Liina respondent also confirmed the presence of a "very informal" car sharing system. The question currently reads: "Does your community have a vehicle

cooperative or some similar car sharing system?" On the final survey I will replace the word "similar" with the word **formalized** so the question reads, "Does your community have a vehicle cooperative or some formalized car sharing system?" In this question, the additional description box proved very useful, in part because it revealed these varying interpretations. Dancing Rabbit respondents almost unanimously responded that there are three cars in their cooperative. One individual wrote that there are four vehicles, clarifying that this total included the shared community tractor. With only two exceptions, Dancing Rabbit respondents were unanimous about the fuel sources used in the vehicle coop ("biodiesel" and "petro diesel"), with two inexplicable exceptions.

Distance to a transit station

Dancing Rabbit and Earthaven respondents agreed unanimously that their community is positioned more than five miles from a transit station. This was no surprise as both communities are located in very rural areas. The Ananda Liina responses offer some potential for concern. Two individuals chose the "less than ½ mile" choice, while one selected the "1-2 mile" option. The discrepancy skips the "0.5 to 1 mile category" completely, so there is effectively no misinterpretation of distance, but more likely a misinterpretation of the concept of a transit station. The question reads: "How far away is your community from the nearest rail or bus transit station?" In Champaign County, Illinois, where Ananda Liina is located, the transit authority map shows a bus stop within 0.5 miles of the entrance to the community (CUMTD). Perhaps the outlying respondent conceived of a transit station as a larger depot or sheltered bus stop, while the majority (n=2) conceived of it as anywhere the bus stops to pick up passengers. This ambiguity will be fixed by changing the word "station" to "stop" so the question will read: "How far away is your community from the nearest rail or bus transit **stop**?"

Sanitation

Responses to the sanitation question were nearly perfectly unanimous, with every Dancing Rabbit respondent marking "humanure" and every Earthaven and Ananda Liina member checking both "humanure" and "on-site septic system". The discrepancies involved two Dancing Rabbit respondents and two Earthaven respondents also marking "overland wetland system" as a sanitation option. One Dancing Rabbit member also marked "living machine". If living machines or overland wetland systems exist at either of these communities, I am not aware of them, although Dancing Rabbit does have a gray water filtration system that feeds into a constructed wetland. The question specifies that the subject should be focusing on a system that manages "human excrement," so I imagine the few outlying answers of this question either result from a misunderstanding of what counts as human excrement or these individuals have confused aspects of their community with living machines or overland wetland systems designated for the processing of human excrement.

Food

All three communities import the vast majority of their food, and most individuals agreed that 25 percent of food or less is harvested on-site. Of all questions, however, this question inspired the most direct criticism as on-site food growth varies dramatically in each season. In the summer, communities grow a substantial portion of their own produce. I have therefore changed this question to a matrix which asks the same questions for Fall, Winter, Spring, and Summer.

Variable responses: Regime Distance Scale

Community Population and Demographics

The mean population levels for Dancing Rabbit (45.5), Earthaven (60.3), and Ananda Liina (9.67) offered no surprises (see table 4). Currently, the Dancing Rabbit website (www.dancingrabbit.org) boasts a population of "about fifty" and the Earthaven website states, "…we have grown to 60 full members… (www.earthaven.org)" and my experience at all three of these communities leads me to believe that these figures are correct or very close. I imagine that formal records of the community membership do exist somewhere, but these formal numbers might differ from the number of adults that have lived in the community for the past six months. My experience is that members tend to

come and go, leaving for months or even years at a time. Nevertheless, community members have a general sense of the number of individuals living in their community, whether it is increasing or decreasing, and it seems to correspond with what is written on their respective websites.

Table A4: Adult and Youth Population

		Number of Adults				Number of Children			
Pre-Test Site	Respondents (N)	Mean	Min	Max	Std. Deviation	Mean	Min	Max	Std. Deviation
Dancing Rabbit	26	45.5	30	55	5.44	10.85	9	13	1.16
Earthaven	10	60.3	40	100	15.96	9	7	15	2.97
Ananda Liina	3	9.67	9	10	0.58	1	1	1	0.00

I was surprised, however, with the range of population responses from Earthaven. When asked: "In the past year, about how many adults (18 years and older) have lived for six months or longer in your community?" one individual responded "40" and another responded "100". Had this survey been distributed randomly, we could assign a margin of error of ± 26.6 persons (with 95% confidence) to the mean of 60.3! This large margin results, in no small part, from the relatively small sample size (N=10). Of course, I expected that there would be some variation in this answer as the number of individuals living in-community fluctuates seasonally, or even monthly. Individuals, like myself, stay for periods of a few months at a time. A six-month stay involves a degree of commitment greater than a temporary visitor as one must endure different seasons and likely seek more permanent shelter than a tent, and probably some relatively enduring means of subsistence. I therefore established a six-month threshold as a means of distinguishing the population of permanent residents.

It is important that a variable like this remain continuous, rather than ordinal. I have no evidence to suggest an appropriate scale for ecovillage population, and even if I did create a scale the responses 40 and 100 would likely be in different scale categories. I have trouble reconciling what may have caused this discrepancy other than a different interpretation of the word "community" which some individuals extend beyond the formal boundaries of their ecovillage's property. For example, Earthaven is surrounded by several other land trust communities that are not formally part of Earthaven, but participate in social events and farmer's markets. Earthaven also has a complex membership hierarchy which includes full members, provisional members, supporting members, and other categories with different obligations and residency requirements. I assumed this type of complexity could be controlled by inquiring about the number of individuals who lived in the community, regardless of membership status.

I will solve this problem by offering respondents a **population range option**, where they can write their *lowest* estimation and *highest* estimation for community population. I can then take the midpoint of this estimation. This will allow individuals with multiple conceptions of their community population to offer both conceptions on the survey.

Water

Both Earthaven and Ananda Liina surveys offered unanimous responses to the question relating to on-site harvesting of water. Both communities are in consensus that 76 to 100 percent of water comes from wells, rain harvesting, or surface water on-site. Dancing Rabbit respondents split nearly half-and-half. Thirteen respondents (50 percent) answered that 76 to 100 percent of water is harvested on-site, while twelve respondents (46.1 percent) answered that 51-75 percent of water is harvested on site. One individual marked the 25-50 percent option. The index of qualitative variation (IQV)—which measures variation in ordinal or nominal variables on a scale from 0, meaning zero variation to 1—for this question at Dancing Rabbit was 0.741. I am not surprised to see this variation,

and unfortunately it is difficult to gauge the accuracy of this question. Many households at Dancing Rabbit harvest their water exclusively from rain, and store it underground cisterns. Others, especially those in the process of building their first permanent home, harvest their water from a single county tap. In the summer of 2011, I watched as one young resident engaged in the unenviable task of transporting bucket after bucket of water from the tap at the south end of the community to his construction site at the north end. Fortunately, the community shares a general consensus that 50 percent or more of its water is harvested on-site. These results offer support for a five-point scale, rather than a four-point scale. I will discuss this change below.

Personal Vehicles

When asked "How many personally owned vehicles were parked on your community's property last night?," respondents offered an enormous variety of answers. No single response exceeded 50 percent of all other responses. As both an open-ended question and a reality that likely changes from day-to-day, some variation was expected. At Dancing Rabbit, where a community-wide covenant forbids active members from keeping personally owned vehicles on the property, I was not surprised to see a variety of relatively low answers. The number of vehicles belonging to visitors (like myself) and other non-member residents fluctuates throughout the year, peaking in the summer months when the community is visited by a wave of volunteers. At Earthaven, where car ownership is not restricted, there are considerably more personally owned vehicles, but the variation of responses, ranging from 20 to 50 is unacceptably large (mean= 34, standard deviation = 10.92) relatively to the population size. As the true answer to this question changes from day-to-day and even season to season, its accuracy is a moving target. A better approach will be to offer an ordinal scale similar to electricity and water consumption, asking what proportion of individual community members keep personal vehicles on community property: 0-20 percent; 21-40 percent; 41-60 percent; or 61-80 percent; or 81 to 100 percent? I believe these ranges will more clearly and accurately what I'm trying to understand which is, in essence, does your community support a culture of individual automobile ownership?

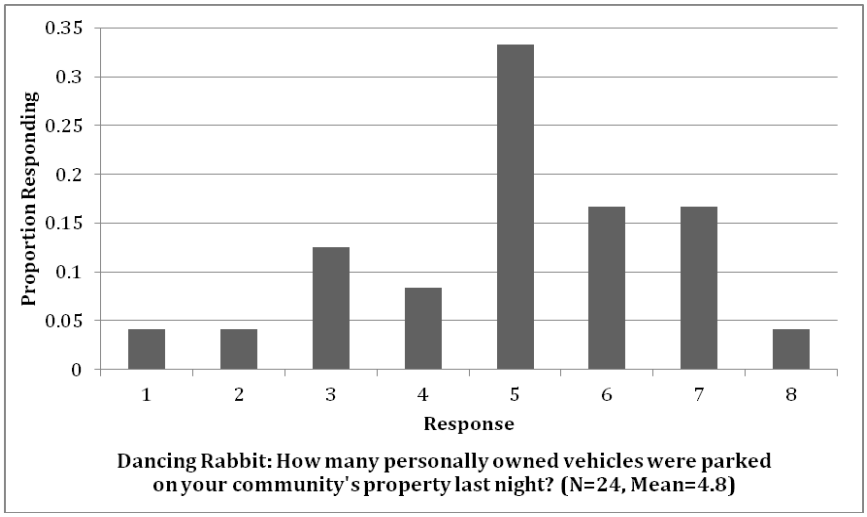


Figure A 2: Personally owned vehicles at Dancing Rabbit.

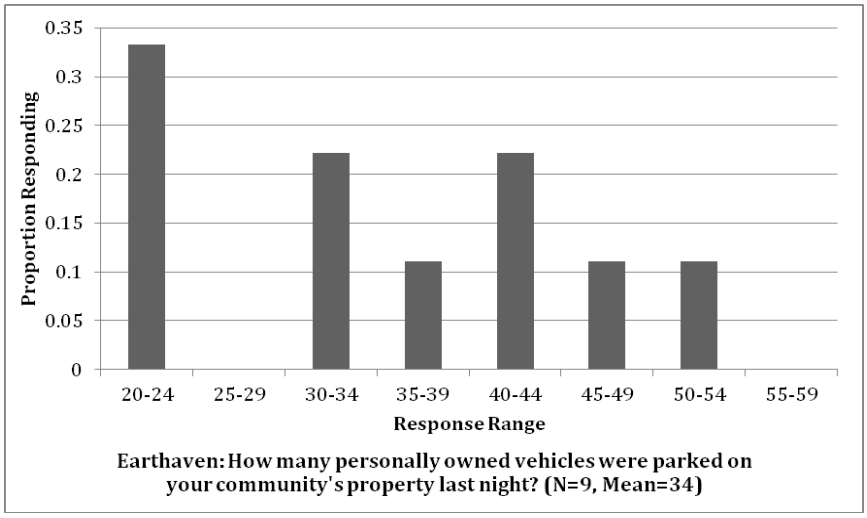


Figure A 3: The open-ended personal vehicles quesiton resulted in a diversity of responses. This variability is no surprise. The question format will be changed to ordinal-numerical

Paper versus online surveys

Significant differences in survey outcomes can be explained by a small inconsistency in wording on the online and paper surveys.

I was surprised to find that there was a significant ($\alpha < 0.05$) difference in the mean Regime Distance Score (henceforth "score") between respondents that used paper and online surveys at Dancing Rabbit (DR). The mean score for all paper surveys was 9.76 while the mean score for all online surveys was 10.99, yielding a difference of 1.23 points (see table 5). The results of these surveys suggest that individuals who took the online survey perceive their community significantly ($p=.0026$) further from the socio-technical regime than individuals who took the paper survey. This difference could be attributed to response bias: I e-mailed a link to the online survey to every individual on the community listserv one evening, and on the following day I distributed paper surveys in-person to individuals who had not yet taken the online survey. Assuming that every individual checked their e-mail within the twelve hour span of e-mailing the survey link, it is possible that individuals who took the online survey felt more empowered to answer the questions or perhaps more eager to participate in my research, and this somehow would resulted in significantly different responses. There is little evidence to confirm this, however.

Table A5: A significant difference between the mean scores of paper and online surveys

	Paper Surveys	Online Surveys
n	11	15
mean score	9.76	10.99
difference		*1.23*
pooled std error		*0.367*
t-score		*3.35*
p-value		*0.0026*

More detailed exploration reveals some significant differences in online and paper responses in one demographic category and three specific "Regime Distance" questions. The demographic difference is no surprise: individuals who completed the online survey were, on average, ten years *younger* than individuals who completed the paper survey. The average age of individuals who completed the online survey was 35.7 years while the average age of individuals who completed the paper survey was 45.2 years.

Table A6: A significant difference between the mean age of paper and online survey respondents

	Paper Surveys	Online Surveys
n	11	15
mean respondent age	35.67	45.18
difference		*9.51*
pooled std error		*3.74*
t-score		*2.55*
p-value		*0.0177*

This age difference, however, cannot explain the difference between online and paper surveys. Do older community members perceive their community significantly different than their younger neighbors? In fact, they do not. There is no significant correlation (Pearson's r = -0.164, p= 0.4221) between respondent age and regime distance score.

The most interesting and perhaps most revealing discrepancies between online and paper survey respondents were their perceptions of "zoning" and "zoning restrictiveness." Individuals who took the paper survey perceived zoning significantly *more* restrictive than individuals who took the online survey[59]. Similarly, individuals (see tables 7). The difference, as it turns out, is can be directly connected to an inconsistency (indeed, an embarrassing oversight!) in the wording of the questions in the two different media. The paper pre-test survey reads, "26. Which of the following best describes the zoning category of your community's land?" while the online pre-test survey question reads "26. Which of the following best describes the ZONING CATEGORY *designated on your community's land by county or city government?* [emphasis added]." This difference in wording resulted in widely disparate responses. Nearly every online respondent chose either "My community's land is NOT ZONED" or "I don't know" while paper survey respondents chose "Ecovillage Zoning" nearly across the board. This difference has twofold importance: First, the "no-zoning" choice results in one full regime distance point while the ecovillage zoning choice results in

[59] The scores of zoning restrictiveness are a bit counter-intuitive. A lower score represents a lower Regime Distance Score, implying that the community is closer to the mainstream where there is theoretically more zoning restrictiveness. Therefore, a lower score means more restrictive and higher score means less restrictive.

zero points. Innovative as it is, ecovillage zoning is still municipal zoning and thus considered part of the socio-technical regime; Second, Dancing Rabbit's land is not zoned as Scotland County Missouri has no zoning ordinance. This question failed from construct validity, and my cognitive interview with one ecovillage resident revealed that she perceived the question to refer to the *internal* zoning rules of Dancing Rabbit. Dancing Rabbit Ecovillage has established its own zoning regulations, and without specific reference to "county or city government", respondents checked the "Ecovillage" zoning box.

Question 26 primed respondents for the next question, which reads "To what extent do you agree with the following statement: When making building decisions in my community land-use regulations like zoning or subdivision regulations restrict our ability to build what we want." Respondents are given a Likert scale ranging from Strongly Disagree to Strongly Agree. Of course, online respondents mostly disagreed while paper respondents had mixed answers, leaning relatively more towards the "agree" side. They likely perceived the question to be referring to internal zoning rather than government zoning

Table A7: A significant difference in the perception of zoning restrictiveness between paper and online survey respondents

	Paper Surveys	Online Surveys
n	11	15
mean zoning restrictiveness score	0.77	0.93
difference		*-0.16*
pooled std err		*0.754*
t-score		*-2.13*
p-value		*0.0435*

When variation in these two variables are controlled (all values set to the mean values), the standard deviation in total regime distance score declines from 1.01 to 0.65. Figure 2 displays how Dancing Rabbit responses cluster more tightly around the mean Regime Distance value (10.46) once the influence of the two zoning questions are controlled. This change eliminates the overlap between the upper and lower bounds of Earthaven and Dancing Rabbit, respectively.

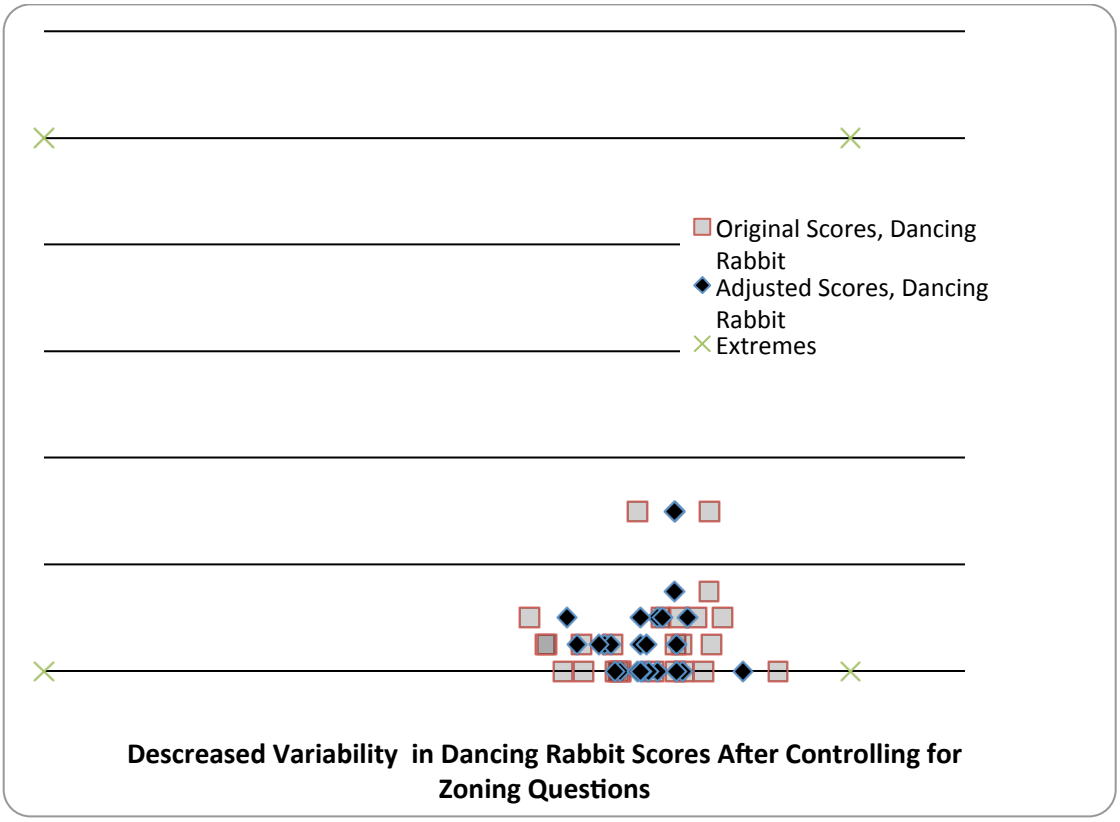


Figure A 4: After zoning questions are controlled, the variability in composite regime distance scores decreases. Dancing Rabbit scores cluster more around their means.

General changes: A new five-point scale for quantitative questions

In addition to the specifc changes in the survey questions discussed above, I have made several changes to the scaling tools used in the survey. For questions that probe the approximate porportion of intenrally sourced electricity, food, water, and labor, I will now employ a five-point scale in increments of 20 percent instead of a four-point scale in increments of 25 percent. I believe this change will allow, firstly, for communities to choose a category that includes 50 percent as a median choice rather than an upper or lower-bound of a cateory. With only four options (0-25 percent; 26-50 percent; 51-75 percent; and 76-100 percent), a respondent who believes that their community grows about "one-half" of the food they consume has to choose between 26-50 percent or 51-75 percent. There is large enough a conceptual distance between 25 percent food production and 75 percent food production that offering a 40-60 percent option is much more comfortable and accurate. This five-point scale will also result in a more fine-grained "Regime Distance" scale and may offer more detail on the characteristics of ecovillages with very minor changes to the survey instrument.

The new five-point scale can be conveived of verbally as "Close to none" (0-20 percent); "A little" (21-40 percent); "About half" (41-60 percent); "Most but not all" (61-80 percent); and "All or just about all" (81-100 percent)". This five-point scale will match the five-point "strongly agree to strongly disagree" Likert scale used in other question in the survey.

SUMMARY OF CHANGES: Regime Distance Scale
The changes I've made will help collect more accurate and representative information about ecovillages across North America. The specific changes are listed below:

- I have offered a high-low population range option for the community population question. Questions that estimate the adult and youth population now read:

Adult Population: The adult population of some communities can go up and down, so it is sometimes hard to pin an exact population number. In the past year, what is your estimation for the HIGHEST and LOWEST number of adults (18 years and older) that have lived for SIX MONTHS OR LONGER in your community? (If you know the exact number, enter the same number for both boxes below).

Youth Population: The youth population of some communities can go up and down, so it is sometimes hard to pin an exact population number. In the past year, what is your estimation for the HIGHEST and LOWEST number of children (younger than 18 years) that have lived for SIX MONTHS OR LONGER in your community? (If you know the exact number, enter the same number for both boxes below).

- For questions about electricity, water, personal vehicle ownership, construction labor, and food, I have expanded the four-point (0-25%; 25-50%; 51-75%; and 76-100%) scale to a five-point (0-20%; 21-40%; 41-60%; and 80-100%) scale. This will allow respondents to choose 50 percent as an option without having to distinguish it from 51 percent. Respondents now have a conceptually safe "about half" option.

- I added the word "formalized" to the question about vehicle cooperatives, as to distinguish it from an informal car sharing system. It now reads:

Does your community have a vehicle cooperative or some formalized car sharing system?

- I changed the question about personal vehicle ownership from a continuous variable to a five-point numerical scale.

- Changed the word transit "station" to transit "stop" in the question about public transit.

RESULTS: Regime Influence Score

The results of the "Regime Influence" scale portion of the questionnaire demonstrated considerably more variability than the "Regime Distance" scale. My assumption is that none of these communities have had influence in planning policy changes in their jurisdiction, in part because they exist in regions with little planning or zoning of which to speak. When asked about whether their community had interacted with local or regional government, many residents marked "I don't know," a response that is effectively the same as replying "No." I found the open-ended comments in this section especially useful. They helped clarify problems with the wording of questions and a need to procure more details about a community's influence in its region.

Community as a good example

The first question in the regional influence scale test asked: **To what extent do you agree with the followings statement: "Government officials in my jurisdiction see my community as a good example of urban development."** Responses to this question were variable, but not surprising. A plurality of Dancing Rabbit respondents marked "I don't know" (N=10), while 7 marked "Disagree" and 7 marked "Neither agree or disagree." Earthaven subjects offered a similar array of responses, with a majority marking "I don't know" (N=5), and others marking "Strongly Disagree", "Disagree", and "Neither agree nor disagree".

Table A8
Question: To what extent do you agree with the followings statement: "Government officials in my jurisdiction see my community as a good example of urban development."

Community	N	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	I don't know
Dancing Rabbit	26	1	7	7	1	0	10
Earthaven	10	2	1	2	0	0	5
Ananda Liina	3	0	0	3	0	0	0

The open-ended responses to this question illuminated several issues: Firstly, respondents interpreted the word "urban" differently than I had intended. The conceptual distinction between urban and rural varies even amongst policy makers, planners, and different offices in the federal bureaucracy (Isserman, 2005). As a student of urban planning, I interpret the phrase "urban development" to mean any type of development involving hardscape: roads, buildings, parking lots and other infrastructure in the human built environment. Urban development can take place in a rural region. Small towns in regions that are rural by anyone's standard can develop roads, buildings, sewerage, et cetera. "Rural development," on the other hand, generally refers to economic development in agricultural regions and may or may not refer specifically to roads, buildings, and infrastructure. This distinction is probably different from the conceptions of urban and rural that non-planners keep, and given that two of these communities are in regions that are (almost) unequivocally rural, several respondents were confused by the word "urban" in the question, and assumed that urban development could not occur in their rural community. Open-ended responses included:

- *Not sure they know what to think of us... too rural to be seen as urban development, I assume.*
- *We aren't an "urban" community, so I'm not sure how to answer this. In general, we have a positive image locally, but I can't speak to how government officials see us.*
- *We are not urban.*
- *we are rural*
- *We're not urban…*

The second discrepancy with this question involved the distinction between "Neither agree nor disagree" and "I don't know." These two options are effective the same. If an community has little to no interaction with local government officials it would make sense for an individual to state they don't know AND that they neither agree nor disagree about government officials favorable opinion of the community. I do not think this is an issue, however. I will score both of these options identically in the scale. This question ultimately aims to gauge whether or not local government has a favorable opinion an ecovillage. There is no important conceptual difference between a respondent that has no strong opinion and a respondent that doesn't know at all.

Additionally, I believe this question can query the opinion of multiple groups that influence the urban development process. There is a difference between the opinions of elected and non-elected officials, non-ecovillage neighbors—who can often provide a dose of NIMBYism to unorthodox development—and the local news media, who might also contribute to the discourse of urban development. I will therefore expand this question to a matrix of choices for four actors. The question will appear as follows:

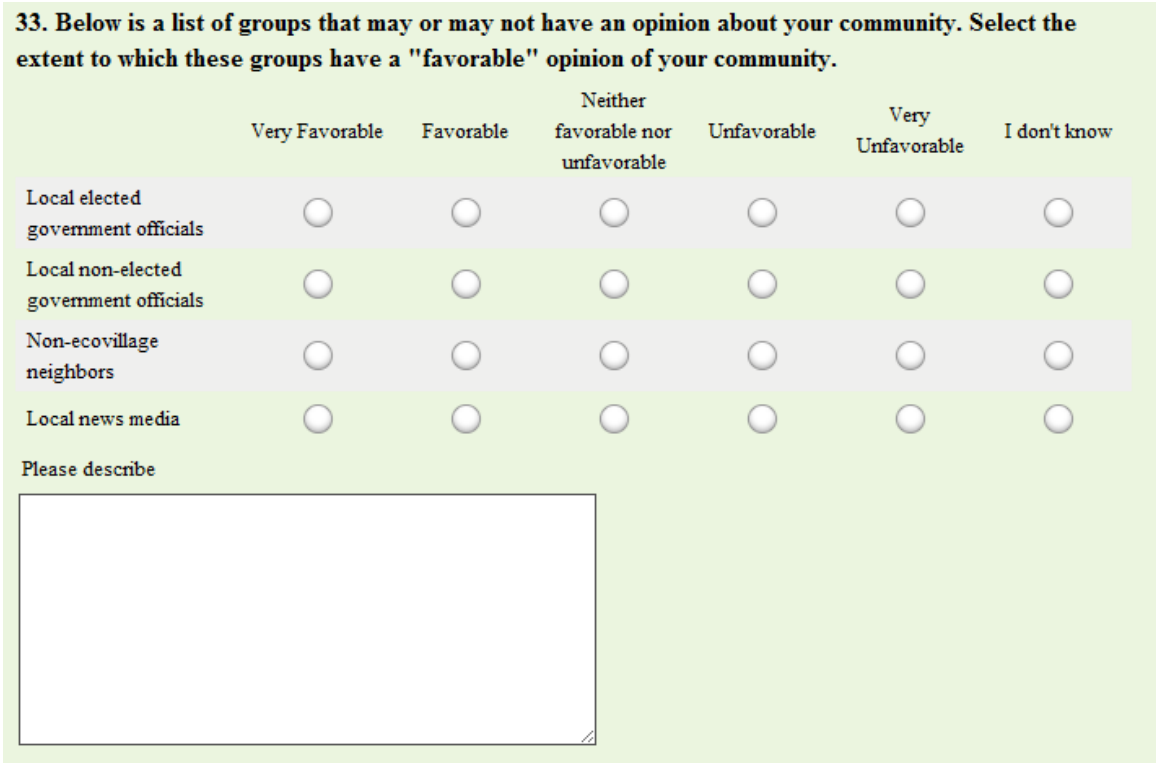


Figure A 5: A screenshot of the online test survey.

This solution eliminates the need to distinguish between "urban" and "rural" and allows respondents to provide more specific information about the opinion of different actors in the socio-technical regime.

Advice to local or regional government

Respondents were asked: **In the past year, have local government officials contacted members of your community for advice on urban development decisions in your city or county, even once?** Not a single respondent, from any of the three communities, replied "Yes," The responses divided almost evenly between "No" and "I don't know," however. If a community had never been accessed for advice, residents would be correct in answering either one of these ways.

Table A9:
In the past year, have local government officials contacted members of your community for advice on urban development decisions in your city or county, even once?

	(N)	Yes	No	I don't know
Dancing Rabbit	25	0	14	11
Earthaven	10	0	6	4
Ananda Liina	3	0	2	1

The new question will offer allow for more accurate responses by providing a frequency scale ranging from "Very frequently (More than once a month)" to "Never". It will also offer a more specific prompt about the *type* of advice that elected or non-elected government officials have solicited. For

the sake of brevity, I will collapse non-elected and elected government officials into one category and hope that respondents elaborate on any advice they have provided in the open response box.

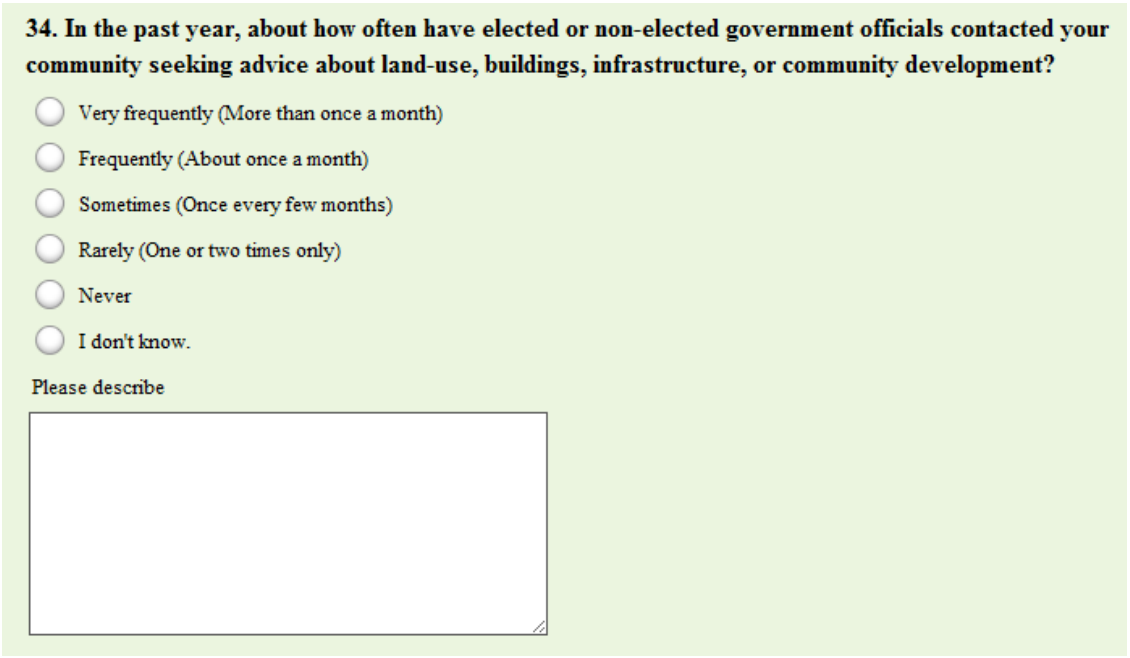


Figure A 6: Screenshot of the online test survey.

Planning Partnerships

I was surprised to see that two individuals from Dancing Rabbit responded affirmatively to the question: **Has your community ever partnered with local government officials on long-range plans for your city, county, or regional district?** Others responded as expected, answering "No" and "I don't know."

Table A10:
Has your community ever partnered with local government officials on long-range plans for your city, county, or regional district?

	N	Yes	No	I don't know
Dancing Rabbit	26	2	16	8
Earthaven	10	0	8	2
Ananda Liina	3	0	3	0

The two individuals that replied "Yes" offered the following comments:

- *we worked with the county officials when there was a grant to explore economic development.*
- *Work with county government regarding roads and CAFOs*

On one hand, I am encouraged that both affirmative responses offered more detailed descriptions. On the other hand, it is difficult to discern with these responses alone whether Dancing Rabbit's contribution to these plans have influenced urban development. What was the community's role?

Has their contribution resulted in enduring change in the way planning is done in the region? A detailed open-ended response is important for this question as there is no way to capture the possible diversity of answers in a single multiple-choice scale. I will therefore solicit more detailed responses by adding the phrase, "***If yes, please describe the plan and any changes that have resulted from your community's participation," above the open-ended response box.***

Zoning Questions

Reponses proceeded as expected, with most of the respondents answering "No" or "I don't know" when asked whether municipal authorities had changed the zoning of the community's land or created new zoning to accommodate it. Of course, the variation in Dancing Rabbit might be traceable to misconceptions of "zoning", as individuals who filled out the paper survey may have been primed to think that the survey referred to internal rather than municipal zoning, although this question is identically worded in both the online and paper versions.

Table A11:
Have local government officials ever changed the zoning of your community's land from one zoning category to another EXISTING zoning category in order to accommodate your community?

	N	Yes	No	I don't know
Dancing Rabbit	26	0	19	7
Earthaven	10	0	9	1
Ananda Liina	3	0	2	1

To your knowledge, have local government officials ever created a NEW zoning category or amended subdivision regulations in order to better accommodate your community?

	N	Yes	No	I don't know
Dancing Rabbit	26	0	19	7
Earthaven	10	0	9	1
Ananda Liina	3	0	3	0

Open-Ended Description of Ecovillage-Government Relationships

The open-ended section offered some good details about each community's relationship with its local authorities. Repondents were instructed: "**Feel free to discuss your relationship with local government officials, especially those related to urban and regional planning. "** Several individuals interpreted the question to ask if they *personally* interacted with local municipal authorities, replying in the following ways:

- *None personally*
- *I don't have any relationship with the local government officials.*
- *I don't have a relationship with local officials*

This, of course merits a re-wording, changing the word "your" to "your community's."

Others offered the following responses (select responses from all three communities):

- *I'd say it is friendly, but we aren't being used as a model locally. We are VERY rural, and the types of decisions I think you are getting at are just not things that get a lot of attention locally.*

- *We can't do what we want to do under local government regulation. So we just do not talk to them anymore.*

- *They have been fairly cooperative and have overlooked some things, have at times said what we are doing is good, even though outside regulations. Newer officials seem to be more picky than older ones.*

- *Local government officials don't have a clue what we're doing here. They appreciate the tax base and fear the growing voting block. In a county that is economically depressed they are glad that we're here and spending money but do not understand AT ALL our choice regarding building, community, etc.*

- *… it does not seem that the gov is able to work with our ideas because it does not meet any codes and they are unable to change this to our benefit. the best thing we have going is a rural county with little money…*

SUMMARY OF CHANGES: Regime Influence Scale
I will improve the reliability and validity of the Regime Influence Scale, by soliciting more fine-grained responses. By eliminating the term "urban" from all questions, I will eliminate the confusion over the concepts of urban and rural. Other change include:

- The question gauging the extent to which residents believe policy-makers perceive them as a "good example" will instead ask whether elected government officials, non-elected government officials, non-ecovillage neighbors, and local news media perceive them favorably or un-favorably. This will offer more details about the moral standing of the ecovillage within its local context.

- The question regarding contacts with government officials will be converted to a ordinal-numerical scale question that allows for respondents to distinguish between one contact and regular contact.

- The question regarding partnerships with local plan-making efforts will solicit more detailed open-ended responses, as to gather detailed information that certainly varies in character from community to community and cannot be captured in a single scale.

- No changes will be made to the question regarding zoning changes, but hopefully variability in this question will be reduced with the more consistent conceptualization of zoning in the Regime Distance portion of the survey.

CONCLUDING REMARKS

The results of the pre-test demonstrated variability that will be remedied by changes in wording and question format. Inconsistencies question wording also proved to be a significant factor in the finals scores of respondents. I am convinced these changes will allow me to dispatch a survey that accurately depicts a community's distance from the socio-technical urban development regime and its influence on that regime. I am also convinced that the new and improved survey instrument will serve to reliably represent an entire community even though it is completed by a single community resident.

Additional questions for the final survey steps

- Changes in the survey have made the questionnaire longer. Will this increase in length lower response rates?

- Surveys will not be randomly distributed amongst the North American Ecovillage population. This is a census, and the non-random nature of the survey effectively precludes me from conducting inferential statistics. How can I show that responses were representative, if not random? Could this survey be enhanced by drawing a random sample of ecovillages in North America? The current population consists of exactly 150 communities. Is it better that I am conducting a census?

- What relationship exists between the *age* of a community and its *influence* on the surrounding community? Very influential communities (e.g. Ecovillage at Ithaca) have built relationships with their surrounding jurisdiction as they've grown older and stronger. This growth in influence is undoubtedly a complex evolution, but it will be worth testing whether age plays a significant role in ecovillage influence.

- Future research should involve surveying planning professionals in different jurisdictions, and a systematic comparison of planners in jurisdictions *with* ecovillages and jurisdictions *without* ecovillages. Are there significant differences in responses, and if so, what are the characteristics of the ecovillages in the most influenced jurisdictions?

References

Dillman, Don A., Jolene D. Smyth, and Leah Melani Christian. 2009. *Internt, mail, and mixed-mode surveys: The tailor design method, Third Edition.* John Wiley & Sons, Inc: New Jersey.

Isserman, Andrew M. 2005. In the national interest: Defining rural and urban correctly in research and public policy. *International Regional Science Review.* 28 (4). Pp. 465-499.

Smith, Adrian. 2007. Translating Sustainabilities between Green Niches and Socio-Technical Regimes. *Technology Analysis & Strategic Management.* 19 (4): 427-450.

Appendix B: Dancing Rabbit Resource Use

Resource Use – Average American vs Dancing Rabbit 2011

We are often asked how our resource use compares with the Average American. Here's some figures to give you a sense of how we are doing. While this is a great step towards sustainability we feel we still have a long way to go.

	Average American	Average person at Dancing Rabbit	DR Percent of Avg American
Vehicles Per Person[1]	.83	.06	7%
Miles Driven Per Person[2]	9,548	894	9%
Motor Fuel Use (gallons) Per Person[3]	379	26	7%
Electricity (kwh per year)[4]	4,320	325	7.5%
Propane/Gas – therms[5]	365	29	8%
Water Per Capita Gallons per year[6]	49,134	4,454	9%
Household Waste lbs/year/person[7]	1600	411	26%

Figures for Dancing Rabbit based on calculations in 2011

- 1 – Average American: http://cta.ornl.gov/data/tedb30/Edition30_Full_Doc.pdf. Dancing Rabbit: 3 vehicles shared by 52 people (does not include interns and visitors)
- 2 – Average American: http://cta.ornl.gov/data/tedb30/Edition30_Full_Doc.pdf. Dancing Rabbit: 46,511 miles drive by 52 people (does not include interns and visitors)
- 3 – Average American: http://cta.ornl.gov/data/tedb30/Edition30_Full_Doc.pdf (miles driven divided by average of 25.2 mpg). Dancing Rabbit: miles driven divided by estimated mpg of 30 (includes truck and passneger vehicles)
- 4 – Average American: http://www.eia.doe.gov/cneaf/electricity/esr/table5.xls and http://quickfacts.census.gov/qfd/states/00000.html (2.6 persons per household) Dancing Rabbit: 15

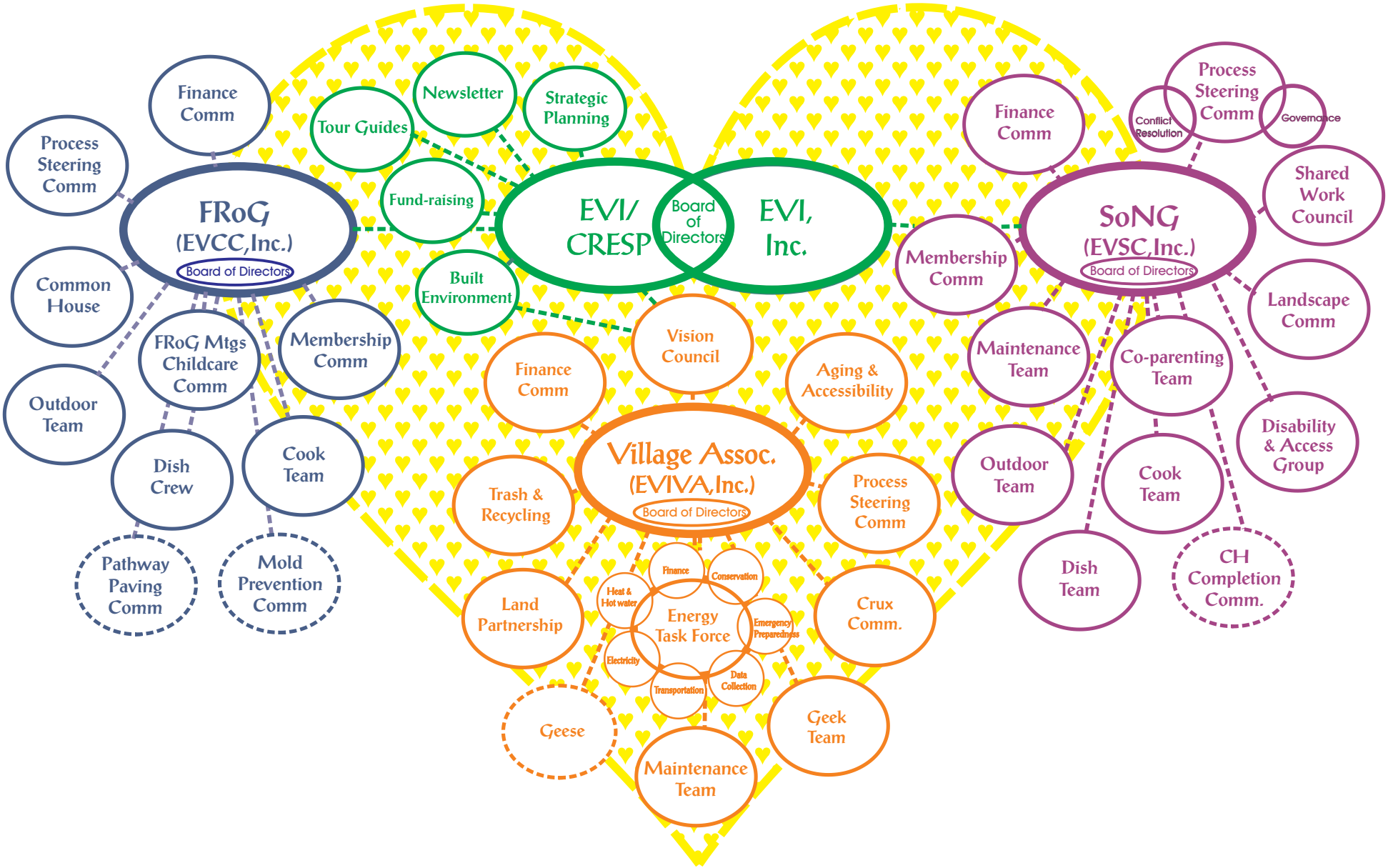
kW of solar and wind – produces 19,503 kWh per year divided by 60 people (includes interns and visitors pro rated for time at DR). http://rredc.nrel.gov/solar/calculators/PVWATTS/version2/pvwattsv2.cgi

- 5 – Average American: http://www.epa.gov/climatechange/emissions/ind_assumptions.html (7915 cf * 12 month / 100 cf/therm /2.6 people per household) Dancing Rabbit: Based on measured cnsumption in Skyhouse divided by 6 people
- 6 – Average American: http://www.drinktap.org/consumerdnn/Home/WaterInformation/Conservation/WaterUseStatistics/tabid/85/Default.aspx (divided by 2.6 persons per household (see footnote 4)). Dancing Rabbit: 138,500 gallons used from county water system, plus 128,000 from roof catchment divided by 60 people (includes interns and visitors pro rated for time at DR)
- 7 – Average American: http://www.wisegeek.com/how-much-garbage-does-a-person-create-in-one-year.htm. Dancing Rabbit: 57 cubic ft dumpster * 52 weeks * 8.33 lbs/cubic-ft / 60 people (lbs/cubic ft source: http://www.nmenv.state.nm.us/swb/doc/Conversiontable.doc)

Please let us know if you see any errors in our calculations or improper assumptions.

Appendix C: EVI Boards and Committees

Ecovillage at Ithaca - Organizational Structure



Appendix D: EVI Facts Sheet

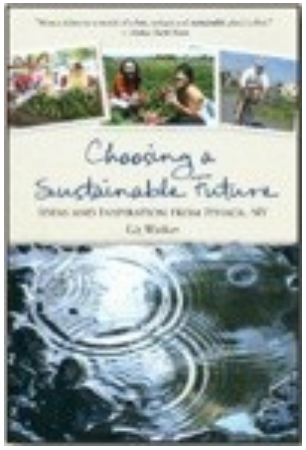
Want to Know More?

Read EVI co-founder Liz Walker's 2005 book about the Ecovillage at Ithaca – $17.95 including tax.

Or, Liz's 2010 book about Ithaca area sustainability and social justice movements:

Choosing a Sustainable Future: Ideas and Inspiration From Ithaca, NY

$19.95



Make checks payable to EVI/CTA

Both books available for purchase at the end of your visit or on the EVI website: http://ecovillageithaca.org

Our three-times weekly community dinners help bring residents together to develop a strong sense of community – they also function to save cooking and shopping energy.

EcoVillage *at Ithaca*
Center for Sustainability Education

Sustainability –

Meeting the needs of the present without compromising the ability of future generations to meet their own needs.

World Commission on Environment and Development. 1987. *Our Common Future*. Oxford University Press. Pages 8 and 43.

Ecovillage at Ithaca Mission Statement –

To promote experiential learning about ways of meeting human needs for shelter, food, energy, livelihood and social connectedness that are aligned with the long term health and viability of Earth and all its inhabitants.

Adopted by the EVI, Inc. Board 28 October 2009

http://ecovillageithaca.org

education@ecovillage.ithaca.ny.us

Fact Sheet by Richard W Franke Last updated: 08 October 2011

EcoVillage *at Ithaca*

Land = 175 acres (70.8 hectares)
5 acres (2 ha.) each 2 neighborhoods (FROG and SONG)
5 acres (2 ha.) third neighborhood (TREE)
10 acres West Haven organic farm
5 acres Kestrel's Perch organic berry farm
1 acre (0.4 ha.) pond
149 acres (60.3 ha.) open space, including 55 acres (22.3 ha.) in conservation easement administered by the Finger Lakes Land Trust

People = about 160 (includes only the first two neighborhoods)
Ages 1 to 82
Teachers, computer experts, health workers, homemakers, retirees, farmers, choir director, university administrator, carpenters, social workers, legal profession

Range of household types

SONG residents install Structural Insulated Panels (SIPs) to build their own homes

Two Neighborhoods with a third forming

FROG (First Resident Group) 30 houses, 5 designs with shared heating systems in clustered groups of houses

SONG (Second Neighborhood Group) 30 houses, individual designs, 14 with solar panels, 2 with solar hot water, some with composting toilets

TREE (Third Residential Ecovillage Experience) This neighborhood is currently forming itself – see the website http://www.tree.ecovillageithaca.org or ask us if you are interested in participating in TREE's creation

Legal Structure

Neighborhoods are Cohousing Cooperatives

Village Association is a Nonprofit Landowning Cooperative

Education Center is a Nonprofit NGO

History

Grew out of the 1990 cross-US walk for a livable world

First neighborhood residents moved in in 1996; second neighborhood in 2002; third neighborhood forming with construction start expected in 2012

Purpose

Ecovillage at Ithaca provides a comfortable US middle class lifestyle on 40% less energy and resources than currently used by similar households in the same climate zone. We are working on ways to conserve even more over time. We strive to be a laboratory for ways to enjoy a rich, full life while sustaining the earth's resources for future generations. Let's leave a livable world for our children and grandchildren.

EVI's root cellar allows winter storage of root vegetables with no additional energy. It was designed and built by students and ecovillagers.

Sustainability Features – a few examples; more are described on the tour

FROG homes partly heated with passive solar – 14 foot (4.3 meters) windows and super insulation – use 40% less energy than US avg, thus lower heating costs – similar for electricity. Trellises with vines keep windows cool in summer

Great room and balcony design gives high quality of life with less space usage – FROG avg is 1,228 sq ft (114m^2) versus a 2001 US avg of 2,230 ft^2 for single homes

Sustainability Features – continued

Clustered houses leave more land available to maintain biodiversity

Organic farm and berry farm within ½ mile reduces transport costs for much of our food in summer months to almost zero

SONG houses use Structural Insulated Panels (SIPs) or straw bale

SONG houses have radiant floor heating

47% of SONG houses have solar electric panels which generate about 75% of electricity needs

Rainwater catchment in some houses; community catchment in SONG

TREE (3rd neighborhood now forming) to have Aging in Place option such as staircase-free designs plus deep green features

Common Houses (CHs) for each neighborhood (each 30 houses) facilitate community meals that save money and promote community solidarity; CHs have guest rooms, laundry, child play rooms and other facilities that allow for smaller individual homes

Multifunctional pond – wildlife protection, swimming, ice skating, water management, fire protection, light bounces off surface in winter for light and heat in FROG Common House