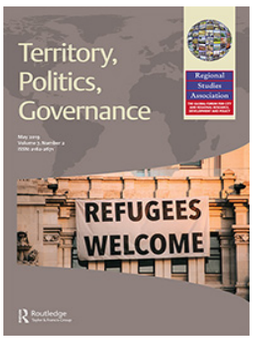

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Imagining the post-fossil city: why is it so difficult to think of new possible worlds?

Maarten Hajer[a] and Wytske Versteeg[b]

ABSTRACT

The phenomenon of climate change requires a rethinking of existing socio-geographical arrangements. This paper argues that the transition to 'post-fossil urbanization' is hampered by the lack of positive imaginations of alternative possible urban futures and post-fossil city life. It asks the question why it is so difficult to conceive of new possible urban worlds, and tries to answer it by using the established concept of 'imaginary' and introducing the concept of 'technique of futuring'. The salience of the imaginary of the modern city is used as an example. The paper points at the International Society for Organization (ISO) and 'living labs' as contemporary techniques of futuring, organizing urban futures. It then aims to recoup one's capacity to imagine alternative possible worlds and explores the role that academics can play in this endeavour.

KEYWORDS

imagination; imaginaries; techniques of futuring; post-fossil city; sustainable futures

HISTORY Received 9 March 2018; in revised form 23 July 2018

INTRODUCTION

'We tell ourselves stories in order to live,' Joan Didion famously wrote (Didion, 2006, p. 185). Language not only mirrors but also actively constitutes our various worlds (Fischer & Forester, 1993). This 'linguistic turn' has been spelled out and developed in academic fields ranging from philosophy (e.g., Austin, 1962; Rorty, 1992; Wittgenstein, 2009), via anthropology (e.g., Ingold, 2016; Reck, 1983), to business, public policy, and politics and conflict resolution (e.g., Cobb, 2013; Hajer, 1995; Salmon, 2017). But story telling does not depend on language alone. Linguistic imaginations are often complemented with visual imagination (Machin, 2014) and numbers (Porter, 1996). In interaction, different symbolic means, such as narratives, numbers and visuals, perform 'world making' (Goodman, 1978; Hajer, 2009, 2017) and create our perceptions of reality and possibility, increasingly in a 'transmedia' style (Hassler-Forest, 2016). This raises two interrelated questions for academic research. The recognition that the analysis of language is insufficient to understand how worlds are made first opens up the question how – and where – we can study the interaction between the various means for world-making. Second,

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if telling a story – by whichever means – is to act upon the world, we should ask ourselves which stories we currently tell, and whether or not these stories are helpful. Do our own stories – and the way in which we tell them – contribute to making this world a better place? The following explores this further, with the particular goal of thinking of alternatives to the current fossil fuels-based models of urban life. By so doing, we contribute to creating a new perspective of 'desirable futures' in light of the current climate crisis (Bai et al., 2016). In this we are particularly struck by a single question: why it is so difficult to think of new possible worlds to imagine a post-fossil future?

When it comes to the transition to a post-fossil future, the city is a crucial site of change. The city has captured the imagination throughout history, from the Tower of Babel to Ebenezer Howard's garden city, Frank Lloyd Wright's Broadacre City to the modernist imaginaries of a 'functionalist' city, with high-rise buildings in its core, a regional 'field' of suburban housing and, when it comes to transport, a focus on the automobile (cf. Hall, 2014). The following will use one remarkably salient imaginary: that of the modern regional city, conceived in the 1920s and 1930s, as an example to spell out how it captured the imagination. As we will argue, this is only partly due to the intellectual genius of the movement for modern architecture, led by Le Corbusier and others. It was aligned with an industrial coalition that pushed the cultural appreciation for a privately owned automobile and suburban life and selling privately developed, mass-produced suburban enclaves and, increasingly, urban gated communities. The salience is such that governments still find themselves locked in the 'large socio-technological system' that emerged over time (Summerton, 1994). Politicians in the mean time feel the electoral pressure from the suburbs to keep traffic flowing and to leave the fiscal privileges of suburban homeownership untouched. The pattern of urbanization has, in that sense, become a political force in itself. Hence, in order to keep these urban fields going, governments extend the existing infrastructural system, predominantly focusing on infrastructure such motorways, flyovers and the application of 'smart' technology to improve the overall 'flow' of traffic.

The International Resource Panel (IRP) recently showed that this model of urbanization is unsustainable (cf. Swilling et al., 2018). The automobile city is a major cause of CO_2 emissions because of its spacious layout. Moreover, the automobile city is a drain on natural resources, from sand to water, from steel to cement. If we follow United Nations (UN) statistics, the trend towards urbanization will continue: up to 66% of the world's population will be expected to live in cities by 2050 (UN, 2014). This implies a 40% increase of urban inhabitants. Continuing to build cities according to the principles that emerged over the 20th century, with a dominant role for automobility and widely dispersed and scattered 'enclavism', is evidently unsustainable in terms of the resources needed to build cities and to operate them, as well as in terms of the environmental externalities, most notably CO_2 emissions that come with this style of building cities.

The problem is not awareness. Many policy-makers realize that going on like this cannot work. Yet, breaking out of the pattern, transitioning to a new, more sustainable mode of urbanization, is proving very difficult indeed. Although this can be seen as a matter of a politics of interest at a superficial level, the root cause might be that it is very difficult to imagine alternative, post-fossil futures for urban life in the first place.

Imagination is a crucial political sphere. Looking back, imaginaries were central to urban change in the past. Twentieth-century urbanization was profoundly influenced by the imaginary of a 'functionalist' city, as promoted by modern architects such as Le Corbusier. While we may now associate the modern city with lots of problems, it was a positive imagination at the time, focused on creating a more healthy urban environment than the slum-based dwellings of the 19th century, using the latest technologies, such as concrete, steel and, of course, the newly emerged combustion-engined vehicle. While the modern imaginary dates back to the 1920s, we still construct cities following key principles of spatial lay out and sociocultural preference that emerged in the first half of the 20th century.

We are struck by the fact that we see only a few sketches of alternative urban futures. We explore why this is the case, elaborating on various sociotechnical imaginaries and the past and analyze them in terms of 'techniques of futuring' (ToF). In order to find out how one may come to envisage alternative models of urban development, we describe transdisciplinary experiments from different contexts, which have successfully suggested alternative imaginations of the future. We briefly consider the networks and ways of thinking necessary for such imaginations. In conclusion, we reflect on the role of academic research with regard to the furthering post-fossil futures.

IMAGINING THROUGH DISCOURSE

Imagination is both 'the faculty or action of forming new ideas, or images, or concepts of external objects not present to the senses' as well as 'the ability of the mind to be creative or resourceful' (*New Oxford American Dictionary*). The need for resourcefulness can hardly be denied when thinking about what is necessary to make a transition to a more sustainable world. Yet, this issue of sustainability immediately also brings out the difficulty of imagining both problem and solution. A global phenomenon of climate change is itself never fully 'present to the senses', and very difficult to visualize (Morton, 2013). We use a discourse analytical approach (Hajer, 1995; Hajer & Versteeg, 2005) to analyze these effects. This brings out how we operate with metaphorical or metonymical figures to obtain an understanding about the issue that resists understanding in the full. This can either be a 'graph' presented by a climate modeller suggesting what may be the result of continued CO_2 emissions, in which the graph is the statistical representation of the environmental problem 'out there', or it can be approached through images, e.g., of a singular polar bear on a floating, supposedly melting, ice sheet (Doyle, 2007; Hulme, 2009, cf. Leonardo DiCaprio's acclaimed documentary *Before the Flood*). Images such as these are very effective in suggesting a 'moral wrong' of mankind doing harm to vulnerable and dependent species. Yet, they also present climate change as a phenomenon occurring far away, and thus fail to connect to its causes in our own everyday behaviour.

Popular mediagenic imaginations do not connect with the repercussions that acting upon climate change would have to our everyday life. If this connection is made, this is typically done in one of four ways. First, there is the *discourse of limits*, which was popularized by the 1972 Club of Rome publication *The Limits to Growth* (Meadows, Meadows, Randers, & Behrens, 1972). This neo Malthusian discourse emphasizes the finiteness of the Earth's resources, questioning whether the available natural resources are capable of sustaining existing human behavioural patterns (Torgerson, 1995). The dominant technique is 'extrapolation', which, when applied to the urban field, resonates very well with policy-makers. In 2016, an estimated 54.5% of the global population lived in urban settlements. This is expected to increase to 66% by 2050. Close to 90% of this increase will take place in Asia or Africa, with China, India and Nigeria accounting for 37% (United Nations, 2014, 2016). Statistical extrapolations such as these provide a trope to grasp the situation cognitively, and the numbers powerfully suggest that the default is leading us into a highly problematic future, mostly communicated in crossing lines in a diagramme. The suggestion of the discourse of limits, as Torgerson (1995, p. 4) put this: the future might not work after all. Worrisome as this is, the discourse of limits with its sense of impending catastrophe is effective in raising concern amongst policy-makers but hardly results in a narrative that inspires politicians to act, let alone the public at large.

A second discourse focuses on *problematizing the present*. 'Der Himmel über dem Ruhrgebiet muß wieder blau werden,' argued Willy Brandt in 1961 as part of his election programme. ('The sky above the Ruhrgebiet should turn blue again' – the Ruhrgebiet being the industrial heart of Germany.) His remark signified the start of German environmental politics, and is now seen as one of the first moments at which an environmental problem – air pollution – was conceptualized as a government responsibility (Umweltbundesamt, 2011). Against all odds, air pollution has

made a comeback. The sheer growth in numbers of cars and electricity usage cancels out all technological advancements in reducing emissions. Visuals of streets obscured by smog clearly show the extent to which contemporary cities are plagued by air pollution, a phenomenon that was thought to have been resolved decades ago. This holds true not only for urban areas in the Global South, such as Delhi, Mexico City or Beijing, but also for northern cities such as Paris and London. Interestingly, the Chinese premier Li Keqiang made exactly the same promise to 'make the sky blue again' at the National People's Congress in May 2017 (McDonald & Watt, 2017).

A third discourse is about *the experience of alternatives.* Take for instance the Mayor of Paris, Anne Hildalgo, who suggested the future of her city was not to be determined anymore by extending the space for the cars. She not only problematized the present but also actively provided alternatives for using urban space, transforming a motorway at the borders of the Seine into walkways, initiating 'carfree Sundays' and with place-making such as in the creation of 'Paris Plage', 'urban beaches' at several locations. This is a potent way to connect 'far-from-my-bed'-type issues such as climate change to measures that provide alternatives. It was pioneered by New York transport commissioner Janet Sadik Kahn who pedestrianized Times Square and part of Broadway (Sadik Kahn & Solomonow, 2016). Moreover, it suggests a type of intervention that is not aiming at cognitive persuasion but is about experiencing the possibility of alternatives.

The fourth discourse is a *cultural politics of dissensus* (cf. Rancière, 2010). An illustration is the example of a performance art intervention called 'Human Cost'. Human Cost was a so-called 'guerrilla performance', organized in April 2011, by the artists collective 'Liberate Tate' as part of a protest against the sponsorship of Tate Britain by oil company BP.[1] On the anniversary of the BP oil disaster in the Gulf of Mexico, a group of artists undressed in the central room of the museum; others started to pour 'oil' (in fact, a mixture of sunflower oil and charcoal) over their naked bodies. It resulted in an iconic image: 'oil victims' on the marble floor of a prestigious museum, a growing oil stain in the otherwise super clean museum environment. The Tate, with its neoclassicist architecture designed to convey a sense of sacred and quasi-religious adorement of the cultural artefacts selected by learned authorities, was confronted with its own inconsistencies. In a museum environment, with its emphasis on cleanliness and solemn and silent ceremonialism, in which people are typically asked to 'please not touch the works of art' and 'please keep your voices down', oil was pored over almost naked human beings. An intervention seemingly out of place, pointing out the existing symbolical order but, more importantly, bringing out the 'impropriety' of the way in which 'dirty oil' had penetrated the cultural domain with its emphasis on purity and aesthetics.

All four discourses described above are approximations of the environmental 'problematique', the complexity of which resists one-to-one representation (Hajer, 1995). Seeing the discourses as approximations implies that they all come with their own particular bias, highlighting certain aspects of the problem over others. Similarly, such discourses each hint at their own set of solutions and often also differ in who are seen as the agents of change.

A discourse-analytical approach focuses on the understanding the *particular* effect of such approximations. The discourse of limits argues 'this cannot go on' appealing to cognitive capacities ('if we do not act … '), but nearly always uses rhetoric to reinforce its point (be it through a steep graph or through strong wording; cf. Hajer, 2009). It is characteristically addressing key decision-makers. The second discourse of problematizing the present derives its persuasive effect from pointing at an existing and recognizable 'bad'. Here the political appeal comes from the fact that it is characteristically the political leadership itself that speaks. It utters its wish to end the problematic present, yet without necessarily spelling out how. The third discourse of 'experiental futuring' (Candy & Dunagan, 2017) offers options of future living that suggest that the transition may be for the better. Here it is often facilitated by political leadership but addressing ordinary citizens in an attempt to create popular appeal to a preferred political response to the environmental problematique. Finally, and fourthly, the cultural politics of dissensus derives its effect

from the way it reveals the incongruences of current cultural practice. It suggests oil companies bring dirt into respected spaces. It also suggests hypocrisy on part of those who accept support from 'big oil' but claim to be environmentalists. Typically it is universities, art institutions and pension funds that are being addressed. It seeks to bring out the need for a re-valuation, thus raising the crucial issue of value change, so often overlooked in more technocratic approaches to environmental politics (cf. Hajer, 1996; Ghosh, 2016; Wilson, Carlson, & Szeman, 2017). From this set of four the experiental futuring seems best positioned to contribute to our ability to collectively imagine alternative futures. In the following we want to explore its potential further using the concept of 'techniques of futuring' (cf. Hajer & Pelzer, 2018).

THE CONCEPT OF 'TECHNIQUES OF FUTURING'

The topic of the future is slippery terrain for social science. How can we know something about what has not yet happened? Social scientists are used to emphasizing the degree to which the past explains what we do in the present. Perhaps because it is so difficult to conceptualize how the future influences the present, we may even overweigh the importance of the past. The notion of 'path dependency' refers to the fact that the costs of switching to a previously plausible alternative increase over time (Pierson, 2000), or, more broadly, the extent to which present actions are limited by existing institutional contexts, locked in routines and decisions made in the past. Recent scholarship, however, has emphasized that it is at least as important how (our conceptualization of) the future predicts what we do in the present (Beckert, 2016). It is then not the future per se that we should empirically focus on, but the ways in which our expectations of the future feature in present-day thought and decision-making (cf. also Borup, Brown, Konrad, & Van Lente, 2006).

Predictions and imaginations of the future influence the way in which we act here and now. That is true in the abstract, and it holds true in concrete decision-making processes. As Beckert (2016) shows, any capitalist economy depends on confidence; the economic system works only as long as we trust its future benefits. But also in everyday life we use particular 'techniques' to deal with the uncertainties. The investment logic of both individual and institutional actors is guided by what Beckert calls their 'fictional expectations' of the future.

If we could unlock this dynamic of fictional expectations – if we would know how people come to hold particular fictional expectations, perhaps it is possible to create promising imaginaries of a post-fossil future. This type of social science of futuring would be about how to narrate a viable alternative rather than limiting ourselves to a critique of the present, in the hope that we could contribute to the transition to this future.

A suggestion to examine seriously how fictions play a role in the way we deal with uncertainties related to the future is easily misunderstood. Should we not stick to the facts in a world of bubbles and alternative truths? While the response is understandable, it would still be a grave mistake to respond to the new story lines of 'alternative facts' and 'fake news' by retracting to a world of 'solid facts'. Science and technology studies scholarship has shown how facts are products of particular contextual conditions; that all findings require a certain way to perform them as effectively binding statements of fact (Hilgartner, 2000; Shaping & Schaffer, 1985) and how technological development is influenced by 'sociotechnical imaginaries', defined as 'collectively held and performed visions of desirable futures' (Jasanoff, 2015, p. 19). In all cases, the social consequences of facts require a contextual understanding. Thinking in terms of imaginaries cuts, as Simin Davoudi recently put it, 'through the Enlightenment's dichotomous perspective on real versus illusionary, reasons versus emotions, facts versus fictions, and politics versus arts' (Davoudi, 2018, p. 105).

Instead the topics for research should be, first, to examine carefully and empirically how facts and fictions interrelate – and history has shown that they do interrelate (e.g., Bleecker, 2009) – and, second, how policies are built upon these imagined futures. We suggest approaching this endeavour using the concept of techniques of futuring (ToF), which has been defined as 'practices

bringing together actors around one or more imagined futures and through which actors come to share particular orientations for action' (Hajer & Pelzer, 2018, p. 225). Importantly, ToFs provide a lens through which to understand empirically the emergence of (discourse) coalitions. We can look for the ways in which shared imaginaries emerge, or, in our language, how we perform the future.

The idea of 'performing the future' relates the particular ways in which we imagine our future to a concrete set of practices through which this 'futuring' happens. An example from the past helps to illustrate the dynamics of performing the future. The imaginary of the modern city is often reproduced via a narrative centring of the architect Le Corbusier. He is then seen as the personification of the modernist urban imaginary. Working with a moral quest, he was working to rid the city of its slums, seeing the new technology of the car with a combustion engine and combining it with new building techniques such as steel frames and concrete. This led him to imagine an alternative city, with broad streets for traffic, and repetitive high-rise. Reading his *Urbanisme* (1925) (translated as *The City of To-morrow and its Planning*) suggests he really saw this as a positive step forward (Corbusier, 1987). The 'Plan Voisin' for Paris was to replace the district of Le Marais, introducing high-rise and motorways. With hindsight we see that the imaginary of modern architecture and design inspired the construction of a lot of the urban fabric that we now perceive as deeply problematic. But it would be wrong, of course, to attribute this legacy solely to Le Corbusier, his activities in the Congres Internationaux de la Architecture Moderne (CIAM) or via his written work. Rather than focusing on architects, let alone a single person, we would focus on the practices of futuring that helped to convey the image of a 'modern' city and make its claim to present the future stick.

Our analysis would highlight the particular role of the 'expo' in the interbellum. At the time 'world expos' were a prime ToF (Rydell, 1993). Indeed, before Le Corbusier published *Urbanisme*, his Plan Voisin had been presented in the Pavilion of the Esprit Nouveau at the Exhibition of Decorative Art, Paris, 1925. Industrialists were seriously concerned about the risks of social unrest and over a string of expos they tried to spread new ideas for an 'age of progress'. This culminates in the New York World's Fair of 1939 and, more in particular, its most successful pavilion, the 'Futurama', initiated by General Motors (GM).

GM had asked Norman Bel Geddes, a leading designer in America at the time, to present his vision in a pavilion devoted to an imaginary of the world of 1960. By then Bel Geddes had already designed 'the City of Tomorrow' for Shell in 1937. This campaign intended to promote the use of gasoline by providing an imagination of the beautiful world that the automobile would bring; a world 'without a stop'. Futurama was a further development of this idea. The GM pavilion allowed more than 20 million people a preview of the world of the 1960s in a blend of fact and fiction. Using staging techniques, it was suggestive that this was not about choice out of possible worlds, it was a prediction of things to come. The world of 1960 was experienced as an increasingly realistic option. The experiental futuring started with a circulating miniature world at a giant scale of 35,000 square feet, encompassing both the city and the countryside. The public watched from moving chairs that circulated around the model. Here a new world of possibilities was shown, with the automobile as its (futuristic) organizing mechanism. Motorways, flyovers, petrol stations and suburbs were here presented as a coherent idea for the future. Then, as people walked through the pavilion, their surroundings started to grow bigger and bigger, up to the point where they could experience the future on a scale of 1:1. At the exit, all visitors were handed a button: 'I have seen the future.'

The GM pavilion was a technique of futuring par excellence. Futures were presented in terms of a very concrete experience. The footage that can still be found on YouTube testifies to this. It played cleverly on the public's movements and desires in order to suggest that the world as presented by GM not only was a likely future but also was the future to want. This play on the aspirations of the general public also found its commercial expressions. Post-war advertising campaigns

explicitly cast the car as an object of desire promoting it as a cornerstone of the new 'suburban' lifestyle. 'Here we are, envying,' proclaims a jealous young couple in a 1937 Packard ad, looking at their neighbour's new car against the background of a suburban environment. 'Here we are, being envied,' says the same couple, once they have bought their own Packard (Edelstein, 2014). Car ownership became connected to social aspirations and social mobility, to success and ambition, and a new spatial order, of work, residential areas and recreation was now projected on a regional scale. And the investment programme for the government was clear: it needed to build superhighways to allow everybody access to this new future.

The modern city is, of course, not the only influential spatial imaginary of the 20th century. Ebenezer Howard's garden city and Frank Lloyd Wright's Broadacre City clearly left their mark as well. In all three cases, the initial planner's ideas were repackaged, twisted and turned, often to fit better the commercial interests of project developers. Yet, without a doubt, the imaginaries were performative, creating ideas about how to go on (cf. Davoudi, 2018). In order to recoup the value of spatial imaginaries, we need to understand better how they exert their influence (cf. Jessop, 2010).

IMAGINATION AS POLITICS

The capture of the collective imagination is undoubtedly one of the most fundamental ways in which power is exercised. It is what Steven Lukes referred to as the third dimension of power influencing people's wishes and thoughts (Lukes, 1974). The problem with this dimension of power, as Lukes pointed out already, is that it far less concrete than the way in which power is exercised in, for example, decision-making. Yet, to influence what people perceive as likely or plausible is determining the thought space of decision-making. Indeed, often the more observed 'first dimension' of power is played within the confines of some fictional expectation. This is subtle expressed in what Raymond Williams referred to as 'structures of feeling' (Williams, 1977). With the concept of ToFs, we aim to make this into an empirically observable domain of study.

World fairs are very concrete examples of ToFs, the power of which we can see with the advantage of hindsight. In the context of fairs we characteristically see 'pavilions', such as The Futurama. In such a secluded context, a new fictional expectation about the future is presented. It disseminated an optional future reality, with fossil fuel usage at its heart. The effectiveness of The Futurama was that it tapped into the aspirations of its visitors. Some 27 million Americans came to see the show (Rydell, 1993, p. 135).

We now face the task to think about the alternative urban futures that allow us to break away from the problems the imaginary of the modern city, partly inadvertently created (Steffen, Broadgate, Deutsch, Gaffney, & Ludwig, 2015). World expos clearly no longer have the same appeal in the West. The expo of 2015 in Milan was deeply controversial and lacked imagination. Interestingly, the model still seems to fit countries aiming for a modernist, centrally led, make over, such as China (Shanghai Expo 2010), Kazachstan (Astana Expo 2017) or the Gulf States (Dubai 2020). One attempt to use this particular technique in current urban politics is the Chrystal, the pavilion by Siemens in London's Docklands. The Chrystal is entirely devoted to the smart city. Built at a cost of £70 million, it uses the high-tech equivalent of expo techniques to convey a particular view of a sustainable future, blurring the corporate wish with the foretelling. A second domain of ToFs is advertisement. Of course, there is a true bombardment of the metonymical idea of 'buy a good car, have a good life', but nowadays that model too seems more effective in rising economies such as China than in the West.

To understand futuring, we need to broaden the scope of our search. We see a scale with two opposites. On the one hand, Keller Easterling who points at the way in which our worlds are now shaped via a set of organizational practices that are nearly entirely outside the democratic public debate but influence our future world in a profound way nevertheless. The International Society

for Organization (ISO), a 'private non-governmental organization', decides on the standards that 'shape nearly every product and process encountered in urban space' (Easterling, 2016, p. 171). The standard finding and standardization processes conducted under ISO rules strongly influences the possibility space of the city and hence our future experience of the city, yet this process takes place behind closed doors, outside of the public domain. On the other side of the spectrum, we find the Living Labs: urban research and innovation practices, typically small scale, in which citizens or product users themselves play a crucial role together with both private and public stakeholders (cf. e.g., Evans & Karvonen, 2011). Both the ISO and Living Labs are techniques of futuring in their own right. The question is how they contribute to finding alternatives for our current unsustainable model of urban life.

THE ROLE OF THE ACADEMY: TOWARDS A TRANSDISCIPLINARY PRACTICE

Modellers suggest that we have a maximum of a few decades to reduce CO_2 emissions to zero, partly depending on assumptions on CO_2 removal from the atmosphere in the long run (van Vuuren, Boot, Ros, Hof, & den Elzen, 2017). Some add that the next three to five years are crucial: if we do not buck the trend in CO_2 emissions, we are unlikely to limit global warming to a maximum of 2.0 or 1.5°C (Figueres et al., 2017). This raises a fundamental question for the academy: does our current practice of research maximize our capacity to help achieve this deep decarbonization? In the context of this paper we observe that academics currently co-produce a highly restrictive imaginary of future cities. Most notable is the strong research orientation on the topic of 'smart cities', often simply because of the calls that prescribe this as topic, such as in the 'Smart cities and communities' theme of the EU Horizon 2020 programme. The typical vision of the smart city is arguably a contemporary equivalent of the 1939 Futurama: an attractive vision of the city in which hardly any attention is paid to the way in which urban studies has discussed the city and the dynamics of urban life for decades (cf. Hajer & Dassen, 2014).

Of course, critical social geographers have since long contested this implicit promise of smart city imaginaries (e.g., Viitanen & Kingston, 2014), but these protests have not necessarily been voiced in the most effective way or to the most relevant publics. There is an uneven battle for the minds in which academics focus their best attention on their own internal communication via peer-reviewed outlets, while business and industry dominate the public debate with teleological predictions of a coming future of smart cities and self-driving vehicles. Yet, imagining futures is not innocent. Mediatization has become so pervasive that it leaves an imprint about how we conceive of our realities: we are unable to think beyond the circulating images. Guy DeBord famously argued, writing in the 1960s, that we live in the society of the spectacle (DeBord, 1994). The images of the smart city convey a particular perspective on where the future will lead us. Indeed, we can see how policy-makers respond to the challenge suggesting they want to take advantage by offering their city as a 'living lab' for smart city experiments. Consequently, policy-making becomes a 'fill out' exercise to 'prepare' for the smart city with policies developed on the basis of these images. In fact, technologies are much more open and the public debate should be about what we want to achieve with smart tech, or with other means (cf. Hajer & Dassen, 2014; Townsend, 2013).

We will now try to combine the insights in the power of previous urban imaginaries with the challenge of imagining post-fossil cities. Academics are traditionally comfortable with, and good at, establishing the facts. However, the alarming facts regarding the future of the Earth have by now been well established, most prominently in the series of Intergovernmental Panel on Climate Change (IPCC) reports. Yet, can academic research also help to create alternative perspectives?

Here, the broader adoption of a transdisciplinary approach is required (Lang et al., 2012). Working with stakeholders is nothing new for most academics. Working with non-governmental

organizations (NGOs) and (quasi)-public agencies such as housing corporations, electricity utility companies, or municipalities or ministries is everyday practice in many of the social sciences.

The transdisciplinary methodological literature argues that we need to engage societal actors in the early phases of research, the idea being that this would then allow for a new scientific enquiry into issues that the stakeholders needed most, thus also improving on the societal value of the academic effort. The type of transdisciplinary research needed is one in which we all, as academics, give serious thought to the legitimation of our research orientation and knowledge production – not as an afterthought or in a 'box' of a research application, but as part of the process of the research endeavour.

In the remainder of this argument, we discuss three examples in which academic research helped to co-construct networks, and successfully connected various kinds of stakeholders and their specific knowledge: The Post-Fossil City Contest (PFCC) by the Urban Futures Studio, the experiment with the 'iShack' at Enkanini, Stellenbosch, South Africa, and 2050 – An Energetic Odyssey, an imaginary of the North Sea as a renewable energy hub.

The first example is the PFCC. Having reached the conclusion that we, as academics, were not very successful in trying to think of future imaginaries on our own, the Urban Futures Studio organized a call inviting artists to do so (for more information, see postfossil.city). We received 250 entries from over the world: from Australia to Zimbabwe and the United States. We selected 10 of them, which we then academically curated towards an exhibition organized in Utrecht city hall, the Netherlands. Throughout the process, we were in close contact with national and municipal policy-makers. Indeed, the winning submission – chosen by a jury of both academics and policy-makers, and awarded a €10,000 prize – had designed a boundary object designed to travel between cities and thus ritually connect local thought processes regarding the shape of a post-fossil city. A number of national media paid attention to the initiative (Pelzer & Versteeg, 2018) and the exhibition has travelled to The Hague and Ghent (Belgium) thereafter.

The second example of a post-fossil imaginary is an experiment from the Sustainability Institute of the University of Stellenbosch. This experiment focused on the informal settlement Enkanini, close to Cape Town. Rather than starting from the question which change would be necessary for a transition to a post-fossil world, researchers asked Enkanini inhabitants what could be done to improve their life in the settlement. The answer was that they wanted better provisions. After creating a new sanitary infrastructure the next issue was light, primarily to provide more security. The team led by university professor Mark Swilling then set out to develop a system of solar panels with a smart meter, a charger and three lights. What makes this example so revealing is that it is also based on smart technology but now producing a very different value set. Enkanini is the smart city as well. Yet, this time the intervention was the result of deliberations with the inhabitants. Moreover, by focusing on the informal settlements, it prioritized the deprived, a group which is typically absent in regular smart city futuring. The entrepreneurialism of the inhabitants was a driving force in the experiment, the logic of which was not so different from the Packard advertisement mentioned above. Inhabitants saw the solar panels on the shack next door, then wanted one as well and immediately saved money because of it. The research team from the University of Stellenbosch did and does regular empirical work and publishes about it (van Breda & Swilling, 2018), but it also initiated, organized, monitored and improved the intervention.[2] Here, academic researchers took on an interesting new role, not only in initiating the intervention but also in their commitment to stabilizing it. Thus, they helped to create an imaginary that may well work in other informal settlements in Africa, very much in the spirit of the quest for 'just transitions' that the researchers had committed themselves to beforehand (cf. Swilling & Annecke, 2012).

A third example is again derived from my own practice, and started from the question: what would be necessary for the Netherlands to reach the 2°C target? A rigorous back-cast study (Haller, Deng, & van Breevoort, 2013) had shown that local initiatives – insulating our homes,

changing our diets – would come nowhere near the 2°C target if societal energy demands were still to be met. This imaginary – initially called 'Big is Beautiful', a pun to the environmentalist classic *Small is Beautiful* (Schumacher, 1973), but later renamed 2050 – An Energetic Odyssey – is in some respects very different from the previous example. Its starting point was a policy goal rather than an existing situation, and it did not focus on the local but proposed a far-reaching offshore wind strategy. 2050 – An Energetic Odyssey was a visualization of this strategy: what would it look like if we installed 25,000 ten-megawatt windmills on the North Sea? Crucially, however, this visualization – to the realization of which various societal actors had financially contributed – was not just shown in a report. Instead, it was projected onto the floor of the Shell Research Laboratory, with the Director Generals for Energy of 28 European Union member states standing around it. Workshops were organized around it, with stakeholders ranging from radical environmental groups to chief executive officers and ministers. Visualized like this, the findings of the study had a radically different effect than if they had been presented as an executive summary; they produced a joint experience, an imaginary that actors could literally step into (Hajer & Pelzer, 2018).

It should be clear from these three very different examples that there is not a single good intervention. A successful imaginary will always have to be specific to its target audience and its intended goals, and thus depends upon a particular dramaturgy and a carefully employed discourse. Yet, they are examples of a new transdisciplinary practice that can help conceive and actively shape post-fossil city futures.

CONCLUSIONS

The use of fossil fuels is deeply embedded in our societal values and everyday routines. As a consequence, we lack coherent imaginaries of alternative post-fossil futures. This lack of imagination hinders our capacity for change. Currently, the available imaginaries are almost all corporate and focused on technological innovation. In these glossy visualizations the urban fabric and often conflicting nature of everyday city life remain hidden from view. Owing to programmes of research funding, such as Horizon 2020, academic language typically reproduces these corporate perspectives on the 'smart city' instead of helping to stimulate a more open debate. Whereas critical sustainability scientists are skilled in observing and pointing out the incompleteness of these corporate perspectives, they traditionally limit themselves to a reactive role.

The university has unique possibilities to help overcome the 'crisis of the imagination' from which societies currently suffer. As 'soft' and relatively apolitical spaces, universities can connect knowledge with societal actors and thus contribute to societal change. However, this requires that academic researchers take on a different role than merely presenting the facts or criticizing developments in the world 'out there'.

We argue that rather than reacting over or implicitly reinforcing already existing imaginaries, critical sustainability science should actively try to develop new imaginaries in cooperation with societal stakeholders. Social scientists possess insights into the way in which language and imaginaries work, but this in itself is not sufficient for a successful intervention. For that, active participation from stakeholders is necessary, as illustrated by the examples shown in this paper. This process, in which networks and interventions are built simultaneously, resists narrative closure. Academic research should simultaneously try to understand the various developing imaginaries and help to create and disseminate new ones. It requires one to think beyond isolated local experiments and to consider actively the different levels and platforms through which particular interventions can become successful, and how various initiatives can be connected with one another, and with the relevant stakeholders involved. In addition to the golden standard of peer-reviewed articles, there are many other ways to connect research findings to the relevant publics, as the various examples discussed in this paper have shown. Building post-fossil cities requires imaginaries

that take into account not merely a lack of fossil fuels but also the role of energy in our society and all the aspects of human life that depend on it.

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NOTES

1. Cf. http://www.liberatetate.org.uk/performances/human-cost-april-2011/
2. See Vimeo 164419981.

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