Lektioita

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Imagining energy transitions: Carbon neutrality in Finland

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Please take one full minute with me to listen to some soon extinct sounds. In just a few years, these sounds will no longer be heard on a daily basis in central Helsinki. The machines producing these sounds will soon be dismantled and the site where these sounds have been produced will be fully transformed.

What you have heard is a recording by media and sound artist Mikko H. Haapoja from the Hanasaari B power plant, a combined heat and power plan, fuelled by coal and wood pellets, located amidst urban Helsinki (Haapoja 2020). The power plant was constructed in 1974 and over the course of four decades, the plant's smokestacks and the mountains of coal sitting on the waterfront became a familiar sight to residents of the city.

In 2015, the city council of Helsinki was at a crossroads. In order to meet the city's climate objectives and emissions reductions obligations, something had to be done to the Hanasaari power plant. The debate centred around two options. Should the city invest in modifications to the existing plant and attempt to reduce emissions there? Or should a new large-scale facility, able to burn other fuels in addition to coal, be built further away from the centre of the city?

The city council opted for neither of these options. Instead of building a new large-scale power plant or modifying the existing one, the city council decided to invest in several decentralized projects and increase energy efficiency. At the time, this decision was discussed and justified as one that is flexible, proceeds in stages and takes into consideration current and future developments in both markets and technologies.

Such discussions on the future of energy and how to respond to climate change were ongoing not only in the city council of Helsinki, but across various sites globally as I started my PhD in late 2015. There was a constant publication of reports, press releases and news articles as well as demonstrations by various actors calling and stating that *something must be done*. We need to change the ways in which we are producing and consuming energy.

This imperative to change was voiced by many: heads of state, grassroots activists, global energy giants, researchers as well as communities living near energy facilities. At the same

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time, we were confronted with research from organizations such as the Intergovernmental Panel on Climate Change, or the IPCC, telling us that *too little, too slowly* is happening in response to climate change (IPCC 2018).

Far from disappearing or alleviating, such demands have only increased, become louder and voiced by novel actors during these last five years. This constant interplay between change and stability – or the persistent and shared calls for change amidst a setting that was not changing in a sufficient manner or at a sufficient pace – this interplay was what sparked my interest in examining energy policy and how it is debated.

An academic field that deals with such questions is the field of sustainability transitions research and in particular energy transitions research. Sustainability transitions research focuses on how radical changes can occur in the way societal functions – or the ways in which we meet certain societal needs – are fulfilled (Köhler *et al.* 2019). The field thus takes change as its core focus and seeks to address how change occurs, what drives changes, and what consequences arise from distinct changes.

At the same time, research on sustainability transitions also noted what I have just referred to: that sufficient changes in the ways in which we meet our energy needs are not happening. Concepts were quickly developed to understand the lack of change, such as the notion of locking in to specific technological and societal pathways that then become difficult to break free from (Unruh 2002). But even acknowledging lock-in was not sufficient. Not only were we locked-in to unsustainable practices, but research uncovered how certain societal actors actively resisted change and sought to maintain current structures (e.g. Geels 2014).

Parts of the sustainability transitions research field thus shifted from analysing how energy policies, practices and infrastructures change to analysing how they remain stable or event resistant to change. This was quickly coupled with conceptual developments that highlighted how actors and sectors resistant to change could be challenged, disrupted or destabilized, thus focusing on actively attempting to undermine these sectors (Kivimaa and Kern 2016; Johnstone *et al.* 2020). In sum, the research field of sustainability transitions has been significant in both amplifying the perceived need to change the ways we produce and consume energy as well as understanding the complexities that lie behind this process.

I, however, found myself in an ambiguous position. I was interested in understanding the processes of change and stability that lie behind energy transitions. But, as I started looking into the question, I realized that I was even more interested in how we, collectively and societally, make sense of the never-ending calls to change. How do we seek to understand and debate this ubiquitously voiced need to change and what does involvement in such debates do to us?

To begin exploring this, I turned to various people and fora, where the need to change or maintain current energy systems was debated. This had me looking at specific sites where energy is discussed by those wielding power in decision-making, such as the national parliament of Finland and the city council of Helsinki (Karhunmaa 2019). I also interviewed those actors who attempt to influence decision-makers and convey the views of a particular constituency, such as environmental organizations and industry representatives (Kainiemi, Karhunmaa & Eloneva 2020).

But I was not only interested in these sites where power and politics are so clearly upfront. I was also interested in other areas where energy transitions are made sense of, such as debates in newspapers and the media (Antal & Karhunmaa 2018) as well as amongst academics, particularly those academics who are keen to play a public role in discussing energy policy (Karhunmaa 2020).

I began to analyse the materials by focusing on the type of language and discourse that is used to make sense of energy transitions (Isoaho a& Karhunmaa 2019). I analysed how certain issues are framed and problematized and consequently, how these framings and problematizations enable certain forms of acting and knowing while excluding others.

My aim in doing so was to focus on how knowledge and objects of intervention are constructed, understanding that such processes always involve choices and simplifications, which are by no means neutral.

What I came to realize is that the imperative to do something to our energy systems was and continues to be fuelled by images of the future. At times, these are images of a climate-wrecked future, where parts of the world become uninhabitable due to climate change – as depicted in the title of the widely read New York magazine article "The Uninhabitable Earth" by David Wallace-Wells (Wallace-Wells 2017). At other times, we are encouraged by images of a bright future, where wind mills churn renewable energy, cars are electrified or local communities produce their own energy in micro-grids.

No matter what the visions of the future are and whether they are ominous or hopeful, science and technology played a crucial role in both depicting those futures as well as being called upon to attain them. This aspect – or the central role of science and technology – is captured in the analytical concept of sociotechnical imaginaries, which forms one of the theoretical anchoring points of this thesis. The notion of sociotechnical imaginary originates from the field of science and technology studies, or STS, and has been developed by Sheila Jasanoff and Sang-Hyun Kim (Jasanoff & Kim 2009; 2013; 2015). Sociotechnical imaginaries refer to collectively held and publicly performed visions of the future that structure and legitimize current activities and action. A sociotechnical imaginary is a vision of a desirable future or a good life. By appealing to the idea and vision of a good future, the future is brought to the present as an element of policy and political negotiation.

In this thesis, I have been interested in how the necessity to transform energy systems is debated and contextualized in Finland. My central argument is that energy policy actors in Finland are committed to a shared imaginary of carbon neutrality, where Finland is seen as a prosperous welfare society that has addressed climate change by attaining a balance between greenhouse gas emissions and removals. Within the imaginary of carbon neutrality Finland is seen as a nation that is driven by technological knowhow and development as well as economic growth.

The imaginary is interpretatively flexible, or accommodates various views on carbon neutrality. That is, while my empirical research shows that energy policy actors share a commitment to carbon neutrality, my research likewise demonstrates that there is no shared consensus on what attaining carbon neutrality means and what type of practices it calls for.

I address this in the first article of the thesis, where I show that politicians at different scales of governance – the national parliament of Finland and the city council of Helsinki - all call for attaining carbon neutrality in the future (Karhunmaa 2019). Yet, they differ in their suggestions of what desirable policy for carbon neutrality is and how policy should interact with and set the scope for investments in order to attain carbon neutrality.

Likewise, in the second article of the thesis, I show how different energy policy actors all envision Finland as a carbon neutral society in the future (Kainiemi, Karhunmaa & Eloneva 2020). Yet, they carry out diverse forms of institutional work to pursue carbon neutrality and make slight distinctions by calling for zero emissions, emissions-free, low carbon and truly emissions-free, thus making at times implicit and at other times explicit inclusions and exclusions of specific energy sources, such as nuclear energy or bioenergy.

In the fourth article of this thesis, in turn, I show that an internationally recognized and widely known energy transition, the German Energiewende, or the shift away from nuclear energy and towards renewable energy and enhancing energy efficiency, is debated in Finland in terms of the Energiewende's impacts on Germany's carbon neutrality and not, for example, as a case of grassroots activism and how that has shaped energy policy (Antal & Karhunmaa, 2018).

The thesis thus demonstrates how the imaginary of carbon neutrality forms the foundation for national debates on energy policy in Finland, while maintaining space for

negotiating the appropriate policy measures and political pathways for attaining carbon neutrality. As a theoretical contribution, I want to highlight three areas for further debate in the research on sociotechnical imaginaries, which are the scale, heterogeneity and mobility of sociotechnical imaginaries.

First, the question of scale is paramount to understanding what is the collective behind a sociotechnical imaginary and how that collective is held together by the promise of a desirable future. While the issue of scale has been raised in previous literature, it has been discussed mainly as something that raises conflict and contestation (e.g. Smith & Tidwell 2016). That is, when collectives at different scales have diverging imaginaries, they will compete over whose imaginary is more significant or should become embedded into policy. This study makes a different contribution. By showing that actors are committed to the same imaginary, my research focuses on the debate and contestation that can occur within a sociotechnical imaginary. Rather than forming a source of conflict, the imaginary of carbon neutrality has created consensus and a shared foundation for political debate. Conflict, on the other hand, plays out in the proposed means to attain carbon neutrality. In this way, I argue that the imaginary of carbon neutrality sets the parameters for what is considered legitimate and right, and energy policy actors have to operate and voice their proposals within those parameters.

Second, the findings from the thesis suggest focusing on the question of the heterogeneity – or diversity – of sociotechnical imaginaries. I call for this in a landscape where there is already much research underway to uncover alternative imaginaries and visions of the future (e.g. Longhurst & Chilvers 2019). Complementing such studies, this thesis argues that we need to be attentive also to the diversity that can be accommodated within a sociotechnical imaginary, particularly in an interpretatively flexible one. Through examining the subtle differences between actors, we can try to make better analytical sense of what types of practices are becoming legitimized and materialized in specific policy pathways. This is particularly important in a political and discursive context, where all actors ascribe to the idea of wanting to act on climate change and wanting to transform societies towards carbon neutrality.

Third, then, this study calls for further analyses on how sociotechnical imaginaries are made mobile and embedded into different contexts. Through work on travelling imaginaries, we already know that imaginaries do not move from one context to another unchanged (Pfotenhauer & Jasanoff 2017). Instead, the movement of an imaginary always requires problematization, for example, regarding what is assumed to be mobile and what is being compared (Forsyth & Levidow 2015). I argue that as we have come to understand more about how imaginaries differ across political cultures and administrative contexts, we now need to focus on how do alternative imaginaries become embedded or fail to do so and what type of social, political and economic work happens during this process.

Research on sociotechnical imaginaries has shown that there always exist a possibility to imagine otherwise. But this is not sufficient. In addition to imagining otherwise, we need to think about how alternative imaginaries are made visible, by whom, and who sees them? If we want change in the world, we do not only need to imagine otherwise, but scrutinize and understand how that imagination becomes embedded and gains power in distinct political and administrative cultures.

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