

Attaining carbon neutrality in Finnish parliamentary and city council debates

ABSTRACT

This article examines how political actors at different scales present desirable governance options for reaching carbon neutrality in Finland. The analysis is based on documentary materials and speeches in the national parliament of Finland and the city council of Helsinki in the years 2011-2015. I show how in Finland carbon neutrality serves as a broad sociotechnical imaginary that unites political actors across scales. Due to its interpretative flexibility, this imaginary accommodates different pathways to attain it. While politicians in the national parliament call for a stable and predictable policy environment, politicians on the city council demand adaptive and flexible policy measures for reaching carbon neutrality. What is presented as “good policy” for carbon neutrality differs significantly across the two levels of governance. This demonstrates the importance of distinguishing between sociotechnical imaginaries and the proposed policy means to attain them.

Keywords: sociotechnical imaginaries; energy policy; parliamentary debates; cities; renewable energy

1. Introduction

Political debates often make reference to what policy should do and how policies can bring about desired futures. Political speech is infused with claims about good and anticipated futures, as well as proposals that allocate responsibilities to different actors and entities for achieving those suggested visions. The future of energy systems – identified as one of the “central policy challenges facing industrial countries” (Miller et al. 2013, p.135) – is particularly subject to visionary claims. These proposals are voiced amidst uncertainty related to developments in the field of energy, particularly with regards to recent increases in the production and consumption of renewable energy. While the field of renewable energy is developing rapidly, there remains uncertainty as to the specifics of these developments, and how regulation in different contexts will respond (Stokes 2013; Geels et al. 2016). In such circumstances, the claims articulated on the future of energy policy shape current activities through projections of what is good and desirable (Jasanoff & Kim 2015). Current decisions on energy policy and its governance are influenced by sociotechnical imaginaries, which structure the scope of what is considered feasible and possible (Jasanoff 2015). This article examines how politicians at two distinct levels of governance – a city council and a national parliament – discuss energy futures and present desirable policies for progressing towards sociotechnical imaginaries. As energy policy is a field oriented towards achieving broad societal goals, its governance will present plural, ambiguous, and sometimes contradictory aims (Betsill & Stevis 2016). Politicians have the task to weigh energy policy against other societal goals.

In the current context of uncertainty regarding future energy developments, it is relevant to analyze how the politically responsible actors at different scales of governance publicly address the making of energy futures. What type of visions are conjured to guide action? More precisely, what are presented as good policies for attaining desirable energy futures at different scales? I examine how politicians present and delineate their own scope of action when proposing governance options for energy policy. The comparative analysis looks at developments during 2011-2015 in Finland, a country where city climate action has coincided with increased public and political interest in energy policy (Haukkala 2017; Heiskanen et al. 2018). I argue that in Finland carbon neutrality serves as a broad imaginary that unites political actors across scales. Rather than competing over vastly distinct imaginaries, the differences are worked out *within* the imaginary of carbon neutrality through proposing different desirable ways of attaining it. Due to its interpretative flexibility, the imaginary of carbon neutrality allows for politicians at different levels of governance to present and propose divergent means for reaching it. While politicians in the national parliament present good policy as stable and predictable, city councilors call for policy measures that are adaptable to technological and societal changes.

In the next part of the article, I discuss the role of imaginaries in multilevel political debates on energy transitions. The third section outlines the research design, including background to the national and city contexts of energy policy in Finland. The fourth part presents the results of the empirical analysis, with the fifth part discussing the findings. In the conclusions, I present some implications for the governance of innovation at different scales.

2. Imaginaries and energy transitions in multilevel political debates

The literature on expectations, futures, imaginaries, and technology is a growing field that covers several disciplines, including science and technology studies (STS), sociology, and futures studies. In this article, I focus specifically on the STS concept of sociotechnical imaginaries (Jasanoff & Kim 2015), while also drawing on the literature of the sociology of expectations (Konrad 2006). I use the term expectations to discuss less formalized ideas about the future, which may or may not be part of a wider sociotechnical imaginary (Eames et al. 2006; Korsnes 2016). In contrast, sociotechnical imaginaries are “collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology” (Jasanoff 2015, p.6).

Sociotechnical imaginaries contain a degree of stability, which both enables and restricts the scope for individual and collective action. This occurs as imaginaries “reconfigure actors’ sense of the possible spaces of action but also their sense of the rightness of action” (Jasanoff 2015, p.23). In contrast, the sociology of expectations stresses that organizations and individuals take strategic action to influence and shape desirable outcomes in technological development (Konrad et al. 2012). While the concept of sociotechnical imaginaries does not exclude the potential for such strategic action, it suggests that the scope of action is demarcated by

existing imaginaries that delineate what is presently conceived of as legitimate and possible. This does not mean that imaginaries are not subject to change, or that they cannot be contested. Rather, change may occur as new elements are interwoven into existing imaginaries (Felt 2015), or manifest as transformations when imaginaries travel from one location to another (Pfothenhauer & Jasanoff 2017).

The literature on energy and sociotechnical imaginaries has examined how different imaginaries of the future compete, and how the success of one imaginary over others influences, for example, the development of infrastructure, policy, standards, and norms (Burnham et al. 2017; Eaton et al. 2014; Levidow & Papaioannou 2013). The competition of different imaginaries has been examined in cases ranging from local bioenergy visions (Eaton et al. 2014), to national discourses on energy availability (Teschner & Paavola 2013), to international organizations' views on bioenergy (Kuchler 2014). However, focusing on the competition between different imaginaries has left less room for examining the proposed ways for progressing towards desirable future imaginaries. Yet, important questions remain regarding the relation between imaginaries and the proposed means to realize them. Are sociotechnical imaginaries always co-produced (Jasanoff 2004) with particular social, technological, and scientific ways to pursue them? Can sociotechnical imaginaries accommodate multiple divergent ways of attaining them? Instead of viewing these questions as conflicting, it is possible to answer both affirmatively. Sociotechnical imaginaries are always co-produced with particular ways to realize them, however an imaginary may also accommodate multiple ways of being attained.

For example, Felt (2015) demonstrates how the imaginary of keeping Austria free from specific technologies is co-produced over decades with an imagined preferred social order and way of living. Progressing towards the imaginary requires constant rehearsal, so that the non-development of specific technologies becomes naturalized as an essential part of Austrian identity. While Felt's study shows how a specific imaginary is co-produced in a particular location, Pfothenhauer and Jasanoff (2017) employ comparative analysis to show how one imaginary (the "MIT model of innovation") is co-produced in three different countries with local ideas about the current undesirable situation and its feasible solutions. This shifts the attention from assessing the "uptake", "success", or "failure" of global models in specific places to examining how policy concepts are detached from their origin, whether this is possible in the first place, and how concepts are transformed in this process (Pfothenhauer & Jasanoff 2017; Forsyth & Levidow 2015). These examples demonstrate how sociotechnical imaginaries become locally embedded as they are co-produced with desirable ways for realizing the imaginary.

An interpretatively flexible imaginary calls for paying particular attention to the proposed means of attaining it. In their examination of cities participating in the Carbon Neutral Cities Alliance, Tozer and Klenk (2018) find that the interpretative flexibility of carbon neutrality allows for individual cities to present divergent sociotechnical paths for reaching the imaginary. For example, Vancouver links carbon neutrality to 100% renewable energy, whereas Melbourne includes carbon offsets in their definition of carbon neutrality (Tozer & Klenk 2018). This means that while the cities participating in the Carbon Neutral Cities Alliance share an

imaginary of carbon neutrality, the imaginary is co-produced in different places with particular sociotechnical paths to attaining it, which are based on local resources and capabilities.

In this article, the interpretative lens of sociotechnical imaginaries is applied to examining political debates on energy futures at the national and city level. Political speech lends itself particularly well to the analysis of imaginaries, as it is infused with visionary claims and directed at imagined publics. In the field of energy, political speech has been analyzed through parliamentary transcripts to make sense of changes in political parties' discourse over time (Leipprand et al. 2016), or to contextualize political parties' decisions regarding specific energy choices, such as nuclear new-build (Edberg & Tarasova 2016).

The level of the nation-state is important for the production of energy policies, strategies and practices. While energy research highlights the difficulties of transitioning away from current energy systems, empirical accounts of recent energy transition debates in various industrialized countries find unanimity amongst diverse stakeholders around the long-term necessity of an energy transition (Betsill & Stevis 2016; Edberg & Tarasova 2016; Leipprand et al. 2016). At the same time, there is often little precision in these accounts over what is to transition, how and when (cf. Meadowcroft 2009). The matter of politics at the national level becomes the debate over the plural means of achieving an energy transition, rather than the end-goal of a transition (Meadowcroft 2009; Stirling 2014).

The role of cities and local governments in energy policy has been increasingly examined in the literatures on multilevel governance and transition studies (Marsden et al. 2014; Hodson et al. 2015). However, city-level energy policy has not been extensively analyzed in terms of imaginaries (see Tozer & Klenk 2018 for an exception). City authorities carry out important functions regarding energy use and production, including planning and setting targets for carbon reductions, and through their roles as partial or full owners of local energy companies. Yet cities are often tied to the central state to secure financing for projects, and thus function in a dynamic relation with other levels and forms of governance (Betsill and Bulkeley 2006). Additionally, cities have become internationally networked through initiatives such as C40 and the Covenant of Mayors. Expectations towards cities in the literature on multi-level governance are, nonetheless, contradictory, as cities are described as essential to tackling global environmental problems, yet their capacities to do so are contested (Bulkeley et al. 2016). Policy makers' expectations oscillate between viewing cities as subsumed to fulfilling national governmental aims, acting as local "testbeds" for nationally scalable solutions (Hodson et al. 2015), or having full capacities to provide local solutions to global issues. Empirical accounts place cities in a nuanced relation with other governance levels, and discuss how local actors will tend to flexibly translate and implement the broad goals and expectations set by national actors (Eames et al. 2006; Marsden et al. 2014; Korsnes 2016).

The present study contributes to the literature on socio-technical imaginaries (Jasanoff & Kim 2015), in particular to comparative research on imaginaries, by exploring how imaginaries play out at different levels of governance. In this way, it also sheds light on debates on city-level climate action (Marsden et al. 2014; Hodson

et al. 2015; Tozer & Klenk 2018) by investigating how city representatives present their scope for action in the face of uncertainty about future energy systems.

3. Research context and design

3.1. Research context

This section contextualizes the comparison between governance scales by presenting a brief introduction to national and city level energy policy in Finland. Finnish per capita energy consumption has been amongst the highest in industrial countries, with the industrial sector as the largest energy user. In 2015, the total primary consumption of energy in Finland consisted of around: 25% wood fuels, 24% oil, 19% nuclear, 8% coal, 6% natural gas, 4% imported electricity, 4% peat, 5% hydropower, 0,6 % wind power and 5% other sources (Statistics Finland 2016). This mix of energy sources, where around three equal thirds of production come from renewables, nuclear, and hydrocarbons has been called a successful and well-diversified electricity production mix in Finland (IEA 2013). The long-term goals of Finnish energy policy are in line with the European Union's energy and climate policies, aiming to reduce greenhouse gas emissions by 80% from 1990 levels by 2050.

The Finnish energy sector is rather centralized, both in terms of infrastructure and governance (Teräväinen et al. 2011; Ruostetsaari 2009). The 2010s have seen renewed interest in energy policy. Haukkala (2017) discusses the rise of a new green advocacy coalition in Finland, which has focused on increasing citizen participation in energy policy, decreasing dependence on fossil fuels and centralized energy production, and closing down coal-fired power plants. In addition, reformulating energy policy to respond to the rise of renewable energy has been the topic of cross-party parliamentary work¹. Important policy decisions during the studied time period (2011-2015) include the negotiation of a National Climate and Energy Strategy² in 2013 and the passing of a Climate Law³ in 2015. Finland is one of the few European countries proceeding with nuclear new-build, and the years 2011-2015 witnessed several critical developments in the regulatory processes. The time period covers two national elections, in 2011 and 2015, where the 2011 elections led to the establishment of a coalition government of six parties, whereas the 2015 elections were won by the centre party⁴.

As the capital of Finland, Helsinki is the largest city, with a population of around 635 000 inhabitants (1.5 million in the greater metropolitan area). Helsinki is often placed in the spotlight concerning decisions on energy and climate issues, due to its status as the capital as well as its carbon-intensive profile of energy

¹ <http://energiaremontti2015.fi/parlamentaarinen-energiaremonttiryhma/>

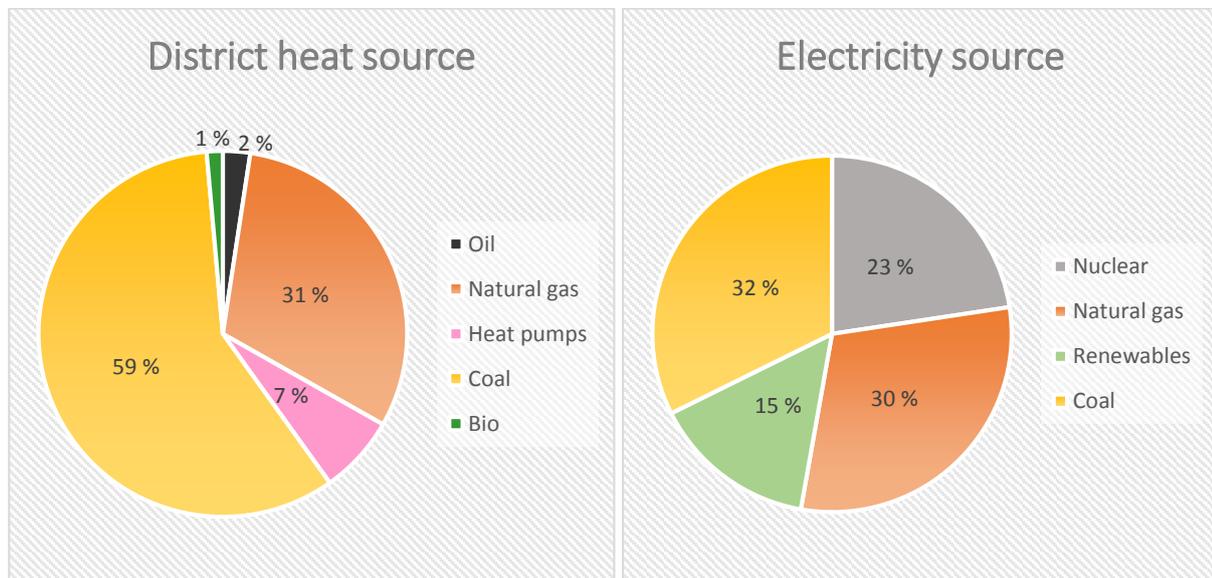
² It has been typical for each new government to create a National Energy and Climate Strategy. The one from 2013 was formulated by the 2011 coalition government. A new strategy was presented to parliament in 2017.

³ The Climate Law sets the broad long-term goals of climate policy. It covers only the sectors that are not covered by emissions trading, i.e. agriculture, land-use, and transport.

⁴ The comparative focus of this article is on scale, so the differences between political parties, while very interesting, are not examined in detail due to space constraints.

production. Figures 1 and 2 show the shares of different energy sources in district heat and electricity production in Helsinki, with natural gas, coal, and nuclear dominating.

Graph 1 Sources of district heat and electricity production in Helsinki in 2016 (Adapted from Helen 2017)



The city council is responsible for setting both Helsinki’s climate policy goals and the policy measures to meet them. In the examined time period, the climate policy goals of Helsinki were to decrease greenhouse gas emissions in energy production by 20% while increasing the amount of renewable energy to 20% by 2020, as compared to 1990 baselines (Helsinki City Government, 2015). The city council is the full owner of Helen Ltd, formerly Helsinki Energy, which supplies district heat and electricity to Helsinki. Similar to other capital cities, Helsinki has had a different representation of political parties than that of the national parliament, with the centre-right and green parties competing for leadership.

3.2 Materials and methods

The materials for the analysis consist of national and local parliamentary discussions and energy policy documents from the years 2011-2015, and participant observations from 2015 onwards. The selected time period contains over 700 documents covering energy policy in parliamentary meetings⁵. To limit the data, only those parliamentary debates that were covered in at least two major national news outlets⁶ during the time period were chosen. The selection produced five plenary debates detailed further in Annex 1⁷ (two during 2013 and three during 2014), totaling 234 pages of text for analysis. The two years feature prominently, since in

⁵ www.eduskunta.fi contains full written transcripts of all parliamentary meetings.

⁶ The chosen outlets Helsingin Sanomat and Yle (the national broadcasting company) are the largest news sources in Finland, with a weekly reach of 1 million (Helsingin Sanomat) and 1,4 million (Yle) people.

⁷ Two other parliamentary debates related to energy were also covered in the news, but these were not selected into the research material as they discussed specific questions regarding a citizen initiative on energy certificates and the dissolution of the Act on the Protection of Rapids, and did not refer to broader questions on energy policy.

2013 a Climate and Energy Strategy was debated and accepted, whereas 2014 witnessed several discussions on the review of nuclear power plant permits.

The other set of materials consists of debates on energy futures in the city council of Helsinki. I have selected one case study from the time period as illustrative of how city councilors debate energy futures. The case covers the debate over the future of a centrally-located coal-fired heat and electricity power plant in Helsinki, which is further described in section 4.2. The materials used for the analysis include city council debates on the decision and supporting background documents, which are presented in Annex 2, totaling 65 pages of text for analysis. In addition, background documents (e.g. Helen 2014) were consulted, but not incorporated into the research material.

The research material has been complemented by participant observation at various energy policy events from the autumn of 2015 onwards; for example, public breakfast meetings organized by the parliament on renewable energy and the launch of work on the new Climate and Energy Strategy. The participant observation involved attending events and hearing about the latest developments in energy policy at the national and local levels. The analysis of the observation material is based on written notes, online presentations, and collected leaflets.

Jasanoff (2015) highlights comparison as one of the methods for drawing out distinctions in sociotechnical imaginaries. The analysis of sociotechnical imaginaries calls for being attentive to the construction of meanings, discourses and representations (Jasanoff 2015). At the same time, it is important to remember that imaginaries are neither cause nor effect in a conventional sense, but rather a rearticulated commitment to a specific social order (Jasanoff 2015). The analysis centered on identifying recurring discursive elements in the material, focusing on how desirable energy futures were presented and what types of policy means were proposed as “good” for realizing those futures – for example, through stating that policy *should* provide something. As called for in comparative research, any differences between the two sets of materials were focused on. The material was read, coded, and re-coded in an iterative manner using Atlasti software. Since the electricity and heat sectors were the most debated ones in the material, the analysis centers on them. All of the original empirical material was in Finnish or Swedish, and all quotes have been translated into English by the author.

It is important to acknowledge the limitations of this article. First, the selection of materials focuses on how politicians articulate energy futures in public addresses (the parliament or city council). I do not claim the identified imaginary and the proposed ways to progress towards it are shared amongst a wider public. Rather, this article analyses societally powerful actors, who have the access to resources that enable the dissemination of their views. How politicians negotiate and construct their views on energy policy prior to publicly vocalizing them is outside of the scope of this study. Second, the article focuses on the proposed policy and governance paths towards a carbon neutral imaginary, which has been an understudied area. The question of technological pathways, the role of different energy sources, and transboundary carbon flows in the imaginary of carbon neutrality is left for further research. Third, the parliamentary material extends over a longer period of time

and covers earlier debates (2013-2014) than the city council material (2015). While the debates are set only a few years apart, in terms of developments in renewable energy and their visibility in Finland, the time period has been identified as containing several new initiatives (Haukkala 2017). This could imply that city councilors were exposed to more information concerning the speed of the breakthrough of renewable energy.

4. Results

The results section first analyzes how carbon neutrality functions as a unifying sociotechnical imaginary, due to its interpretative flexibility in both the parliament and city council (section 4.1). I identify how cleantech is proposed as a central approach at both levels of governance for reaching carbon neutrality (section 4.1). While cleantech is a similarity across governance scales, the rest of this article focuses on the differences between the city council and the national parliament in their proposals of “good” energy policy for progressing towards carbon neutrality (section 4.2).

4.1. Carbon neutrality through cleantech

Both the parliamentary and city council debates articulate carbon neutrality as a common long-term goal. In parliamentary speeches, it is stated that Finland should strive towards being an almost (80-95%⁸) carbon neutral society by 2050, and stressed that this goal unites across political party lines: “*We have a common view on the direction. The government’s commitment to carbon neutrality in Finland is excellent*” (Parliamentarian 2013). At the city level, the same goals are raised for Helsinki. These are not presented just as goals; rather the discussion is of a carbon neutral society by 2050. This is discussed as the long-term goal of climate and energy policy for Finland, and one that requires participation from all societal sectors. The imaginary is precise in that it contains a specific timeframe, which is in line with EU-level climate policy. However, the timeframe is distant (in comparison to, for example, electoral timeframes), and carbon neutrality is rarely discussed in the examined material with regards to short- or mid-term targets. The chosen term of “carbon neutrality” is interpretatively flexible, as it leaves open questions related to the inclusion and exclusion of specific energy sources and technologies, the role of transboundary carbon flows and offsetting, and the role of carbon capture and storage. The use of carbon neutrality in both city councilors’ and parliamentarians’ speech is most likely due to the combination of flexibility and distant timeframe, which leaves space for various interpretations and proposed policy paths. For example, the imaginary of carbon neutrality can accommodate both those parliamentarians who are in favor of nuclear energy and those against it.

Within the imaginary of carbon neutrality, both parliamentary and city council debates present positive expectations for technological progress and development in Finland. At both levels, cleantech is identified as a central approach for attaining carbon neutrality. However, cleantech contains a significant amount of interpretative flexibility, as it can be linked to very precise technologies and sectors (such as battery technology) or more abstract ideas (such as the bioeconomy). The development of clean technologies is

⁸ This figure is measured against 1990 greenhouse gas emissions levels, which is the common baseline set for EU member states.

consistently linked to the pursuit of societal goods, such as employment and revenue generation, in a mutually constitutive way. For Finland to prosper further while maintaining climate commitments, however, parliamentarians and city councilors call for more emphasis on developing and exporting cleantech: “*Probably something that came up in every address is that we all believe in cleantech. It has great potential*” (Parliamentarian, 2014). Cleantech is expected to deliver reputational value to Helsinki and Finland: “*This is how we will get new investments to Helsinki, this is how we will get new companies, this is how we will get those much wanted new jobs*” (City councilor, 2015). Parliamentarians’ and city councilors’ views on cleantech are often anchored in the nationally strong metaphor of Nokia, the Finnish communications and information technology company. Nokia is portrayed as a source of national pride, where a small country succeeded in producing a leading global technology. Investing in cleantech is presented as a central approach to moving towards a future carbon neutral society while also creating employment and economic growth.

4.2. Differences in proposals for attaining carbon neutrality

The next section examines the differences between the national parliament and city council as to what “good” policy is for attaining carbon neutrality.

Demanding a predictable future in parliamentary debates

In the parliamentary debates, the imaginary of carbon neutrality is co-produced with predictable and persistent policies for attaining it. Demands for the persistency, predictability and unambiguity of energy policy appear consistently throughout the empirical material, for example in calling for “*persistent and predictable incentive and tax policies*” (Parliamentarian, 2013). These function as guiding principles for energy policy, and are likened in importance to questions of national security: “*There are few sectors—perhaps national defense may be another one – where predictability and persistency would be as important as in energy policy*” (Minister, 2013). The success of Finnish energy policy is presented as a “*consequence of the persistent politics that has been carried out in Finland over decades, and for the most part, our energy issues are fine*” (Minister, 2013). One of the outside measures of success that is presented is the IEA’s review, which states that Finland’s success in decarbonization comes from its approach – quite distinct to other European countries – of developing nuclear energy and bioenergy (IEA 2013).

Parliamentarians claim that successful energy policy can be attained only when predictable policy makes the future knowable for other actors. The stated motivation is to decrease the risks that industry and investors face when making investment decisions. The industries in question are the large energy-intensive industries that are making investment decisions worth millions or billions of euros in Finland. Policy should be able to create “*an anticipatory and investment inviting market*” (Parliamentarian, 2013) through regulation that is set for the long term and does not respond to changing circumstances. “*For industry, the regulation regarding energy production needs to be persistent and unambiguous, so that companies can calculate the profitability of their energy investments long enough into the future*” (Parliamentarian, 2013). Here, profitability calculations function as an anticipatory practice that has the potential to make a specific future present through calculation. Parliamentarians present this as necessary for maintaining the important energy-intensive industries in Finland.

This resonates with previous studies, which point to the centrality of industrial aims in negotiating energy and climate policies in Finland (Teräväinen 2010; Kivimaa & Mickwitz 2011). Further, the findings highlight continuity as one of the key governmental aims of energy policy in Finland (Teräväinen 2010). While the importance of continuity in policy is stressed, this does not mean that the future or the surrounding world are presented as something static and unchanging. Rather, the unpredictable changes of the outside world are seen as drivers that justify the predictability and persistency of governance arrangements. As the Minister for Economic Affairs in 2013 states: *“The world often changes in unpredictable ways, in ways that dramatically change these starting points. At the same time we need to take care, as MP Kärnä spoke of a few hours ago, that energy policy should be based on predictability and persistency (shout from other MP: precisely!) and we should make decisions we can rely upon”*. Parliamentarians thus discuss their own role as the creators and facilitators of predictable and anticipatory markets.

Responding to uncertainty in parliamentary debates

The rapid development of renewable energy is acknowledged to be a challenge to maintaining persistency and predictability as the primary characteristics of progress towards a carbon neutral society. New renewable energy technologies, by which I refer especially to wind, solar, and heat pumps⁹, are represented as some of the sources that introduce more uncertainty into energy policy and markets: *“Variable renewable energy generation, wind and solar power, and different related national support systems, have messed up the electricity markets and made the completion of profitability calculations difficult. Related to this, companies making energy investments are uncertain, for understandable reasons”* (Minister, 2013). As described by the Minister, the development of renewable energy is challenging the possibility to anticipate the future and conduct profitability calculations. Assumptions that have previously been valid for calculating future profits from energy investments no longer apply. This means that the means by which the goal of carbon neutrality is linked to specific governance arrangements is momentarily opened for debate. Importantly, the imaginary of carbon neutrality itself is not questioned in this discussion.

In response, the parliamentary debates contain a discussion about whether energy policy should be made “in real time” or persistently. The proponents of making policy “in real time” argue that policy needs to be able to take into consideration changing circumstances, such as the aforementioned changes in renewable energy, and respond to them through rapid policy changes. This presents an alternative and competing view of the necessary governance arrangements for attaining carbon neutrality, where the ability to react to change is more important than the predictability of policies. However, the concept of making policy “in real time” is quickly countered in the parliamentary discussions by arguments stating that the goals of persistency and predictability are too critical for energy policy to be subject to perpetual revision. The competition over these two views

⁹ In many ways, none of these technologies are that new, and have been around since the 1970s. What is new is their advanced technological development and increased viability of use at a commercial scale. I use the term new renewable energy to distinguish from bioenergy (which is the largest source of renewable energy in Finland) and hydropower (which, while an important source of electricity production, has not been significantly invested in and developed since the late 1960s).

takes place through the framing of “good” versus “bad” policy. The proponents of making responsive policy “in real time” are countered through framing “bad policy” as taking place within a short timeframe, or as short-sighted, jumpy, and unpredictable in an area of national concern: *“the tax raises and shortsighted cuts in support that we have recently witnessed are only causing uncertainty in a field of business that is considering investment decisions worth hundreds of millions of euros”* (Parliamentarian, 2013).

A similar dynamic of framing good policy as predictable and bad policy as fluctuating and responsive to change is visible in the following incident from my field notes. At a public energy policy event in 2016, a wind energy developer described the rapid technological developments in wind energy technology that had lowered prices dramatically in the last five years (from 2010). She described the price decreases as exceeding the expectations of both technology companies and policy makers. She continued by addressing the MPs present at the event, and calling for energy policy to be consistent and continuous, proceeding to state that from an industry actor’s point of view, talk about cutting wind energy tariffs in the future is problematic. She stressed that it is not the future act of cutting tariffs that is problematic; rather, it is deviating from what has been previously agreed upon. The example highlights how both policy-makers and technology developers present past and future technological developments in renewable energy as unexpected and difficult to predict. Energy policy and its governance arrangements, however, are required to be known and predictable.

This section has shown how the framing of good policy as foreseeable and stable has been successful at the national level. The mobilized arguments maintain the status quo, where employment and growth should be achieved through the development of the industrial sector. As the next section discusses, however, the “goodness” of predictable policy is not a given preconceived demand for policy at all levels of policy-making. Rather, it is a specific example of how the imaginary of carbon neutrality is co-produced with an imagined preferred way to attain it in parliamentary debates.

Demanding adaptable policies in the city council of Helsinki

In the city council debates, the imaginary of carbon neutrality is co-produced with policies that are flexible and adapt to changing circumstances. In 2015, the city of Helsinki faced a decision over the continuity of a centrally-located coal-fired power plant in Hanasaari. The plant supplies district heat (420 MW) and electricity (220 MW)¹⁰ to Helsinki, largely from burning coal. It is operated by Helen Ltd, which is fully owned by the city of Helsinki. The power plant had not yet reached the end of its operational lifetime, so the decision over the future of the power plant was motivated by the city’s climate policy goals. The decision is assessed here as a way of grounding the imaginary of carbon neutrality at the local level. Akin to the parliamentary discussions, it is notable that the imaginary itself is not called into question; rather, the debate centers on the different proposals for attaining carbon neutrality in Helsinki.

¹⁰ Information on Hanasaari power plant: <https://www.helen.fi/helen-oy/tietoa-yrityksesta/energiantuotanto/voimalaitokset/hanasaari/>

At the beginning of 2015, two options were on the table. In the first option (see Table 1), the coal-fired power plant would be replaced by a new multifunctional power plant in Vuosaari that would use mainly biofuels, especially converted wood chips from forestry, and also be able to burn coal. The building of the new plant required a significant financial investment. The second option consisted of upgrading the existing power plant in Hanasaari to be able to burn wood pellets in addition to coal. This option was cheaper in comparison, however it continued the reliance on coal as a fuel-source. Surprisingly, neither of these options was chosen, despite the fact that policy process had proceeded quite far and extensive environmental impact assessments had been conducted for both options (Helen 2014). Instead, a third option emerged during 2015, which was finally chosen by the city council. The third option consists of meeting future energy service needs through a decentralized investment program, which includes the replacement of parts of the existing Hanasaari power plant with one or several new heat power plants working with biofuels and the upgrade of other existing heat power plants. While less straightforward than the proposed facility investments and modifications of options 1 and 2, the option leaves room for increasing energy efficiency and the uptake of new heat production technologies, such as heat pumps, solar heat technologies, and geothermal heat, in response to rising demand. It also opens the possibility of using the centrally located land area of Hanasaari for urban development.

Table 1 City council options for Hanasaari power plant (from Helsinki city government 2015)

	Option 1	Option 2	Option 3
Summary	Building a new multifunctional power plant in Vuosaari	Modifying the existing power plant to better accommodate wood pellets in addition to coal	Decentralized option
Replace existing Hanasaari power plant?	Yes	No	Yes
Cost of investment	960 million	300 million	360 million
Cost of option as compared to BaU scenario¹¹	890 million	690 million	490 million

The third option appeared late in the decision-making process, at a time when uncertainty over the future was cited as the justification for debating another option. While the following analysis centers on the decision as an example of how debates over moving towards a carbon neutral society can develop, it is important to

¹¹ The BaU scenario is a reference scenario, which assumes continuation of heat and electricity production with the existing power plant in Hanasaari

acknowledge that citizen and business initiatives¹² as well as party politics influenced the decision. City councilors recognize that the decision over the fate of the Hanasaari plant had been long debated with only two options. The emergence of a third option and its further exploration are described positively: *“I find it very good decision-making when changes in the operational environment can be acted upon, and a third option presented”* (City councilor 2015). The city councilors acknowledge severe changes in the operational environment of energy policy since the initial analysis of the two options had begun in 2012 (Helen 2014). The speed of change from then on is described as dramatic, with *“only uncertainty being certain”* (City councilor 2015).

In the official documentation prepared for the city government, the third option was justified based on expectations concerning *“significant uncertainties and an unclear view of the future, it is the board’s [of the city-owned energy company] view that it is justifiable to avoid large one-time investments”* (Helsinki City government 2015). The expected sources of uncertainty include developments in new technologies, climate mitigation actions, attitudes towards nuclear energy, changes in fuel prices, and changes in customers’ values and behavior (Helsinki City government 2015). In addition to identifying these drivers of uncertainty, the document also mentions uncertainty over national and EU-level decision-making and the continuity of state policy instruments. The role of the city as embedded in other levels of governance is thus acknowledged in both the documents and council debate (cf. Betsill and Bulkeley 2006).

The third option is justified on the basis of flexibility, proceeding in stages, and the potential for conducting future re-evaluations depending on changes in the demand for heat in Helsinki (Helsinki city government 2015). In the city council debates, “good policy” is presented as the ability to react to changes. The decision is commended because it allows taking into account technological and societal developments. *“The most important aspect of the presented decision is progressing in stages. The investments made in the model form a development pathway, where the development of markets and technology can be taken into account and used in the best way, and risks in decision-making can be minimized.”* (City councilor 2015). The relation between technological development and policy development is presented as one of adaptation, flexibility, and reaction. This is enabled through choosing the open and somewhat unclear third option.

This adaptive approach to technological and policy development is then elevated as a principle for guiding energy policy more generally: *“The starting point of energy policy needs to be that it is not based on single, large, megalomaniac projects, but on being linked to development, always ready to renew and bring in new technologies”* (City councilor 2015). The benefits of the adopted third option are weighed against the initial two options, which are portrayed as costly lock-in investments into specific technologies that leave little room

¹² For example, Coal-free Helsinki (<http://hiilivapaasuomi.fi/helsinki>) and the Climate Leadership Council (<http://clc.fi/>) campaigned actively for the third option, and the decision was debated in local and national media. However, an analysis of these initiatives and the influence of party politics lies outside the scope of this article.

for reconsideration or possible reversals based on future development. In this case, the two initial options are framed as “bad” policy by presenting them as inflexible approaches to meet the city’s climate policy goals.

5. Discussion

Analyzing political speech at two levels of governance shows that within the broad imaginary of carbon neutrality there exist possibilities for presenting different governance arrangements and paths for realizing the imaginary. This extends previous work that has connected imaginaries to specific innovation pathways (Levidow & Papaioannou 2013) or storylines (Tozer & Klenk 2018). Building on previous literature, I highlight the importance of examining sociotechnical imaginaries in conjunction with the proposals for attaining the imaginary. I examine how desirable and good policies, an under examined area compared to technological or innovation pathways (Levidow & Papaioannou 2013), have been justified by politically responsible actors.

The study speaks to recent work that has highlighted the importance of scale for analyzing sociotechnical imaginaries (Smith & Tidwell 2016; Eaton et al. 2014; Burnham et al. 2017). The current analysis demonstrates how a broad imaginary can unite actors across scales (Tozer & Klenk 2018). This does not mean, however, that political actors propose similar policy paths for attaining the imaginary. Thus, while city councilors claim that stabilizing policy causes undesirable lock-ins to specific technological pathways, parliamentarians present the stability of policy as desirable, and necessary for creating favorable markets for investors. Vice versa, conducting energy policy “in real time” is framed as creating unnecessary uncertainty at the national level, whereas responsiveness to technological and societal changes are desirable at the city level. Consequently, what is presented as “good policy” for carbon neutrality differs significantly across the two levels of governance.

At the same time, it is important to consider how the proposed governance arrangements can lead to different outcomes. The stable and predictable policies promoted by parliamentarians will tend to favor the status quo and existing industrial interests. This is not surprising, as Finnish energy policy has been noted to contain few elements of disruption, or policies aimed at destabilizing the existing regime (Kivimaa & Kern 2016). In contrast, the adaptable policies supported by city councilors might lead to difficulties in rapidly mobilizing policy, especially in a situation where Finnish cities in the metropolitan region are already struggling to meet their climate change mitigation targets (Dahal et al. 2018).

While the analysis has shown the possibility to imagine different policy paths for carbon neutrality, the mutual commitment to cleantech and the justifications for good policies at both levels show the importance of economic growth and employment in Finnish energy policy debates. This resonates with Kuchler (2014), who discusses how the imperative of making cost-effective choices limits the utopian potential of second generation bioenergy imaginaries in international organizations. Likewise, in Finnish parliamentary and city council debates the imaginary of carbon neutrality is rarely co-produced with governance arrangements promoting radical change and challenging the existing social order.

6. Conclusions

This article has shown how a broad sociotechnical imaginary, in this case that of carbon neutrality, can accommodate divergent policy proposals for attaining it. Through an analysis of political speech in the national parliament of Finland and the city council of Helsinki, my central claim is that sociotechnical imaginaries are always co-produced (Jasanoff 2004) with specific proposals of governance arrangements to realize the imaginary. Interpretatively flexible imaginaries may, however, be co-produced in distinct ways across scales and places.

In Finland, an energy transition to a carbon neutral society appears as a unifying sociotechnical imaginary shared by politicians at different levels. While the imaginary is precise, with carbon neutrality as a long-term societal goal to be achieved in 2050, it is also interpretatively flexible, as carbon neutrality accommodates multiple views on the role of acceptable technologies, energy sources, and offsets. In addition, politicians at the two levels of governance promote the broad and ambiguous concept of cleantech as a central approach for reaching carbon neutrality. Cleantech is to provide solutions not only to climate mitigation but also to problems pertinent to Finnish society, as it produces growth, employment, and export potential.

While cleantech is promoted as a central approach for realizing carbon neutrality, there are notable differences in the proposed governance arrangements between the national parliament and the city council. In the parliamentary debates, politicians highlight the importance of predictable and persistent policy measures. Good policies for reaching a carbon neutral future are those that ensure stable market conditions for investments, thus favoring established interests. In contrast, city councilors demarcate their responsibility as one of being attuned to changes, setting a general direction towards carbon neutrality but remaining committed to flexible policy paths for reaching carbon neutrality. The stronger alignment of parliamentary groups with the interests of the energy intensive industries may explain the favoring of stable and predictable policies, whereas city councilors may shy away from making single costly investments in economically tight times. As such, the city council's chosen third option does not entail an immediate radical change in heat and electricity provision, but rather constitutes an opening for several incremental changes to happen in the future and leaves a role for municipal energy companies to be a part of these changes.

The conducted analysis points to a few important avenues for further scholarship. First, regarding the governance of innovations, the analysis highlights the importance of producing nuanced studies of actors at different scales. Comparisons across scales can highlight different framings of apparently similar technoscientific trajectories and show how technological and political orders are co-produced in distinct manners. Further, such comparisons can shed light on what types of governance arrangements may be preferred at distinct levels. Second, regarding sociotechnical imaginaries, the analysis highlights the importance of being precise about the entities analyzed. As the literature on sociotechnical imaginaries has rapidly expanded in recent years, imaginaries have been coupled with a variety of terms and analytical concepts, including pathways (Levidow & Papaioannou 2013), frames (Eaton et al. 2014), master frames (Dentzman 2018),

storylines (Tozer & Klenk 2018), the multi-level perspective (Burnham et al. 2017), and energy values (Levenda et al. 2018). The current analysis calls for distinguishing between what are identified as imaginaries and what constitute proposals for realizing the imaginary. Making such a distinction allows exploring whether there are separate competing imaginaries, or whether differences emerge in how imaginaries are co-produced with specific governance arrangements or sociotechnical pathways in particular places.

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Annex 1

Table 1 Selected parliamentary debates

Title of news article	Date of parliamentary debate	Type of discussion
Peat and wind caused heated debates in parliament, HS, 04.04.2013	03.04.2013	Preliminary debate on long-term climate and energy strategy
Parliament scolds government over coal consumption, HS, 05.12.2013	04.12.2013	Plenary meeting on the long-term climate and energy strategy
Parliament concerned about Russian nuclear power, HS, 19.09.2014	18.09.2014	Question from opposition on energy self-sufficiency at plenary meeting
Government cuts peat taxes and increases benefits to wood residue, Yle, 07.10.2014	07.10.2014	Prime minister's note on energy policy at plenary meeting
Fennovoima continues to divide the parliament, HS, 04.12.2014	03.12.2014	Plenary meeting on nuclear power plant (Fennovoima) decision review

Table 2 Selected material on city level case

Document	Date
City council debate over Helen's development program	02.12.2015
City government proposal on Helen's development program	23.11.2015