

# Creating transitions to electric road transport in Norway: the role of user imaginaries

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## **Abstract**

The aim of this paper is to study the role of user imaginaries in relation to electric cars and the role these imaginaries play in the ongoing transition towards electrification of the transport sector. We conducted interviews with a diverse group of stakeholders to explore how imaginaries of the public are constructed and how the shared expectations of a user trajectory shaped by user groups with different concerns and different expected technology developments influence policy. We identified a range of implications and influences of this shared imagination for different aspects of the development of strategies and policies related to electrification of the transport sector in Norway. Finally, we discuss how these user imaginaries, that we call imagined publics, appear to have become part of the process of sociotechnical changes and what the consequences may be for a transformation to sustainable mobility.

## **Keywords**

Electric vehicles, imagined publics, transitions, energy policy

### **1. Introduction**

The politics of technology involve translations between various interrelated settings ranging from the context of design to the context of use (Nahuis and Van Lente, 2008). Not only parliaments and public authorities accommodate political practices, but also laboratories (Latour, 1987), demonstrations (Pinch and Bijker, 1987; Rip and Schot, 2002), markets (Summerton, 2004), and even actual use (Gjøen and Hård, 2002; Ozaki et al 2012). People, institutions, and firms must be aligned, moulded, and disciplined to create (and accept) technological development (Sovacool 2014). In this article, we researched how different forms and modes of governance have been used to influence practices related to sustainable mobility in Norway, with a special focus on the introduction of the electric car. In doing so we tap into at least one of the questions that this journal aims to answer, the question of ‘what different social groups are involved in the production of a particular energy system’? (Sovacool, 2014). Further on, how people imagine energy technologies and their futures is a critical social facet of energy transitions (Sovacool and Brossmann, 2010; Sovacool and Ramana, 2014). Thus, the article tries to tie together different key debates in the energy studies and social science field concerning communication and persuasion (sociotechnical imaginaries), energy governance and user practises (Sovacool, 2014).

Reducing emissions from cars is of high priority and the sustainable transition of road transport by electrification is a significant tool that has been included on the agenda in Norway, in the

EU, and other parts of the world such as California, in the US. Research has shown that the initial transitory phase to electromobility is dominated by the need for consistent and stable national policies where governments signal a strong national interest, create market interests, and ensure availability of vehicles (Dirks et al. 2011). Norway has certainly been through such a transitory phase and is currently considered the leading electric vehicle (EV) country in the world and the country where electric mobility is increasing most rapidly among private car users. In fact, 35% of all EVs sold in Western Europe in 2014 were sold in Norway<sup>1</sup> and over 18% of all new cars sold in Norway are now electric. This huge success can, to a large degree, be ascribed to Norway's ambitious policy in this area, with a wide range of different measures targeted towards increasing the number of electric vehicles (EVs) and encouraging private EV ownership and use.<sup>2</sup>

There has been a call to put more attention on the perspectives of technology developers and promoters as public responses to proposed developments or technologies often emerge through interactions with those advocating and promoting them (Burningham et al. 2007). Research has further shown that when industrialists and policymakers make decisions, they often do so in light of an imagined public response, and the public can be quite powerful as 'an imagined public'. Imagined publics may considerably influence the strategies of industrial, scientific, and political actors (Walker et al. 2010; Skjølvold, 2012). This paper is inspired by quite recent literature in the field of public understanding of science, which deals with 'imagined publics'. In this article, we focus on the way stakeholders imagine the public, and how these imaginaries

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<sup>1</sup> Retrieved from <http://www.elbil.no/nyheter/statistikk/3361-norge-dominerer-det-europeiske-elbilmarkedet>.

<sup>2</sup> The most important present policies and incentives to promote electromobility in Norway are vehicle reregistration tax exemptions, the lowest annual vehicle licence fee, VAT exemptions, access to bus lanes, road-toll exemptions, reduced fares on national road ferries, free public parking with or without free charging, and charging stations (Assum et al. 2014; Ryghaug and Toftaker, 2014). The import of IC cars is heavily controlled through strict import regimes and purchase taxes. Consequently, although the electric car is expensive for its size and comfort class, it is considered to be a financially viable alternative in many Norwegian households.

may influence the way strategies and policies aimed at increasing electric mobility in Norway are shaped. By doing so, we set out to move beyond a focus on the pure technical potential or cost-benefits that tend to dominate many policy discussions regarding sustainable transitions. Instead, we focus on studying the following: (1) the way stakeholders actively construct or imagine ‘the public’ or electric car users; and consequently, (2) how these constructions influence the way strategies and policies are formulated to promote the future of electric mobility in Norway.

In this way, this paper attempts to break new ground as it sets out to explore how imaginaries are given agency and how they are invoked for strategic purposes by stakeholders. Actual user needs and preferences of EV owners are analysed elsewhere (see e.g. Ryghaug and Toftaker, 2014). Thus, we focus our attention on how the societal embedding of technology (in this case related to the EV) is anticipated and included within processes of policy development and deployment. Rather than being left outside of these processes, we explore how users as imaginaries are given agency through the functional and epistemic competences that are ascribed to them. In other words, we set out to study how the imagined user becomes an ‘action’ in the knowledge production of stakeholders in influencing practices related to EVs.

This paper is based on an analysis of interviews with different types of stakeholders involved in the implementation phase of EVs in Norway, such as national and local authorities, governmental and non-governmental organizations, EV manufacturers and distributors, private enterprises, and energy suppliers. However, before we move to the analysis, we will briefly discuss earlier research on imagined publics and how that research defines the way publics are imagined and how such imaginaries influence policies, actions, and strategies. The article then goes on to describe data and methods, before moving on to the analysis of stakeholder imaginaries of different EV user groups. This is followed by a discussion about how these imaginaries are related to and follow a broader socio-technological trajectory of electric road

transport and subsequently, how they lead to an imagined electric mobility transition pathway. The article concludes with a discussion of implications of this shared imagination for the development of strategies and policies related to electrification in Norway and beyond.

## **2. Imagined publics and their consequences**

The public is often powerful as an idea and not only as a participating agent. The concept of imagined publics gives life to ‘shared repertoires and expectations amongst actors in technical-industrial networks’, expectations that are often projected and internalized into both organizational practices and/or working practices (Walker et al. 2010, p. 943). Walker et al. (2010) argue that feedback processes and longer-term development of such shared repertoires and expectations mean that ‘the public’, as constructed and imagined, will potentially be present at multiple stops along the evolving trajectories of technology development and deployment. Next, we will look at some of these stops in relation to the deployment of EVs.

Another related concept that is fruitful for our study is the concept of the ‘imagined layperson’ (ILP). Maranta et al. defined the ‘conceptions of laypersons as they are manifested in the products and actions of experts (Maranta et al. 2003, p. 151). This concept has been useful in describing typical situations where experts produce solutions or advice (i.e. strategies or policies) that can assist laypeople, and it also describes situations in which they must consider the layperson’s world and estimate what may be relevant to them. As experts often do not have direct access or contact with relevant laypersons, the laypersons or users often are *imagined*. These ILPs that are integrated into the expert’s work may be implicit, they may differ from ‘real’ laypersons, and they are often imagined with limited competence and possibilities of action. Thus, imagined users are functional social constructs, and as an imagined public, they

need not be explicit nor do they necessarily bear any resemblance to real users (Maranta et al. 2003).

Maranta et al. (2003) have argued that experts construct and thus address ILPs in various ways: as individualized ILPs, as representative ILPs, or as generalized ILPs. Generalized ILPs would most closely represent the 'imagined public' because they are addressed as collectives rather than individuals or representatives of particular social groups. In the following analysis, we will investigate to what extent stakeholders in electric mobility issues imagine laypeople or users as individuals, as representatives of particular social groups, or as a collective.

In the analysis, we will examine the way stakeholders in the transport sector form strategies by equipping imagined laypeople with certain capabilities and social functions. It is recognized that stakeholders imagined publics may be influential in the sense that they influence technology design and that both scientists and engineers are known to include imagined publics in the design of technology (Woolgar, 1991; Akrich, 1992). Less focus has been given to the fact that stakeholders may also, and often will, include imagined publics or laypeople in the design of policies or strategies. This means that imagined publics may also influence the implementation of technologies. In this respect, imagined publics are also driving expert's interactions with the public (Maranta et al. 2003) as well as policies, strategies, and choices of action related to technology implementation processes. This means that imagined publics may have a political impact and can be seen as a virtual form of public participation (Heidenreich, 2014).

To our knowledge, imagined publics related to EVs and sustainable mobility have not been directly addressed by earlier studies. There are, however, a few studies on imagined publics related to renewable energy from which we may draw insight. Several studies based on interviews with actors within the renewable energy industry and policy development arena have found that their interviewees imagined the public to be generally supportive of renewable

energy technologies; however, they expected the public to be resistant to specific renewable energy developments, in line with the NIMBY concept ('not in my backyard', see e.g. Devine-Wright, 2005) (Walker et al. 2010; Skjølsvold, 2012; Heidenreich, 2014). Other studies have shown that the public has typically been imagined as knowledge-deficient, ignorant, and oppositional with irrational concerns rooted in emotions or self-interest (Barnett et al. 2012; Cass and Walker, 2009; Besley and Nisbet, 2013; Powell, 2011; Wynne, 2001). These kinds of imaginaries have thus led to engagement strategies that are particularly concerned with educating the public, as well as moderating emotions (Heidenreich, 2014).

Turning to electric mobility, what can we draw from these earlier findings? On one hand, we know from earlier studies of renewable energy that the NIMBY concept, the knowledge deficit concept, and the imaginary of the resistant public have been quite widespread imaginaries among stakeholders (although there is also research on more ambivalent imaginaries, see e.g. Heidenreich, 2014). On the other hand, we could also expect stakeholders to have a more positive imaginary of the public – expecting the public to be supportive of the electric car as they may see it as a new climate friendly technology, therefore viewing the public as 'green customers'. However, the EV obviously deviates from the often large, area-consuming renewable energy developments in many ways. The EV is also closely linked to another well-known technology – the internal combustion (IC) car, which likely influenced the way related publics were imagined. Thus, all in all, based on earlier research, we find it difficult to envisage how the imaginaries of stakeholders involved in the implementation of EVs will look and what their consequences will be. This topic will be further scrutinized in the analysis section, but first a brief discussion on the data and methods used for this analysis.

### 3. Data and methods

A significant number of stakeholders engage actively to stimulate the growth of and knowledge regarding EVs in the transport sector in Norway, as well contributing to policy development and deployment. Currently, the primary objective for policy development and implementation has been to convince people to buy and drive electric cars. The empirical basis for this article is 20 qualitative interviews with various stakeholders in the EV-related industry representing national and local authorities, governmental organizations (GOs) and non-governmental organizations (NGOs) that work to promote electrification of transport, EV manufacturers and distributors, mobility agents, and energy suppliers. We based our recruitment of respondents on their involvement in the implementation phase of EVs in Norway, either because of their function as managers, leaders, or their roles as ‘key’ players; their roles as EV providers and distributors; their participation in national action plan resource groups; frontrunners within private enterprises or the public sector; and on the basis of their active involvement in the media, with NGOs, and interest groups. Some were approached directly while others were sampled through ‘snowballing techniques’ (Atkinson and Flint, 2004), because in many cases, the stakeholders recommended new informants as relevant interviewees. The interviewees in the initial round of 16 interviews identified four projects or initiatives as particularly successful in working towards electrification of the transport sector.<sup>3</sup> This led to a subsequent round of four new interviews where representatives elaborated upon their roles and experiences resulting from their involvement with these four initiatives.

- Table 1 about here -

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<sup>3</sup> These four initiatives were known as ‘the incentives package’ representing the policies outlined in the introduction, the Green Car initiative, Transnova, and the Green Highway project.

Approximately one half of the interviewed stakeholders also had extensive experience as EV users. Eight out of the twenty interviewees came from organizations that participated in efforts leading up to the action plan for electrification of the transport sector.

The research questions were addressed through individual interviews using a semi-structured interview guide covering several thematic areas. The protocol was flexible enough to allow respondents to interrupt, elaborate, and discuss topics that they felt were important. The interviews were conducted by telephone between February and August 2010. This was a particularly good period for analysing stakeholder views about future EV users as EVs were still quite novel those days, and the period mark the end of the 'early market phase (1999-2009)' and the beginning of the 'market introduction phase (2009-2012)' (Figenbaum et al. 2015). The recorded interviews lasted between 30 and 90 minutes. All were transcribed verbatim. Quotations used in the paper have been translated from Norwegian in a manner that retains their intent and tone. The strategy of analysis was inspired by grounded theory (Strauss and Corbin, 1998). We began by examining the transcribed interviews for salient categories, which were given a code. We then grouped these codes to find related subcategories that might be linked to more comprehensive categories. Quotations were selected to represent the various categories and positions as accurately as possible.

In the next section, we will map out how stakeholders, central in the introduction of EVs, imagined and anticipated the public. We look into how their framing may influence policy development and deployment in the electrification of the transport sector. Quotes or excerpts from the interviews illustrate our primary findings.

#### **4. The imagined publics of EVs**

Stakeholders largely agreed that the electrification of road transport in the near future revolves around two relevant user groups: the private individual EV users and those who use EVs

through their business (such as public fleet owners). Because Norway has a particularly high share of private EV users, we focus our analysis primarily on the imagined private EV user.

Our interviews indicated that the public related to EVs was imagined heterogeneously. These imaginaries were developed in some cases through direct encounters with EV users, but also through the circulation of second-hand narratives, reports, surveys, etc. Many of the stakeholders referred to a variety of user groups who were imagined to have differing qualities based on how long they had been EV users and when they acquired the car. Examples were 'early adopters', 'current users' or 'relatively new users', as well as 'future users' that often also were referred to as 'the common Norwegian' when reaching mass markets of users and even 'non-users' for describing people that were still not driving EVs but who potentially could become EV users. These labels were seldom used consistently, but were used as overlapping categories with sometimes blurred boundaries.

None of the types of interviewees in particular, adhered to one of the user groups. Most stakeholders were preoccupied with the imagined group of *early adopters*. This group was seen as important for two reasons. First, these users were perceived as willing to accept the additional costs associated with EVs. Second, they were imagined to accept the 'technological teething' problems associated with EVs. One stakeholder claimed that these first 'enthusiasts' were extremely excited about EVs and did not require that the EV performed equally to an IC car, for instance regarding safety. The difference between the group imagined as early adopters and those envisioned as future users was thus described in terms of idealism. A stakeholder from an energy interest group stated that '[s]ome idealists will buy it anyway, but most households have a pressed economy and will calculate total costs'. Thus, for the mass-use of EVs to flourish in the future, stakeholders envisioned that EV technology had to improve so that EVs had the same qualities as IC cars, and in order for them to compete regarding price, they had to be cost-efficient. A transition towards a large mass market would mean that, in the end, people would

basically just go out and buy themselves a car, and whether or not that car used petrol, diesel, or electricity was unimportant.

All in all, we will see that as markets were expected to grow, the imaginary of EV users resembled, more and more, that of the IC car user. Notably, the imagined public was greatly aligned with an imagined technological development. The interviews revealed not only a trajectory of different imagined user groups but an entire socio-technical trajectory that included expectations of future user patterns and preferences. In the next section, we will discuss how such an imagined socio-technical trajectory would look from the perspective of the stakeholders as they envisioned new groups of users with specific concerns and hopes for the technology entering the EV market along with technical and political developments related to EVs. This trajectory, largely follow the inclusion of current users (where the first ones to adopt EVs were labelled early adopters), then you have imaginaries of future users, people that are seen to be potentially interested in buying EVs. Following the socio-technical trajectory the group of future users will then grow along the development of a market expansion phase. As the market expands user groups get more and more varied, resembling more and more the market for IC cars as one get closer to having a mass market. This means, that even though there are distinctions made between future users and the mass market, these groups of users are, as we will see in the following, sometimes very similar or even identical.

### *Imagining current and future user concerns*

Our analysis revealed that the stakeholders had quite clear ideas of the primary concerns of future users. One important factor was price. An interviewee explained:

You can get a conventional car that's much bigger and that has all the advantages an electric car doesn't have. People put price at the top when they buy cars. You

have the image factor as well, but you do not generate large sales from image alone.

This quote, along with many others, illustrates that the imagined laypeople were constructed as *cost-concerned, rational consumers*. Another economic barrier that stakeholders expected would preoccupy future users was uncertainty regarding the resale value of EVs and the life span of the battery. We found that stakeholders largely constructed users as concerned with economy and motivated by the incentives offered through the ‘incentives package’. As one stakeholder from a governmental organization stated:

We want to stimulate a faster phasing in of electric cars in the Norwegian market through facilitating a) infrastructure; and b) a good regulatory framework during the transitory phase until the cars sell themselves and the regulatory framework and economic incentives are superfluous and can be phased out.

Consequently, stakeholders largely saw electrification of the transport sector as a strategy where the public needed to be lured into electric mobility first and foremost by *economic incentives*, and a predictable regulatory framework and infrastructure. This was, by and large, resulting from their views regarding who the future users would be, the concerns believed to preoccupy future users, and the limitations future users were thought to associate with the technology.

Second, the analysis demonstrated that concern regarding the *technical features* of the EV, such as safety, were seen as barriers keeping people from ‘going electric’. In line with this finding, small improvements in technology were consequently seen as having potential for making the EV more suitable for more people. Many stakeholders emphasized safety as an important aspect, and future users were framed as opting for a car that ‘felt’ safe. Thus, we noticed that safety meant more than meeting standard safety requirements – it was also envisioned as a feeling.

Third, we found that stakeholders typically regarded the *driving range* as the most important characteristic that determined the usage of the car and different user groups. The majority of stakeholders described both current and future users primarily as urban dwellers living in densely populated areas where ‘most of their trips are pretty short and infrastructure is in place’. Thus, for the majority of stakeholders, the current user was someone who had a clearly defined transportation need and a predictable driving pattern, such as a commuter. Thus, stakeholders, to a large degree, considered the area of use to be a result of ‘the technology’ or defined by its technological limitations (such as battery capacity). The description of ‘intended’ usage suggested that, in practice, the EV would function as the primary car of the household, in terms of being used for every day (shorter) trips and errands. However, having an additional IC car was seen as necessary for ‘going to the cabin’, going on holiday, and being able to tow:

Everybody with more than one car in the family will be first to acquire an electric car. Primarily, it will be an “everyday car”, while petrol and diesel cars will accommodate the more demanding tasks – we’re talking SUVs (...) pulling boats out of the lake and stuff, and for going on long distance trips.

Stakeholders also emphasized that they believed users to be very concerned about having local ‘charging stations’ available, and potential users were diagnosed with ‘range anxiety’ – a label the stakeholders used to describe the public’s fear of running out of electricity. One interviewee explained, ‘You’ll quickly get used to driving an EV, as long as you do it for a certain amount of time and rid yourself of the “mental thing” in your head, that you do not have enough range’. Thus, range anxiety was considered something irrational that would disappear with more experience and as drivers realised that their home-charging access would cover their needs. Another interviewee explained:

You need charging facilities and you need fast charge-stations. However, they won't necessarily be used much. Probably not at all. But it's about safety. Because if you have that feeling that you won't make it, that you're out of power, and you have to stay somewhere for a long time to re-charge, that sucks! That's a barrier!

All in all, seeing driving range as an important psychological or 'mental' barrier for users seemed to be widespread among stakeholders. In line with this, several interviewees mentioned that the most efficient measure to reach potential users would be to establish a large charging infrastructure. This would make it possible to drive between cities and to a greater extent 'use the car as a normal family car'. Thus, we see that the stakeholders wanted to improve charging availability and charging speed in order to overcome range-anxiety, even though this emotion was seen as irrational and something that would be overcome by the practice of driving an EV. As one stakeholder phrased it: 'We do not really need fast charging, strictly speaking'. However, he saw it as an important step towards convincing individuals of electric mobility as a viable alternative. He felt there is a need for fast charging, facilitated EV use among "ordinary people".

All in all, we found user imaginaries that were quite close to those from previous research in that publics often are imagined as knowledge-deficient and concerned (Barnett et al. 2012), partly due to emotions (Cass and Walker, 2009). It is also interesting to note that even though the most common way to meet knowledge deficits and concerns has been to provide more information or to educate the public so that they may make rational choices, our interviewees, in contrast, chose a completely different strategy. The stakeholders suggested creating a network of charging stations (a material reconfiguration) as a response to imaginaries of the lacking technical properties of EVs (driving range) and the imaginaries of social properties (range anxiety) of driving EVs in order to dismiss what they viewed as the irrational concerns

of imagined laypeople. It was suggested that range anxiety, viewed as an emotional property, be handled technically by building a larger (faster) charging infrastructure. It is also interesting to note that publics were, at the same time, imagined to be rational and driven by costs. This led stakeholders to promote the implementation phase of EVs supported by economic incentives. Users were seen to operate under technological and economic uncertainty, which made economic incentives crucial to compensate for this in the eyes of the stakeholders. Thus, the incentives offered by the transport policies contributed to removing some of the barriers stakeholder believed were perceived by EV users. The imagined publics clearly affected their beliefs, however more importantly, the imagined publics also influenced the actual decisions that these change-agents were making: one example was the strategy to focus on building a large network of fast charging stations across Norway to alleviate range anxiety, another was to support a package of incentives that would make the economic risk of buying an EV more less.

Most stakeholders believed that at the time of the interviews, one was in the beginning of a transitory phase where it was, above all, important to create a sort of favourable and predictable political climate for the EV to be taken up and adopted by ever larger audiences and groups of users. Most stakeholders, however, believed that in the long run, the electrification of the transport sector would become self-sustaining. In the following section, we will turn our attention towards this so-called 'self-propelled phase' of EV use and scrutinize how stakeholders framed how one could develop mass market of electric car users.

### *Reaching a mass market of electric cars*

As already mentioned, most stakeholders distinguished between early, current, and future users of EVs. However, while the early user was typically seen as an environmentally concerned idealist, current users were typically seen as urban commuters with driving patterns that fitted

the EV. Among future users, parts of the public frequently referred to as the ‘masses’ or the ‘common man’, were seen as the last people to buy EVs, and the ones that would buy an EV only after it became as common as an IC car:

I think car producers have to make their bestselling models into electric cars. It’s the only way to get the “masses” convinced. I think everybody wants a car that can satisfy their needs. We are concerned with safety. The car has to be impact safe. You need to be able to re-fuel. It can’t break down in the middle of the road, because then you won’t be able to re-fuel.

Apart from being affordable, compared to a similar IC car, the EV also needed to perform well, which was interpreted as not running out of fuel or electric power, and to be able to meet all every day driving needs. One suggestion was to ‘look at what ordinary car buyers look for, and what they emphasize. What will make them choose an electric car or why won’t they?’ Thus, we found that stakeholders largely constructed the mass future users as ‘rational men’.

Only a few stakeholders mentioned the need to change mobility practices more fundamentally, for instance by imagining that future users would prefer car sharing over private car ownership. Changing mobility practises (and not only switching from one type of car (IC) to another (EV)) was thought to be difficult, as this was expected to meet cultural barriers. For instance, most Norwegians believed they had to own their own car to cover all their transportation needs, according to the stakeholders.

We found that even though most stakeholders emphasized the economic aspects as most important for future users, they also largely acknowledged the role of image and performance as important features to the future user. This was expected to change as new user segments started to drive EVs. One stakeholder stressed the fact that with early users, the electric car in itself signalled a certain status due to its electric and environmentally friendly features.

However, what was considered ‘cool’ for early users was not considered so for later user groups that were imagined to want ‘fancy’ cars. Thus, design and aesthetic appeal were increasingly thought of as properties that the electric car needed to develop as future users were anticipated to demand more ‘attractive cars’.

As mentioned above, early users were constructed as enthusiasts that largely chose to drive electric because of a special interest in technology or for environmental concerns. Environmental arguments were, however, to our surprise, almost completely missing from the imaginaries of future electric car drivers and mass market framings. Thus, the overall imagined public was not seen as being motivated by pro-environmental concerns. Even the stakeholder from an environmental organization did not think environmentally conscious people would be the ones driving electric cars (as they were expected to already be acting on behalf of their pro-environmental concerns by, for example, using public transport).

We also found that nearly all stakeholders emphasized the benefits of learning-by-doing in order to convince users to buy an electric car. One distributor emphasized that those potential users who were ‘nearly there’ were those who were afraid of losing money and did not want to make an unsatisfactory economic investment. A remedy could be leasing an electric car for six months or one year, as that may convince them to buy one. In line with this, a stakeholder mobility agent emphasized the need to remove some of the barriers against trials and testing. Although most stakeholders valued the potential in creating acceptance through a process of learning-by-doing, some also emphasized the need to avoid negative experiences and not to introduce the electric cars prematurely or it may create user situations where the electric car would not meet their needs. Thus, car distributors and dealers were mentioned as important in identifying user needs and offering EVs as an option when an electric car would fit the needs of the customer. Further on, EV use in the public sector was seen as potentially leading to increased acceptance among the general public:

I think that when municipalities and other fleet-owners buy electric cars, it makes people aware of the car through their job; they become familiar with the new technology, and thus, they may want to buy it privately.

Nonetheless, apart from some elaboration around the potential effectiveness of lowering the threshold for test-driving, economic incentives were upheld as the most important way to persuade more and people to buy and drive electric cars. Economic incentives were clearly seen by many of the stakeholders as the ‘quick fix’ – a fast and efficient way to convince future users. As an example, an online electric car ‘calculator’ developed by the Green Car initiative that allowed potential users to consider how they would use the car and to perform a cost-use analysis was seen as an important measure to allow potential users to realize that ‘it pays off’ to buy and drive electric. In other words, actual strategies were made on the basis of the imagined publics. This type of strategies made here, have similarities to earlier studies of imagined publics (Heidenreich, 2014) that have demonstrated that it is common to view the public as having a knowledge deficit that consequently should be met with education and information. However, in contrast to earlier studies of imagined publics and renewable energy technologies that stress the importance of *public engagement* and where developing engagement strategies has become entirely normalized part of standard industry practice (Walker et al. 2010), our interviews show little evidence that public engagement played a role in their strategies. Imagined laypeople were largely constructed as users and as groups of consumers. All in all, the interviews revealed that stakeholders often drew distinctions between early users, current users, and future users. By emphasizing different aspects of user concerns, stakeholders constructed what we consider to be an evolving trajectory of user imaginaries with suitable strategies for policy implementation, as illustrated in Table 2.

- Table 2 about here -

## 5. Discussion: An imagined transition pathway to electric mobility

There is clear evidence of a shared imagination or anticipation of ‘the public’ at work amongst the varied actors that we interviewed. These imaginaries were developed in some cases through direct encounters with EV users, but also through the circulation of second-hand narratives, reports, surveys, etc.. In the previous section, we demonstrated how stakeholders in the transport sector think in terms of viable pathways or socio-technical trajectories by equipping imagined laypeople with certain capabilities, social functions, and concerns. We also explored how the dynamic and changing imaginaries of the user became visible when stakeholders elaborated upon what separates early and current users from future users.

We find that, in general, stakeholders framed users as deeply entrenched in a Norwegian ‘culture of mobility’, as previously described by Sørensen (2005), where a car culture of mobility and private car-ownership was seen as central. The car was seen to provide personal mobility and as a ‘tool’ in performing activities, while the process of phasing in electric cars largely was seen as a process of *technology replacement*. The traditional IC car, as a type of technology, was to be replaced with the EV.<sup>4</sup> Economic and regulatory incentives, facilitating use by infrastructure (charging stations), and investments and technological enhancements (such as increased battery capacity as well as faster charging) were seen as particularly important tools for promoting the electrification of cars.

Whereas early users were somewhat individualized and given agency on the grounds of being environmentally engaged, economically resourceful and with a particular interest in technology, future users were generalized as aggregates that were not particularly preoccupied with pro-environmental behaviour or a particularly technology. Future users were frequently

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<sup>4</sup> A similar policy of simple substitution, rather than promoting a new automobility system was previously noted in France in the early 1990s (Gjøen and Hård, 2002).

described as a collective whole – ‘we Norwegians’, ‘the common man’, ‘the masses’, or ‘people in general’. Even though the ‘masses’ of future users, to some degree, were described as varied, it was evident that the use of privately owned cars as the primary means of transportation in the future remained largely unquestioned among stakeholders. The future user was imagined to want a ‘normal’ car just like the combustion engine car.

Thus, in one sense, we may say that early users have some similarities to what was found in previous research on imagined publics related to renewable energy technologies, namely that the public (represented as future users) would be resistant to buying a car that did not have the same qualities as combustion engine cars, although we did not find simplistic anticipation of the NIMBY concept among our interviewees. By working towards making the electric car equivalent to the IC car in terms of range, comfort, size, and design, the experts did not include qualities and “accessories” that could possibly lead to greater complexity. Thus, mainstreaming was their preferred strategy.

This mainstreaming process can be further traced in the way stakeholders seemed to emphasize certain modes of communication and certain actions as particularly relevant for the strategies needed to convince future EV users to drive electric, such as the Green Car Calculator. We found that information tools such as the electric car calculator were regarded as highly relevant in order to increase knowledge among users, potentially enabling them to cross the economic barrier by providing knowledge that visualized costs. Stakeholders believed the electric car would ‘prove’ itself as a working technology, provided it was not assigned to the ‘wrong’ user, i.e. someone with a user pattern that did not fit the car. This is clearly an example of the fact that the imagined publics not only affected stakeholders’ beliefs, but also actual behaviours and decisions on how to reach mass markets.

Overall, current and future users were described as primarily occupied with technological qualities and motivated by the economic advantages of owning and using EVs. Users needed to be equipped with economic and political predictability in order for the deployment of electric cars to continue, and in order to create a self-propelled electrification of car transport. Thus, the furthering of electric transport was described as best achieved through the use of economic incentives or removing technical barriers such as low battery capacity and insufficient charging infrastructure. This strategy may be recognized in the actual electrification policies, such as the “incentives package” to which many of the stakeholders had contributed. Further on, the stakeholders in unison claimed that a premature ending of current incentives would be detrimental, as it would be likely to slow down or even stop the deployment of electric cars in Norway. The analysis also revealed that the electric car, at the time of the interviews, was not seen as a fully ‘developed’ technology. Stakeholders, however, believed that future users would consider moving to electric cars as they became more advanced and included the features of IC cars. As one stakeholder emphasized, the value attached to the ‘smelly’ or ‘noisy’ engine of the IC car is ‘a thing of the past’, and that when the electric driveline is all that separates the electric car from the IC car, users will soon chose to drive electric.

Research done on the actual user needs and preferences of EV owners reveal that the imagined publics of these EV stakeholder reflect the actual public in many ways. For instance, user studies support that range anxiety is not very prevalent, and something that goes away with the experience of driving EVs. Most EV drivers are also happy with the driving range as the car fit their driving patterns and most live in two car households (Ryghaug and Toftaker 2014). Surveys of Norwegian EV owners have shown that economic incentives, and especially, the exemption from purchase tax and VAT has been important for most EV owners, in addition to exemption from road tolling and access to using bus lanes in certain areas (Figenbaum et al. 2015; Bjerkan et al 2016). Research on EV owners’ motivation for buying an EV name the

environment (38%) and practical reasons (28%) as the most important reasons, in addition to the economy (29%) (Haugneland, 2012). There seem however, to be a tendency to under report the importance of environmental aspects for the motivation of buying an electric car in the research literature, at the expense of economic aspects. Studies that not only assess the importance of the Norwegian incentives and that go deeper into analysing actual user needs and preferences among electric car drivers, reveal, among other things, that the newer electric cars models are considered to be *more comfortable* than traditional IC cars. This has not only to do with drivability and the silent engine, but also has to do with the comfort gained from driving without feeling bad for the environment (Ryghaug and Toftaker, 2014). Thus, in a way the stakeholders interviewed here seem to show a somewhat biased perception of user groups that reflects certain types of actual users: the very economically oriented user, while overlooking other aspects, such as the more symbolic aspects attached to being an electric car owner (being more environmentally aware, more future-oriented etc), (see Ryghaug and Toftaker, 2014, for a thorough discussion of actual user experiences of electric car driving in Norway).

Car use has unquestionably contributed to climate change. The introduction of policies in order to face some of these challenges has aimed at creating strong incentives for the electrification of transport. The Norwegian case is one of very few cases where a transformation of the transport sector seems to be well under way. This makes it a particularly interesting case to learn from, and a case that have applicability beyond this isolated case and a case that other nations that have just started to embark on the electrification of the transport sector can learn from. However, replacing ICs with EVs is not the only possible trajectory, and the Norwegian strategy does not seem to transform the way we move or think about mobility to a great extent. The stakeholders interviewed here clearly seemed to share openness towards the possibility for changing mobility practices through social learning. Nonetheless, they continued to see individual car use as the dominant mode of transportation in the future and deployment of

technology as first and foremost relying on techno-economic incentives, while to a large degree, overlooking possibilities to transform practices by other means. In this way, the imagined technology development and diffusion trajectory described in the interviews resemble one of the future pathways described by Dijk, Orsato, and Kemp (2013, p. 143) as a pathway in which ‘alternative fuel vehicles are simply another car in a sustained social context, much like a technical substitution process’ and not necessarily a transition process. Following this pathway, one does not expect user preferences or mobility patterns to change. People may buy a greener car but do not necessarily change their travel behaviour. We find in our analysis that a similar imagined technology deployment trajectory was the most dominant imaginary of the stakeholders analysed here, and that this line of thinking seems to influence their strategies overall. However, it is important to keep in mind that other pathways and possible trajectories also exist (and that some studies that have looked at actual EV user practises hint at more transformative mobility changes taking place, see Ryghaug and Toftaker, 2014). One may, for example, foresee a trajectory as pointed out by Dijk et al. (2013) where ‘one assumes more changes in mobility behaviour, especially more travel planning, mixed use of multiple transport modes, perhaps less private car ownership, and so forth. This path also assumes ‘technical changes in supporting products (e.g. new ICT devices) investments in modal transfer and parking spaces to allow the lining of transport modes and policy changes (e.g. new taxes, subsidies, visions, and experimentation programs) but the primary change involves consumer behaviour’. We found few traces of such an imagined technology development and user trajectory among our interviewees. However, it is evident that if stakeholders keep imagining and thereby prepare for a simple substitution pathway, an alternative imaginary of the users will also need to be in place. Thus, in sum, we may conclude that our analysis is actually presenting a story about an ‘imagined transition’ where not only the users are imagined but the entire trajectory of electric mobility.

## 6. Conclusion

In this paper, we focused on the role of policymakers and other stakeholders and how they attempt to intervene in order to govern social practices for sustainability. The images and knowledge that stakeholders draw upon not only influence their construction of users but, as the concept of an ‘imagined public’ suggests, they also influence the shaping of policies and implementation strategies. Our analysis follows the processes of deliberation among stakeholders and discusses this in relation to implementation and policy strategies. Studying how publics are imagined helps to identify how user representations are constructed and co-constructed with national policymaking.

We clearly found evidence that imaginaries of ‘the public’ give life to shared repertoires and expectations amongst the stakeholders we interviewed and form expectations that are projected and internalized into strategies as suggested by Walker et al. (2010). The incentives implemented in order to achieve an accelerated use of EVs in Norway demonstrated that Norwegian stakeholders, to a large extent, have recognized that the responsibility for a rapid transition towards a sustainable transport sector lies beyond individual behavioural choices. We also find the tendency to think of the EV in terms of an environmental technology of value to society that imply disadvantages for the users, hereby warranting society to put in place compensatory measures to help the diffusion process.

However, if future users are ‘mainstreamed’, primarily imagined as consumers that are not occupied with particular issues such as environmental issues, one might also overlook the transformative potentials of the practise of driving electric cars. For instance, Ryghaug and Toftaker (2014) demonstrated that the practice of driving small, unconventional EVs with a limited driving range might actually *sensitize* users more generally towards their mobility needs, their energy consumption, and environmental issues. Thus, in line with Skjølsvold

(2014), we see that the future is by no means a neutral construct. How the future is framed, what is incorporated and what is left out, and who gets to define the future are all central in accounting for the choices that are made.

We identified a range of implications and influences of this shared imagination for different aspects of the development of strategies and policies related to electrification in Norway (to a very limited degree, for the engineering and design of technical objects), and more considerably, for strategies regarding infrastructure (location and type of charging) and the processes of engagement. In these ways, we demonstrate, in line with earlier studies of imagined publics, that ‘the public’ has become, ‘inscribed in the evolving form, distribution, and politics of a key category of sustainable-technology development and diffusion’ (Walker et al. 2010, p. 943). Like many other studies of this kind, we have difficulties in establishing how deeply embedded this inscription might be. The imagined public appears to have become part of the process of sociotechnical change, but how significant these imaginaries have been when compared with other actors (real or anticipated), and when compared with other effects on systemic change, we cannot be certain.<sup>5</sup> In this sense, our work uncovers a set of possibilities for future research relating to how the public might be imagined and invoked differently in countries with a less potent electrification strategy and what impact other invocations might have. Another interesting line of inquiry would be to study how other imaginaries of the public could potentially shape sustainable mobility more profoundly and how this can be achieved.

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<sup>5</sup> This point was also made by Walker et al. (2010).

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## Tables

**Table 1.** Profile of interviewees.

Role	Number of interviews
Energy suppliers and industrial organizations	3
GOs and NGOs, including non-profit and environmental organizations	7
Car manufacturers and distributors	3
Mobility agents	2
Interest groups and trade unions	3
Representatives from local and national authorities/administrations	2
Total	20

**Table 2.** Schematic view of user imaginaries, characteristic use, main traits and accompanying governance strategies.

Users imaginaries	Characteristic area of use	User traits and priorities	Strategy
Early	Two car households EV as second car City use	Environmentalists Idealists Accept 'teething problems'	Unimportant
Current users	Two car households EV as second car City use Commuters	Range anxiety Car safety increasingly important Environment less important	Strong and predictable Economic and regulatory incentives Technology development Infrastructure investments
Future users	More and more areas of use as car technology is developed	Economy important Environment not important Decreasing range anxiety	Technological development Continued economic incentives Incentives adjusted as technology gets more mature
'Self-propelled' mass market	EV used as any IC car	Diverse user groups No specific traits	No incentives needed