

Between hope, hype, and hell: electric mobility and the interplay of fear and desire in sustainability transitions

Article (Published Version)

Kester, Johannes, Sovacool, Benjamin K, Noel, Lance and Zarazua de Rubens, Gerardo (2020) Between hope, hype, and hell: electric mobility and the interplay of fear and desire in sustainability transitions. *Environmental Innovation and Societal Transitions*, 35. pp. 88-102. ISSN 2210-4224

This version is available from Sussex Research Online: <http://sro.sussex.ac.uk/id/eprint/90092/>

This document is made available in accordance with publisher policies and may differ from the published version or from the version of record. If you wish to cite this item you are advised to consult the publisher's version. Please see the URL above for details on accessing the published version.

Copyright and reuse:

Sussex Research Online is a digital repository of the research output of the University.

Copyright and all moral rights to the version of the paper presented here belong to the individual author(s) and/or other copyright owners. To the extent reasonable and practicable, the material made available in SRO has been checked for eligibility before being made available.

Copies of full text items generally can be reproduced, displayed or performed and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Environmental Innovation and Societal Transitions

journal homepage: www.elsevier.com/locate/eist

Original Research Paper

Between hope, hype, and hell: Electric mobility and the interplay of fear and desire in sustainability transitions

Johannes Kester^{a,*}, Benjamin K. Sovacool^{b,c}, Lance Noel^b, Gerardo Zarazua de Rubens^b^a *Transport Studies Unit (TSU), School of Geography and the Environment, University of Oxford, United Kingdom*^b *Center for Energy Technologies (CET), Department of Business Development and Technology, Aarhus University, Denmark*^c *Science Policy Research Unit (SPRU), School of Business, Management, and Economics, University of Sussex, United Kingdom*

ARTICLE INFO

Keywords:

Electric mobility
 Uncertainty
 Critical security studies
 Sociology of expectations
 Automobility

ABSTRACT

Conceptualizations and articulations of ‘the future’ play a persistent and important role in discussions about technology adoption and the broader domain of sustainability transitions. The Sociology of Expectations, part of the transitions and science and technology studies literature, specifically focusses on the performative role that desirable expectations play in the development and marketing of a technology. In this paper we argue that these insights can be coupled with the performative role of undesirable futures, as outlined by Critical Security Studies. Based on a qualitative diffractive reading of these twin literatures we argue that the performativity around desired and undesired futures follows distinct yet complementary logics. Our reading highlights that a focus on expectations alone does not fully explain the initiation and success of a sustainable innovation, nor that a focus on undesired futures fully explains the acceptance of security claims. The paper exemplifies these insights with a reflection on electric vehicle development.

1. Introduction

Expectations and visions about the future play an important and persistent role within sustainability transitions and assessments of innovation processes (Schick and Winthereik, 2013; Schot and Geels, 2008; Sovacool et al., 2019a). Within the broader transition literature as well as that from science and technology studies, the Sociology of Expectation (SoE) literature explicitly studies the politics around futures with their attention to technological expectations and hypes (Borup et al., 2006; van Lente, 2012). Research shows that these desired futures compete and act performatively as they ‘motivate and guide innovation actors’ (Konrad, 2006, p. 430) through legitimization, prioritization and coordination in order to ‘raise resources and protection’ for certain technologies over others (van Lente and Bakker, 2010, p. 695). SoE thus studies the development of these technological visions, promises and expectations over time (Brown and Michael, 2003) as it seeks to reveal the processes and practices behind their acceptance and rejection. Importantly, although SoE acknowledges the role of uncertainty and risk underneath such promising futures (Berkhout, 2006; van Lente and Bakker, 2010), and some work highlights the role of negative expectations (Nerlich and Halliday, 2007), most attention centres on the hype cycles and promises of new technologies and their subsequent failure, disappointment and resistance.

Futures as a topic, entity, or rhetorical technique are not only hopeful though; some are feared, hated or otherwise undesired. Critical Security Studies (CSS) takes on these undesired futures as it reflects on the performative effects of security practitioners’ use

* Corresponding author at: Transport Studies Unit, School of Geography and the Environment, University of Oxford, South Parks Road, OX1 3QY, Oxford, United Kingdom.

E-mail address: johannes.kester@ouce.ox.ac.uk (J. Kester).

<https://doi.org/10.1016/j.eist.2020.02.004>

Received 4 April 2019; Received in revised form 11 February 2020; Accepted 24 February 2020

2210-4224/© 2020 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

of risk and security discourses and practices to identify, warn, and govern others based on perceived undesired futures (Aradau et al., 2015a; Buzan et al., 1998; Calhoun, 2004).¹ In addition to traditional military defence, border controls, anti-terrorism and other security topics, CSS has been used to analyse a variety of topics, including climate change debates (De Wilde, 2008; Methmann and Rothe, 2012), natural resources (Christou and Adamides, 2013), infrastructure (Aradau, 2010) and specific technologies (Amicelle et al., 2015; Weber and Lacy, 2011). While the security literature focuses on futures through threats, dangers, catastrophes or other perceived events that negatively impact a referent object (Buzan et al., 1998), similar to SoE, it does so via practices of knowledge gathering and meaning attribution. Like SoE, CSS scholars analyse how security practitioners identify and make sense of future threats, as well as how these practitioners engage politically to garner support for the countermeasures that they think are necessary *in the present*. In other words, these theories present comparable yet different performative logics (structured ways by which people act): one logic detailing the performativity of desirable futures with its desire to change certain aspects of the present (SoE) and one detailing the performativity of undesirable futures with the aim to preserve or stabilize the present (CSS).²

In this paper we draw on a diffractive reading (Barad, 2007; Van Der Tuin, 2011) of both literatures to offer a more extensive explanation of how such desired and undesired futures perform the present, and exemplify this reading briefly with a discussion of the debate on electric vehicles (EVs). A diffractive reading draws inspiration from wave diffraction in physics (waves overlapping or bending around obstacles or slits) and is translated to the social sciences as ‘the practice of reading insights through one another while paying attention to patterns of difference’ (Barad, 2011, p. 445). It offers a method to read one theory with another, constantly moving between them while looking for differences without pre-fixed object or subject positions (Barad, 2007). A diffractive reading is based on the premise that ontology, epistemology and methodology are always already entangled, meaning that ‘reality’ shifts with different perspectives, just as those perspectives need to be attentive to changes in ‘reality’ [using the term broadly to describe ‘a material-discursive environment’ (van der Tuin, 2014, p. 235)]. Furthermore, it highlights the interaction between already entangled entities – between theories and between people’s observations and their theories – and as such questions judgements from observers who try to ‘reflect’ on issues, as reflection requires distance from their study object in time or space (Sehgal, 2014; van der Tuin, 2014).

We utilize such a reading to understand how expectations or hypes develop out of a range of desirable futures (the promise of additional services, more convenience, cost savings) and in response to a range of undesired futures (like climate change, product failure, unauthorized access, disruptions). Reading SoE with a focus on security quickly highlights how a promise or expectation often comes in response to a problem and with its own subsequent concerns that are performative as well. Meaning that a focus on the promise or hype alone within SoE might not fully explain the initiation and subsequent success or failure of a sustainable innovation. In turn, we also see opportunities for CSS to engage with desirable futures (cf Anderson, 2007). As we will discuss below, Securitization Theory, a particular CSS theory, observes how threats are securitized – hyped in a way (see section 3) – to garner political support for extraordinary countermeasures (Buzan et al., 1998). While this theory presents the threat and countermeasure as part of a single performative act, we would argue that the acceptance of the threat is not logically equal to the acceptance of the countermeasures, but that in fact their acceptance and implementation can be influenced by the performative effect of its desirable elements.

In addition to a diffractive reading of these fields of study to highlight such differences and interrelations, we draw on a richly focused case study of electric mobility and the literature on automobility (Kester, 2018b; Reese, 2016; Tyfield, 2014; Urry, 2004) to offer a brief empirical example that highlights the interaction between hopes (desired future changes) and fears (undesired future changes). This interaction is used to answer why, after earlier hypes and given that the technology itself is over a hundred years old (Melton et al., 2016), EVs are only now slowly moving from concept vehicles to mass market deployment. Specifically, this paper studies why the vision of full EV deployment is broadly shared among experts (Kester et al., 2018a) in the current transitional phase of EV deployment (van Lente and Bakker, 2010), but members of the public and industry are still seen to reject these vehicles on a combination of costs, functionality and a level of ignorance and uncertainty about the technology (Li et al., 2017; Liao et al., 2017; Rezvani et al., 2015). While the need for more sustainable transport and emission reductions thus seems to have convinced experts and policy makers, this seems insufficient to wholeheartedly convince consumers. Unfortunately, as Selin (2008, p. 1890) argues: ‘until the technological processes are perfected [and] until consumers accept or reject [it,] most signifiers of the technology lie in the realm of fiction.’

The subsequent sections read the SoE and CSS literature diffractively, that is, reading both literatures through each other, constantly moving from one to the other while working through their differences. Section 2 describes the selection of theoretical literature and the methods behind the primary data used in the final example. Section 3 briefly introduces both theories and offers a general reflection on their shared positions on the role of the future in the present and performativity. Section 4 then engages with uncertain futures, primarily from the SoE literature and its focus on desirable futures. Section 5 in turn offers a reflection on the desirable notions behind countermeasures, primarily from the perspective of CSS. Section 6 provides an example of how both literatures together offer a fuller explanation of the recent developments around electric mobility. The conclusion summarizes and reflects on the theoretical and academic insights gained from this more extensive crossover.

¹ In this paper, security is defined overarchingly as a field of study consisting of all logics and practices pertaining to risk, safety, threat, danger, uncertainty, and so on (Kester, 2018a). As such, it is not limited to any particular subjects or themes (like the state, terrorism, migration, military or borders).

² While both SoE and CSS also touch on risks and uncertainty, we see infrequent interaction between these literatures and the more general risk literature (Aven and Renn, 2009; Roeser, 2012), partly explained by the epistemological and ontological focus on performativity in SoE and CSS that contrasts with the positivist ‘controlled extension of rational action’ in the risk literature (Luhmann, 1993, p. 13).

Table 1
Overview of Nordic expert interviews.

	Interviews (n = 227)	Respondents (n = 257)	% of Respondents
Country			
Iceland (Sept-Oct 2016)	29	36	14.0%
Sweden (Nov-Dec 2016)	42	44	17.1%
Denmark (Jan-Mar 2017)	45	53	20.6%
Finland (Mar 2017)	50	57	22.2%
Norway (Apr-May 2017)	61	67	26.1%
Gender			
Male	160	207	80.5%
Female	40	50	19.5%
Groups	27		
Expertise			
Transport or Logistics	73	81	31.5%
Energy or Electricity System	63	75	29.2%
Funding or Investment	10	12	4.7%
Environment or Climate Change	12	16	6.2%
Fuel Consumption and Technology	22	23	8.9%
Other	13	14	5.4%
EVs and Charging Technology	34	36	14.0%
Sector			
Commercial	68	70	27.2%
Public	37	46	17.9%
Semi-Public	40	51	19.8%
Research	37	39	15.2%
Non-Profit and Media	12	13	5.1%
Lobby	23	25	9.7%
Consultancy	10	10	3.9%

2. Research methods

The first part of the manuscript ties together insights from the SoE and CSS fields around three themes: the performativity of desirable and undesirable futures, the uncertainty of desired futures, and the promise behind undesired futures. These three themes emerged from a review of the core publications within SoE and CSS. Given the extensiveness of the CSS literature, most of our focus went to the central theoretical works of key authors (Booth, 2007; Buzan et al., 1998; Dillon, 1996) and the main critique on those works by subsequent generations of scholars (Balzacq et al., 2015). For the SoE literature, similarly, we prioritized the theoretical contributions of key authors (Brown and Michael, 2003; Deuten and Rip, 2000; Van Lente, 2000), although the smaller size of this field allowed for the inclusion of initial empirical contributions (Bakker and Budde, 2012; Kriechbaum et al., 2018). Within these works, we focused on the ways these key authors see that futures are performed (identified, imagined, shared and utilized) and for what purposes, paying special attention to how – what we subsequently termed – undesirable and desirable futures return in SoE and CSS.

The second part of the manuscript tests our conceptual insights. For this we draw on data from a larger study on the future of electric vehicles and vehicle-to-grid (using EV batteries for electricity grid storage purposes) in the five Nordic countries: Iceland, Norway, Sweden, Finland and Denmark (Kester et al., 2018a, 2018b; Noel et al., 2018). Among others, we draw on 227 semi-structured interviews with professionals working directly or indirectly on electric mobility and vehicle-to-grid across 17 Nordic cities from late September 2016 until May 2017 (Table 1). The interviews crossed several sectors, including local, regional and national governments (ministries, agencies, and departments); regulatory authorities and bodies; universities and research institutes; electricity (grid) companies; automobile manufacturers and dealerships; private sector companies including those working on charging equipment, transport software, alternative transport technologies, and electricity and fuel traders; and industry advocacy groups (EV, biofuel, automobile, etc.) and civil society organizations (EV associations, car associations, etc.). Questions were asked about the major energy and transport challenges, about the benefits of EVs as well as their challenges, about potential suggestions to speed up the EV transition, and about vehicle-to-grid (its benefits, challenges and potential incentives). The interviews lasted between 25–90 min and were conducted in person or by phone, if personal meetings were impossible. We differentiate between number of interviews and number of respondents as some interviews were conducted with up to four experts.

In addition to the expert interviews we conducted 8 focus groups with 61 members of the public. The participants in Table 2 were recruited either through local university connections and a combination of personal contacts and broad advertisement or through local psychology labs with subsequent recruitment through the email lists of those labs. The only requirement for participation was that the participants were over 18 and living permanently in the region of the particular focus group. Candidates were offered around 20 euros and a light meal with refreshments. In general, the groups lasted between 1.5 and 2 h, and, in line with Krueger and Casey (2014), consisted of 5–10 and ideally 6–8 participants. The candidates knew the topic beforehand and were given a brief introduction

Table 2
Overview of Focus Groups.

Classifications	Participants (n = 61)	% of Participants
ICE: Iceland [Mixed Gender] (Oct 2016)	5	8,2%
SWE: Sweden [Mixed Gender] (Nov 2016)	6	9,8%
DK1: Denmark [Mixed Gender] (Feb 2017)	10	16,4%
FIN1: Finland 1 [Mixed Gender] (Mar 2017)	9	14,8%
FIN2: Finland 2 [Mixed Gender] (Mar 2017)	7	11,5%
DK2: Denmark [Male] (Jun 2017)	7	11,5%
DK3: Denmark [Female] (Jun 2017)	8	13,1%
NO: Norway [Mixed Gender] (Sept 2017)	9	14,8%
Female	32	52,5%
Have driver's license	50	81,9%
Currently own or have access to a car	29	47,5%
Experienced (as driver or passenger) an EV	8	13,1%
Own an EV	0	0,0%

into the workings of the focus group, and halfway in about V2G, but not about electric vehicles. Overall, the groups were tilted towards participants living in urban/semi urban regions and towards (advanced) students and young professionals. Gender was relatively equal, but age ranged from 19 to 61, with the majority in their late twenties and early thirties. Most of them had a driver's license but few owned a car, although many could borrow one from family or friends. In some of the focus groups in Denmark, Sweden and Norway participants had experience with an EV and shared this with the group.

After collection of the interview and focus group data, each interview or focus group was fully transcribed, and then coded by a single individual on a statement by statement level. We coded every response based on the topic of the statement, and later gathered these codes in larger themes. Statements with claims that EVs offer better performance, energy efficiency, energy independency, guilt-free driving or reduced CO₂ and local emissions (separately coded but collated under emissions) were for example gathered under the theme of EV benefits. We followed a similar process for the focus groups and other parts of the interviews on EV challenges, the transport and energy challenges, policy suggestions and vehicle-to-grid. The statements and themes were then inductively analysed across the full sample using NVIVO, with some of the relevant results reported below. In a second line of enquiry, we, from the beginning, also generated three codes to categorize those statements explicitly dealing with fear and desire, (future) expectations and security. These were used for referencing only. Lastly, as both the expert interviews and focus groups were conducted under full anonymity, we report individual quotes and statements by either respondent number [e.g., R1] or focus group number [DK1 – the first focus group in Denmark].

3. Desirable and undesirable futures

Before delving into the empirical data, we start by offering a basic introduction to both SoE and CSS for those unfamiliar with these fields of study, and summarize them in Table 3. In addition, this section briefly reflects on the similarities behind these fields in how they approach the future.

In short, SoE examines how visions and expectations 'about future benefits affect and structure technology in the present'

Table 3
Summary of Sociology of Expectations and three schools in Critical Security Studies.

Theory	Emphasis	Key Concepts	Key Authors
Desired Futures			
Sociology of Expectations	Studies how imaginaries, promises, expectations or visions about future technological innovation help perform those innovations	Expectations; visions; promises; interpretative flexibility; promise-requirement cycles; hype-disappointment cycles; protected spaces	Harro van Lente; J. Jasper Deuten; Arie Rip; Nik Brown
Undesired Futures			
Securitization Theory ('Copenhagen' School)	Studies how the call on security by a securitizing agent moves something from regular politics into the realm of security thereby enabling extraordinary measures	Speech act; securitization; securitizing move; extraordinary measures; audience acceptance; facilitating conditions; intersubjective politics; desecuritization	Barry Buzan; Ole Waever; Jaap de Wilde
Security practices and routines ('Paris' School)	Studies how security agents and their routines (re)perform particular instances of security governance, plus general reflections on the role of surveillance and risk and how they shape and govern daily life.	Practices and discourses; agents; habits; routine; governmentality; risk; insurance; biopower; disciplinary power; conduct of conduct; calculation; etc.	Didier Bigo; Mitchell Dean; Michael Dillon; Michel Foucault
Normative security ('Aberthwyth' School)	A focus on the ethics of security, adhering to the notion that security helps improve people's lives and should be approached normatively for the betterment of those weaker off.	Security as a condition of having choices; emancipation; community; insecurity as life-conditioning; survival-plus;	Ken Booth; Richard Wyn Jones; Anthony Burke

(Sovacool et al., 2019a, p. 171). SoE generally focusses on the narratives around ‘future technological performance [as they] mobilise attention, guide efforts and legitimate actions’ (Van Lente, 2000, p. 43). Specifically, SoE scholars describe how technology advocates will often share a particular narrative or expectation that ‘positions’ the expected future development of the technology as well as the advocates themselves, the users and the adversaries (Deuten and Rip, 2000; van Lente, 2016). Within these narratives, SoE differentiates between expectations, rhetorical visions and promises. Whereas expectations refer to a specific manifestation of technology (we need to build chargers because EVs will come), visions offer the broader narrative storylines about progress, equity, profit, etc. (electric vehicles will lead to pollution-free cities) and promises ‘are the sales pitch of visions’ (EVs have efficient motors that reduce carbon emissions), hypes in turn reflect the (too) quick and broad social uptake of a vision that ultimately fails to live up to its expectations and promises (Eames et al., 2006; Kriebbaum et al., 2018; Sovacool et al., 2019a). The narrative in turn engages a ‘promise-requirement cycle’: when promises are politically accepted they become a requirement to be achieved for their advocates, as they help set the agenda around a technology, justify a redistribution of resources, and support the development of protected spaces (Bakker et al., 2011; Borup et al., 2006).

Conversely, CSS describes a burgeoning field that reflects on security as a discourse and practice. To new students, the field is explained as containing three schools of thought (C.A.S.E Collective, 2006): Securitization Theory (the ‘Copenhagen School’), an emancipatory approach to security (the ‘Aberystwyth School’), and the practices and governmentality approach to security (the ‘Paris School’). The differentiation between these schools is highly artificial. For one, because there are many exchanges between them. But also because they all share the ‘assumption that security threats and insecurities are not simply objects to be studied or problems to be solved, but the product of social and political practices’ (Aradau et al., 2015b, p. 1). Of central interest in relation to SoE is Securitization Theory (Buzan et al., 1998), which theorizes the grammar, e.g. the internal rules of a logic, of security based on Austin’s (1975) speech act theory.³ In short, Securitization Theory sees actors (individuals or collectives) securitizing a referent object – that what needs protection – as a security issue based on an existential threat. In making this claim (a locutionary act, e.g. what is actually said), the actor attempts (an illocutionary act, e.g. performs something by saying) to have the issue removed from regular political discussions to the security realm where emergency measures can be taken. Simultaneously, the speech act defines who the good guys are (the self), who the threat or threatening party are (the other) and what exactly is the state of the referent object that needs protection. Importantly, it is only when the speech act and the emergency measures are accepted by the intended audience (the perlocutionary act, e.g. the effect on the listener) that a securitizing move becomes a successful case of securitization – and vice versa when an issue is desecuritized (e.g. moved back into the realm of day-to-day politics).

Securitization Theory is a relatively straightforward but much discussed and criticized approach (Balzacq et al., 2015), in part because it presents security as a negative and temporal self-referential practice (it sees desecuritization as preferable). As such, it contrasts with the more positive view on security from the Aberystwyth School where security helps to emancipate individuals, and the more routine-like view on security from the Paris School that takes security as a prime way to govern and order the day-to-day affairs of society. The more practices-inspired security literature (Bigo, 2014) of the Paris School for example concentrates on security practitioners and studies how these agents, soldiers, or cybersecurity specialists with their analyses and routines keep (re)performing the initial insecurity. Similarly, governmentality (Foucault, 2007) inspired security scholars focus on the way that security methods and models are used to surveil society, and, through that, govern flows of people, goods and data (Dillon and Lobo-Guerrero, 2008) with the intent to prevent the need for exceptional interventions.

Even though they come from different fields of study and have a different focus, the future generally is approached similarly in SoE and CSS. Both focus more reflectively on *present futures*, or how the future is commodified, managed and anticipated in the present, as opposed to *future presents* or how the present develops into the future (Brown and Michael, 2003). This results in part from a shared adherence to principles of performativity, with both fields approaching futures as ‘substantive representations’ that are performed and managed in the present (Michael, 2000). CSS scholar Anderson (2010, p. 778) writes for example that underneath ‘all forms of anticipatory action is a seemingly paradoxical process whereby a future becomes cause and justification for some form of action in the here and now.’ Similarly in SoE, Van Lente et al. (2013, p. 1626) write that ‘the promises of the future that make up a hype, have a performative capacity in the present as they attract resources, coordinate activities, and spur competition.’

Likewise, both the countermeasures of CSS and the problem and promises of SoE are empty but derivative signifiers, which need to be filled by supporters in particular contexts and accepted by a variety of audiences (Krause and Williams, 2015). SoE scholar Van Lente (2012, p. 774) for example discusses how the practices around desired futures that are hyped on a broader social level in some cases lead to actions that the project managers would have rejected, because in these instances the ‘participants will reason in terms of “not missing the boat”, but the “boat” only exist due to the collective decision not to miss it’. Massumi (2005) similarly discusses how people are governed based on security threat schemes, like the colour coded terrorist threat levels in various countries, without ever experiencing the fear of the threat itself. As such, both theories depict logics that are intersubjective – they exist in-between social agents, not objectively or purely subjectively in the minds of individuals. Furthermore, both logics can be applied to multiple and constantly shifting referent objects. The moment we are safe, we find new insecurities. Likewise, a new promise emerges the moment a promise is reached or deemed a lost cause (when the hype bursts or a technology is abandoned).

Furthermore, both theoretical fields have a similar notion of what happens when these representations – either promises or threats

³ Securitization is only one of the elements of the wider security framework of the ‘Copenhagen School’, which also includes a focus on sectors (each with their own referent objects and levels of analysis, like the military or the environment) and the notion of security complexes (regional cooperating or conflictual groups of countries). The grammar of Securitization relates to the internal rules that a successful securitization needs to follow in order to generate a plot consisting of a threat, time sensitive urgency and a solution (Buzan et al., 1998, p. 33).

– are performed in the present. For instance, Securitization Theory's (simplified) description of how a speech act offers a description and thereby enacts the self, the other and the referent object, links up to SoE scholar Michael (2000, p. 22) and his description of how performances help shape the 'self, the production of subject positions for readers/viewers, the enrolment and alignment of various others, the bringing into being of a particular state of affairs.' Moreover, authors in both fields argue that an increase in capacity and desire to know the future does not automatically reduce uncertainty. On the contrary, both fields contain arguments that such a desire 'leads to a shared escalation in uncertainty' (Brown and Michael, 2003, p. 6) or a situation where the 'threat is endemic, uncertainty is everywhere; a negative can never be proven' (Massumi, 2009, p. 159).

Of course, SoE and CSS differ in their disciplinary roots and empirical application. As an example, there is quite some work in CSS on border security and the technologies and practices that border security practitioners use to identify and prevent those with nefarious intentions to enter a country (Glouftsiou, 2018). In contrast, SoE has seen various studies focusing on the hype around hydrogen vehicles and their promise of lower emissions in road-based transport (Bakker and Budde, 2012). Where CSS problematizes undesired futures and studies the processes through which they are identified (made known), shared (communicated) and countered, the SoE literature thus seems to problematize the relative success or failure of desired and hyped innovations. This is a distinction that has been observed before, for instance by Adam and Grove writing for future studies, when they differentiate between the practices of getting to know and tame certain 'embedded, embodied, contextual' undesired futures and those desired 'socio-economic activities that seek to shape, form and colonise a future of our own making' (Adam and Groves, 2007, p. 11).

In the next sections, this distinction between the performativity of desirable futures as theorized by SoE and the performative security logic of undesirable futures as presented by Securitization Theory will be analysed more carefully. This is attempted by reading them diffractively: as two overlapping waves with a focus on the differences that emerge from their combination as well as how they strengthen or cancel each other out. Firstly, by analysing the uncertainty behind SoE's desirable futures and how this relates to CSS's notions of uncertainty, and then by focussing on the potential performativity of the desirable aspects behind CSS's undesirable futures with insights from SoE.

4. The uncertainty behind desired futures

In line with our intent to read the SoE literature with the (critical) security studies literature in mind, especially how notions of uncertainty and insecurity return, we note two aspects. First, that the SoE literature with its focus on promises and expectations deliberately moves beyond the initial problematization. And second, that uncertainty and undesired futures do return in various ways in their analyses, indicating moments where agents (implicitly) call on security logics.

Within SoE, the analysis frequently starts when advocates and innovators promote their new technology in response to a problem and with the promise – and later requirement – to solve that. For example, Budde et al. (2012) start their hype-cycle analysis of hydrogen vehicles from the premise that 'concerns about climate change, air quality, and depleting fossil resources raise new priorities' and then question why innovative actors sometimes change their strategies and do so in counterintuitive, if not opposing, directions (p1072). In other words, they move away from the initial problem to the uncertainty surrounding the fulfilment of the technological promise (Borup et al., 2006). To be fair, this is a deliberate move that Berkhout (2006, p. 299) defends when he argues that:

In much contemporary analysis, expectations are typically subordinated within concepts of risk and uncertainty. These point to our (lack of) knowledge about the future, and in particular knowledge of futures over which there may be some control, individually or collectively, but they seem to ignore the more purposive, functional and active ways in which social actors seek to construct, make sense of and shape their futures by making them more concrete in the form of images and visions.

However, in contrast to more traditional security studies (Williams, 2008) or probabilistic and psychological risk studies (Arnoldi, 2009), CSS does acknowledge the performative effects of various present futures (Anderson, 2010). Securitization Theory in particular highlights how much work needs to happen for undesired futures to become accepted, just as all three acknowledge the social force that security practices and discourses exercise once they are in effect. To assume that the problem is valid and widely accepted on a macro or regime level (Geels and Raven, 2006) ignores how much work and support actually is available behind the promise of a new technology. It is not just the performative nature of the promise that draws resources, CSS highlights that it is the (level of) acceptance of the problem's urgency that frees up resources for those promises.

Attention to undesirable futures is further warranted as questions about uncertainty and undesired futures return in SoE beyond the initial undesired future. They are in fact offered as the reason why expectations about the future 'can play such a big role' (van Lente, 2012, p. 776). Uncertainty remains present in SoE in at least four ways. First, they are present as the negative visions and expectations that resist the promised development. A case in point is the Aramis project, a French project to build personal rapid transit based on the non-mechanical platooning of small vehicles, which was cancelled for various reasons including an inability to counter the image that female passengers of these automated vehicles would be vulnerable to attacks from unsavoury individuals in the same car, essentially becoming 'rape wagons' (Latour, 1996, p. 21). In such cases, SoE describes this as a contestation about the value of the promised change and how that leads to a 'moralization' of the desired future as either utopias or dystopias (Berkhout, 2006; Hjerpe and Linnér, 2009). From a Securitization Theory perspective however, such a claim is essentially a (successful) speech act: an attempt to securitize the referent object of women's personal security in transport. In this respect, it is interesting that both SoE and Securitization Theory observe practices that are meant to narrow down and simplify the perceived futures. However, instead of highlighting the urgency of the threat, SoE's practices strategically promote the expectations while they simultaneously 'downplay[] the bad' (Michael, 2000, p. 30) and the many contingencies that lie behind the promise (Brown and Michael, 2003). For CSS this

raises the question to what extent countermeasures – artificially uncoupled from the threat – experience similar practices and downplay the ‘good’.

Second, uncertainty returns in SoE as the likelihood whether the promise will be fulfilled. The focus here lies on the identification and countering of the technological, investment and regulatory mechanisms that generate uncertainty about the emergence of the desired innovation. This too is comparable to security where the audience acceptance of a threat is central (Buzan et al., 1998). However, in CSS the uncertainty behind a threat is often cause for action (Massumi, 2009), whereby an inability to accept a threat and its countermeasures is sometimes framed as a threat itself, especially when it comes to defence or terrorism. The SoE literature in contrast finds occasionally that a certain level of ambiguity or misalignment in the interpretations of an innovation is used strategically to further larger visions of technological development (van Lente et al., 2013). The argument hereby being that a development could initiate many more beneficial opportunities than the ones already imagined, and that an acceptance of this beneficial uncertainty allows for a better alignment of the vision and actual technological developments over time. As mentioned, such an acceptance of uncertainty does not return within Securitization Theory, but it does return in the more governmentality inspired CSS studies. Specifically, Foucauldian inspired security work highlights that there is a difference between power that sets limits on life (sovereign power – the power to kill) and power that secures the circulation of goods, data and people indirectly through their environment so that the flows can move on and are allowed to generate new uncertainties (Dillon and Lobo-Guerrero, 2008; Foucault, 2007). This is similar to how Adam and Groves (2007, p. 41) argue that ‘without processes that produce difference life ceases. The opacity of the future therefore has an ineradicable foundation in this principle of life.’

Third, there is the uncertainty that results from competing promises or desired technologies. The competition between VHS and Beta-Max is an example where two technologies offer a similar service, and thus a similar promise, but propose different ways to get there. Within SoE this is a regular focus area, yet to our knowledge it is not often an explicit topic of study within (critical) security studies (e.g. Kester, 2017), even though competing security claims are acknowledged as a core reason why securitizing moves are rejected or become desecuritized (De Wilde, 2008; Williams, 2008). On the other hand, CSS spends more time analysing how practitioners try to identify various undesired futures. Studies have highlighted a range of different epistemological and ontological logics and approaches identified by CSS scholars as to how practitioners go about when they identify undesired futures (Anderson, 2010; Kester, 2018a). These include different forms of insecurity (risk, uncertainty, threats, dangers, etc.); different logics through which futures are rendered knowable (scenarios, extrapolation, training, and so on); and different logics of securing undesired futures (such as prevention, pre-emption, preparedness, precaution, resilience, and deterrence). To our knowledge, SoE has so far not engaged with different ways that promises or expectations are identified and acted on.

And fourth, SoE acknowledges that any uncertainty about the consequences of technological innovations might hamper their success. In the case of electric mobility this would include concerns about the environmental effects of increased electricity use (Archsmith et al., 2015) or concerns about demand effects on distribution networks (Knezović et al., 2017). An alternative issue includes, for example, the precautionary European debates on genetically modified food where the promise is overruled by the uncertainty of its future effects. As briefly mentioned above, the CSS literature has studied how uncertainty in certain cases reinforces the need to act on a threat, but less attention has been paid in CSS and Securitization Theory particularly to the uncertain effects of countermeasures. Given the routine political nature of governmentality and security practices studies however, this type of consequential uncertainty might offer an interesting point of contrast.

In short, from an SoE perspective undesired futures are a core element behind the cause of the promise, the motivation to follow the promise and a challenge to its success. Consequently, Berkhout argues to ‘see expectations as ‘bids’ about what the future might be like, and which are offered by agents in the context of other expectation bids’ (Berkhout, 2006, p. 301). As bids, expectations contain both objectives and the means or technology to reach those objectives in a particular social setting (Berkhout, 2006). In doing so, the bids offer both a promise to solve a problem and a promise of profit and further services (van Lente, 2016). SoE is yet unclear about the precise factors that bring about the success or failure of expectations, but seeks answers in the inherent attractiveness and timing of desired futures and in the power of those who support and organize themselves around such futures. Within Securitization Theory the speech agent and audience have steadily gained further attention (Balzacq, 2005; Buzan et al., 1998; Côté, 2016; Stritzel, 2012), which might offer insights for SoE’s undertheorized role of both the contextual nature of the position of the ‘advocate’ and audience acceptance (van Lente, 2012). The CSS literature for example discusses that there often are multiple possible audiences and that threats undergo translation and localization across communities (Stritzel, 2014), that these audiences can have multiple roles and can offer either moral and formal support (Roe, 2008), that the acceptability of claims depends on the social capacity and status of the speech actors, or that audience acceptance depends on both internal and external contextual factors: including the audience’s historic reference framework, receptiveness to the claim and ability to reject claims from formal mandates (Balzacq, 2005; Balzacq et al., 2015).

5. The promise behind undesired futures

Where the previous section discussed how SoE touches on uncertainty and undesired futures, this section reflects on the ways that CSS deals with the promise behind emergency countermeasures. The discussion highlights, firstly, the difficulty of studying countermeasures due to the totalitarian tendency of security discourses especially when utilizing Securitization Theory. Secondly, it touches on the role of auxiliary promises within security practices, those that go beyond salvation. Lastly, it ends with a reflection on the different normative positions on security which point to different ‘promises’ and highlight how similar ethical reflections hardly return in SoE.

First, and as mentioned in Section 3, SoE scholars differentiate between general ideas about the future, promises, expectations and

visions. They also differentiate between micro level expectations around a single technology, meso level expectations that enable more than one technology, and macro level expectations that legitimate the opportunities for new technologies on a societal level (Budde et al., 2012). From a CSS perspective, this is of interest as there is very little clarity on different degrees of security, primarily due to the overwhelming binary secure/insecure focus in traditional security studies and early reflective work (Booth, 2007). Similarly, a quick reflection on CSS highlights a relative absence of academic debate on countermeasures and whether they contain what SoE sees as promises or expectations. Williams (2008, p. 9) explains this through the inherent link between a countermeasure and the acceptance of the threat, when he writes:

Asking how security might be achieved implies not only that we know what security means and what it looks like in different parts of the world, but also that there are particular actors which, through their conscious efforts, can shape the future in desired ways. In this sense, how we think about security and what we think a secure environment would entail will unavoidably shape the security policies we advocate.

Basically, countermeasures are perceived as a natural extension of the acceptance of the insecurity, whereby the insecurity justifies and shapes the countermeasure, and vice versa. This clearly is the case in Securitization Theory with its totalizing tendency to approach the threats and countermeasures as one overarching speech act, which potentially hides important ‘auxiliary’ aspects that could help achieve audience acceptance, even for the threat itself.

Second, this might explain why, when one looks for auxiliary aspects of security proposals, one can find more examples in the CSS schools that do not utilize a language of extraordinary threats. For example, when focusing on governmentality approaches to security with their attention to circulations of people, data and goods (Foucault, 2007), the promise of not halting those flows becomes quite important in many of the countermeasures (Leese and Wittendorp, 2018). Rephrased, the promise of a countermeasure is a negation of the insecurity *with minimal impact* on the current state of affairs (yet see Dillon, 1996 who actually argues that the moment a referent object is secured it has already changed because it is “fixed” and set apart). The latest airport security scans, for example, not only minimize the threat of explosives and other undesired products being smuggled through, but are also sold based on the promise of increased passenger convenience and faster passenger throughput for airport management. Alternatively, examples of a promise can be found in more traditional cases as well. For example, in debates about terrorist kit strikes there are those who accept the need for such strikes (thus accepting the threat) but then advocate for drones instead of boots on the ground or pilots in the air as the cheaper option in terms of money and human life (Baggiarini, 2015; Hall and Coyne, 2014).

The notion of a promise thus returns in various forms in CSS. However, it is at this point that the practices around undesired futures differ from those of desired futures, as desired futures run on a promise of a better state of affairs and hence are geared to change the current state of affairs rather than its preservation. The point is that a focus on securing and preserving, which makes security ‘a powerful political tool in claiming attention for priority items in the competition for government attention [and] helps establish a consciousness of the importance of the issues so labelled in the minds of the population at large’ (Buzan, 2008, p. 288), is potentially more powerful than future promises and visions as it is both narrower and more demanding.

On the one hand, security claims are often narrower. Although security claims are not ‘fixed’ or ‘stable’, they are also not seen to have a large ‘degree of interpretative flexibility’. This flexibility is a core finding from SoE in relation to successful expectations, especially when things do not go as expected. In those cases, this flexibility allows for a broader acceptance from both the people working on the project and those in the field or society more broadly (Berkhout, 2006; van Lente et al., 2013). Furthermore, SoE scholars note that expectations showcase cyclical behaviour, as the support and popularity of the promise of a desired future grows and wanes over time. For these scholars, the lesson is that promised futures are used and adapted strategically and that they act as a resource, albeit one that offers no guarantee for the future (van Lente et al., 2013). Security sees similar cyclical attention spans, but often in response to events that could have been secured better.

And on the other, security claims are to some extent also more demanding. Particularly, we would argue that SoE downplays the call for urgency, agenda-setting and resources inherent to the undesired future, like climate change, that a particular technology promises to solve. That in such cases, it is less the promise of the innovation as it is the acceptance of the undesired future that is most strongly and directly related to the level of public support for subsidies and ‘protected spaces’ (Konrad, 2006; van Lente and Bakker, 2010). In other words, the urgency of threats at times surpasses additional desirable elements like convenience or efficiency. Without an understanding of the way undesired futures are performed, and the full ethical implications that come with securing through specific countermeasures (social exclusions in particular), SoE subsumes, or at a minimum equalizes, the two performative logics that are identified by SoE and Securitization Theory.

Lastly, a complicating factor regarding the promise behind countermeasures is that there are different perspectives about the normative value of security that go beyond SoE’s moralization in terms of utopias and dystopias. Within CSS, some scholars argue that security is a failure of democratic processes and thus that the countermeasures are anti-democratic (Neocleous, 2008). Others argue that security is a neutral logic that is positive or negative depending on the arrangement of the countermeasure and the relative position of the actor and observer (De Wilde, 2012; Foucault, 2007). And some within the Aberystwyth School who argue that security is a positive logic that is meant to be used to enact change through properly chosen countermeasures (Booth, 2007). Such fundamental differences highlight the political nature of undesired futures and raise awareness to the strategic use of security language by some and for some. Moreover, these fundamental differences also partly explain why CSS is not clear on what makes a future desired or undesired. CSS scholars principally follow the interpretation of the agents involved by repeating, critiquing or analytically reflecting on the insecurity that the agents discuss politically. Less often, they reflect on the absence of security in cases that scholars deem it necessary (Booth, 2007; Hansen, 2000) or on the presence of security where it should not be: for instance when security is commercialized and privatized, and private security parties gain an active interest in performing new or further

insecurities (Leander, 2005). This relates to SoE where the origin of what makes something desirable is likewise contextually, politically and socially mediated – as per the self-reinforcing hypes around new technologies. SoE however, to our knowledge, has limited reflections on the wider ethical and social effects that could result from particular technological visions and hypes.

Both desired and undesired futures are thus imagined and performed in the present through ‘anticipatory action’ (Anderson, 2010). Their illocutionary performances follow similar modes of reasoning but focus on different elements of an event. Just as the securing of undesired futures is based on a recognition of the threat and the promise of a solution (and often comes with some level of sacrifice), the desired futures offer a promise for a better life following a promise to solve a problem and/or offer additional services, rents and comfort. While CSS can learn from this, SoE could look at CSS for its various explanations and approaches to undesirable futures, wider ethical awareness and a stronger differentiation between the performativity that results from both desirable and undesirable futures. Taking a step back, the analysis further highlights that with multiple actors and audiences the same future can be both desirable and undesirable to different people at the same time. In some cases different actors have different normative expectations of the same future, in others, technological promises are explicitly stated to counter undesired futures and the threat-promise interaction is itself entangled. Hence, instead of merging these literatures, we propose to keep them analytically separate but to acknowledge the real-life entanglement of the respective problematizations and solutions.

6. The present future of electric mobility

In this section, we exemplify the insights from the diffractive reading above by drawing on both sets of literature in relation to the narrative around electric vehicle development. Specifically, this section studies electric vehicles both as a solution for undesired futures and as a technology that is sold on the promise of a better future. As mentioned, this section draws on secondary literature about the evolution of EVs as an alternative vehicle technology plus raw qualitative data (on specific instances of expectations and insecurities) and the various already completed meta-analyses on the main transport, energy and EV benefits and challenges in the Nordics. Table 4 summarizes the various CSS and SoE speech acts that one can observe in the Nordic EV debate using the grammar of Securitization Theory adapted to SoE. Importantly, while we separate the promise of EVs (hope) from the uncertainty and counter discourses (hype) around them in Table 4, their close interaction means we take them together in Section 6.2.

6.1. Hell: EVs as a solution for undesired futures

A reflection on the last 10 years of EV development and deployment in comparison to the earlier waves of electric mobility in the 1970s and 1990s offers roughly three core reasons why EVs are on their way to mass market deployment since 2005 (IEA, 2018). First, technological development in its broadest sense (e.g. including supply chain management, ICT developments, etc.) and especially developments in Li-ion battery technology, as well as business experience with consumer batteries, made it possible to foresee a future business case that is slowly becoming reality (Bohnsack et al., 2014; Weldon et al., 2018). Subsequently, second, the advent of new market players like Tesla and the bold decisions by traditional companies like Nissan, shifted the narrative around EVs from vehicles, like the Buddy and EV1, that are ‘like driving a toaster’ [DK1] to vehicles that are ‘the sick thing to have’ [NO] now. This applies to consumers but also to other car companies who took heart from the Tesla Roadster (showcasing the use of Li-ion battery

Table 4
Hope, Hype and Hell of Nordic Electric Vehicles.

	Hell: The undesired future	Hope: The promise of EVs	Hype: The undesired nature of EVs
Referent object	A liveable planet	Continued (private) automobility	Continued (private) automobility, electricity grids, liveable planet, urban environment
Speech actor	Climate advocates, EV developers and charging companies, increasingly local governments	EV developers and charging companies, climate advocates, some local (and national) governments	Initially inexperienced consumers and early EV test drivers, traditional car industry (marketing), but now also grid operators, emergency services and cities
Promise / Threat	Resource depletion, health consequences and climate change due to GHG and particle emissions from internal combustion engines	Promise of emission reductions, energy security, quieter propulsion, smoother ride, vehicle-to-grid (battery to help balance the grid and renewable energy’s intermittency), etc.	EVs are seen as expensive, potentially dangerous (fire), as having limited range (stranding), causing local grid stress (peak electricity demand), and to compete for urban space
Expectation / Action	Need to reduce emissions in transport: low-emission vehicles, public transport, active mobility	EVs are a cleaner and better private car: invest in EVs, EV supply chains and charging solutions.	EVs are (1) a step down compared to internal combustion engine vehicles or (2) a necessity but carefully integrated in wider sustainability transport policies
Audience	Primarily national governments, but also general public and car-buyers, and incumbent high-emission industries	Primarily national and local government (incl. finance ministries), but also general public / tax payers, and new car buyers	Primarily car owners and new car buyers, but also national and local governments, tax payers and EV and charging infrastructure developers
Facilitating conditions	System of automobility (roads, distances, build environment, etc.), natural ecosystem, academia and media	System of automobility, media and academia, fossil fuel companies, social networks; related technological sectors (batteries, ICT)	System of automobility, media and social networks (word-to-mouth), car supply chains

technology in cars) as well as the Toyota Prius (for jumpstarting hybrid engine technologies) and the affordable Nissan Leaf (for showing that it is possible to build a reasonably priced ‘normal’ family EV). Third, and what we would argue here, is that this took place in conjunction with developments in renewable energy sources, like household solar panels, and generally a much broader and shared acceptance of climate change and local pollution as security threats as opposed to the 1990s, especially by companies and governments, both local and national.

From a (critical) security perspective, the problematization of climate change in the 1990s lacked the international recognition by governments, companies and individuals that it has gained since. Basically, an argument can be made that the security claims of climate change, fuel dependency and local pollution were accepted by some, but not by enough for the extraordinary interventions to keep the EV momentum going and overcome the technological and economic challenges that remained. In contrast, the third wave of EVs came at a time of increasingly broad international recognition of climate change, increasing urban concerns and experience with smog, and a renewed attention to oil dependency. In other words, it came at a time of a broader – but not complete – acceptance of these issues and the need to act on them (Dijk et al., 2013; Wells and Nieuwenhuis, 2012).

This became clear in our research when we asked experts and focus group participants to discuss the main energy and transport challenges. While the focus groups primarily discussed public transport limitations and costs, long distances, local weather conditions, and issues surrounding fossil and nuclear power generation, the experts offered a wider range of 44 distinct transport and 40 distinct energy challenges. On the transport side, the top five challenges included (1) the fossil fuel intensity of transport (42 % of the interviews), (2) long travel distances (17 %), (3) the state of public transport (16 %), (4) road congestion (15 %) and (5) local population density (10 %) (Sovacool et al., 2018b). For energy in turn, the experts discussed (1) the integration of renewables (15 %), (2) the electrification of transport and other sectors (11 %), (3) the management of intermittency in electricity generation from wind and solar sources (9%), (4) carbon intensity and climate change (8%), and (5) supporting local electricity grids (8%) (Sovacool et al., 2018a).

Although influenced by Nordic geography and weather patterns, these challenges clearly are climate inspired and drive home the need for measures to counter the climate and environmental impact of both transport and energy generation, which are responsible for respectively 24 % and 42 % of the world’s CO₂ emissions from fuel combustion in 2015 (IEA, 2017). In the Nordic region, transport is even responsible for 42 % of total energy-related greenhouse gas emissions, which is partly due to the high share of renewable electricity generation (Nordic Energy Research and IEA, 2016, p. 61). As R154 summarized the main transport challenge for Finland: *‘emissions reduction is the main challenge in the transportation system.’*

The acceptance of this challenge, we argue, follows various moves to secure climate change by academics (Barnett, 2003; Dalby, 2014; Gemenne et al., 2014) and various non-academic organizations over many years, as reflected on within CSS (Corry, 2012; Methmann and Rothe, 2012; Buzan et al., 1998). In response, political objectives have been set in the Nordics (Sovacool et al., 2018b), and with those, in a SoE sense, come requirements and expectations about various technologies. Yet, a closer look at the promise of renewable electricity generation for example quickly indicates that these requirements themselves are problematized if not securitized. As R82 explains for Denmark:

We have an objective that in 2035, it is all renewable energy in Denmark. Everything. And I think in 2020 we have eighty percent renewable. That’s a lot. So, we need to have more flexible consumption, energy consumption, and we need to use more electricity. We basically need to change the entire system.

In other words, in line with CSS, this is not depicted as a normal state of affairs, but as something extraordinary. Furthermore, it comes with challenges that need to be tackled, like intermittency. R128, again for Denmark:

In general, I think the greatest challenge is that we will have a lot of renewable energy integrated and mainly wind power energy, and this is fluctuating according to weather conditions, and the same with the PV, which is the sector that is starting up to be installed. All of this production is very much fluctuating so we have to balance this, and secondly also that it is actually replacing some of the central power plants which were, let’s say, back up - providing ancillary service and a balancing function - so we have to have something else to replace that. So, there’s a whole set of balancing issues, where to store all the energy, how to get the best efficiency out of the energy, now that we have decided we should have this amount of renewable energy integrated.

Or in Finland, where it was directly phrased in terms of security of supply by R160, an electricity grid expert:

Of course, the security of supply issues, because quite a lot of renewable [energy] has already come and still is coming to the market, so that we have the balance between production and consumption. That is the challenge in the near future. For example, we now have this strategic reserve which is like... at least for some years to ensure that we have enough capacity, but in the long term we need to develop demand side flexibility. [...] At the moment, or maybe in the near future, a challenge will be that we don’t have enough flexible production capacity, and the same solution is, at least part of the solution is that demand side...

Basically, from a security of supply perspective the acceptance of climate change and the need for renewable electricity generation has resulted in a situation where the old solutions to intermittency and security of supply are no longer viable (diesel generators and gas fired powerplants). The acceptance of climate change, by Nordic transport policy makers at least, has moved the debate into a new security discourse where the answers are sought elsewhere, among others in the emission reductions and fast responding battery storage that are promised by EV advocates.

6.2. Hope and Hype: performing the future through a desire for EVs

A concurring explanation for the recent success of EVs could draw on SoE and its argument that EVs failed to materialize earlier because the technology failed to live up to its promises. The transition literature in fact offers four main reasons why EVs failed to reach mass markets before 2005, including 1) the state of the technology and its business case, in particular regarding battery technology (Orsato et al., 2012), 2) the resistance of incumbents, especially car manufacturers (Dijk et al., 2013; Zarazua de Rubens et al., 2018), 3) the competing promises from alternative technologies like fuel cell vehicles and biofuels in alternating hope and hype cycles (Dijk et al., 2013; Geels, 2012), and 4) because of consumer preference for cars that deviated less from their current models (Dijk, 2011). In other words, the justifications for the failure of earlier EV programs are sought across a range of factors, except in the support for EVs (and other low-emission vehicle technologies) following a more successful securitization of transport emissions. Together however, these expectations and the underlying securitization point to a threefold promise of EVs. The promise of electric mobility centres (1) on the climate reduction capacity of EVs, (2) on the ability of the EV industry to live up to its promise of full deployment, and (3) on its implicit consumer promise (or ascribed expectation) to substitute existing vehicles with newer and cleaner EVs.

First, the general promises of a reduction of global greenhouse gas emissions and a reduction of local particular emissions are central to EV development, ever since the 1970s. This was confirmed by our expert interviews, with over 73 % of the interviews claiming it as the core benefit of EVs (Noel et al., 2018), and some, like R232 in Norway, stating at a later moment: *'the whole picture is the decarbonization... We didn't mention it because it is so obvious.'* This obviousness, however, is the result of years of work. The previous section already discussed how the securitization of this issue slowly increased, leading to more public support measures favouring vehicles that fulfil this promise. However, CSS in particular highlights multiple audiences, which implies that the promise ultimately needs to convince not only policy makers but buyers as well, both fleet owners and private owners, especially given the still higher purchase price for EVs. It is here that one can find more diverging positions. Among our focus group participants for example there was a greater variance of opinion towards the environmental benefits of EVs. In Denmark, a male focus group participant remarked for instance that *'I'm not really sure whether it is really a green car, because most of the electricity that it is using is not green. So, it's polluting somewhere but not where it is driving'* [DK1]. Similarly, in Finland a male participant stated that there are *'still conflicting theories or studies whether [an EV] is more efficient during its lifetime compared with normal cars'* [FIN2]. This might explain contradictory findings over the years about the importance of a vehicle's environmental impact for the purchase intention of consumers, which is found to be a significant positive factor in some studies (Bunch et al., 1993; Kurani et al., 1994; or the overview of post 2010 studies in Liao et al., 2017) but not a deciding factor in others (Dijk, 2011; Flamm and Agrawal, 2012; Mills, 2008). In short, while the increased acceptance of transport related climate change, as a security claim, might have convinced public authorities and experts in certain regions to support the promise of EVs and low emission transport, this does not completely equate to consumers.

Second, the promise behind EVs not only solves a problem but also contains an expectation that it is possible to do so, by developing and scaling up the technology and by offering a valid business case. To be clear, this did not suddenly derive from an intrinsic interest by existing car manufacturers, although most car manufacturers have or shortly will have EVs in their portfolio (IEA, 2018). Instead, further down the supply chain it was recently found that car dealerships still have inherent incentives not to promote EVs (Zarazua de Rubens et al., 2018). Earlier, Orsato et al. (2012) contributed the renewed technological and business case developments around EVs to an entanglement of developments that together create a happy ecosystem which includes incentives (European and Californian emission requirements and public support), technological developments (Li-ion batteries, hybrid engine technology, high-speed charging, etc.), and somewhat favourable market conditions (e.g., initial high fuel prices, renewable energy interest, developments and awareness). However, as both the direct and indirect incentives and some of the market conditions lean heavily on public measures as a means to conquer the uncertainty behind EV development and as a means to overcome incumbent resistance, this returns the argument to the acceptance and willingness of public authorities to act on the threat of climate change.

Third, the interaction between these first two promises opens up to a third expectation that is ascribed to the promise of EVs. Budde et al. (2012) show how car companies have certain expectations about consumers, but we would argue, in line with Selin (2008), that the reverse is true as well. Earlier work in this respect suggest that consumer preferences regarding the range, price, functionality and environmental impact of EVs have been rather consistent across the 1990s and the period after 2005 (Dijk, 2011). In other words, consumer expectations about what an EV should be have remained relatively stable. This implies that the initial vehicles did not live up to these expectations, at least not to the extent that climate security and emission reductions overpowered them. During the interviews, our experts for example generalized how consumers perceived EVs, highlighting not just their issues with the purchase price, but also their uncertainty about range [e.g., R42, R46, R72, R164], the life time of the batteries [e.g., R17, R30], what to do in time of emergencies [e.g., R79], how and where to charge [e.g., R34], an EVs reliability in adverse weather [e.g., R20, R146, R175], and the vehicle's future value [e.g., R44, R53]. As our first respondent, R1, in Iceland mentioned:

People are afraid because they [don't know what to do] if they have a problem or when they are almost out of battery, and the temperature is cold, and they have to pick up the baby downtown. This is what they don't like.

Or as one of our female Norwegian focus group participants remarked:

It just has to be so common that I have no fears of any complications or whatever. That I'm not afraid of getting stuck in a tunnel for two days. [] Here in the East and the West [of Norway ...] running out of gas is almost impossible, but running out of electricity is actual possible. And what do you do then? Because when you stop with a gas driven car, then you might get someone

to buy some gas and give you a can of gas and you can fill it up and [] drive to a gas station, but what do you do with an electrical car?

This was a position shared by a participant in Finland, who gave it more urgency when claiming that *‘Especially if you’re in a part of the country that’s more sparsely populated and you might not have enough battery, you don’t want to be stranded’* [FIN1]. To be clear, these uncertainties about range and stranding are not just rhetorical reactions to a new unfamiliar technology (Noel et al., 2019), they can be read as a speech act in line with Securitization Theory; as constituting a call to act upon an undesirable future that needs to be prevented or mitigated (Kester, 2019). The security grammar used in these cases empowers the initial rhetorical response, pushing industry to develop products adhering to consumer expectations and governments to subsidize for more public charging.

Simultaneously, experts highlight how these uncertainties, especially the ones about range, charging and reliability, are partly perceptions to be altered with actual experience [e.g., R38, R40, R69, R105, R152, R236]. Of course, experts further note that not all consumers are uncertain, but that EVs excite as well [R44] and furthermore that attempts should be made to make consumers feel ‘secure’ [R1, R114]. In this respect, one can observe in line with the SoE literature that EVs are sold based on additional promises, like *‘being quiet. You can also drive inside buildings. There are a lot of new possibilities with EVs’* [R73]. These possibilities include less tired drivers due to a smoother drive, better performance and superior technology, cost-savings, the integration with the electricity grid and renewable energy generation through vehicle-to-grid or the energy independency resulting from less fossil fuel imports (Noel et al., 2018).

Interestingly, in accordance with insights from the security literature, we also found remarks that confirm that insecurities, once addressed, move to the next insecurity. As R105 explains, with experience *‘the range anxiety disappears’* but *‘we have charge anxiety now. That the charger is taken by one or two other vehicles. That’s the biggest issue.’* In other words, besides the promise and resulting expectation that EVs help reduce the environmental impact of transport (for public authorities) as well as the promise and expectation that the technology and business will get to a point that the EVs are market ready with growth and profit potentials (for and by markets), there is also the implicit expectation that EVs must behave similar or better than existing transport options (consumers) and it is at this point that the promise of EVs finds resistance in security framed warnings and uncertainty.

7. Conclusion

In this paper, we offered a synthetic and diffractive reading of SoE and CSS, as these fields share a focus on the political use of the ‘future’ as deployed in the ‘present’ in order to guide, shape and prioritize certain sustainable technologies and practices over others. Even though CSS studies the politics of threat acceptance and countermeasures and SoE studies the politics of promises around desirable innovations, the resulting crossover between these fields provides a nuanced discussion about the role of desired and undesired futures in the present.

In this paper we argued to take these fields and their underlying performative practices as empirically entangled but analytically separate approaches, and offered an example on electric mobility to showcase some of the insights that can be gained from this intersection. In particular, our analysis on electric mobility in the Nordic region showed how a focus on undesired futures – climate change – can explain regime level changes that go against normal innovation ‘promises’, by supporting technological and business developments in the absence of consumer acceptance. Furthermore, it showed how a focus on insecurity can highlight alternative ascribed expectations that might not fit the promise that is espoused by the advocates of an innovation.

Our reading of SoE and CSS leads to a number of insights. First, the transitions literature needs to more cogently examine the various political effects and performative logics behind present futures, negative or positive. Such logics are central to both the struggles between niches and regimes in multi-level perspective and the actors in transition management, and highlight the need to engage with the discourses and politics that agents at all levels utilize to advocate their various positions (Avelino et al., 2016; Geels, 2014; Patterson et al., 2017). In this respect, utilizing some of the security insights from CSS might help SoE gain a better grip on the advocates (speech actors) and subsequent audience acceptance of particular promises and visions.

Second, the SoE and transitions literature need to be more aware of the underlying security-based performative practices behind desired innovations, including its inherent urgency and authority as well as the broader ethical and social consequences that come with. Desire alone might incentivize innovations that further ease daily routines, but undesired futures incentivize and/or enforce sustainable innovations for which ‘sacrifices’ need to be made. This is especially important for socially and environmentally desirable innovations and transitions that offer few direct individual benefits. Furthermore, in relation to the broader ethical and social consequences, it is worth studying whether only security excludes groups in society or that desirable visions contain social exclusions as well. We suggest they do (Sovacool et al., 2019b), which calls for a need in SoE to be aware of broader ethical consequences of visions and promises. This potential intellectual fecundity is not unidirectional. In turn, CSS could engage more with the contextually ascribed audience expectations about acceptable countermeasures (limiting the range of options) and with the desirability of security measures and their additional services more generally.

Lastly, upcoming research on the ‘present future’ in sustainability transitions should continue to engage reflexively and diffractively with other potential literatures, beyond the scope of this paper. For example, the diffractive reading presented here highlights that SoE and CSS both draw on notions of risk and uncertainty as mediating concepts between desired and undesired futures. While the more positivist approach of the traditional risk governance literature might not be comparable with the performative focus of SoE and CSS, recent developments around a *relational theory of risk* with its culturally informed risk interpretations could offer more common ground (Boholm and Corvellec, 2011; Bohholm et al., 2015; Burgess, 2019). This is especially true if taken together with work in CSS on the performativity of risk that discusses how risk and security practices are moving away from the

extrapolation of past trends to the pre-mediation of possible futures (Grusin, 2004) and thus from risk probabilities to risk possibilities (Amoore, 2013). Risk, whether probable or possible, mediates fears and desires against a background of uncertainty by commodifying past trends and future expectations. As such, risk too performs particular futures in the present, while emphasising the thin line between desired and undesired futures as it points to the actual risk thresholds and how those are inspired by sociotechnical and environmental contexts (Groves, 2017) yet frequently perceived differently by individuals.

In short, the intersection of security, expectation, fear, and desire presented here offers a promising avenue to reveal that uncertainty itself is politically open and performative of the sociotechnical systems behind sustainable transitions of mobility, energy and other sectors in more ways than either of these literatures alone currently depicts.

Acknowledgements

The authors are appreciative to the participants of the focus groups and expert interviews for their openness and the generous use of their time. We also thank Xiao Lin for her help with some of the interviews, and the Research Councils United Kingdom (RCUK) Energy Program Grant EP/K011790/1 “Center on Innovation and Energy Demand,” and the Danish Council for Independent Research (DFF) Sapere Aude Grant 4182-00033B “Societal Implications of a Vehicle-to-Grid Transition in Northern Europe,” which have supported elements of the work reported here. Any opinions, findings, conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the respondents, the RCUK Energy Program or the DFF.

References

- Adam, B., Groves, C., 2007. *Future Matters: Action, Knowledge, Ethics*. Brill, Leiden and Boston.
- Amicelle, A., Aradau, C., Jeandesboz, J., 2015. Questioning security devices: performativity, resistance, politics. *Secur. Dialogue* 46, 293–306. <https://doi.org/10.1177/0967010615586964>.
- Amoore, L., 2013. *The Politics of Possibility: Risk and Security Beyond Probability*. Duke University Press, Durham and London.
- Anderson, B., 2007. Hope for nanotechnology: anticipatory knowledge and the governance of affect. *Area* 39, 156–165. <https://doi.org/10.1111/j.1475-4762.2007.00743.x>.
- Anderson, B., 2010. Preemption, precaution, preparedness: anticipatory action and future geographies. *Prog. Hum. Geogr.* 34, 777–798. <https://doi.org/10.1177/0309132510362600>.
- Aradau, C., 2010. Security that matters: critical infrastructure and objects of protection. *Secur. Dialogue* 41, 491–514. <https://doi.org/10.1177/0967010610382687>.
- Aradau, C., Huysmans, J., Neal, A., Voelkner, N. (Eds.), 2015. *Critical Security Methods: New Frameworks for Analysis*. Routledge, London and New York.
- Aradau, C., Huysmans, J., Neal, A., Voelkner, N. (Eds.), 2015. Introducing Critical Security Methods, in: *Critical Security Methods: New Frameworks for Analysis*. Routledge, London and New York, pp. 1–22.
- Archsmith, J., Kendall, A., Rapson, D., 2015. From cradle to junkyard: assessing the life cycle greenhouse gas benefits of electric vehicles. *Research in Transportation Economics, Sustainable Transportation* 52, 72–90. <https://doi.org/10.1016/j.retrec.2015.10.007>.
- Arnoldi, J., 2009. *Risk. Polity*.
- Austin, J.L., 1975. *How to Do Things With Words*, 2nd ed. Harvard University Press, Cambridge, Mass.
- Avelino, F., Grin, J., Pel, B., Jhagroe, S., 2016. The politics of sustainability transitions. *J. Environ. Policy Plan.* 18, 557–567. <https://doi.org/10.1080/1523908X.2016.1216782>.
- Aven, T., Renn, O., 2009. On risk defined as an event where the outcome is uncertain. *J. Risk Res.* 12, 1–11. <https://doi.org/10.1080/13669870802488883>.
- Baggiarini, B., 2015. Drone warfare and the limits of sacrifice. *J. Int. Political Theory* 11, 128–144. <https://doi.org/10.1177/1755088214555597>.
- Bakker, S., Budde, B., 2012. Technological hype and disappointment: lessons from the hydrogen and fuel cell case. *Technol. Anal. Strateg. Manag.* 24, 549–563. <https://doi.org/10.1080/09537325.2012.693662>.
- Bakker, S., Van Lente, H., Meeus, M., 2011. Arenas of expectations for hydrogen technologies. *Technol. Forecast. Soc. Change* 78, 152–162. <https://doi.org/10.1016/j.techfore.2010.09.001>.
- Balzacq, T., 2005. The three faces of securitization: political agency, audience and context. *Eur. J. Int. Relat.* 11, 171–201.
- Balzacq, T., Léonard, S., Ruzicka, J., 2015. ‘Securitization’ revisited: theory and cases. *Int. Relat.* 30, 494–531. <https://doi.org/10.1177/0047117815596590>.
- Barad, K., 2007. Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning. Duke University Press, Durham and London.
- Barad, K., 2011. Erasers and erasures: pinch’s unfortunate ‘uncertainty principle.’ *Soc. Stud. Sci.* 41, 443–454. <https://doi.org/10.1177/0306312711406317>.
- Barnett, J., 2003. Security and climate change. *Glob. Environ. Chang. Part A* 13, 7–17.
- Berkhout, F., 2006. Normative expectations in systems innovation. *Technol. Anal. Strateg. Manag.* 18, 299–311. <https://doi.org/10.1080/09537320600777010>.
- Bigo, D., 2014. The (in)securitization practices of the three universes of EU border control: Military/Naval – border guards/police – database analysts. *Secur. Dialogue* 45, 209–225. <https://doi.org/10.1177/0967010614530459>.
- Bohnsack, R., Pinkse, J., Kolk, A., 2014. Business models for sustainable technologies: exploring business model evolution in the case of electric vehicles. *Res. Policy* 43, 284–300. <https://doi.org/10.1016/j.respol.2013.10.014>.
- Boholm, Å., Corvellec, H., 2011. A relational theory of risk. *J. Risk Res.* 14, 175–190. <https://doi.org/10.1080/13669877.2010.515313>.
- Boholm, M., Arvidsson, R., Boholm, Å., Corvellec, H., Molander, S., 2015. Dis-Ag-reement: the construction and negotiation of risk in the Swedish controversy over antibacterial silver. *J. Risk Res.* 18, 93–110. <https://doi.org/10.1080/13669877.2013.879492>.
- Booth, K., 2007. *Theory of World Security*. Cambridge University Press, Cambridge, NY.
- Borup, M., Brown, N., Konrad, K., Van Lente, H., 2006. The sociology of expectations in science and technology. *Technol. Anal. Strateg. Manag.* 18, 285–298.
- Brown, N., Michael, M., 2003. A sociology of expectations: retrospectively prospecting and prospecting retrospectively. *Technol. Anal. Strateg. Manag.* 15, 3–18.
- Budde, B., Alkemade, F., Weber, K.M., 2012. Expectations as a key to understanding actor strategies in the field of fuel cell and hydrogen vehicles. *Technological Forecasting and Social Change, Contains Special Section: Actors, Strategies and Resources in Sustainability Transitions* 79, 1072–1083. <https://doi.org/10.1016/j.techfore.2011.12.012>.
- Bunch, D.S., Bradley, M., Golob, T.F., Kitamura, R., Occhiuzzo, G.P., 1993. Demand for clean-fuel vehicles in California: a discrete-choice stated preference pilot project. *Transportation Research Part A: Policy and Practice, Special Issue Energy and Global Climate Change* 27, 237–253. [https://doi.org/10.1016/0965-8564\(93\)90062-P](https://doi.org/10.1016/0965-8564(93)90062-P).
- Burgess, A., 2019. Environmental risk narratives in historical perspective: from early warnings to ‘risk society’ blame. *J. Risk Res.* 0, 1–15. <https://doi.org/10.1080/13669877.2018.1517383>.
- Buzan, B., 2008. *People, States & Fear: An Agenda for International Security Studies in the Post-Cold War Era*. ECPR Press.
- Buzan, B., Weaver, O., de Wilde, J.H., 1998. *Security: a New Framework for Analysis*. Lynne Rienner Pub, Boulder, Colorado.
- C.A.S.E Collective, 2006. *Critical approaches to security in Europe: a networked manifesto*. *Secur. Dialogue* 37, 443–487.
- Calhoun, C., 2004. A world of emergencies: fear, intervention, and the limits of cosmopolitan order. *Canadian Review of Sociology* 41, 373–395. <https://doi.org/10.1111/j.1755-618X.2004.tb00783.x>.

- Christou, O., Adamides, C., 2013. Energy securitization and desecuritization in the New Middle East. *Secur. Dialogue* 44, 507–522. <https://doi.org/10.1177/0967010613499786>.
- Corry, O., 2012. Securitisation and 'riskification': second-order security and the politics of climate change. *Millennium-Journal of International Studies* 40, 235–258.
- Côté, A., 2016. Agents without agency: assessing the role of the audience in securitization theory. *Secur. Dialogue* 47, 541–558. <https://doi.org/10.1177/0967010616672150>.
- Dalby, S., 2014. Rethinking geopolitics: climate security in the Anthropocene. *Int. J. S.* 5, 1–9. <https://doi.org/10.1111/1758-5899.12074>.
- De Wilde, J.H., 2008. Environmental security deconstructed. In: Brauch, H.G., Spring, Ú.O., Mesjasz, H.C., Grin, J., Dunay, P., Behera, N.C., Chourou, B., Kameri-Mbote, P., Liotta, P.H. (Eds.), *Globalization and Environmental Challenges, Hexagon Series on Human and Environmental Security and Peace*. Springer, Berlin Heidelberg, pp. 595–602.
- De Wilde, J.H., 2012. In: Floyd, R. (Ed.), *Security and the Environment: Securitisation Theory and US Environmental Security Policy*. Cambridge University Press, New York, pp. 213–214. <https://doi.org/10.1017/S1537592711004750>. 2010. Perspectives on Politics 10.
- Deuten, J.J., Rip, A., 2000. The narrative shaping of a product creation process. *Contested Futures: A Sociology of Prospective Techno-Science*. Ashgate, Aldershot, pp. 65–86.
- Dijk, M., 2011. Technological frames of car engines. *Technol. Soc.* 33, 165–180. <https://doi.org/10.1016/j.techsoc.2011.03.013>.
- Dijk, M., Orsato, R.J., Kemp, R., 2013. The emergence of an electric mobility trajectory. *Energy Policy* 52, 135–145. <https://doi.org/10.1016/j.enpol.2012.04.024>.
- Dillon, M., 1996. *Politics of Security: Towards a Political Philosophy of Continental Thought*. Routledge, London and New York.
- Dillon, M., Lobo-Guerrero, L., 2008. Biopolitics of security in the 21st century: an introduction. *Rev. Int. Stud.* 34, 265–292.
- Eames, M., McDowall, W., Hodson, M., Marvin, S., 2006. Negotiating contested visions and place-specific expectations of the hydrogen economy. *Technol. Anal. Strateg. Manag.* 18, 361–374. <https://doi.org/10.1080/09537320600777127>.
- Flamm, B.J., Agrawal, A.W., 2012. Constraints to green vehicle ownership: a focus group study. *Transp. Res. D Transp. Environ.* 17, 108–115. <https://doi.org/10.1016/j.trd.2011.09.013>.
- Foucault, M., 2007. *Security, Territory, Population: Lectures at the Collège de France 1977–1978*. Palgrave Macmillan, New York.
- Geels, F.W., 2012. A socio-technical analysis of low-carbon transitions: introducing the multi-level perspective into transport studies. *J. Transp. Geogr.* 24, 471–482. <https://doi.org/10.1016/j.jtrangeo.2012.01.021>.
- Geels, F.W., 2014. Regime resistance against low-carbon transitions: introducing politics and power into the multi-level perspective. *Theory Cult. Soc.* 31, 21–40. <https://doi.org/10.1177/0263276414531627>.
- Geels, F., Raven, R., 2006. Non-linearity and expectations in niche-development trajectories: ups and downs in dutch biogas development (1973–2003). *Technol. Anal. Strateg. Manag.* 18, 375–392. <https://doi.org/10.1080/09537320600777143>.
- Gemene, F., Barnett, J., Adger, W.N., Dabelko, G.D., 2014. Climate and security: evidence, emerging risks, and a new agenda. *Clim. Change* 123, 1–9. <https://doi.org/10.1007/s10584-014-1074-7>.
- Glouftsiou, G., 2018. Governing circulation through technology within EU border security practice-networks. *Mobilities* 13, 185–199. <https://doi.org/10.1080/17450101.2017.1403774>.
- Groves, C., 2017. Emptying the future: on the environmental politics of anticipation. *Futures, The Politics of Anticipation: On knowing and governing environmental futures* 92, 29–38. <https://doi.org/10.1016/j.futures.2016.06.003>.
- Grusin, R.A., 2004. Premediation. *Criticism* 46, 17–39. <https://doi.org/10.1353/crt.2004.0030>.
- Hall, A.R., Coyne, C.J., 2014. The political economy of drones. *Def. Peace Econ.* 25, 445–460. <https://doi.org/10.1080/10242694.2013.833369>.
- Hansen, L., 2000. The little mermaid's silent security dilemma and the absence of gender in the Copenhagen School. *Millenn. - J. Int. Stud.* 29, 285–306. <https://doi.org/10.1177/03058298000290020501>.
- Hjerpe, M., Linnér, B.-O., 2009. Utopian and dystopian thought in climate change science and policy. *Futures* 41, 234–245. <https://doi.org/10.1016/j.futures.2008.09.007>.
- IEA, 2017. *CO2 Emissions From Fuel Combustion 2017 - Highlights*. OECD / International Energy Agency.
- IEA, 2018. *Global EV Outlook 2018: Towards Cross-modal Electrification*. OECD / International Energy Agency, Paris.
- Kester, J., 2017. Energy security and human security in a Dutch gasquake context: a case of localized performative politics. *Energy Res. Soc. Sci.* 24, 12–20. <https://doi.org/10.1016/j.erss.2016.12.019>.
- Kester, J., 2018a. *The Politics of Energy Security: Critical Security Studies, New Materialism and Governmentality*. Routledge.
- Kester, J., 2018b. Governing electric vehicles: mobilizing electricity to secure automobility. *Mobilities* 13, 200–215. <https://doi.org/10.1080/17450101.2017.1408984>.
- Kester, J., 2019. Security in transition(s): the low-level security politics of electric vehicle range anxiety. *Secur. Dialogue*. <https://doi.org/10.1177/0967010619871443>. 0967010619871443.
- Kester, J., Noel, L., Zarazua de Rubens, G., Sovacool, B.K., 2018a. Policy mechanisms to accelerate electric vehicle adoption: a qualitative review from the Nordic region. *Renewable Sustainable Energy Rev.* 94, 719–731. <https://doi.org/10.1016/j.rser.2018.05.067>.
- Kester, J., Noel, L., Zarazua de Rubens, G., Sovacool, B.K., 2018b. Promoting Vehicle to Grid (V2G) in the Nordic region: expert advice on policy mechanisms for accelerated diffusion. *Energy Policy* 116, 422–432. <https://doi.org/10.1016/j.enpol.2018.02.024>.
- Knezović, K., Marinelli, M., Zecchino, A., Andersen, P.B., Traeholt, C., 2017. Supporting involvement of electric vehicles in distribution grids: lowering the barriers for a proactive integration. *Energy* 134, 458–468. <https://doi.org/10.1016/j.energy.2017.06.075>.
- Konrad, K., 2006. The social dynamics of expectations: the interaction of collective and actor-specific expectations on electronic commerce and interactive television. *Technol. Anal. Strateg. Manag.* 18, 429–444. <https://doi.org/10.1080/09537320600777192>.
- Krause, K., Williams, M.C., 2015. *Critical Security Studies: Concepts and Cases*.
- Kriechbaum, M., López Prol, J., Posch, A., 2018. Looking back at the future: dynamics of collective expectations about photovoltaic technology in Germany & Spain. *Technol. Forecast. Soc. Change* 76–87. <https://doi.org/10.1016/j.techfore.2017.12.003>.
- Krueger, R.A., Casey, M.A., 2014. *Focus Groups: A Practical Guide for Applied Research*. SAGE Publications, London.
- Kurani, K.S., Turrentine, T., Sperling, D., 1994. Demand for Electric Vehicles in Hybrid Households: an Exploratory Analysis. 1. pp. 244–256.
- Latour, B., 1996. *Aramis or the Love of Technology*. Harvard University Press, Cambridge, Mass.
- Leander, A., 2005. The power to construct international security: on the significance of private military companies. *Millennium-Journal of International Studies* 33, 803–825.
- Leese, M., Wittendorp, S., 2018. The new mobilities paradigm and critical security studies: exploring common ground. *Mobilities* 13, 171–184. <https://doi.org/10.1080/17450101.2018.1427016>.
- Li, W., Long, R., Chen, H., Geng, J., 2017. A review of factors influencing consumer intentions to adopt battery electric vehicles. *Renewable Sustainable Energy Rev.* 78, 318–328. <https://doi.org/10.1016/j.rser.2017.04.076>.
- Liao, F., Molin, E., van Wee, B., 2017. Consumer preferences for electric vehicles: a literature review. *Transp. Rev.* 37, 252–275. <https://doi.org/10.1080/01441647.2016.1230794>.
- Luhmann, N., 1993. *Risk: a Sociological Theory*. Walter de Gruyter, Berlin and New York.
- Massumi, B., 2005. Fear (the spectrum said). *Positions East Asia Cult. Crit.* 13, 31–48.
- Massumi, B., 2009. National enterprise emergency steps toward an ecology of powers. *Theory Cult. Soc.* 26, 153–185. <https://doi.org/10.1177/0263276409347696>.
- Melton, N., Axsen, J., Sperling, D., 2016. Moving beyond alternative fuel hype to decarbonize transportation. *Nat. Energy* 1, 16013. <https://doi.org/10.1038/nenergy.2016.13>.
- Methmann, C., Rothe, D., 2012. Politics for the day after tomorrow: the logic of apocalypse in global climate politics. *Secur. Dialogue* 43, 323–344. <https://doi.org/10.1177/0967010612450746>.
- Michael, M., 2000. Futures of the present: from performativity to prehension. In: Brown, N., Rappert, B., Webster, A. (Eds.), *Contested Futures: A Sociology of*

- Prospective Techno-Science. Ashgate, Aldershot, pp. 21–39.
- Mills, M.K., 2008. Environmentally-active consumers' preferences for zero-emission vehicles: public sector and marketing implications. *J. Nonprofit Public Sect. Mark.* 19, 1–33. https://doi.org/10.1300/J054v19n01_01.
- Neocleous, M., 2008. *Critique of Security*. Edinburgh University Press, Edinburgh.
- Nerlich, B., Halliday, C., 2007. Avian flu: the creation of expectations in the interplay between science and the media. *Sociol. Health Illn.* 29, 46–65. <https://doi.org/10.1111/j.1467-9566.2007.00517.x>.
- Noel, L., Zarazua de Rubens, G., Kester, J., Sovacool, B.K., 2018. Beyond emissions and economics: rethinking the co-benefits of electric vehicles (EVs) and vehicle-to-grid (V2G). *Transp. Policy (Oxf)* 71, 130–137. <https://doi.org/10.1016/j.tranpol.2018.08.004>.
- Noel, L., Zarazua de Rubens, G., Sovacool, B.K., Kester, J., 2019. Fear and loathing of electric vehicles: the reactionary rhetoric of range anxiety. *Energy Res. Soc. Sci.* 48, 96–107. <https://doi.org/10.1016/j.erss.2018.10.001>.
- Nordic Energy Research, IEA, 2016. *Nordic Energy Technology Perspectives 2016: Cities, Flexibility and Pathways to Carbon-neutrality*. OECD / International Energy Agency and Nordic Energy Research, Stockholm.
- Orsato, R.J., Dijk, M., Kemp, R., Yarime, M., 2012. The electrification of automobility: the bumpy ride of electric vehicles toward regime transition. In: Geels, F.W., Kemp, R., Dudley, G., Lyons, G. (Eds.), *Automobility in Transition?: A Socio-Technical Analysis of Sustainable Transport*. Routledge, New York & London, pp. 205–228.
- Patterson, J., Schulz, K., Vervoort, J., van der Hel, S., Widerberg, O., Adler, C., Hurlbert, M., Anderton, K., Sethi, M., Barau, A., 2017. Exploring the governance and politics of transformations towards sustainability. *Environ. Innov. Soc. Transit.* 24, 1–16. <https://doi.org/10.1016/j.eist.2016.09.001>.
- Reese, K.G., 2016. Accelerate, reverse, or find the off ramp? Future automobility in the fragmented American imagination. *Mobilities* 11, 152–170. <https://doi.org/10.1080/17450101.2015.1097037>.
- Rezvani, Z., Jansson, J., Bodin, J., 2015. Advances in consumer electric vehicle adoption research: a review and research agenda. *Transp. Res. D Transp. Environ.* 34, 122–136. <https://doi.org/10.1016/j.trd.2014.10.010>.
- Roe, P., 2008. Actor, audience (s) and emergency measures: securitization and the UK's decision to invade Iraq. *Secur. Dialogue* 39, 615–635.
- Roeser, S. (Ed.), 2012. *Handbook of Risk Theory: Epistemology, Decision Theory, Ethics, and Social Implications of Risk*. Dordrecht; Springer, New York.
- Schick, L., Winthereik, B.R., 2013. Innovating relations-or why smart grid is not too complex for the public. *Sci. Technol. Stud.* 26, 82–102.
- Schot, J., Geels, F.W., 2008. Strategic niche management and sustainable innovation journeys: theory, findings, research agenda, and policy. *Technol. Anal. Strateg. Manag.* 20, 537–554. <https://doi.org/10.1080/09537320802292651>.
- Sehgal, M., 2014. Diffractional propositions: reading Alfred North Whitehead with Donna Haraway and Karen Barad. *Parallax* 20, 188–201. <https://doi.org/10.1080/13534645.2014.927625>.
- Selin, C., 2008. The sociology of the future: tracing stories of technology and time. *Sociol. Compass* 2, 1878–1895. <https://doi.org/10.1111/j.1751-9020.2008.00147.x>.
- Sovacool, B.K., Kester, J., Zarazua de Rubens, G., Noel, L., 2018a. Expert perceptions of low-carbon transitions: investigating the challenges of electricity decarbonisation in the Nordic region. *Energy* 148, 1162–1172. <https://doi.org/10.1016/j.energy.2018.01.151>.
- Sovacool, B.K., Noel, L., Kester, J., Zarazua de Rubens, G., 2018b. Reviewing Nordic transport challenges and climate policy priorities: Expert perceptions of decarbonisation in Denmark, Finland, Iceland, Norway, Sweden. *Energy* 165, 532–542. <https://doi.org/10.1016/j.energy.2018.09.110>.
- Sovacool, B.K., Kester, J., Noel, L., de Rubens, G.Z., 2019a. Contested visions and sociotechnical expectations of electric mobility and vehicle-to-grid in five Nordic countries. *Environ. Innov. Soc. Transit.* 31, 170–183. <https://doi.org/10.1016/j.eist.2018.11.006>.
- Sovacool, B.K., Kester, J., Noel, L., de Rubens, G.Z., 2019b. Energy injustice and Nordic electric mobility: inequality, elitism, and externalities in the electrification of vehicle-to-grid (V2G) transport. *Ecol. Econ.* 157, 205–217. <https://doi.org/10.1016/j.ecolecon.2018.11.013>.
- Stritzel, H., 2012. Securitization, power, intertextuality: discourse theory and the translations of organized crime. *Secur. Dialogue* 43, 549–567. <https://doi.org/10.1177/0967010612463953>.
- Stritzel, H., 2014. *Security in Translation: Securitization Theory and the Localization of Threat*. Palgrave Macmillan.
- Tyfield, D., 2014. Putting the power in 'socio-technical regimes': E-mobility transition in China as political process. *Mobilities* 9, 585–603. <https://doi.org/10.1080/17450101.2014.961262>.
- Urry, J., 2004. The "system" of automobility. *Theory Cult. Soc.* 21, 25–39. <https://doi.org/10.1177/0263276404046059>.
- van der Tuin, I., 2014. Diffraction as a methodology for feminist onto-epistemology: on encountering Chantal Chawaf and posthuman interpellation. *Parallax* 20, 231–244. <https://doi.org/10.1080/13534645.2014.927631>.
- Van Der Tuin, I., 2011. A different starting point, a different metaphysics: reading Bergson and Barad diffractively. *Hypatia* 26, 22–42. <https://doi.org/10.1111/j.1527-2001.2010.01114.x>.
- van Lente, H., 2012. Navigating foresight in a sea of expectations: lessons from the sociology of expectations. *Technol. Anal. Strateg. Manag.* 24, 769–782. <https://doi.org/10.1080/09537325.2012.715478>.
- van Lente, H., 2016. *How Expectations Matter: the Sociology of Expectations and the Development of Needs*.
- van Lente, H., Bakker, S., 2010. Competing expectations: the case of hydrogen storage technologies. *Technol. Anal. Strateg. Manag.* 22, 693–709. <https://doi.org/10.1080/09537325.2010.496283>.
- van Lente, H., Spitters, C., Peine, A., 2013. Comparing technological hype cycles: towards a theory. *Technol. Forecast. Soc. Change* 80, 1615–1628. <https://doi.org/10.1016/j.techfore.2012.12.004>.
- Van Lente, H., 2000. Forceful Futures: From Promise to Requirement, in: *Contested Futures: A Sociology of Prospective Techno-Science*. Ashgate, Aldershot, pp. 43–64.
- Weber, C., Lacy, M., 2011. Securing by design. *Rev. Int. Stud.* 37, 1021–1043.
- Weldon, P., Morrissey, P., O'Mahony, M., 2018. Long-term cost of ownership comparative analysis between electric vehicles and internal combustion engine vehicles. *Sustain. Cities Soc.* 39, 578–591. <https://doi.org/10.1016/j.scs.2018.02.024>.
- Wells, P., Nieuwenhuis, P., 2012. Transition failure: understanding continuity in the automotive industry. *Technol. Forecast. Soc. Change* 79, 1681–1692. <https://doi.org/10.1016/j.techfore.2012.06.008>.
- Williams, P.D. (Ed.), 2008. *Security Studies - An Introduction*. Routledge, New York.
- Zarazua de Rubens, G., Noel, L., Sovacool, B.K., 2018. Dismissive and deceptive car dealerships create barriers to electric vehicle adoption at the point of sale. *Nat. Energy* 3, 501–507. <https://doi.org/10.1038/s41560-018-0152-x>.