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Original research article

"We rather not connect trade to politics, let alone geopolitics" – The changing role of Russia as a landscape pressure for zero-carbon energy transitions

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ABSTRACT

This article aims for conceptual and empirical insights by focusing on a missing aspect in sustainability transitions research: the geopolitical setting as a landscape pressure for energy transitions. It analyses how energy super-power Russia is depicted before and after 2022 as a factor influencing the energy transition of small northern European countries: Estonia, Finland and Norway. The article also provides empirical findings on the impacts of the ongoing war on European energy transitions. We use the 'landscape' concept of transition studies to analyse actor perceptions and expectations of this geopolitical landscape shift, via interviewing experts at the energy-security nexus. Landscape is the selection environment for niches and socio-technical regimes, influencing their operational conditions. It contains rapid shocks, e.g., wars and pandemics, and slower geopolitical developments, the effects of which are dependent on the interpretation of actors. The results show that, before 2022, despite all three countries sharing a border with Russia, it was perceived differently as a landscape pressure: a direct security threat in Estonia; both a rather implicit indirect threat and a favoured economic partner in Finland, and; a distanced landscape factor in Norway. Perceptions about Russia became more uniform towards a geopolitical threat after the 2022 landscape shock, resulting also in extraordinary policy measures. The differences between countries show that landscape pressures are partly socially constructed, and, hence, subject to active influence by some actors. For instance, some landscape pressures may be affected by efforts of (de) politicisation or (de)securitisation to reduce or increase the public's focus on them.

1. Introduction

The Russian Federation has been the second-largest natural gas producer, and third-largest oil producer in the world. In 2021, oil and gas revenues made up almost half of its federal budget and 14 % of the world-wide distribution of oil; China being the largest importer of Russian fossil fuels [1]. Russia has had a major role in the international energy market by exporting large quantities of natural gas and oil to Europe, but it has also produced electricity to its neighbouring countries (e.g., Finland and the Baltics). Of European Union (EU) member states, Lithuania, Hungary, the Netherlands, Finland, Greece and Slovakia had over 50 % dependence on Russia for their fossil fuels,[1] while Germany and Poland used the largest quantities of Russian energy. Therefore, Russia's military invasion in Ukraine in February 2022 had significant ramifications for European energy security and its zero-carbon energy transitions, making the EU refocus on the geopolitical connections of its energy systems [2]. Russia's military strength and pursuits are substantial, extending its influence on other countries beyond energy trade. The 2022 event and Russia's actions more generally can be described as a 'landscape pressure' for socio-technical energy regimes in different European countries. This article draws from sustainability transitions literature's concept of 'landscape' to examine how Russia has been perceived as an influencing factor in three small European countries, bordering with Russia, before and after 2022. It also aims to increase understanding about geopolitics in landscape theorisation, as transitions research has mostly ignored geopolitics until now despite calls made (see [3]).

Landscape is a central concept in transition studies, being one of the

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[1] Accessed 26.09.2022: https://www.iea.org/reports/national-reliance-on-russian-fossil-fuel-imports/which-countries-are-most-reliant-on-russian-energy.

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three core elements of the multi-level perspective (MLP) [4]. It is the selection environment for niches and socio-technical regimes, determining their operational conditions [5]. It is often described as a slow-moving, relatively stable heterogenous grouping of things, such as environmental problems, demographic trends, political ideologies, and macro-economic patterns, while it can also comprise rapid shocks, such as wars and pandemics, labelled as 'landscape shocks' [6]. The landscape has been criticised as difficult to operationalise [7] with much less research on it than the other concepts of the MLP: niches and regimes. Therefore, we want to further examine this concept in the context of geopolitical shifts, exemplified in this article by superpower Russia forming a landscape influence on the energy transitions of some of its neighbouring countries. Smith et al. [8] have described landscapes as 'spatially distributed across policy jurisdictions at different scales', while 'the boundaries of a socio-technical regime are not necessarily identical with those of a geographical landscape' (p.446). Therefore, the landscape for zero-carbon energy transitions looks different from the perspective of different countries, being socially and politically constructed (see [9,10]). It is argued to differ from the viewpoint of different individuals and their social identities [11]. We also connect geopolitics as a landscape pressure to questions related to securitisation and politicisation.

Empirically, this article analyses how Russia is depicted as a factor influencing the energy transition of small Nordic European countries – Estonia, Finland and Norway – before and after Russia's 2022 invasion of Ukraine. The countries share a border with Russia but have had differing energy profiles and relationship with it. The aims are 1) to conceptualise and operationalise geopolitics as a landscape pressure in sustainability transitions research, and 2) to explore how global energy superpower Russia can form a landscape pressure for smaller countries in the interface of energy and security and 3) how this pressure interlinks with the decarbonisation of the energy system. As the empirical analysis is timed at both before and after of the 2022 security crisis in Europe, we also draw from the conceptualisation of 'extraordinary measures' connected to the possible securitisation of climate and energy policy [12,13]. Extraordinary measures represent a way to react to security-related landscape shocks. In the context of the political economy of energy, extraordinary measures have referred to breaks from previous 'normal' political practice [14], shifting executive power from ministries to agencies, and isolating selected decisions and important information from public access [13].

We analysed 46 interviews conducted in 2020–2021 and 22 interviews in 2022–2023 with energy and security experts in the three countries. We compared how they construct Russia as a geopolitical landscape pressure in relation to zero-carbon energy transitions. The interviewees are part of epistemic communities, with knowledge of both policy sectors, and are here referred to as representing the energy-security nexus. They are knowledge-based experts potentially shaping decision-making in uncertain transitions. They share normative, value-based rationales with a common understanding of the causal beliefs, problems and solutions [15]. As part of the epistemic communities, their perceptions of Russia as a geopolitical landscape pressure bears significance on the governance and future expectations concerning sustainability transitions. The latter set of interviews has been complemented with an analysis of potentially extraordinary policy changes in response to the European energy crisis in the case countries.

The article starts with a literature review aiming to complement the landscape concept with a geopolitical lens, followed by context on EU-Russia energy relations in Section 2. Section 3 presents the research method. Section 4 presents country contexts and findings, divided into perceptions, expectations, extraordinary measures and stabilising/destabilising effect on transitions. Section 5 discusses the findings and Section 6 concludes.

2. Geopolitics as a landscape pressure in sustainability transitions

2.1. Bridging geopolitics with sustainability transitions research

Geopolitics has been defined as 'the interaction between geographical factors, politics and international relations' ([16] p.7). The literature on geopolitics has two main streams: classical realist geopolitics that makes interpretations about international relations based on geographical factors and sees states as the main geopolitical actors, and critical geopolitics which is interested in how assumptions about geography are used in global politics and how these impact dominant power and knowledge structures as well as the role of companies as actors alongside the states [17–19]. We adopt the critical perspective, when linking geopolitics to transitions research to account for actors' changing perceptions about landscape pressures. The changing perceptions about the landscape have been noted as one of the transformative outcomes for opening up and unlocking unsustainable socio-technical regimes (see [20]).

Energy is connected to geopolitics as an objective of conflict, means in a conflict and a cause of a conflict [21]. The rapidly expanding literature on the geopolitics of energy transformation claims that the energy transition impacts international relations and security in different ways: for instance, by altering the power relations between states, creating shifts in the resources required with implications on peace and conflict, shaping security of supply needs, and regionalising previously global energy relations [22–26]. A common argument has been that the energy transition will weaken the power of hydrocarbon exporting states, resulting in possibly increasing global instability due to uncertainty regarding these states' reactions to the transition [24,27]. Van de Graaf proposed possible strategies for these states, such as a race to sell the oil, curtail production to preserve profits for the future, and a transformation to shift to other revenue sources [28]. This field of research has also extensively discussed how the expansion of renewable energy and hydrogen may impact the geopolitical context [22,29].

A less discussed topic is the ways in which geopolitical developments – or expectations of geopolitical developments – influence the progress in energy transitions. Recent research notes, for example, that geopolitical events (such as the Russian attack into Ukraine in 2022) have complicated the operation and reduced the power of international oil companies [30], thereby, benefitting the energy transition. There is also evidence that geopolitical risks related to the supply of fossil fuels have promoted the expansion of renewable energy in Europe [31]. We, however, identified a research gap pertaining to actor perceptions and expectations of particular geopolitical developments and the impact of these on the progress or stagnation of sustainability transitions. Hence, in this article, following the perspective of critical geopolitics, we take perceptions and expectations about geopolitical pressures and developments as a landscape pressure in sustainability transitions. Empirically, our article focuses on perceptions and expectations related to one major state, Russia, and how they have influenced smaller countries' energy transitions by affecting the broader contextual and external context, i.e., the landscape for the transitions.

As noted, landscape is the selection environment for socio-technical niches and regimes that are exposed to changing pressures when landscape conditions change [5]. An example of a socio-technical regime is an electricity system with its associated institutional structures and practices. Niches are protected spaces where energy innovations, deviating from the established system, emerge. Ground source heat pumps or new home energy saving applications are examples of such niche innovations. Frank Geels posits that the landscape is a derived concept, because it is always defined in relation to the socio-technical regime 'as external environment that influences interaction between niche(s) and regime' ([32] p.27). The landscape is depicted to be outside the direct influence of niche and regime actors [33]. For example, the Russian energy and security related actions cannot be directly influenced by

Estonia's energy regime or niche actors.

The concept of landscape was first introduced by Arie Rip and René Kemp in the context of technological change [34]. They described 'evolving sociotechnical landscapes' forming part of transforming societies and the social context into which new technologies are introduced. Such landscape can be understood in a metaphorical sense, as something that sustains us and we are a part of, for example as a society, and in a literal sense, such as geography and economics [34]. Rip and Kemp specified that certain technologies are also elements of a sociotechnical landscape, for example, motorcars influencing rules and culture more broadly: ideas of freedom, democracy and masculinity; motorcars becoming a cultural necessity. They, however, also described technology and local practices, and technological regimes as something separate from the landscape, an idea that later contributed to the formation of the MLP framework by Frank Geels. Rip and Kemp also mention that novelty, starting at micro-level local practices, will evolve within existing regimes, and may eventually 'irreversibly transform the sociotechnical landscape' [34].

Berkhout et al. mention broad political, economic and institutional contexts as the landscape [5]. The landscape has also been described to include, for instance, environmental problems, globalisation, transnational actors such as the UN [33], demographical trends, political ideologies, macro-economic patterns [32], values, worldviews [7], cultural repertoires [35], social movements, scientific paradigms [8], overarching policies such as climate change agreements [36], wars, pandemics, and natural hazards [37]. Johnstone and McLeish [38] have noted how wars substantially change the symbolic and cultural landscape, referring to landscape imprinting. This means that major geopolitical events can create substantial and long-term impacts on the landscape. Whereas several landscape developments are global, more local landscape developments also occur, such as changes in national political compositions or more localised environmental problems. In effect, the landscape has been criticised of being a 'garbage can' of contextual influences [39] and difficult to operationalise in practice [7]. Wieczorek has argued that landscape characterised as exogenous and stable is problematic in application to developing countries' transitions, because changes occur faster in emerging economies than in Western countries [40].

The landscape has received much less attention than the niche and regime concepts in sustainability transitions literature. Yet, there has been work to create a more nuanced understanding of the concept. Van Driel and Schot described three kinds of landscape dynamics: 1) factors that do not change or change very slowly, such as the climate; 2) rapid external shocks such as wars or oil price fluctuations, and 3) long-term changes in certain directions, such as demographical trends [41]. Geopolitical developments can be seen to comprise both rapid external shocks and long-term changes. Geels has distinguished between stabilising and destabilising influences on existing regimes [35]. Landscape changes create pressure for change at the regime level and prompt responses from the regime, while stable landscapes and some landscape changes can reinforce existing regimes [8]. Smith et al. remarked that over longer periods, the rise of new regimes can also influence broader landscape developments, for instance, aeromobility or communications regimes affecting globalisation [8]. This supports the early descriptions by Rip and Kemp [34]. In support, Kivimaa and Sivonen have observed how the zero-carbon energy transition shapes the broader landscape, for example, via influencing international relations and global stability [42]. Already in 2011, Geels called for more research that investigates the influence of regime shifts to landscape changes [32]. Yet hardly any empirical research has materialised.

Scant attention has been paid to the spatial dimension of the landscape. It has been noted that culture, natural environment, economies and populations form the landscape in specific places, regions or countries, and a question has been posed regarding what relationship exists between nationally applicable and more international landscapes [7]. This means that the landscape for zero-carbon energy transitions looks different from the perspective of different countries or regions. Effectively, the boundary between regimes and the landscape is blurred [43]. The scale of the analytical setting influences what eventually is included in and excluded from the landscape category. Rock et al. posed a question of how landscape pressure can be documented, measured or assessed in a useful way, because it is composed of numerous features and counter-acting forces [7]. They proposed a set of components, by focusing on a specific part of the landscape: the socio-political landscape formed of institutions, values and regulations that broadly guides the economy. Perceptions and expectations about geopolitics fall under the socio-political landscape.

Smith et al. noted that there is a link between actors and the landscape, for example, how landscape developments change actor interdependencies and may generate new expectations about regime performance [8]. Also Grin et al. remarked that landscape developments do not evade human agency [33]. Still, more detailed attention to agency in relation to the landscape is recent. First, the values of actors are fairly permanent and hence situated at the landscape level [43]. Huttunen et al. argue that a landscape change in terms of strengthening altruistic, biospheric or post-materialist values would facilitate transitions [37]. More actively, actors can be seen to contribute to the production of landscape, as a social phenomenon, by performing practices that are upheld by social norms and values [43,44]. Second, actors with agency interpret landscape developments for the use of niches and regimes [45]. Contesse et al. argue that also non-human actants have agency with landscape influence [46].

The above conceptual remarks of the landscape have been made on the side of other topics and have not been in main focus of academic research on transitions. There are selected studies that have paid more specific attention to the landscape [45,47,48]. Upham et al. used social representations theory to study the Fukushima nuclear plant disaster as a landscape shock for the German energy transition. They emphasised that an understanding of the landscape is formed by differing social identities, making risk perceptions relational, conceiving a landscape shock 'as a strongly social phenomenon with psychological dimensions' which are 'experienced differently by different individuals and groups' ([11] p.9–10).

Morone et al. claimed that landscape actors can be found by identifying political and economic activities producing pressure, such actors being global and local, and influencing the landscape by mutually supportive actions [47]. Antadze and McGowan, in contrast, argued that actors placed in the niche level can influence landscape dynamics via moral agency that slowly separates rules and practices from their moral foundations [45]. They describe such actors as 'moral entrepreneurs' who aim to disrupt existing unsustainable regimes by questioning those normative rules located at the landscape level that are supportive of current regimes, and pave way for new regimes with new moral rules.

Morone et al. describe unintentional and intentional sources of landscape pressure. The former include unpredictable events that affect a socio-technical regime incidentally (e.g., earthquakes and wars) [47]. The latter are intentional pressures by actors on others to create responses in a particular regime (e.g., oil embargoes or climate change conventions). They state that the landscape level is not a unitary whole but a constantly changing multi-layered institution, where the civil society plays an important role. Martinez Arranz utilises the categories by Morone et al. and adds a further distinction between landscape pressures and indicators that reflect scientific information on natural events and human-induced environmental impacts (e.g. CO_2 emissions), i.e. used as proxies for the landscape pressures [48]. He finds that international landscape pressures were most important drivers of socio-technical change.

From previous literature on the landscape [45,47], we can distinguish four different categories under the landscape concept. 1) Directly observable natural events and changes without direct human intervention (e.g., earthquakes, volcano eruptions). 2) Concrete developments based on the performance of vast groups of actors (e.g., environment,

global finance and trade, international relations and security, demographics, health, overarching laws and policies), which can be described as social and institutional constructions. 3) Geographical location and overall scale (geographical, or number of people affected) of these developments, i.e., the spatial element. 4) Perceptions and expectations of regime and niche actors regarding the above factors (risk of natural events and changes in concrete developments) and the value and importance assigned to these.

By bridging geopolitics with the conceptualisation of the landscape in sustainability transitions, we make the following propositions: Both rapid external geopolitical shocks and long-term landscape developments create new, changing expectations for socio-technical niches and regimes. Large geopolitical shifts result in cascading landscape impacts by creating other landscape changes, such as substantial changes in values and moral rules or changes in the performance of large groups of actors. Such landscape shocks may also result in alterations in previously rather stable perceptions. Powerful actors' perceptions and expectations about geopolitics dominate over other social constructions of the landscape, affecting the acceleration of new niches and destabilisation of socio-technical regimes. We explore these propositions in relation to our empirical findings in Section 5.

2.2. Shifts in the geopolitical setting pertaining to Russia-EU-relations

Following the 1990s energy market liberalisation [27], early 2000s energy policy in the EU was mainly influenced by market forces and depoliticisation of energy instead of energy security [49]. The geopolitical setting was at the background. The disputations over natural gas between Russia and Ukraine, in 2006 and 2009, and the expansion of the EU with new Eastern European member states raised concerns over the dependence of the EU on Russian energy flows [50] and created discourse around such risks as a more visible part of EU energy policy [51].

In 2009, the EU introduced its third energy package. This was argued to reduce trust in the Russia-EU energy relations. For example, partly as a result, Russia perceived the EU as a misguided partner and a geopolitical rival, where the energy package was interpreted by Russia as an attack against the Russian state owned gas company, Gazprom, and undermine the country's influence in Europe [52]. However, others claimed that the gas crises did not result in major change on corporate business strategies in Europe, they did not complicate European companies' relationship with Gazprom or influence the expansion of Nord Stream [17], with the second pipeline planned in 2011 and constructed during 2018–2021. Hence, a certain geopolitical reality was accepted in the EU, where albeit the Russia risk was emphasised by some, beneficial energy trade between the EU and Russia was preferred on the EU level and in many member states. Somewhat akin to the EU, Norway pursued energy collaboration with Russia before 2022. Instead of energy trade, trust building between Norway and Russia was related to shared economic interests and the petroleum industry [53].

The invasion of Crimea by Russia in 2014 brought forward a discourse shift in EU energy policy. There were some sanctions imposed on the Russian oil sector [27], and the EU launched a new energy security strategy that aimed to improve gas security, increase energy production in the EU and diversify supplies [54]. Nonetheless, this did not have a major impact on EU energy policy and Germany's plans to proceed with the Nord Stream 2 gas pipeline. While Eastern European member states raised objections to Nord Stream 2, some countries, such as Finland, avoided making it a geopolitical issue [55]. This ties into attempts to pursue ongoing trade relations between European and Russian energy companies [17,56] and the power of large corporations in the geopolitical context [17,30].

It took a substantial geopolitical shift, i.e., Russia's full-scale attack on Ukraine in 2022, to change the EU's energy policy strategy towards Russia and better account for geopolitical considerations. The actions of Russia towards Ukraine changed the geopolitical setup to a degree that the 'geopolitical holiday' was considered over [2]. This meant that turning a blind eye to geopolitical security as part of energy security was no longer acceptable. Many EU member states had made energy policy principally based on economic, market-based and climate change considerations, ignoring or undermining geopolitical risks (e.g. [57]). For these states, the 2022 events resulted in a new discourse and rationale for energy policy. In more practical terms, the EU launched the RePower policy package that outlined ways to improve security of energy supply, interwoven with the climate change mitigation aims of the EU Green Deal (accelerating the diffusion of renewable energy and reducing energy demand) but also in the short-term contrary to those aims (strengthening the EU's LNG infrastructure and supply). Some of the policy measures proposed in the aftermath of Crimea, such as increasing the use of LNG, establishing a joint vehicle for natural gas purchases, and sanctions against Russian fossil fuels [58], were only taken into use in 2022–2023.

Also, individual member states reacted to the war. Some countries, such as Lithuania and Poland banned gas or coal imports, while others refused to pay Russian supplies in Russian currency essentially resulting in halted supplies [59]. Russia, in turn, first reduced the gas flow in the Nord Stream pipeline and then suspended it, before the gas pipelines were damaged by explosions in September 2022 [59]. These actions amounted to cascading landscape impacts following the initial geopolitical disruption.

3. Research approach

In the analysis, we focus on the **perceptions and expectations of actors** regarding landscape developments pertaining to geopolitical connections with Russia, and the value and importance assigned to these pressures. While China was also rather frequently mentioned by interviewees, for the small states bordering Russia, the latter formed a more substantial landscape pressure. We study the perceptions and expectations presented by expert actors in the energy-security interface, and how these actors present perceptions or expectations of others. The statements researched are analysed from confidential in-depth interviews. Actors' image, cognitions and frames of reference about policy and policy problems can be discovered by focusing on stakeholder perceptions [60]. Expectations, in turn, can be seen as 'coordinating devices' that contribute to the 'shaping of technologies' and channel efforts into specific directions [61]. The perceptions and expectations about the geopolitical landscape can have a **stabilising or destabilising effect**, i.e., they can support the stability of the existing regime, or they can destabilise the existing regime and create opening for niches to expand and upscale. In our approach, we also examine to what extent 'extraordinary measures' [13] were described by the interviewed experts to have been taken into use in our case countries' energy policy context in response to the landscape shock caused by Russian invasion of Ukraine. The measures described by the interviewees are complemented with a list of policy changes found in official policy documents and IEA country reviews (see Appendix).

Here, we conjecture Russia forming a part of an external geopolitical landscape, constructed both by actual events and actions conducted by the Russian state and the perceptions of expert actors about Russia and expectations about its future actions. Therefore, we approach the landscape as a socially constructed entity that influences technological change [9]. In the analysis, we have placed regime boundaries at national energy systems, because national systems are often affected by the same energy market rules and legislation and, for example, national electricity transmission networks. However, one could alternatively look at regional energy regimes, within regional market, resource, and policy settings, or, for example, the European energy regime with the same broader EU institutions while the infrastructure is still largely affected by national rules, resource availabilities and transmission bottlenecks.

Our aim is to increase understanding about geopolitics in landscape

theorisation. Geopolitical lenses can reveal those aspects in transitions that are not elaborated in the traditional governance-based approaches, as it might be that consensus and cooperation between the actors of different administrations does not exist, nor it is sought after [3]. The political and socially constructed nature of transitions is also in the need of analysis due to the constantly evolving societal setting, where the transitions happen and are managed [62,63].

The principal research method is an analysis of semi-structured in-depth interviews which is complemented with information on recent policy changes, and whether recent policy changes were described by the interviewees as extraordinary measures. In the first phase 2020–21, we identified experts in the fields of energy, security, defence and foreign policy in the three case countries based on our earlier knowledge, organisational websites and suggestions from those interviewed. The interviews include key people with expertise in the energy-security nexus in each country before 2022; this was a topic not well known to people based on the process of contacting experts. The interviews included general questions about the interactions between energy and national security policy and specific probing questions on Russia. The questions about Russia explored the influence of Russia on Estonia's/Finland's/Norway's energy and security policymaking, how perceptions of Russia had changed over time since 2006, and whether attention has been paid to the possibility of a military attack or war as part of energy policymaking. We conducted in total 46 interviews with 51 experts in the case countries between September 2020 and April 2021. The interviewees included people from the public administration, the energy industry, academic research, and party politics (Table 1). In the second phase, responding to the changing geopolitical landscape, we re-interviewed some of the initial set of interviewees to obtain insights into how perceptions about Russia had changed and what concrete energy policy changes had taken place – and whether they could be regarded as extraordinary. The re-interview selection was made based on choosing most informative and elaborate interviewees from the first round and key organisations in the public administration. We were unable to obtain new interviews from some of the previous people from key organisations, and hence seven new interviewees were recruited (three for Estonia and two for Finland and Norway). The second round comprised in total 22 interviews with 26 interviewees, conducted between November 2022 and March 2023. All interviews were recorded and transcribed in full (Table 2).

In the analysis phase, we first searched for all paragraphs referring to Russia – with key words Russia, East*, neighbour, Soviet, Putin – in the interview transcripts. We then coded each paragraph under the three analytical elements (perceptions, expectations, and exceptional measures), identifying and grouping both prevalent and more uncommon themes, and summarised our interpretation in a separate working document. The working document detailed each interview separately noting down relevant quotes and made a specific analysis of perceptions and expectations related to the Russia risk made in each interview. This enabled analysing how much interview evidence was available for each identified frame, organising them in the order of importance, i.e., number of interviews.

The limitation of this research approach is a relatively small group of representatives, although the interviewees are likely to capture a large share of the energy-security expertise in the case countries in the time of the study. Another issue relates to how the findings were interpreted, as there was divergence between interviewees whether they expressed personal opinions about geopolitical pressure or their interpretations how the broader society sees this, or both. We considered these two perspectives when interpreting findings.

Table 1
Categorisation of interviewee profiles during 2020–21.

	Public administration	Industry/ business	Research	Politics
Estonia (n = 16)	6	2	6	2
Finland (n = 17)	7	3	4	3
Norway (n = 18)	7	4	5	2
Total	**20**	**9**	**15**	**7**

Table 2
Categorisation of interviewee profiles during 2022–23.

	Public administration	Industry/ business	Research	Politics
Estonia (n = 9)	7	1	1	0
Finland (n = 10)	6	3	0	1
Norway (n = 18)	3	3	1	0
Total	**16**	**7**	**2**	**1**

4. Russia as a geopolitical landscape for Estonian, Finnish, and Norwegian energy transitions

4.1. Case countries and Russian relations

Estonia is an Eastern European country of 1.4 million people. It has a 294-kilometre land border with Russia, the country regaining independence from Soviet Union in 1991. In 2004, Estonia became a member to the EU and the North Atlantic Treaty Organization (NATO). Oil shale has been a vital domestic energy source for Estonia's energy independence and employment but facing a need to phaseout due to EU climate policy targets. The phaseout has been contested due to its influence on a less-developed region with a large Russian speaking population. Among other Baltic states, Estonia has been bound to the Belarus-Russia-Estonia-Latvia-Lithuania (BRELL) agreement, giving power to Russia to control the electricity grid to guarantee grid operation. Since 2015, a plan has been in place to desynchronise from the Russian grid by 2025. Generally, the relatively recent independence has created a rather high level of distrust towards the Russian state, increasing since Russian annexation of Crimea in 2014, resulting in energy policy with rather strong national security orientation. Expansion of wind power has been slow due to interference of wind turbines with the defence sector's air surveillance radars, but wind power construction experienced an upturn in 2023 because of investments in new radars.

Finland is a small Northern European country with 5.6 million residents, gaining independence from Russia in 1917. Finland is geographically large in comparison to its population size and includes a 1340-kilometre border with Russia. Import of fossil fuels and electricity from Russia played a rather large role in the Finnish energy system before 2022, as Finland has no domestic fossil fuel reserves. Finland has had high shares of renewable energy and nuclear power in its energy mix for a long time, with almost fully decarbonised electricity production. It has similar issues as Estonia in expanding wind power in eastern parts of the country. Before 2022, the Finnish-Russian energy relations were described based on ‘good will’ and kept somewhat neutral in political discussions [64]. Geopolitical analyses of energy policy decisions were avoided. Finland's security policy is based on a comprehensive security concept, with an aim to avoid military conflict with Russia [65], while this aim was also less explicitly voiced in security policy before 2022. Finland has been an EU member state since 1995 and joined NATO in 2023.

Norway is a Nordic country with 5.5 million people, being one of the richest countries in the world and one of NATO's founding members. It is not an EU member state but complies with some joint legislation via the EEA agreement from 1992. Norway has a short 196-kilometre land border with Russia. It has a vast coastline and continental shelf with access to substantial offshore oil and gas reserves. Norway has almost fully decarbonised its domestic energy consumption due to significant

hydropower reserves and highly electrified transport. Russia was not considered in relation to energy policy before 2022, and concerns were related mostly to the Svalbard area of the Arctic region [66]. Russian cooperation was before 2022 defined as based on common interests to prevent escalating crises [67], while several incidents in the cyber space tracked to Russia were of concern. Decreasing trust due to differing interests and changing markets, expected to lead to increased competition over European gas markets was observed before 2022 [53].

4.2. Perceptions of Russia as a landscape pressure

The perceptions presented in **Finland** about Russia before 2022 in the energy context present a form of dissonance. This applied to both the interviewed experts' own opinions and their thoughts about the broader societal perceptions about the geopolitical pressure Russia formed. Good bilateral relations with Russia and long-lived (but increasing) military caution were presented simultaneously by most interviewees. Overall, 10 out of 15 interviews mentioned both benefits and risks. Via inductive analysis of the interview transcripts, we could identify and categorise four types of perceptions:

1) Perceptions about **good bilateral relations** emphasised the history of good trade collaboration with the Soviet Union and Russia. They focused on history, positive impacts of energy cooperation for Finland, and how it supported security-political cooperation.

We have in Finland after the second world war acquired energy from Russia continuously and we haven't had any troubles about it.

(Business actor)

2) Another positive perception about Russia was **mutual dependency**. It emphasised different aspects related to trade, including the dependence of Finland for inexpensive fossil fuel streams from Russia, Finnish companies' investments in Russia and the risk of losing them, and Russia's dependence on its import income from European energy trade.

I think Russia is more dependent on Europe than Europe on Russia, because a large share of Russian import income comes from these gas and oil trades.

(Civil servant, energy)

3) A related perception was that of **pragmatic view** which some described as 'not ready to make tough decisions'. This means that certain risks were recognised but political and business actors did not want to sacrifice the good trade relations and inexpensive energy flows.

In questions related to Russia, we have not had the habit of rocking the boat… we rather not connect trade to politics, let alone geopolitics.

(Researcher)

4) Alongside these more positive perceptions, a more negative perception existed around **caution over and increased criticism** of Russia. On the one hand, it presented long-term existence of cautiousness which has been evident in the discussions around certain energy policy decisions, such as Russian involvement in Finnish nuclear power construction. On the other hand, it also acknowledged tighter stances towards Russia under Putin's leadership.

Maybe us civil servants have it in the genes that we are cautious about Russian connections.

(Civil servant, energy)

There is an earned stigma in Russia cooperation… the mainstream has become very Russia critical in political discussions, and also perceptions of civil servants and Russia researchers.

(Researcher)

After 2022, only the fourth type of perception existed and became stronger. The interviewees emphasised how all faith and trust were lost, and collaboration will not return in a long time. One interviewee saw that the 'energy weapon perspective' (see [68]) had become part of the discussion.

The perceptions in **Estonia** before 2022 had two dominating types, both negative towards Russia, expressed in 13 out of 16 interviews, and one minor more positively-oriented perception type, visible in two interviews.

(1) The most dominant perception was about the Russian state as a **serious long-term threat**. It was about distrust based on previous experiences 'in the blood of Estonians' and how policy actions should therefore reduce dependences in all areas.

We see a very determined and aggressive Russia, rising from the ashes threatening Europe, Finland and the Baltic states.

(Civil servant, energy)

There's always been a strong distrust towards Russia and Russia has demonstrated several times how they might use energy to influence policy.

(Researcher)

(2) The second, more energy specific perception was about Russia **tightly connected to energy policy**. It was based on historical interconnections of gas and electricity networks and the ongoing pursuit of electricity network desynchronisation from Russia. This type also referred to the use of energy by Russia in the past to influence and manipulate other countries.

(3) The third, infrequently used perception described Russia as a **good neighbour**. This also referred to the past and how previously electricity flow had been uninterrupted as well as directing European energy investment interest to Estonia.

Well on the energy side Russia has been a very good neighbour… electricity has been flowing freely all that time and given us this security of the grid.

(Politician)

Due to already quite critical perceptions, there was not a large difference after 2022. The interviewees mentioned more openness about the critique, a loss of remaining trust and a clearer description of Russia as an aggressor country.

Before 2022, perceptions of Russia in **Norway** showed a similar dissonance as in Finland, though with somewhat less orientation to good trade relations than in Finland and more strongly formulated threats of Russia. Overall, three types of perceptions were identified.

(1) The most frequent perception was of Russia perceived in a rather **neutral or cooperation-based** manner. It emphasised possible energy collaborations on the Arctic, existing cooperation and lack of complications.

We have other issues with Russia, of course as everybody has, but the energy field has not been something complicated and particularly not since agreeing on the delineation of the economic zones.

(Politician)

(2) The second perception was about geopolitically **assertive and threatening Russia**. It emphasised the increasing geopolitical security concerns over Putin's Russia and its military mobilisation, harshness of Russia's stances and the increasing threat it poses to Europe.

We have experienced a more assertive Russia. A Russia that has become quite harsh when it comes to their characteristics on what's happening.
(Civil servant, security)

(3) The third perception was less strong than the second but still described Russia as a **doubtful actor emphasising Norway's two-pronged relations**. The potential concern of Russian actors' adverse actions was seen while at the same time positive collaborations pursued, while the perception type also highlighted increasing difficulties in maintaining this two-pronged approach.

There's this idea that okay fine, but we need a two-track relationship with Russia. And after 2014, it's become even more apparent that that two-track relationship has been difficult to sustain.
(Researcher)

After 2022, the positional changes in Norway were not as clear as for Estonia and Finland. Whereas some interviews remarked about the loss of trust and that Russia has become a rogue state, others were less clear, mentioning indirect effects of the crisis on Norway but also similarities as fossil fuel producers.

If you look at Russia's core interest in terms of energy, and you then look at Norway's core interest, I think we are pretty much aligned. We are two large oil and gas producers, both of us.
(Civil servant, foreign affairs)

Nevertheless, post-2022, the perceptions across the countries became more uniform. Loss of trust was the clearest common denominator.

4.3. Expectations about geopolitical developments related to Russia as a landscape pressure

In this section, we look across the three countries on the expectations that trade or geopolitical considerations about Russia formed for the smaller countries' energy transitions. One of the most dominant expectations before 2022 was **the energy weapon risk**. This referred to the risk of Russia using energy as a coercive tool in international politics. It was mentioned in nine interviews and was linked to both direct energy flows from Russia to Europe and other types of interference with the energy infrastructure.

Russia has cut gas supplies to those countries that they have had bad relations with. This tells about Russia using pretty harsh measures when it wants to if it does not get its political will through.
(Politician, Finland)

The problem was clear to us from day one that we are only connected to Russia and Russia can play all sorts of dirty games with energy.
(Civil servant, Estonia)

This expectation remained after 2022 and became more visible.

The energy weapon perspective was not acceptable in relation to Russia before but has now become part of the discussion. It is clear that Russia is how we see it now, and I don't think any change is happening.
(Civil servant, Finland)

Another related expectation was Russia forming **a serious geopolitical threat**, identified in seven interviews, which essentially materialised in 2022. The interviewees emphasised that Russia is not the same as Soviet Union, and it forms an increased security risk both in terms of military invasion and nuclear power or oil transport accidents.

If Russia falls behind the energy transition for the next 20 years… then that Russia, I think, is dangerous. More dangerous than today because the means to influence internationally are narrowed down to military.
(Researcher, Finland)

I believe one of the greatest impacts that Russian energy production has had on Norwegian defence planning has to do with the potential of Russian nuclear reactors that are, whether they are sufficiently maintained or not, and the issue of nuclear waste from Russian submarines and other vessels.
(Civil servant, Norway)

A third expectation identified was rather a process than a situation (as the two described above), presented in the recognition of **increased energy security talk** since 2014 in six interviews. It dealt with more explicit discussion about the EU's energy dependence on Russia, distribution of energy sources and the Arctic.

Security thinking has strengthened in the energy sector, and the discussion in the EU about Russian dependence is really welcome.
(Civil servant, Estonia)

Fourth, contrary to the previous expectations was one of Russia **not being a large risk**, presented in four interviews. These expectations referred to large world energy markets and replaceability of fuels if Russia were to halt supplies, no interest from Russia to disturb its energy export to Europe, perceived low risk of energy-related disturbances, and also the energy transition itself reducing the risk.

A real conflict between Estonia and Russia… is very unlikely.
(Researcher, Estonia)

I have never regarded it as a big problem, because these are fuels available mainly on world markets or replaceable with other productions. I have never thought Russia would have a big interest to cause disturbance.
(Researcher, Finland)

In addition, two further processes were mentioned as influencing expectation formation – those of **desecuritisation**[2] and **manipulation**. The former, in three interviews, referred to actively desecuritising energy which meant that Russia related risks were not included in energy policy discussions. In turn, manipulation efforts by Russia were mentioned in two interviews to influence people and decisionmakers in other countries. Energy infrastructure as a potential military target was very seldom mentioned as an expectation before 2022.

Overall, the diversity of landscape expectations concerning Russia formed a rather uncertain landscape context for the energy transition before 2022. Approximately one third of interviews did not express expectations, and expectations were especially lacking in Norwegian interviews. Besides differing views about the energy transitions between EU countries [71,72], this also showed the diversity of perceptions and expectations that exist among the experts within countries.

The post-2022 interviews presented much fewer expectations regarding Russia, linking to the loss of trust (Section 4.2). The general

[2] Desecuritisation refers to a process in which issues are removed from the 'emergency mode' back to normal politics [69] although sometimes these issues may remain depoliticised [70].

expectation was that Russia forms a geopolitical and energy-related risk, where return to the old energy trade will take a long time.

> *In planning, we depart from the fact that Russian trade will not return, or at least it will take a very long time for electricity trade and preparing for the fact that it does not return.*
>
> (Business actor, Finland)

4.4. Extraordinary measures linked to the geopolitical landscape shock of Russia's war in Ukraine

As noted in Section 2.2, both the EU as a whole and the European states rapidly reacted to the changed geopolitical situation in 2022. Due to the energy dependencies of the EU on Russia and the sanctions that the EU implemented, also the governments of EU member states undertook rapid energy policy changes in response to the geopolitical landscape shock. Some of these measures could be described as extraordinary, deviating from previously typical energy policy (see Section 1). Based on supplementary document analysis, the Appendix outlines examples of energy policy changes that were implemented in the three case countries. We used the expert interviews to gauge what policy changes could be described as extraordinary.

In Finland, the interviewees mentioned two extraordinary measures. One, a new strategic goal in the climate and energy strategy of halting all energy imports from Russia and, two, acquiring a floating terminal for liquified natural gas. Given a lack of consideration of geopolitics in Finnish energy policy before 2022, the former can be seen as a substantial discursive and strategic change, illustrating a large perspective shift. As stockpiling of fuels have been a long-term approach of Finnish energy policy, no new reserves were established following the 2022 crisis. Accelerating renewable energy projects was also pursued but not perceived as extraordinary. Due to halting fossil fuel flows from Russia, the extraordinary measure is likely to be an accelerating stimulus for the Finnish energy transition.

In Estonia, the interviews revealed three extraordinary measures which differed from previous energy policy. They were strongly related to improving security of energy supply, essentially 1) creating a strategic reserve for natural gas, 2) building a floating terminal for liquified natural gas vessels, and 3) mandate for a strategic reserve for power generation whereby old oil shale power plants are not decommissioned but maintained as reserve. It is clear that the extraordinary measures created as a result of the landscape shock have mainly maintained the existing supply of fossil fuels. However, alongside these measures, policies to increase renewable energy generation were strengthened, but these were not described as extraordinary. Effectively, the shift occurred from a more market-based to security-oriented perspective, strengthening the already existing geopolitical take that Estonia had on energy policy.

In Norway, the extraordinary measures all related to seeing oil and gas production more strongly as critical infrastructure than before. The government and military authorities directed increased surveillance of offshore and onshore installations, and the energy company Equinor (67 % owned by the Norwegian state) became part of the National Security Act to allow better oversight from the government. These measures relate to the stability of the existing fossil fuel regime against external disruptions, connecting to the emphasis given by the EU on the role of Norway for the whole Europe's energy security [73]. Hence, the extraordinary measures in Norway further strengthened its continued support for fossil fuels.

4.5. Stabilising or destabilising effect?

This subsection explores whether the perceptions, expectations and extraordinary measures following 2022 have had a stabilising or destabilising effect on the countries' energy systems. Before 2022, while Russia was perceived as an unpredictable neighbour, the dominant strategy in Finland was to address this unpredictability by aiming to maintain friendly relations and energy collaboration, for example, via electricity trade, new energy developments, and fossil fuel import. There was a culture to not cause 'unnecessary' discussion about the potential security elements of Russia with respect to the energy sector. Thus, energy was largely desecuritised (see footnote 2) and to a degree depoliticised,[3] as there was reluctance to bring 'unpleasant' discussion to the political agenda. Finnish perceptions were also dominated by a techno-economic culture, where security questions were not seen as important as economic benefits envisaged from energy trade with Russia. This was coupled with avoidance to mix economic and security in the same energy policy discussions. The orientation to good energy trade relations somewhat stabilised the incumbent energy system in Finland, due to the availability and long-term import of Russian fossil fuels. Essentially, the inexpensive fossil fuel supply from Russia reduced the speed of energy transition, whereas this co-existed with long-term developments to diversify energy sources and resulted in, for example, new wind power investments. The Finnish energy transition accelerated after 2022, with more motivation for new energy investments and making Finland a renewable electricity exporter. The energy policy decision to halt all fossil fuel import from Russia has had a destabilising effect on the incumbent energy system, whereas the creation of the LNG terminal has a stabilising effect. The expansion of wind power is still curtailed in large parts of eastern and south-eastern Finland due to the interference of wind turbines with the defence system's air surveillance radars – which are of increasing importance in post-2022 tightening geopolitical environment.

The clearest effect of Russia as a geopolitical landscape pressure – but yet two-dimensional – has been on the Estonian energy transition. On the one hand, the perceptions of geopolitical risk have emphasised the energy independence of Estonia in terms of domestic oil shale production which has provided long-term energy security for the country (stabilising effect). Before 2022, the energy transition was also seen as a risk with Russia's possible reactions to Estonia's oil shale phaseout, located in a Russian speaking and poorer region of Estonia. This raised less concern after 2022. On the other hand, Estonia has had a long-term ongoing process to desynchronise its electricity network from the Russian system, alongside the other Baltic countries, and become fully joined in the European system. Broadly, this development also supports the energy transition, as the joined Nordic-Baltic energy market has plenty of renewable electricity available. The operation of defence radars has restricted the expansion of wind power in Estonia but has been advanced with governance developments long-time making. Instead, the extraordinary measures in response to the 2022 landscape shock have stabilised, rather than destabilised the incumbent energy system.

In Norway, the perceptions about Russia were most variable and least specific to the energy transition. They related to the development of control over Svalbard and a disputed maritime boundary area between Russia and Norway until 2010 with fear of conflict, and hence, did not influence the energy transition as such. The energy independence of Norway meant that Russian energy trade was not a factor, and pre-2022 discussions did not consider the security of energy infrastructure against intentional attacks, which have raised concern since. Alike in Estonia, the extraordinary measures in 2022 were oriented to stabilising the hydrocarbon-based system.

[3] Depoliticization refers to "placing the political character of decision making at one remove from the central state" and delegating "decisions that are usually the responsibility of ministers … to quasi-public bodies that either advise or implement those political decisions, or [where] rules are created constraining ministerial discretion" (Wood, 2017, as cited by Jordan and Hewitt [74]).

5. Discussion

This article had two purposes: introduce geopolitics as a landscape pressure in sustainability transition processes and study empirically how global energy super-power Russia can form such a landscape pressure for smaller countries and how this pressure interlinks with the decarbonisation of the energy system. The results – analysed via perceptions, expectations, extraordinary measures and stabilising/destabilising effect – revealed that a large state as an influential geopolitical actor can form a substantial landscape pressure on energy transition via its perceived, expected or actualised effects on energy flows, security risks and economic trade. They also showed how the same developments are interpreted differently by experts both within and across countries, influenced by long-term and more short-term historical experiences, geographical location, and resource availability.

The interpretation of history had two main ways in which it influenced the social construction of geopolitical landscape shocks, in this case, the actions of or expectations regarding the Russian state. First, the history of World War II was visible in the perceptions and interpretations of the expert interviews. In the case of Estonia, its existence as part of the Soviet Union after the war and independence only in 1991, heavily shaped perceptions and expectations of Russia as a geopolitical pressure for the energy sector. In the case of Finland, remarks about 'caution being in the genes' while also more recent history of 'no troubles' were visible. These historical connections connect to 'symbolic and cultural imprinting' resulting from World War II, referring to traumatic experiences of war and collective memories impacting expectations of future war which persist even when other conditions change [38,75]. Due to differing histories of Estonia and Finland with Russia, the imprinting resulted in different perceptions and expectations, especially before 2022.

Second, Finnish perceptions were more commonly associated with a seemingly trade-oriented non-geopolitical approach to international relations. Although energy flows were one-directional from Russia to Finland, overall trade was two-directional. Gaining independence in 1917, being occupied by Russia is more remote history to Finland, and many perceptions were seemingly more influenced by positive experiences of trade and its economic benefits in recent history. In addition, the domestic lack of fossil fuels had made Russian fossil fuel flows important for the Finnish economy. However, cultural imprinting may have played a role in disguising geopolitics from Finnish energy policymaking, as the culture of 'Finlandization', i.e. 'adaptive acquiescence to the will of the Kremlin during the Cold War' [76], coerced neutrality [77] or preventative diplomacy [78], has been argued to have persisted in a lighter form, as a legacy of post-Finlandization, after the Cold War [78]. Such signs of not 'upsetting' Russia were visible in Finnish energy policy before 2022 but ended when Finland joined NATO in 2023.

Besides the historical context, resource availability shapes the formation of geopolitical landscape pressures. Technological development, such as advancements in the price and performance of variable renewable energy, hence changes perceptions and expectations of geopolitical landscape pressures. This means that niche expansion can in the long-term influence how landscape development is socially constructed by large groups of people, as suggested by Rip and Kemp [34].

Perceptions in Estonia about Russia have been influenced by its fairly vulnerable location next to Russia, and domestic energy sources largely being based on oil shale and biofuels. This location and the small geographical area have limited the expansion of wind power due to interference with air surveillance radars, whereas solar power is in rapid increase and new radars have recently been built to support wind power expansion. Norway's interactions have been more limited due to high energy independence and mainly concerning energy resources in the High North, whereas the landscape shock in 2022, and the sabotage of the Nord Stream gas pipelines emphasised the importance of security of critical energy infrastructure against intentional attacks. In Finland, energy transition has reduced the country's dependence on imported fossil fuels, hence, somewhat reducing the hindering impact of the Russian landscape pressure on the energy transition.

The analysis of Russia as a geopolitical landscape pressure for small European states, via perceptions and expectations, links to the value and worldview perspective of the landscape [7,37]. The perceptions have been shaped and diverged due to the values and worldviews in place in the studied countries, as well as in different ministries represented by civil servants. The perceptions that demonstrated dissonance in Finland and Norway emphasised the dominance of economic and technocratic worldviews as opposed to a geopolitical worldview in political decision-making. While Estonia had a more geopolitically-oriented perspective, its active energy policy was nevertheless rather market-oriented before 2022.

The analysis also revealed two approaches to landscape-related expectations: one, in terms of future *situation* and, second, as a *process*. Regarding Russia, the situation was typically expressed as a 'threat' or a 'risk', connecting strongly with the definition of security as 'absence of threats' [79,80]. In other cases, geopolitical landscape pressures could potentially be seen to result in situations that are, for example, opportunities instead of risks. With respect to landscape-related expectations as processes, examples from this study include increasing security talk, via energy becoming more politicised, and desecuritisation. (De)politicisation and (de)securitisation as processes (e.g., [14,70]) can essentially be depicted as ways for some actors to try to influence the perceptions and expectations of other actors about a range of geopolitical landscape pressures. For instance, depolitisation or desecuritisation of energy may divert attention away from geopolitically-oriented landscape developments, as happened in Finland before 2022. Desecuritising environmental problems 'can lead to the depoliticization and marginalization of urgent and serious issues' [69], whereas securitising climate change has gained a high-level political status enabling climate action [12]. Therefore, it is vital that future research regards landscape pressures for transitions as something influenced by perceptions and expectations, as well as those perceptions being actively influenced by others.

The events of 2022, when Russia invaded into Ukraine and the EU responded by sanctions and reducing energy flows from Russia, clearly represent the form of 'landscape shocks' that can take place (e.g., [11,41]). The events resulted in extraordinary measures taken in energy policy, diverging from previous political practice related to energy security and safeguarding critical infrastructure. As crisis measures, these maintained the stability of the fossil-fuel-based energy infrastructure rather than oriented to the zero-carbon energy transition – although the latter have been addressed by the strengthening of already existing policies. The perceptions and expectations about Russia pre-2022 and post-2022 show that there is no clear energy regime stabilising or destabilising effect taking place (see [35]) but rather multi-directional effects shaped by the diversity of interpretations and effects. In sum, the findings support previous scholars in that landscape is a social phenomenon [43,44], i.e., it can be shaped by human agency [33] and interpretations of the landscape matter [45].

Finally, our qualitative empirical analysis supports the propositions made in Section 2, with some elaborations in italics: Both rapid external geopolitical shocks, *such as the Russian war in Ukraine*, and long-term landscape developments create new, changing expectations for socio-technical niches and regimes. Large geopolitical shifts result in cascading landscape impacts by creating other landscape changes, such as substantial changes in values and moral rules or changes in the performance of large groups of actors, *implemented, for instance*, via *economic sanctions*. Such landscape shocks may also result in alterations in previously rather stable perceptions – *by being able to break persistent perceptions and expectations based on past cultural and symbolic imprints* (*e.g., the culture of post-Finlandisation*). Powerful actors' perceptions and expectations about geopolitics dominate over other social constructions of the landscape, affecting the acceleration of new niches and destabilisation of socio-technical regimes – *but transitions create scope for a*

diversity of perceptions and expectations.

6. Conclusions

This article aimed to bring more attention to the often ignored or loosely addressed aspect in sustainability transitions research: geopolitics as a landscape pressure in transition processes. Empirically, it showed that Russia is perceived as a geopolitical entity with large influence on other states, and hence a geopolitical landscape pressure. Despite all three case countries sharing a border with Russia, it was depicted differently as a direct security threat influenced by the 'symbolic and cultural imprinting' associated with historical experiences, geographical location, and resource availabilities. The perceptions and expectations involved substantial caution like in Estonia that had taken active desynchronisation efforts from the Russian grid already before 2022; combined awareness of threat and pursuits of economic cooperation in Finland (linked to trade advantages but also history of 'Finlandization'); and Norway's more indirect expectations due to no direct energy flows with Russia and complete energy independence. It also revealed the broader unpreparedness of many European countries on serious energy security risks and in particular on the criticality of energy infrastructure pre-2022.

The findings bring forth the role of interpretations in forming perceptions and expectations of landscape pressures in general, and how they are socially constructed, as well as the role of geopolitics as a landscape pressure. The process of social construction affects how geopolitical or other landscape pressures influence and are acted upon by actors, explaining varying reactions of different countries on, for instance, climate change or cyber security as landscape pressures. The perceptions and expectations, in turn, are shaped by historical experiences, geography and availability of resources, technological development and conscious efforts by other actors. It also appears that extraordinary measures justified by landscape shocks may be more likely to support the stability of the existing system than a transition, given extraordinary measures are typically short-term reactions to crises rather than based on deliberate and careful long-term thinking. As a result, we call for more research on processes, such as (de)politicisation and (de)securitisation, and how they are being used to construct and reconstruct perceptions and expectations about the geopolitical landscape.

Studying landscape as a socially constructed concept proved to be a useful exercise. With the interview analysis, we showed how the construction of the geopolitical landscape had significant and even fast-changing impacts on energy policies. We also showed how the perceptions and expectations towards a sector, or the changes to it, are (un) folded in interaction with other actors. Landscape is thus fluid, and the interpretation of its effects are tied to ideas, ideologies and geography. Indeed, discussing critical geopolitics as a landscape pressure showed the nuances of policymaking during energy transitions and geopolitical fluctuations. An obvious shortcoming of this study is its Western/Northern European bias. We only investigated three small countries from the north and although it can be argued that we were able to provide a good overview of them in relation to adapting their energy policy before and after full-scale war in Europe, much more could be learned with more countries neighbouring Russia elsewhere.

Potential future research directions in this area include examinations of 'geopolitics as a landscape pressure' shaping sustainability transitions in Global South contexts, in other sectors such as food and digital transitions, in large powerful states and in more localised-regional settings. Future studies could explore how relevant are the identified factors – historical experiences, geography and resource availability – in the formation of the 'landscape' in these other contextual settings and what may be other important factors. Further attention could also be paid to the way geopolitical landscape shocks influence, for instance, investment and innovation policy in sustainability transitions, and how energy superpowers such as Russia influence these developments. In addition, policy-oriented studies could explore whether the implemented extraordinary measures, as a reaction to geopolitical landscape shocks, have long-lasting or transformational impacts beyond the initial crisis.

CRediT authorship contribution statement

Paula Kivimaa: Writing – original draft, Validation, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Marja Helena Sivonen:** Writing – original draft, Investigation.

Declaration of competing interest

The authors have no conflicting interests.

Data availability

The data that has been used is confidential.

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Appendix A. Examples of policy changes in the case countries resulting from Russian attack in Ukraine 2022 (those mentioned extraordinary by interviews marked with *)

	Estonia	Finland	Norway
New policy objectives	Ensuring energy security by keeping imported energy dependency low, reducing the use of fossil gas, maintaining full energy independence from the Russian Federation, increasing the use of indigenous renewable energy sources (wind, solar) and ensuring sufficient managed power in electricity.	Abandoning Russian fossil energy as an objective in Climate and Energy Strategy 2022. * Facilitate abandoning industrial gas use to reduce dependence on Russian gas.	Updated energy policy that aims to provide abundant and affordable access to power, to continue stable oil and gas production on the NCS, and to contribute to lower GHG emissions.
New policy measures	Law accelerating the establishment of offshore wind farms and solar farms. Banning imports and purchases of Russian natural gas, Inc. also LNG, and crude oil and oil products.	A Government Decree on General Terms of Granting Energy Aid. EUR 150M annually to demonstration projects of new technology. Direct subsidies directed to new technologies,	Facilitating private capital for initiatives towards greener industry, esp. developing battery chains, CCS, solar and wind power industries in Norway for Europe. State subsidies directed to research and knowledge

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(*continued*)

	Estonia	Finland	Norway
	Banning large-scale solar PV projects in regions bordering Russia. Reducing gas demand by district heating co-generation plants temporarily switching to shale oil, reduced gas demand in industry and increased uptake of heat pumps. Co-operation to open a new supply route from Finland's liquefied natural gas (LNG) terminal through the Balticconnector pipeline.* Agreements on solidarity measures to ensure security of gas supply signed by Estonia with Finland and Latvia. A decision-in-principle to improve Estonia's energy security and mitigate the risks of a rapid withdrawal of Russian gas. Development of universal service and temporary subsidies to mitigate the impact of the increase in energy prices on households. Creating a strategic natural gas reserve.* Mandate for a strategic reserve for power generation where old oil shale power plants are not decommissioned but maintained as reserve.*	and efforts made to promote expansion of financing solutions. Cost-effective methods that consider the security of supply to promote renewable energy and waste heat in district heating. Wind power construction promoted by allocating additional funding for national surveys for planning and licensing that guide wind power construction. Grants allocated to municipalities and regional councils to speed up permit and planning procedures for green transition and wind power construction. A campaign to increase citizens' understanding of energy to respond to the situation changed by sanctions on Russia and ban on Russian imports. Further developing well-functioning security of supply cooperation between the authorities and companies A solidarity agreement between Finland and Estonia to safeguard security of gas supply. Ministerial Committee on Economic Policy supported measures for leasing a large-scale LNG terminal ship in cooperation with Estonia.* Investments into development of hydrogen and batteries.	sharing, and hydrogen development, but main focus on private capital. Appointment of Energy Commission. Proposed measures, e.g., preparations on new legislation to ensure the responsibility to contribute to security of supply of the power producers, preparations for a new action plan to ensure national energy efficiency, reopening offshore wind farm licensing. Reducing methane emissions from oil and production by electrifying platforms to keep providing oil and gas for Europe. Memorandum of Understanding between Norway and Ukraine to ensure energy cooperation and Norway's aid to rebuild energy facilities. Agreement between six North Sea countries to secure critical infrastructure. Increased preparedness on the Norwegian Continental Shelf between the Norwegian Government, the Police, Armed Forces and operators.* Amendments to National Security Act, e.g., increasing cyber security regulation and control, strengthening national control of properties and companies.*

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