



Justice in Transitions: A Comparative Integrated Report 2022

*Toward Just, Ethical and
Sustainable Arctic Economies,
Environments and Societies*



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Transport: Opportunities For Sustainable Mobility and Addressing Transport Poverty in Iceland



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DataCentres: Sustainable Digitisation & Resilient Communities: Low Carbon Data Centres in Greenland, Iceland & Norway



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Energy: Corporate Cultures & Geopolitical Aspirations: Exploring Socio-Political Barriers to the Energy Transition in Russia & Norway'



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JUSTNORTH CASESTUDIES 1-6

Executive Summary

This report assesses the status of the economic sectors under consideration in case studies 1-6 Justice in Transitions research area in JUSTNORTH, giving a rich overview of the existing context of the economic activities through analyses of justice. The report discusses evaluations of the ethical conditions of economic activities, the risks to stakeholders and ecosystem services and finally, barriers and pathways to sustainable development under the theme of justice in transition. This consolidated report integrates the research findings of case studies and provides a comparative analysis of the findings on human and natural systems, mechanisms for reconciling multiple ethics systems, potential national or subnational regulatory solutions and finally, the ethics of sustainability. Through perspectives of value and analyses of justice, these reports conceptualise the relationship between the existing economic activity and stakeholders' ethical perspectives and criteria of sustainable development goals to make recommendations on legal and regulatory pathways towards just and ethical sustainable development in the Arctic.

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I. Summary of the findings

This report, Justice in Transitions research assesses the status of the economic sectors, represented by activities and projects under consideration in these case studies, giving a comprehensive overview of the existing context of the economic activities, evaluating their ethical condition, the risks to stakeholders and ecosystem services and finally, barriers and pathways to sustainable development. The work conducted as part of this report is critical for achieving JUSTNORTH's primary purpose – to identify and suggest pathways to reduce inequalities and inequities in Arctic economic development.

The Justice in Transitions research comprises six interlinked case studies which are strategically selected to explore both barriers to and opportunities for energy transition. They include several cross-cutting ranges present in the energy system:

- 1) subsectors – oil and gas, renewable energy, and electrical power including energy storage;
 - 2) lifecycle—production, transportation, and conversion;
 - 3) applications and services – mobility, heating and cooling, and industrial applications;
- crosscutting issues and problems – energy poverty, stranded assets, carbon lock-in, environmental degradation, digitisation, cultural heritage, and geopolitics. Given the energy-centric nature of these case studies we have particularly emphasised Sustainable Development Goal (SDG) 7 in our analysis.



More specifically, in Case Study 1 (CS) “Opportunities for Sustainable Mobility and Addressing Transport Poverty in Iceland” we learned about the relationships between mobility capabilities and functionings and poverty and injustice. CS2, “Sustainable Digitisation and Resilient Communities: Low Carbon Data Centres in Greenland, Iceland & Norway” dealt with a common perception that digitisation economy comes with a much lower environmental and socio-economic footprint than the analogue economy of the past. In CS3, “Renewable and Ethical?: Motivation for Wind Power Resistance in Sápmi & the Norwegian Arctic” we examined a conflict between one as a member of a distinct (Indigenous community) and citizen of a country and the world. The CS focused on the justice implications of a proposed wind power plant in East Finnmark. In CS 4 “Liabilities into Assets—Reviving Post-Industrial Communities Through Repurposing Industrial Infrastructures in the Swedish Arctic” we studied the how carbon-intensive industries and communities in northern Sweden (Kiruna) could use available technologies to advance sustainability transitions in ways that accommodate regional and local needs. In CS5, “Stranded Assets, Path Dependencies & Carbon Lock-in: Short/Medium/Long Term Implications of Oil & Gas Development in the Russian, Norwegian and U.S. Arctic” we examined the ways in which Arctic communities, oil and gas businesses and government could effectively manage the inherent risks of stranded assets and enable the Arctic’s long-term sustainability. In CS6 “Corporate Cultures & Geopolitical Aspirations: Exploring Socio-Political Barriers to the Energy Transition in Russia & Norway” we learned

about the ways in which Norwegian and Russian companies navigating the energy transition.

Our research confirmed that although the Arctic has been an ‘energy playground’ for over a century, largely because of the fossil fuel extraction, it cannot and should not be left out of the energy transition. Although the stakeholder views on what energy transition pathways should be taken vary, there plentiful instances in which main actors agree on the desired outcomes. Given the extractive past, path dependences remain strong but, with a few exceptions, not unsurmountable. In fact, there is a strong decarbonisation effort in several Arctic countries both on the demand and supply sides. However, policy makers need to be cautious and not fall into the trap of green extractivism. Utilising the concept of energy services can improve not only achieving SDG7, Clean and Affordable Energy but also facilitate efforts towards other SDGs. However, energy services and uses need to be carefully balanced. Whilst oil and gas development can help achieve some SDGs, albeit at the expense of SDG7, it is not necessary for this purpose and can be replaced, by other types of economic development. There are divergences in values among different types of stakeholders and to the extent that reconciliation is possible, this will require trade-offs and compromise.



Overarching Methodology

A range of methodologies have been used across the case studies. These can be separately considered in terms of methodologies for (i) data collection and (ii) data analysis. They in part reflect the specific purposes and contexts of each CS, as well as the disciplinary expertise and training of the team researchers. Generally, the epistemologies (approaches to knowledge) have been predominately social constructivist, by which we mean that, while the views of interviews are reported reflectively and in relation to value frames, we have not sought to judge them or evaluate their veracity. Rather, we either allow the reader to judge this in studies where a variety of viewpoints have been sought; or, where the emphasis has been on documenting the lived experience of a specific group, the evidence on this is presented as an account of lived experience, from which inferences can be made. The methods section of this report largely represents a synthesis of methodologies used to complete the case studies, Set of Contextual Case Study Papers for Justice in Transitions, Set of Case Study Value Indicators Summary for Justice in Transitions, and Set of Case Study Discussion Paper on stakeholder ethical perspectives and barriers to sustainable development for Justice in Transitions.¹

The main methodologies for *data collection from individuals and groups* were: in-person and online interviews; online focus group discussions; and stakeholder workshops. The tendency has been towards open and semi-structured questioning that follows research themes but allows for flexibility. In addition, ethnographic observation and participation have been undertaken, following delays caused by COVID 19. Site visits have also been undertaken for interview purposes, with the use of online methods enabling data collection through the peak period of travel restrictions. Reflective practice methods have been used in group contexts (in the Kiruna case), to encourage participants to discuss and articulate their understandings and rationales. In general, in informing the specific research questions, the researchers have sought to combine a priori theoretical questions relating to values and their reconciliation, with participants' concerns. In this way, a commitment to co-creation in enquiry has been maintained.

Case studies 1-6 researchers conducted 112 interviews and 9 focus groups and workshops.

¹ Pursuant to the Grant Agreement between the E.U. Commission and JUSTNORTH Consortium, these deliverables were made confidential to preserve the collected data and analysis for scholarly publications. JUSTNORTH have and will continue to disseminate and promote these publications through its communications channels.

Each CS included at a minimum 20 interviews except for CS3 where only 5 interviews were conducted. In the latter case, the national COVID restrictions were particularly disruptive to fieldwork, yet the CS team managed to collect data involving at least 20 participants through a combination of semi-structured interviews, participant observation, and a focus group.

Identification of participants, stakeholders and interviewees has been of a purposive sampling type and has been undertaken via a number of methods. Where a general population sample was required, as in the datacentre study, commercial market research firms have been used to recruit participants, drawing on their standing panels. Where stakeholders were required, recruitment involved personal approaches by the researchers within the relevant communities, often using snowballing (from informants and sometimes surveys, and also working through existing organisations who have contacts into the relevant communities (e.g. the Iceland branch of the European Anti-Poverty Network). This stage of participant identification is clearly critical for the research outcomes and is always approached selfreflectively, generally with the aim of securing representation either of a wide variety of views across a context, or a more focused view of a specific, relevant topic.

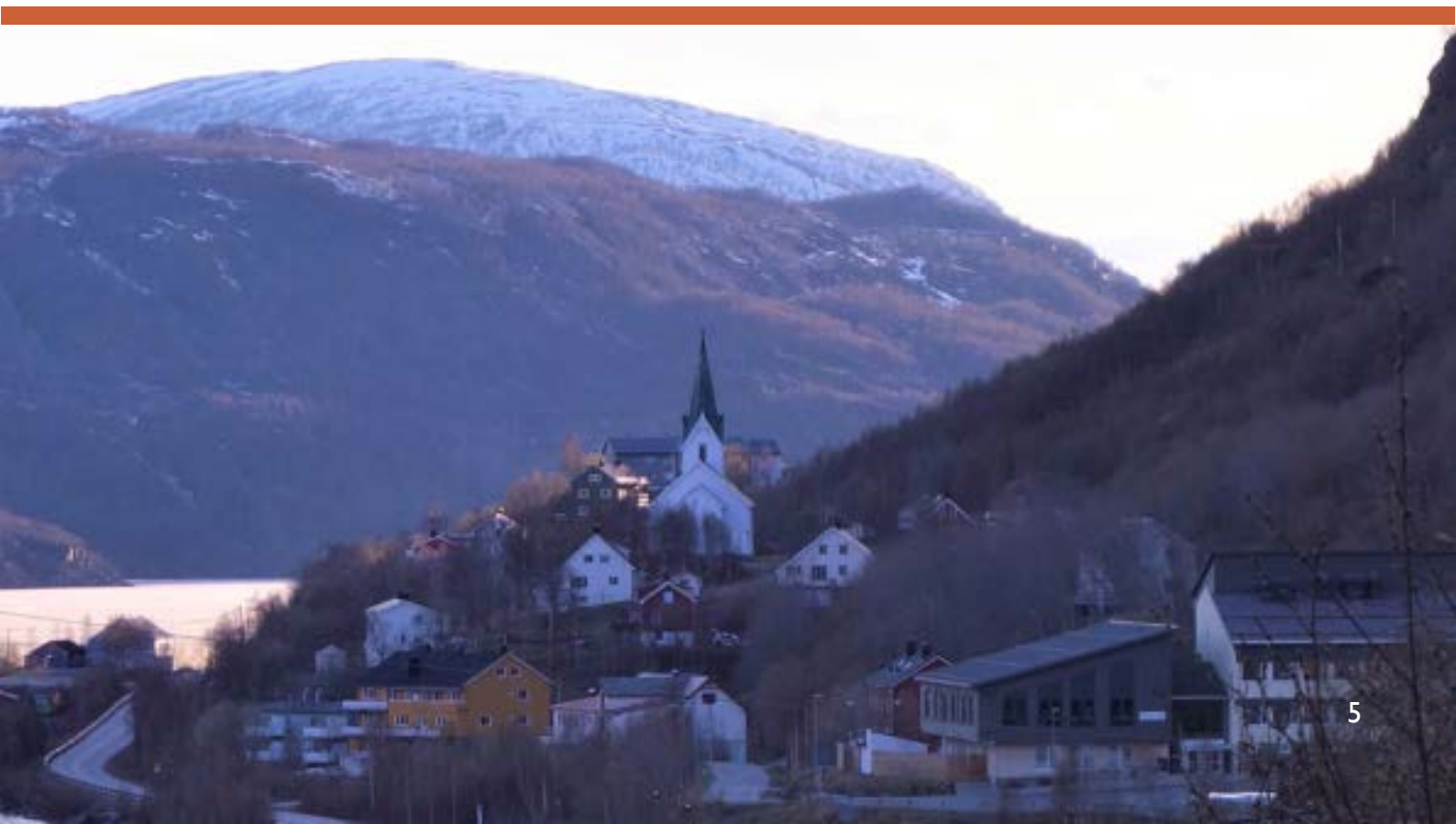
In most cases, specific sites (in all senses) of developments were examined. In other words, the predominant research design is one of case studies. In this type of research design, the aim is not to claim generalisability to other cases in terms of empirical specifics, but rather to identify and explore themes that are likely to be relevant to other cases with similar characteristics (Evers and Wu, 2006). In addition, the further purpose is to inform the design of a values-based decision-aid that is intended for use in multiple contexts. In this way, the project is intended to provide generally applicable ways of understanding comparable situations, based on close investigation and identification of the characteristics of multiple cases.

Regarding methodologies for data analysis, data collected from individuals and groups was analysed through content analysis, with a mix of a priori application of theory and thematic inference, sometimes using formal qualitative coding (i.e. a mix of inductive and deductive coding). In some of the studies involving a larger number of participants, the data were coded with NVivo and/or Atlas TI qualitative data analysis software, as well as MS Excel, with highlevel codes being informed by the interview question and focus group themes, and sub-codes added as they emerged (following e.g. Saldana, 2013). CS5 on stranded assets used a form of narrative analysis in which key moments in participants' experiences were identified and probed as a means of revealing their values. Overall, the aim was to classify and sub-classify case-specific instances of underlying and explicitly stated values that fall within four categories of values: substantive, procedural, SDG- related and ecosystem services. Approximately 2000 raw value indicators were produced as a result of this analysis

Data collection for the purpose of ethical inference and contextualisation involved document and literature review. These reviews were of two

main types. First, selective, narrative forms, involving review of relevant academic and grey literature. Second, systematic review of relevant laws and regulations, NGO statements and official government policy statements. Deductive inference was used for the purpose of inferring ethical matrices, specifically to identify and classify the several types of values observed (equity, flexibility, cooperation, stimulation and capability).

This report represents a synthesis of the case studie results in which we attempt to compare and contrast CS findings along several axes. In Section 3, we do so by the main stakeholder groups and SDGs; in Section 4, we utilise the main economic sectors covered in this WP whilst relying on the Prohibitive, Affirmative, and Transformative vectors of analysis from the Analytical Handbook for Justice Research; in Section 5, we employ the types of value indicators resulting from feildwork; in Section 6 we compare and contrast through the barriers to and opportunities for sustainable development; and in Section 7 we rely on the forms of justice, distributive, recognition, procedural, and restorative (retributive) to conduct our analysis.



3. Human and natural systems: the perceived and desired positive and negative impacts, risks, and benefits across the economic sectors and studied regions

3.1. Comparative summary organized by key actor (stakeholder) type

3.1.1. Industry

In CS1, we focused on mobility-related poverty in Iceland, namely its impacts on the lives of the most vulnerable parts of populations, and on government policies aimed at resolving the problem. As a result, CS1 did not target industry actors. In CS2, corporate documents relating to data centre deployment in Iceland and Norway seek to portray a strong image of a fit with nature. Extra-territorial corroboration of this image is, however, mixed: representations of Icelandic data centres in the international press exhibit concern with the business fragility and environmental impact of cryptocurrency mining. Media representations of data centre sector development in Norway are more positive.

In CS3, Project developer, Grenselandet AS owned by Norwegian companies Vindkraft Nord AS ja Ny Energi AS and Finnish company StI expect the Davvi project to be profitable and to create direct and indirect jobs and income for the municipality in Lebesby. Grenselandet sees the project as part of the national and international decarbonisation effort with positive impacts for the globe. They see wind power as a contribution to local society, driving business development in the region; as contributing to the green shift/decarbonisation of the energy system nationally and internationally; and in terms of Finnmark's contribution to the global

climate transition, which has positive impacts for the globe. Relying on the project impact assessment, the developer expects negative environmental impacts. However, these impacts and risks are dismissed because the assessment considers the area unproductive.

Although the gap between the desired outcomes of the dominant industry actor in CS4, LKAB, and the rest of the stakeholders currently does not appear to be as wide as in CS3, it is nonetheless likely to grow as the remaining iron ore deposit in the Kiruna is depleted. LKAB sees the community's relocation and urban transformation as providing the same urban quality and volume as positive and adequate and its effort to decarbonise steel production via utilisation of hydrogen as contributing to the global effort to combat climate change.² LKAB was not open to even a possibility of developing a Pumped Underground Storage Hydro (PUSH) system, as this is perceived as not fitting with its hydrogen-oriented strategy. LKAB acknowledges some of its negative environmental impacts, such the damage to the ground surface due to the sub-caving method of mining when switching to the invisible mine method of operations. The company sees the shortage of renewable electricity as a major risk to its decarbonisation strategy as this will

² LKAB expects to continue extraction past 2035. In order for the company to continue its mining operations in Kiruna, the municipality needs to relocate. In fact, parts of the municipality have been relocating since 2007. The entire process is expected to be completed by 2035.



We learned in CS5, that the risk of stranded assets is yet to fully register with any of the Norwegian, Russian, or Alaskan industrial actors. We did not find evidence of corporate decision-makers actively considering the economic and environmental viability of future infrastructure considering the time horizons within which the infrastructure is supposed to operate. However, all acknowledge the environmental impacts of oil and gas production while touting various initiatives to mitigate the environmental harm. Var Energy points to its plan to become the safest operator at the Norwegian Continental Shelf, whereas Novatek cites the benefits of natural gas vis-à-vis other fossil fuels as well as its plans to pursue hydrogen production. Prudhoe Bay operators have continued to emphasise their high environmental standards of onshore oil development in the fragile tundra. Since the beginning of Russia's aggressive war in Ukraine, the expansion of domestic oil and gas production is seen in Alaska as serving vital U.S. national interests.

The industry generally sees the social and economic benefits of oil and gas production as offsetting any environmental harm. Based on the evidence that we collected, generally this line of thinking appears to be due to the prioritisation of values that the oil and gas industry places on various aspects of fossil fuel development. It is not that the industry does not recognise environmental harm of oil and gas production, transportation, and, most importantly, use. Yet this recognition

is subject to the ability of oil and gas companies to conduct their core business. Thus, the industry will value and promote economic and social benefits of oil and gas development as long as oil and gas extraction, processing, and transportation remain the industry's principal business.

The impacts identified by both Russian and Norwegian companies in CS6 were primarily positive from a human perspective. Positive impacts for Russian energy companies of especially fossil fuel driven economic activities include an opportunity to increase the global market strength of the Russian energy presence, the advancement of national economic strength, developing the rights of workers in industry as well as Russian people living in Arctic communities. For Norwegian energy companies, such impacts include the potential for new renewable-driven economic gain for individual households in the region Arctic areas, the development of poor areas of the region Arctic, and the commercial activities expansion from future energy developments in the region Arctic areas. Negative impacts for Russian energy companies include the greater proliferation of supply chain infrastructure and processes. Norwegian energy companies emphasise the impacts on communities that have been tied into fossil fuel extraction in their transition away from traditional activities such as mining or work in the system.

3.1.2. Government (National, Provincial/State and Local)

As we learned in CSI, improving mobility as a service via public transportation can help the Icelandic government achieve benefits and mitigate negative impacts and risks that are strongly complementary to supporting the proliferation of electric vehicles. Improving the frequency, accessibility, cost, and reach of public transportation can improve the welfare of Iceland's vulnerable citizens, increase the economic productivity of the workforce and public safety, and help reduce traffic and congestion. Aside from clean air and climate benefits, EVs are not seen as comprehensive a solution as public transport, particularly within urban areas. Moreover, environmental degradation due to increased mining, aluminium production, and charging infrastructure expansion and the security of critical minerals are listed among government's concerns about EVs.

Government actors at all scales expect data centres (CS2) to diversify and improve the state of local economies. However, unlike in CSI where the government could arguably raise its ambitions regarding investment in public transportation, the actual impact of data centres is often less than desired. The local economic growth (if any) associated with data centres needs to be weighed against the cost of the financial incentives that governments spend on attracting their operators. In addition, data centres are energy-demanding, albeit at times providing useful electricity sinks when the supply is high and demand is low.

National governments hope to benefit from multiplier effects such as digital innovation and improved service delivery created by the digitisation. In addition, the resilience of the national job market is somewhat strengthened and there are fiscal revenue benefits from data centre operations, also often drawing in Foreign Direct Investment.

In CS3, local/regional political representatives generally align with the project developer in their overall positive assessment of the Davvi's wind power plant's impacts. They expect positive impacts to be employment and income for the municipality in Lebesby, both directly through the wind power plant, and indirectly through increased activity in the municipality. They see wind power as a contribution to local society in general, driving business development in the region. Some representatives of this stakeholder group also see the wind project as a contribution to the green shift/decarbonisation of the energy system nationally and internationally, and as Finnmark's contribution to the global climate transition, which has positive impacts for the globe. One of the associated risks for this stakeholder group is that workers will commute rather than live in Lebesby or that the latter will create fewer jobs than expected. Like the project developer, they also rely on the project impact assessment that largely dismisses potential impacts on reindeer herding and biodiversity, because the area is not seen as particularly valuable or for Sámi outfield use.

In CS4, the greening of steel production, one of the hardest sectors to decarbonise, is seen as an important part of the Swedish government's climate policy. The same is true for electricity storage, albeit other expected benefits of post-mining sites reuse are yet to register on the national government's radar. The county and municipal governments appear to share the excitement about the climate benefits of LKAB's hydrogen strategy, but they also see the influx additional workforce needed to build the needed infrastructure, including renewable energy generation capacity, as well as potential rising cost of living, as posing risks to the services that the government provides. Thus, unlike in CS3, there appears to be more caution at the regional and local government levels. The biggest divergence between LKAB, the county and local governments in what outcomes are desired, also reflected in the different views of what should happen beyond the life of the Kiruna mine. The government prioritises a sustainable Kiruna municipality as a desired outcome whereas the LKAB's foremost priority is sustaining its mining operations.

We learned in CS5 that the local government in Hammerfest, the state government in Alaska, and Russian federal government generally, align with the industry in terms of the desired and perceived benefits of oil and gas production, albeit to different extents. The widest gap is in Norway where the local government is acutely aware of the finite nature of the Goliat field's operations. In Russia, the industry and government appear to have the same agenda and message. In Alaska, we saw some divergence among government officials about the balance between the risks and benefits of oil production, with some seeing it as essential to the state's welfare and some noting that it is an important part. In Norway, the end of oil and gas is generally seen as certain, in Alaska as certain but in the future, and in Russia as possible in the far future. These views in Norway and Russia, albeit at the national level were confirmed by CS6 findings.



3.1.3. Citizens, Civil Society, and Indigenous Groups

In CS1, vulnerable Icelanders (indigent and disabled) tied the need for improvements in public transportation to the need for improved 'functionings', meaning affordable opportunities for family bonding and greater social mobility. Although climate and air quality benefits, and some economic development benefits were expected, vulnerable (and other) Icelanders perceived EVs as unaffordable. In addition, residents were wary of some environmental risks associated with EV manufacturing.

In CS2, we learned that local communities have high expectations for data centres – diversification of local economies, local jobs, improved public infrastructure. However, local jobs rarely materialise, the resilience of data centre operations is prioritised over the resilience of residences during power outages, and residential consumers end up competing with data centre operators over access to renewable power. Unlike the potential of public transport in Iceland, the potential of the data centres that we studied in Iceland and Norway to benefit local communities is less clear.

Whereas stakeholders of various groups appear to be on the same page in CS1 and CS2 in terms of the desired outcomes, in CS3, the

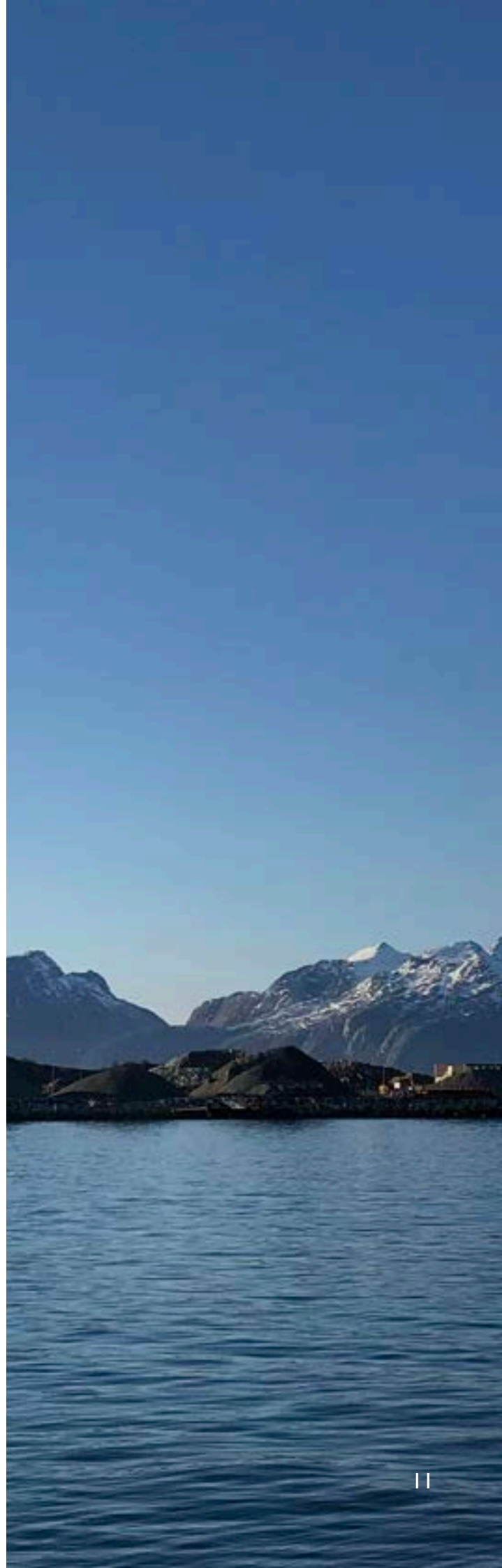
industry and government actors and local residents, NGOs, indigenous rights holders, and reindeer herders cannot be farther apart.

Because the Davvi wind power plant is yet to be constructed, the desired outcomes are premised on people's perception of risks that the project will create. The supplemental impact assessment projected a greater impact of the wind park and the transmission infrastructure on reindeer herding and surrounding ecosystems. These stakeholders associate wind power plans with negative impacts, which includes the disappearance and splitting up of grazing land and migration routes on which reindeer herding depends, and the risk of permanently damaging the ecosystems in the area. If reindeer herders lose grazing areas, some of them will be forced to quit herding which will negatively affect the economy of the municipality and the cultural traditions of the Sámi community. Residents along the route of the proposed transmission lines expect the infrastructure to negatively impact nature and the well-being. They do not expect to benefit from this infrastructure, as the benefits will flow to other parts of the region where the wind power plant is located.



In contrast to CS3, in CS4, we did not find a strong opposition by residents and civil society, and indigenous groups to the industry actor's (LKAB) plans. In fact, some respondents were welcoming of the innovative approach to steel making. Yet, the respondents were even more open to the idea of a PUSH facility as it offered a transformation of the mine beyond the extent of the mining operations. Yet residents were uneasy about the potential environmental impacts of the hydrogen infrastructure and PUSH construction because of their association with the Kiruna mine, which is seen by these stakeholder groups as a source of environmental harm. Similarly to CS3, this stakeholder group also saw renewable energy development and wind development in particular as a source of environmental harm.

In CS5 (in CS6 regarding Russia and Norway), we learned that, whereas there is a strong opposition to oil and gas development in Norway at the national level, the opposition is much subdued in Hammerfest. Yet the anxiety over what happens to the community after the industry leaves is acute. We did not see any debate over the negative environmental impacts of oil and gas among Hammerfest residents. In Russia, environmental NGOs have been the main source of concern over environmental impacts of oil and gas development. There is a paradox in the Russian society over the country's dependence on oil and gas exports as many acknowledge its unhealthy, even deadly impacts, likening it to addiction to illicit drugs. Yet, there is a sense of futility regarding efforts to overcome it. Alaskan residents appear to be somewhere in between, yet the level of personal dependence on oil production in the state is high due to the structure of the Permanent Dividend Fund.





3.2. Comparative summary organized by the applicable SDG

The overarching goal of this WP is SDG 7, Affordable and Clean Energy. Therefore, the analysis below reflects the relationship between SDG7 and other SDGs that are relevant to the examined activities and projects, in the context of the desired and perceived benefits, impacts, and risks of the activities and projects.

CS1 emphasises the importance of the energy services concept for achieving SDG7 as doing so unlocks pathways for achieving several SDGs, in this case, SDG1, No Poverty and SDG10, Reduced Inequalities. Both public and individual transport can be electrified and fuelled by clean and affordable energy, although electric public transport offers a more pronounced positive impact than individually owned EVs. The same is true in CS2. Although data centres can be powered by electricity derived from fossil fuels, utilising renewable energy helps achieving SDG12, Responsible Consumption and Production and SDG13, Climate Action. Our analysis shows that putting energy services as the starting point for charting a pathway for achieving SDG7 is likely to lead to a greater cumulative effect in terms of achieving other SDGs than focusing solely on the environmental impact and cost of energy production.

Wind power development examined in CS3 and energy storage in CS4 are part of increasing the share of renewable energy in the global energy mix (sub-target 7.2). Proponents of wind power development in Northern Fennoscandia understand this as part of their contribution to a global energy transition and a pathway to create economic opportunities and work in the region, which relates to both SDG8 Decent Work and Economic Growth, and SDG11, Sustainable Cities and Communities, as jobs and municipal income will contribute to people wanting to live and stay in the region. Here

SDG7, 8 and 11 come into conflict, as the development of energy in one location, even if it contributes to jobs and community development there, may have negative effects on residents of other communities that will not be able to use the area if the wind park is designed without consideration of their occupation, culture, and livelihoods. In addition, hydrogen production for steel making and, therefore, contributing to Climate Action (SDG13) and SDG 9, Industry, Innovation, and Infrastructure, should not come at the expense of making a city or community unsustainable. Therefore, energy services and end uses not only need to be recognised, they also need to be equitably balanced and prioritised to achieve comprehensive and complementary sustainable development.

CS5 and 6 provide an insight on whether SDG7 should be a lesser priority than other SDGs. Oil and gas production serves as a significant source of economic wherewithal for Hammerfest, Alaska, and Russia, that, according to the industry and some government actors, is needed for achieving all but a few of the SDGs. However, oil and gas development can also lead to path dependence and carbon lock-in that transform productive economic assets into stranded ones thereby creating a sizeable burden on local, subnational, and national economies. In addition, corporate approaches to sustainable development are hampered by a tunnel vision. This vision puts temporal limits on a corporate entity, does not consider the intrinsic value of both human and natural systems, and treats sustainability as part of a business transaction.

4. The ethics condition of the economic sectors: comparative analysis

The analysis below builds on the prohibitive, affirmative, and transformative dimensions from the JUSTNORTH Analytical Handbook for Justice Research to summarise the ethics condition of activities and projects covered in the case studies.

Per the handbook, “[the economic activity] is more or less positively prohibitive [emphasis added] in the sense that it has the potential to prevent unwanted changes (the undermining of cultural values, for example) or negatively prohibitive in the sense that it prevents the realization or the protection of these values.” Negatively affirmative economic activities reinforce “the power of an unjust, immoral, or ethically indefensible status quo” whereas positively affirmative economic activities “reinforce treasured cultural values, enhance respect for the rights of marginalized groups, or strengthen existing participatory decision-making processes.” The transformative dimension focuses on the ability of an economic activity to invoke positive and negative systemic changes.

Prohibitive (-)

1) The current operational process of public transit system in Iceland is failing to improve the ability of vulnerable residents in improving their mobility-related functioning. It runs the risk of further marginalising vulnerable persons, especially the aged and disabled.

2) The current operational process of datacentre set ups in the studied locations in Greenland and Norway are failing in their ability to put a social cost on the losses that residents and host communities incur.

3) Inadequate framework for decision-making regarding wind power development in Finnmark is negatively prohibitive for rights-holders and other stakeholder groups who are formally, but not equitably, included in the decision-making (procedural justice).

4) Mining and extractive industries are notorious for causing negative impacts, such as community displacement from traditional subsistence lands or degrading existing ecological systems and relationships. There are immediately apparent negative prohibitive elements to a PUSH facility, but should one be built it will expand green energy production in the Swedish Arctic. The evolution of energy infrastructure can easily contribute to the degradation of the rights of rural and indigenous residents unless safeguards are in place.

5) The current approach to oil and gas development in Russia all but excludes local participation in the decision-making process thereby circumventing the ability of the nation to diversify away from its fossil fuel-centric economy. This problem also exists in Alaska and Norway albeit to a lesser extent.

Prohibitive (+)

1) Although existing operational processes for public transit systems in Iceland can exacerbate marginalisation of vulnerable persons, they increase overall system efficiency and significantly reduce its environmental impact.

2) Existing operational processes and business need for datacentres can lead to increased social costs for residents. However, they offer the opportunity of diversifying their economies and improving their economic resilience.

3) Production of non-fossil-based energy in Norway, which will facilitate the energy transition and contribute to delivering climate targets globally.

4) If policy and legal mechanisms can be put into place in Sweden and elsewhere to incentivize the redevelopment of post-extractive or post-industrial “brownfield” lands, while protecting or disincentivizing the consumption of “greenfield” areas for new industrial use, the regulatory system can both interrupt or discourage activities likely to cause new harm to rural and indigenous populations, ecosystems or landscapes, or the climate.

5) Although Norway remains a significant oil and gas producer, its elaborate process for opening areas for oil and gas development enables a public discourse that can slow down the pace of new developments. The process of leasing continental shelf and federal lands in the United States provides checks on the State of Alaska to continue oil development in the Prudhoe Bay without due consideration of path dependence consequences.

Affirmative (-)

1) In Iceland, the current operational approach to mobility (both public transit and active travel) is worsening disparities in quality of life between richer and poorer citizens. The quality-of-service delivery between rural and urban residents may also be inimical to government's attempts at slowing the rapid pace of urbanisation.

2) Norway's business approach that leads to reduced energy prices for bulk purchasers of electricity (like datacentres) can lead to higher electricity prices (which can exacerbate the energy burden) for ordinary residents.

3) There is a risk that wind power development in Finnmark will further marginalise communities that are historically marginalised, both reindeer herders and their reindeer that will be negatively impacted by the project development, and other outfield users who do not hold the same legal status but have a close connection with the land.

4) The demand for renewable energy development in Northern Sweden aided by the availability of electricity storage can exacerbate existing inequities in energy access, system reliability and resilience if industrial and residential consumers are forced to compete.

5) The current approach to oil and gas development in Russia that prioritises large infrastructure investments circumvents the ability of the nation to diversify away from its fossil fuel- centric economy. The Trans-Alaska Pipeline System (TAPS) needs to maintain a certain level of oil throughput to operate, prompting the State of Alaska to encourage oil development without considering the stranded asset implications of new infrastructure. The mission and culture of the Norwegian Petroleum Directorate often contradicts the purpose of the deliberate process for opening areas for new oil and gas development.

6) Russian companies prioritise the importance of supply chains rather than the local focus of the region. There is a consistent ignoring of local rights in a way that prioritised supply chains, rather than local issues. Norwegian energy companies often making more liberal justice statements in relation to the legal obligations for achieving affordable costs for the renewable transition. However, the dominance of the economic argument among Norwegian energy companies, despite more of a local focus than Russian companies, threatens to minimise the broader social aspects needed to consider for acting to respect and protect the rights of various stakeholders, not just individual consumers.

Affirmative (+)

1) Iceland's plan to decarbonise its transport sector nationally by 2040 and align the nation with global 2050 Net-zero targets well ahead of time is a laudable ambition with climate benefits.

2) Norway's high renewable electricity generation and availability of an enabling ecosystem means it can catalyse the roll-out of lower-carbon datacentres which contributes to global attempts at decarbonising datacentres.

3) Strengthening the municipality's role in the Davvi wind power development in decisionmaking is positive in and of itself, but, as discussed in the aspects of justice section above, brings with it some concerns over the inclusion of other members of the local and regional areas.

4) Because high electricity prices would be bad for both residential, commercial, and industrial customers, there is broad support for ensuring adequate supplies of energy. While the current plans are disjointed, the industrial and municipal organizations are planning to support the energy transition to low-carbon operation. This is one major area of a broad range of sustainability planning in Kiruna, which also includes industry's shift toward lower-impact mining practices that should reduce the carbon and physical

5) The financial resources and the relative transparency of the Norwegian Sovereign OilFund provide the resources and political will to align the nation with its climate agenda. Alaska's Permanent Fund has significant albeit lesser resources for to support the state's move away from oil. NOVATEK has an ambitious agenda to diversify its business through hydrogen production.

6) The Russian approach highlighted the need for delivering gas to remote areas of the Arctic as integral to their scope of action. The dominant narrative among Russian companies with regards to making decisions in a project was more focused upon stakeholders than local communities from this perspective. This is different sharply from the Norwegian perspective which viewed local community action as central to their justice framing for promoting renewable energy, especially making use of hydrogen. The focal point for Norwegian companies in this regard was placed upon those communities that could afford or offer affordability for future renewable energy projects.

- The unwillingness of Iceland's dominant economic and political class to recognise the growing poverty, vulnerability, and marginalisation among its citizens, while maximising its own economic returns, is holding back the welfare of the country as a whole.
- The rapid attraction of studies datacentres without due consideration to the potential impact on a renewable energy surplus that is already diminishing due to summer drought risks social costs and dissatisfied citizens.
- Transforming the landscape due to wind development in Finnmark brings negative consequences for wildlife, the nature in-and-of itself, reindeer herding, and other outfield use.
- There is transformative potential in planning the energy transition in Kiruna, and some threads indicate ways in which this change could cause a dramatically negative transformation. The grand plans to reinvent the mining and steelmaking industries are being driven by ecological and economic demands from the global market.
- Russia is likely to continue on the path of increasing inequality with dwindling wealth and less room for and appetite from the elites to share the proceeds of the oil and gas economy. Should the political pressure to maintain the status quo persist in Alaska, it is likely start transforming into a post-oil extraction state.
- Russian companies demonstrated their focus on pursuing transformative approaches from this perspective to be delivering the future energy needs for other parts of the world for what they consider to be the economic gain for Arctic regions, and specifically Russian people. This has the inevitable consequence of putting economic gain above the need to prohibitively, affirmatively or from a transformative perspective to ensure positive justice outcomes for affected communities. The Norwegian perspective was less on global supply chains or shareholder value. But their focus on improving the economic purchasing power of individuals in the Arctic threatens a broader framework of understanding beyond improving wealth. Whilst the focus was different in each case, both Russian and Norwegian companies demonstrate significant negative transformative power in their pursuit for resources, fossil fuels or renewables, driven by an unwavering economic imperative.

Transformative (+)

- Iceland can transform and substantially decarbonise its transport sector³ to become a leading contributor to 2050 Net-Zero targets.
- Norway can transform and substantially decarbonise the data-centre sector and become a leading contributor to 2050 Net-Zero targets.
- Potentially bringing economic development and jobs to the Finnmark has the potential to transform a coastal municipality from population decline to activity and growth.
- With the industry making aggressive investments in hydrogen-based, low-carbon steel making and the wide adoption of sustainability planning throughout the extractive process and municipal utilities, this can be a rare opportunity to transform the energy system into a cleaner, more resilient, and more equitable system.
- The financial cushion and strong procedural collective capabilities can help transform Norway into a major contributor to the energy transition. Alaska has the resources but lacks political will to follow suite. The already weak prospects of transforming Russia into a nation with a diversified economy had gotten significantly weaker after Russia's invasion of Ukraine on 24 February 2022.
- Russian companies situated their efforts to reduce carbon emissions into the future thereby delaying taking part in the energy transition. In contrast, the Norwegian companies had a more transformative understanding of temporality reflecting upon the need to transform business models rather than simply focus upon carbon emissions reductions.

³We have not addressed Iceland's large fishing fleet in this analysis

5. Comparative analysis of the value indicators across economic sectors

Each of the case studies has been analysed in terms of indicators of values held in common, enabling comparison in the same terms. These values are: legal, substantive, procedural, SDG related and ecosystem service values. The SDG themes have also provided another way of organising the ways in which each specific value is expressed. Table I below makes use of the five types of value to organise a cross-case comparison, highlighting those values that were found to be most important.

Table 1 Comparison of value indicators across the Case Studies

Value type

CS	Legal	Substantive	Procedural	SDG-related	Ecosystem service
01 Transport: Opportunities For Sustainable Mobility and Addressing Transport	People with a disability have a legally protected right to selfdetermination	Equality, participation, inclusion, dignity are not adequately expressed in the social welfare system	Equality, participation, liberty and justice are not adequately expressed in Icelandic politics	The case as counter to: ending poverty; the availability of decent work; reduced inequality	The case as counter to equitable deployment of, & access to, the benefits of renewable energy supply
02 Datacentre development- Poverty in Iceland	Norway and Iceland have stable legal & regulatory environments for commercial development and land use planning; supportive fiscal environment for datacentre development and foreign investment; location within EEA supports GDPR compliance	Commercial and sector development; energy consumption risks; moral hazard risks; geopolitical military risks; connectivity benefits; climate emissions benefits; offshore resource extraction impacts	Lack of transparency; lack of accountability	Mixed life cycle impacts in terms of decent work and sustainable communities; relative climate action benefits that could be negated by growth; potentially supportive of quality education, industry, innovation & infrastructure	IT resource extraction and disposal impacts as counter to decent work and good health and wellbeing

CS	Value type				
	Legal	Substantive	Procedural	SDG-related	Ecosystem service
<p>03 CS3 Wind power resistance Poverty in Iceland</p>	<p>Nominally legal requirement to take account of public and private interests when providing energy supply; wind turbine developments of >5 turbines or 1MW require a concession, including impact statement; general public must suffer the least possible environmental and landscape disadvantage without unreasonable costs or disadvantages to the licensee. Apparent breaking of the law in Fossen, where work on wind turbines has progressed despite legal judgements on this being pending.</p>	<p>Impacts of wind power on landscapes valued for their cultural and socio-economic value; threat to reindeer herding as a way of life and livelihoods</p>	<p>Municipalities hold decision-making power that is not always exercised in ways perceived as representing Sami interests; inadequate impact assessments (generally and specifically re reindeer herding); developers lobby to achieve their interests and act as if beyond the reach of law</p>	<p>The case illustrates the need to redefine 'affordable and clean energy', and is a particular instance of respecting 'life on land'. It also illustrates the exercise and nonexercise of institutional power (SDG 16) in geographically remote locations. The case illustrates the contested meaning of decent work and the adverse, differential impacts of economic growth, specifically via disturbance of Arctic wildlife, reindeer and ways of life.</p>	<p>In equitable deployment of, & access to, the benefits of renewable energy supply; threats to continued enjoyment of traditional lands and natural symbols, and their socio-economic and cultural value; the vulnerability of Arctic ecosystems that are barely known, already under threat from climate change</p>

04 Repurposing
infrastructure

Swedish law requires that land is remediated after mineral extraction or pollution; Sweden has a net zero GHG policy by 2045 and negative emissions thereafter.

Human flourishing, well-being and respect is limited by the dominance of a large employer of primarily men, who tend to live singly, apart from partners. The local and regional government want to remedy this.

Similarly gender equality in employment opportunities is lacking.

Odour nuisance from waste storage prior to combustion sometimes affects wellbeing and there is a severe shortage of suitable housing.

The indigenous people's organisation fears further land loss to mining

Participation and inclusion in development decisions are perceived as limited. The company seeks to achieve development ends with minimal effort, not democratic deliberation.

The dominance of the mine constrains the development of a sustainable community and wellbeing. Good quality partnerships need to be developed. However, there are local initiatives and motivation towards human flourishing in many specific ways

The mining company is mainly focused on the value of nature in terms of renewable energy supply, including for the generation of hydrogen in future. There is also a priority need to avoid leakage of heavy metals into the drinking water supply.

Some in the community do hold a wider set of ecosystem service values, including those that value nature intrinsically.

CS	Legal	Value type			
		Substantive	Procedural	SDG-related	Ecosystem service
05 Stranded assets (Norwegian case)	<p>Norwegian petroleum assets must be exploited for the benefit of society as a whole; licensed in consultation with those who have interests in the relevant geographical area; and licensed only after the results of impact assessments are known (environmental, social, economic)</p>	<p>The main tension is viewed as between the cost minimisation preferences of the oil and gas firms, and the social value of developing local supply chains that help to support a vibrant community.</p> <p>There is a general preference to maintain oil and gas extraction as an underpinning economic base of communities for as long as possible.</p> <p>There is some concern that making a transition to renewables may not be possible without losing the economic base.</p> <p>State ownership of the productive base of renewable energy – land and sea – has the potential to benefit citizens</p>	<p>There is concern that EU-level decisions relating to climate change will adversely affect production communities. There are differing views of the social licence between the locality and the oil and gas extraction firms. This is viewed by some as having been eroded in terms of the degree to which specific requirements and expectations are enforced by the municipality</p>	<p>Regarding decent work, the municipality has limited power to influence the oil and gas majors in terms of the extent to which they engage with smaller, local companies in their supply chains. Hydrogen production is playing a bridging role between values relating to clean energy on the one hand; and decent work and employment, and industry, innovation and infrastructure on the other. Nonetheless, in so far as hydrogen can be blue or green in origin, it is ambiguous in terms of the values that it expresses.</p>	<p>In relation to life below water and life on land: fish stocks appear to be depleting and it is uncertain why.</p> <p>Oil and gas exploration is not permitted in the marginal ice zone but definitions of this are allowing new, quite sensitive locations to be developed.</p> <p>New infrastructure-relaying techniques are being used to minimise impact on ecosystems, as is monitoring of impact, including and especially the risk of invasive species in relation to shipping. Indigenous people can provide information on the characteristics of pre-Soviet Tundra, for remediation purposes Cryolithological monitoring and remediation work is being used to counter climatic warming around infrastructure (e.g. actively freezing ground and restoring vegetation).</p>

Value type

CS

Legal

Substantive

Procedural

SDG-related

Ecosystem
service

06 Geopolitics of oil

For Norway, the legal values of CS5 apply. The Norwegian Petroleum Directorate also has powers over the volume of production, again for the benefit of society. Pollution liability and emergency preparedness responsibilities are defined

Concerns about loss of employment in the oil and gas sector, given climate targets.

Concerns about the manufacturing and supply chain capacity of Russia vis a vis renewables (wind and hydrolysis).

Some optimism about the potential of hydrogen to substitute for oil and gas employment

Fuel poverty as endemic among the poorer sections of Norwegian and Russian society

Oil and gas extraction companies vary in their rhetoric and openness about their role in climate change, both in terms of anthropogenic emissions and mitigation.

Some companies openly recognise that climate change challenges their core business; others do not.

Some individuals within companies are more open about these tensions than corporate documents

The Russian government is expected to lag in terms of a positive climate response

Oil and gas exploration is acknowledged by some of those questioned to be counter to climate action.

Some oil and gas companies have been practising a degree of diversification into renewables, including hydrogen and exploratory CCS

Non-Russian companies see the potential for Russia of such diversification

There is some optimism that oil and gas extraction companies will eventually, inevitably, have to pivot to renewable energy, including hydrogen. Russia is, again, expected to lag

The indigenous people's organisation fears further land loss to mining that will lead to further deterioration of ecosystem integrity, including in relation to reindeer herding

While the CS are empirically diverse, all embody and raise value conflicts, involving either involving differing interests aligned with different groups within society, or involving different objectives – economic, social or environmental. To the extent that resolution is possible, this will require trade-offs and compromise. However, where there are

major asymmetries in power, it is more likely that there will be winners and losers. In section 7 we look for some of the opportunities or pathways for reconciliation. Before that, in section 6, we look at some of the barriers and opportunities for sustainable development in the six CS.

6. Comparative analysis of the economic activities through the lens of barriers and/or opportunities for sustainable development

In this section we consider the barriers and opportunities for sustainable development in the CSs. Identification of these requires a theory of how change may or may not take place in such contexts. JUSTNORTH has deployed a range of geographical and other literatures to understand its cases, including barriers and opportunities to sustainable development. As we are dealing here with contexts that involve inter-relationships of technology and society in relation to sustainable development, one literature whose potential has perhaps been little used in the project is that of sociotechnical sustainability transitions. While geographical literatures tend to be (understandably) critical of prevailing neoliberal ethics, the transitions literature may offer more in the way of pointers for opportunities and reconciliatory pathways.

Of sociotechnical sustainability transitions perspectives, perhaps the most axiomatic is Geels' (2010) multi-level perspective, with its notion of niche-, regime- and landscape-level processes: the niche being the zone of innovations; the regime the zone of the status quo; and the landscape the zone of high-level, longer-term influences. These are supplemented by concepts of alternative sociotechnical pathways (Geels and Schot, 2007), in which the timing and strength of interacting niche, regime and landscape factors are key. However, there is a wide range of additional concepts and empirics that are relevant here and add explanatory nuance, ranging from branching points in sociotechnical pathways (Foxon et al, 2013); the shaping of organisational fields by energy firms (Heiskanen et al, 2018); the need for mutually reinforcing policy mixes (e.g., Flanagan et al, 2011); and a large body of work using institutional perspectives, for example as brought together in

Geels' (2014) triple embeddedness framework. Although much of the sociotechnical sustainability transitions literature seeks to answer questions around how incumbent technologies come to be substituted by those offering a higher level of sustainability, in so doing, scholars must also engage with questions of incumbency relating to firms and organisations. This in turn involves, inter alia, questions of institutionalisation in the broad sense of societal embeddedness and what this means, for example in terms of different types of norms, be these regulative or cognitive (Scott, 2008). Importantly, societal embedding of technology also involves questions of different types of power (e.g., as characterised by Avelino and Rotmans, 2009; Avelino 2017). This power reflects in part economic power and disparity and hence there is scope here for related political economy work.

Given the explicit geographical boundary of JUSTNORTH, the geography of transitions literature is also particularly relevant (Coenen et al, 2012). This literature adds place-specificity to an understanding of sustainability transitions, including the importance of local networks and other elements of economic geography (ibid), including foci such as cognitive lock-in in conceptions of regional development (Newey and Coenen, 2021). Coenen et al. (2021) review work on the regional foundations of energy transitions, distinguishing between three strands of work that focuses on transitions in, of and by regions. Coenen et al. (2021) make four inferences from the regional transitions literature, that such transitions: (i) may vary across value chains, (ii) are conditioned by various contextual factors, (iii) are enacted through different forms of agency, and (iv) produce multiple types of outcomes (p.223).

All of the above scholarship has implications for understanding barriers and opportunities, because it points to the various processes that are involved in both maintaining and overcoming these. JUSTNORTH focuses on the values implicit and explicit in different types of development, but the enactment of development options is not dependent on values alone: it requires an understanding of why some values are enacted and others are not. Overall, albeit with an emphasis on technology, sociotechnical transitions perspectives draw on a range of disciplines to show how and why particular development options materialise.

It can be seen from this very brief introduction to sociotechnical sustainability transitions perspectives that identification of barriers and opportunities is not a theoretically neutral activity and indeed both requires and benefits from a theoretical underpinning. Table 2. summarises some of the most notable barriers and opportunities relevant to the six cases, in terms of illustrative relevant sociotechnical transitions concepts and corresponding empirics.

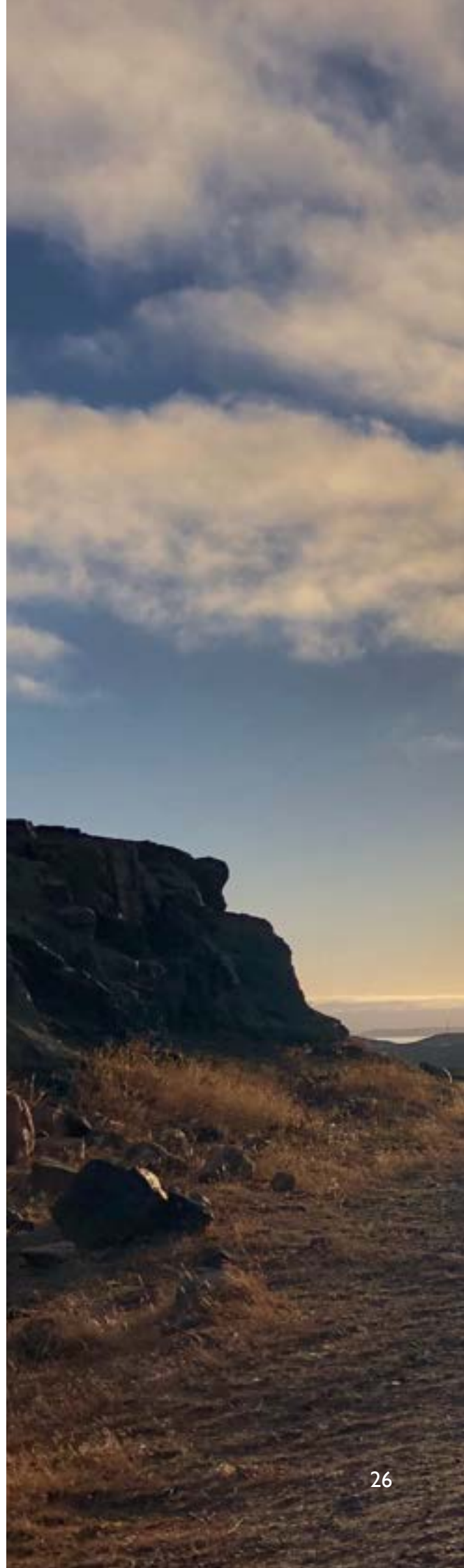


Table 2 Applying sociotechnical transitions concepts to understand barriers and opportunities to sustainable development

CS	Barriers		Opportunities	
	Concept	Empirical problem	Concept	Empirical opportunity
01 Transport: Opportunities For Sustainable Mobility and Addressing Transport	Transport regime norms are proprivate car Social welfare system norms have shifted to a neoliberal	Car use is dominant in Iceland, with public transport underresourced Poverty traps and a lack of social housing	The role of political advocacy in changing regime norms	Political opposition to neoliberalism looks likely to strengthen
02 Datacentre development- Poverty in Iceland	Lack of coherent policy mix	The Northward movement of datacentres is legitimised by climate change and driven by costs but risks overconsumption of surplus renewable power	Installation of a policy mix that reflects multiple objectives, climate and development	Regulatory standards for datacentre efficiency; cumulative impact assessment
03 Wind power resistance	Power over resources is often contested	Sami opposition to the siting of wind power infrastructure on their land	Distinctions between 'power over', 'power to', and transformative power	The Sami seek power over their land. This is potentially a transformative moment in which recognition of Sami land rights could be properly
04 Repurposing infrastructures	Issues of path dependency and transitions governance	The region is economically locked into an extractive industry pathway, in which the mining company is challenged to cocreate new futures	Sociotechnical landscape changes (pro-sustainability) provide support for new sociotechnical pathways	Limits to the extractive industry as opening up opportunities for new pathways: repurposing infrastructure, new governance structures, new visions

Barriers

Opportunities

CS

Concept

Empirical problem

Concept

Empirical opportunity

05 Stranded assets (Norwegian case) Poverty in Iceland

Landscape-level changes (climate change, war) affect regime-level structures; lock-in to unsustainable pathways/ethic

The region is economically locked into an extractive industry pathway, in which the mining company is challenged to cocreate new futures

Landscapelevel changes (climate change, war) affect regimelevel structures

Awareness of branching points and their relationship to extraction to locking in new pathways

Uncertainties around the fossil fuel extraction industry as opening opportunities for new pathways and visions, developed in parallel

06 Geopolitics of oil

Landscape-level changes (climate change, war) affect regime-level structures Normative, political and cognitive lock-in to fossil fuel extraction

The geopolitical strategic importance of oil continues to pose a threat to Arctic ecosystems and to climate integrity

Climate change imperatives and Russian militancy offers the potential for new solutions to energy security

Ramping up of renewable energy supply capacity and energy efficiency have increasing urgency



7. Comparative analysis of the mechanisms for reconciling multiple ethics systems for aligning ethical grounds for sustainability-centric economic decision-making with the desired positive impacts and benefits and acceptable negative impacts and risks

The potential for value reconciliation varies across the contexts studied. In general, and in principle, we judge that honest and open discourse conducted in a manner that accounts for significant societal power imbalances has the potential to facilitate and achieve value reconciliation in most sectors, but there are barriers to this that will need to be overcome. An exception to reconciliation may be where indigenous people hold quite distinct values, in which eco-centricity is prioritised as a part of not only ways of life, but socio-economic wellbeing. We provide summary detail below, taking the sectoral cases in turn.

For the case of transport and mobility in Iceland (CSI), the main reconciliation pathway firstly involves recognition by government and commercial decision-makers that the public transport system is currently not serving particular socio-economic groups adequately. We identify a number of specific problems, the most pathway to reconciliation being that of improving public transport services in terms of bus frequency and routes served outside Reykjavík; and the availability of disability-compliant buses. Other mobility constraints arise from poverty in general and the way in which household income is affected by design of social welfare systems, particularly regarding eligibility. Hence, we also recommend that attention be given to these. These components of a pathway to reconciliation are

consistent with the Icelandic government's stated commitment to low inequality and decarbonising the transport sector.

For the case of datacentre development in Iceland and Norway (CS2), our data suggests that pathways to value reconciliation will likely be principally required in relation to the impacts of the sector's electric power consumption. These impacts are both remote and proximate: remote in terms of the potential for encroachment on indigenous people's land, for the supply and transmission of renewable power; proximate, in terms of potential impact on electric power availability and prices, given the effects of low summer rainfall on hydroelectric infrastructure. Hence while state and public support for datacentre development generally rests on the expectation of positive economic and environmental impact, relative to siting datacentres in warmer, non-Nordic locations, it is where these benefits are uncertain that pathways to reconciliation are likely to be required.

We see several elements to such a pathway. First, there is a range of technical actions that can be undertaken to secure datacentre efficiency in terms of power consumption – these could be mandated through regulation. Second, to the extent that the publics questioned were at best ambivalent about the electric power consumption of cryptocurrency mining and concerned about the effects of datacentre power consumption on electric power prices for consumers, then again these require addressing either through expansion of power supply capacity (which does have costs), or some form of regulated constraints on the datacentre sector. Third, expansion of power supply needs to avoid encroachment on indigenous people's land. Reconciliation in this context will firstly require wider societal recognition of the above problems. For Greenland in the medium term, datacentre development could in principle provide a tax revenue source distinct from extractive mining.

The case of wind power resistance in Sápmi and the Norwegian Arctic (CS3), is highly contentious and it is at all not clear that a reconciliation pathway could meaningfully satisfy both proponents and opponents of development. Indeed, this looks unlikely given the inability or unwillingness of the Norwegian authorities to uphold and enforce the law in Fosen, where wind turbines were already producing energy before a court verdict on this was given. Nonetheless, any such pathway will need to begin with the establishment or use of for a for meaningful participation by stakeholders. It will need to recognise Sámi rights, particularly the right to have livelihoods protected and the land areas left intact. For other locals, there will need to be recognition of their right to decide where they practice recreational activities, cultural practices, harvesting, fishing and hunting. There will need to be transparency around development plans, prompt land use planning decision-making, and agreement on the use of expertise.

Based on experience to date, reconciliation will require significant attitudinal change on the part of either wind power proponents or opponents.

As above, the case of repurposing industrial infrastructures in the Swedish Arctic (CS4) revealed values that conflict, but prospects for reconciliation seem stronger. The researchers concluded that this should be possible if differences and conflicts are openly embraced and when different social actors are encouraged towards a critical reflection on the circumstances and interconnections within which they live, work, and assign values. The researchers found that the Kiruna mining business and the municipality had different understandings of the outcomes and processes of Kiruna urban transformation. However, the use of reflective types of questions used during the interview processes suggested some possible routes towards reconciliation. For example, while the Kiruna mining company seeks urban transformation in the fastest and cheapest way, and in ways that



match its particular competences, this is not a necessity and a change in organisational culture could see different outcomes – should the company choose to change. Indeed, the local authority is of the view that the company should accept that working with urban transformation is about working in a participative, democratic way.

The case study of stranded oil and gas assets in the Russian, Norwegian and U.S. Arctic (CS5) viewed values as having a degree of flexibility, in the sense of being dependent on context, and that this may be important for reconciling differences in participants' values. Another insight from the case is that while stakeholders hold a variety of differing, specific positions, they do seem to agree on a number of high level values: that there is a need for sustainable societies in the broad sense in the north; that the presence of big industries (oil and gas or renewable energy) and local suppliers are important; that there is a need for a proactive national politics on local value creation; that there is a need for monitoring as key mechanism to detail problems and make adjustments; and that long-term sustainability is a common denominator for the Arctic development. There is also some optimism about the potential of blue or green hydrogen to substitute for natural gas. Given these commonalities at a high level, with disagreement at the level of their operationalisation, pathways to reconciliation need to focus on respectful dialogue as a means to identifying those areas and actions that can be agreed upon.



Finally, there are multiple value conflicts in the case of “Corporate Cultures & Geopolitical Aspirations: Exploring Socio-Political Barriers to the Energy Transition in Russia & Norway” (CS6). These firstly involve a conflict of geo-strategic values, in which the Russian state has sought to maintain control of Arctic development, with the consequence that this limits foreign investment and hence the potential for deployment of innovative extraction technologies. This conflict might in principle have been amenable to resolution using specific licensing conditions for foreign companies, but since the Russian invasion of Ukraine has become significantly more difficult (and indeed illegal for Western companies).

Secondly, the CS revealed a discrepancy between the values implicit in corporate statements and those expressed by interviewees, with

in general greater recognition of the cultural wisdom and expertise of Arctic communities expressed in interviews. We concluded that this tacit recognition could provide a foundation for value reconciliation between corporate actors and local communities, by which we mean that practices could in principle perform above the starker statements of corporate intent, in terms of respecting community values. However, the lack of a conducive, democratically determined regulatory regime makes this significantly less likely than in the Kiruna case, for example. Regardless of how well-intentioned a private actor might be, such regulatory regimes serve as long-term guardrails for corporate sustainability policies.



8. Summary of the potential national, or/and sub-national (and, if applicable, international) legal and regulatory solutions for the implementation of such mechanisms

It would be difficult if not impossible to provide recommendations in the context of the governing legal and regulatory regimes across all six cases within the constraints of this report. Therefore, we opted for crafting our recommendations based on the legal and regulatory mechanisms and concepts that are present in some form in each of the studied jurisdictions. We merged our recommendations into the mechanisms and concepts and organised the latter based on the functions that they perform.

Strategic energy planning

Some jurisdictions, such as Norway and the United States, already utilise integrated energy planning, which often involves the use of all available generation and non-generation resources, energy efficiency for example. However, this already innovative approach does not account for perhaps the most important question of energy planning – “what is energy for?” the inclusion of the concept of energy service—the application of energy to benefit human wellbeing—is central to remedying this shortcoming. For example, including this concept as part of administrative rulemaking aimed at the decarbonisation of a nation’s transportation sector can advance seemingly unrelated goals like poverty alleviation. It can also help with understanding the temporal limits of some industrial energy services, such as hydrogen production. Climate change impacts is a recent addition to energy planning. However, the risk of an energy asset becoming a stranded one is usually not a part of this analysis. There is plentiful evidence of energy infrastructure becoming obsolete before it is fully depreciated in and outside the Arctic and not enough mechanisms to prevent it.

Permitting, licensing, and siting

Imposing conditions on power consumption is not a new thing. Therefore, doing so via placing conditions on an operating permit or license of a data centre should not be shocking to its operator. Local residents will likely appreciate that their neighbour, data centre and not just their homes are subject to energy efficiency requirements. Justice-based conditions of operations should also be the basis for licenses given to oil and gas companies.

Rate and tariff-making

The electricity rate or tariff structure that is common in Western countries rests on the division of all electricity consumers into industrial, commercial, and residential classes. The division, even bolstered by further sub-grouping, is problematic because it lacks recognition of the social value that different uses and consumers have. The electricity to heat an emergency worker's residence should not cost more than the electricity spent to mine cryptocurrencies. Recognising the social value of different uses in rate- and tariff- setting might help with easing tensions between local residents and data centre operators.

Environmental and social assessment

The concept of a "significant impact" as part of environmental and social assessments is problematic as it lacks the context of who, what, and why is impacted. Therefore, this problematic concept needs to be replaced. We recommend the concept of unduly interference with individual and collective capabilities. This concept accounts for environmental, social, and economic impacts and places an individual, for example, a reindeer herder, and/or a community, for instance, a reindeer herders cooperative, and the impact on their flourishing at the centre of the analysis.

In conclusion, we emphasise that meaningfully incorporating local knowledge and expertise in economic decision-making is essential for understanding the full range of negative and positive outcomes of a project or activity for ensuring equity and justice. We consider this a compulsory part of every process that determines the fate and conditions of economic development in the Arctic. Whether it is strategic planning, a permitting process, ratemaking, or environmental and social assessment, if a proposed project or activity impacts livelihoods and ecosystems, a local input is necessary. Yet fully implementing this recommendation might be a difficult task as it will require redrawing intrastate jurisdictional boundaries and increasing inter-agency and multi-level cooperation.

9. Ethics of sustainability – methodological recommendations

Building on our learning from the project to date, this section looks at research directions, including methodological options – both analytical and practical – for study of the role of values and ethics in sustainable Arctic development. How should the ethics, and the role of ethics, be studied in such contexts?

Our first point is that, as discussed in Section 6, understanding the role of ethics in sustainable Arctic development cannot be meaningfully undertaken without an understanding of development processes themselves. As we are here concerned with sectors that deploy specific technologies and sectors – those of datacentres, wind-power, mining, and fossil fuel extraction – we have recommended the sociotechnical sustainability transitions literature as a broad framing for examining research directions and methodological options. This literature has the additional advantage of being explicitly interdisciplinary.

Expanding from beginnings initially focused on science and technology studies and evolutionary economics, the field is now embracing, for example, aspects of human and economic geography and has undergone not only substantial growth, but also considerable methodological and disciplinary plurality, although remaining primarily case-based and qualitative (Hansmeier et al, 2021). The latter reflects an emphasis on understanding processes, which are often relational, rather than correlations and associations based on large n analysis (Geels, 2010). We also see a lot of potential in connecting political economic work to the sociotechnical and geographical.

The research problems of sociotechnical transitions are in many ways those of Arctic development. These include the exercise of agency and power (institutional, field-level and also at the level of individual actors); sector and technology phase-out or ‘exnovation’; the creation of protected space for innovations’ (strategic niche management); understanding lockin, path dependencies and path creation as the converse; the development of policy mixes that address multiple aspects of a context; the governance of transitions and the role of civil society. All these and more are discussed in papers setting out the field’s research agenda (Köhler et al, 2019).

These themes are clearly not unique to Arctic development alone, so in narrowing down our focus for methodological recommendations, we need to ask what is particular about the Arctic. These include: its geographical location, resource and hence geopolitical significance and sensitivity; the nature of that resource as including fossil fuel reserves; the sensitivity of its ecosystems and peoples, per se, in relation to climate change, as a global symbol of future development directions, and as host to iconic species. At the heart of this is geography, and for this reason we would suggest the geography of transitions as a key framing for further work.

The scope and direction of future work should be informed by both the key takeaways and limitations of this study. Our intent was to address a wide range of perspectives and aspects of the energy transition in the Arctic such as barriers and opportunities, production, transportation, and use of energy (including energy services). We also attempted to make our study geographically diverse. Yet given the novelty of the project and the limitations of our research due to the ongoing pandemic and limited human and financial resources, we predictably omitted a plethora of important issues, places, and spaces. Among these issues are indigenous participation in decision-making in mineral extraction, the shifting geopolitics of energy production in the Arctic due to the Russia's invasion of Ukraine, the growing demand for critical minerals, and the impacts of climate change on the provision of energy services in Arctic communities. The Arctic might be as integrated with the rest of the world as it has ever been judging by its importance for the health of the global economy and world peace. However, it is still seen by many around the world as an extraction periphery destined to support the global energy transition without getting much in return. This viewpoint is the epitome of injustice and we intend to continue focusing our research on fighting it.



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