

**Renewable Energy for Sustainable Arctic Communities: A Framework for Conceptualizing  
RE Projects as Drivers of Sustainable Development**

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## **Abstract**

Rural Northern communities often struggle to build and maintain sustainable economies. The current models of economic development often do not provide paths to long-term sustainable communities. Concurrently, the concept of human development and wellbeing in the Arctic is being reimagined beyond traditional economic indicators, which drives the need for new projects and industries that can support local economies and contribute to overall community wellbeing. Community renewable energy (CRE) projects have been proposed as a driver of sustainable development in the Arctic and globally. Research on CRE projects has highlighted many hypothesized socio-economic benefits. However, there is a limited understanding of the mechanisms that generate these socioeconomic benefits. This thesis seeks to identify the mechanisms that make CRE projects drivers of sustainable development in rural Northern communities by advancing a CRE model, called the community renewable energy framework, informed by a nation building approach and the concept of creative class. The nation building approach highlights the importance of self-governance, competent governing institutions, cultural match, and long-term planning are instrumental. These factors provide the foundation for deriving socioeconomic benefits from CRE but it is not sufficient to motivate a new future in Northern communities. The creative class concept, with critical adaptations, can be applied to CRE projects to extend their impact beyond the direct benefits and motivate sustainable development through the creation of a local creative class. Finally, this conceptual framework is applied to a community in Northern Norway. This thesis contributes to the body of research highlighting the potential of CRE projects to motivate sustainable development in Northern communities.

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### **Abbreviations**

BIP	Berlevåg Industrial Park
CRE	Community Renewable Energy
EU	European Union
RE	Renewable Energy
UiT	The Arctic University of Norway



## **Chapter One- Introduction**

Across the circumpolar north, rural communities are working to build sustainable economies and enduring communities. Arctic economies are generally conceptualized as three pillars; the formal market economy, subsistence activities and government transfers (Huskey et al., 2014). The formal market economy primarily consists of large-scale resource extraction that are sold on the international market (Huskey et al., 2014). While these projects have brought much needed wealth and economic development to the region, they have undermined the path to sustainable development for many communities (Larsen & Huskey, 2020). Importantly, natural resources are not distributed equally across the region and so not all communities are able to pursue such projects. For those that pursue large-scale resource extraction the projects can make the community dependent on outside investment and subject to the boom-bust cycle and eventual depletion of the resource (Huskey et al., 2014; Larsen & Huskey, 2020). More broadly, the remoteness of many Northern communities and the typically narrow economic base challenges the development of sustainable economies and communities (Larsen & Huskey, 2020).

In recent decades there has been an increased focus on sustainable development. One of the most well-known conceptualizations of sustainable development is the UN Sustainable Development Goals (2015) which were developed as a plan for “people, planet and prosperity” around the world (p.1). Although many national governments have adopted the UN SGDs as guide posts for policy development, governments of the Arctic eight place greater significance on the Arctic Human Development Reports (2004, 2015) and the Arctic Social Indicators Reports (2010, 2013). Developed under the auspices of the Arctic Council, these two reports, which outline the factors that contribute to human development and overall wellbeing in the

region, are the most referenced by Arctic researchers and policy makers. Accordingly, this thesis uses the Arctic Human Development Reports and the Arctic Social Indicators Reports for defining sustainable development and sustainability. The challenges related to large-scale resource extraction, along with the shifting understanding of overall wellbeing and human development in the Arctic has led to a growing number of theories on how to build more sustainable economies and communities. At the same time, there are a growing number of proposed industries and sectors that could contribute to economic development in the region. However, it is unclear how these new sectors and opportunities can motivate the improvement of human wellbeing in the region.

One potential avenue for development is renewable energy (RE) projects. RE projects have been linked to a variety of positive outcomes for rural areas including capacity development, revenue generation and supporting business development. Berka and Creamer (2018), for instance, found that RE projects are often cited to have certain indirect benefits such as increased social capital, empowerment and increased energy literacy. However, many of the proposed benefits to these projects are difficult to account for or are only hypothesized benefits (Berka & Creamer, 2018; Lehtonen & Okkonen, 2016; Okkonen & Lehtonen, 2016). These include many of the indicators associated with wellbeing in the Arctic, such as fate control (Larsen, 2010). Currently, there is a limited understanding of the mechanisms that drive these socioeconomic benefits. In order to address this, this thesis advances a conceptual framework for understanding RE projects as a driver of sustainable development called the community renewable energy framework. This model is based on two existing frameworks, the creative class concept (Florida, 2002) and the nation building approach (Cornell & Kalt, 1998), both of which are adapted to fit the rural Northern context.

The nation building approach represents the foundation of the community renewable energy framework. It consists of four factors; self-governance, strong governing institutions, cultural match, and strategic orientation (Cornell et al., 2005). Cornell et al. (2005) argue that these factors enable communities to take charge of their future. These factors represent the first step in deriving benefits from RE projects but are not sufficient to motivate long-term sustainability for Arctic communities. To do this, the nation building approach is combined with the creative class concept to identify the potential for RE projects to motivate a Northern creative class and subsequently long-term sustainability. Creative capital has been proposed as an alternative economic development strategy in the Arctic and can help to contribute to overall sustainability in the region (Petrov & Cavin, 2017). This is done through the three Ts of the Northern creative class: trust, talent, and technology.

To test the community renewable energy framework, this thesis applies the community renewable energy framework to a case study in Northern Norway. Berlevåg is a small Arctic community located near the Norwegian-Russian border. It has a population of around 900 inhabitants and the population level has declined significantly in recent years. In 2014, the municipality and local energy cooperative installed 15 wind turbines with a total capacity of 45 MW. It is currently one of the most efficient onshore wind farms in Europe (Fladvad & Patonia, 2023). Currently, the municipality has proposed two additional phases of the project to bring the total capacity of the wind farm to 200 MW. However, due to the weak grid connection in the region, the energy generated from the wind farm is unable to be exported outside of the region. Given this, the municipality has been exploring hydrogen production as a way to utilize the excess energy and has developed the Berlevåg industrial project (BIP) which seeks to develop a circular economy from the hydrogen production.

## **Thesis Structure**

This thesis is written in manuscript style and consists of four chapters. Chapter 1 is an introduction to the case and provides the contextual background as well as the key objectives of the thesis. The second chapter advances the community renewable energy framework, a conceptual framework based on the nation building approach and the creative class concept. The third chapter is a case study applying the community renewable energy framework to a community in Northern Norway. Chapter four of this paper presents the overall results of my thesis, including the limitations of the research and lessons learned. Additionally, this section provides recommendations on how to further advance the conceptual framework and how to incorporate the insights gained into Arctic renewable energy planning going forward.

## **Chapter Two- Advancing the Community Renewable Energy Framework**

This chapter was written by Josie Ward under the supervision of Dr. Greg Poelzer. After additional edits have been made this chapter will be submitted to a journal that fits the topic.

### **Introduction**

The economies of many Northern communities center around the three pillars of subsistence activities, government transfers and the market wage economy. The development of the latter remains an elusive challenge for many places. Communities with economically viable natural resources, especially in the mining sector, have been able to create new business and employment opportunities. While resource development has been a driver of economic growth for communities across the Circumpolar North, there are considerable challenges to developing sustainable growth through the resource sector. These include the boom-bust cycle of resource development, the life of nonrenewable natural resources and the potentially adverse impacts of major resource development projects on community health, environment, and wellbeing (Abele, 2018; Southcott et al., 2018). In addition, natural resources are not evenly distributed, with some communities unable to pursue natural resource projects at all. This has led to a need for innovative approaches and complementary systems to drive growth in regions without resource wealth and support long-term wellbeing (Glomsrød et al., 2021; Hirshberg & Petrov, 2015; Petrov, 2008).

The global energy transition provides a potential catalyst for sustainable development in the Circumpolar North. At present, OECD countries such as Canada, the United States, and Norway are investing billions of dollars in this transition. While governments are driving the energy transition to meet national emissions targets, the transition presents a window to increase community energy security and to participate in new business opportunities at both community

and utility scale, offering the potential for sustainable, long term economic growth. This includes the social value of energy, which is the net benefits, both economic and non-economic, derived from an energy project and an emerging area of research is the role that renewable energy projects can play in increasing the long-term wellbeing of rural communities (Miller et al., 2013). The OECD (2012) outlines five benefits of renewable energy for rural areas: generating revenue, supporting business development, bringing innovation, enhancing capacity, and increasing the affordability of energy. Community renewable energy (CRE) projects are one type of RE project that has been given considerable attention in recent years. There is considerable debate about the meaning of community in the context of CRE projects (Hicks & Ison, 2018; Holdmann et al., 2022; Walker & Devine-Wright, 2008). They can encompass:

*“those that are sized to serve a community (as is the case with district heating projects), projects of varying sizes initiated by a community or community organisation (as is the case with various social enterprises invoking environmental or “localism” logics), as well as privately owned operations that attempt to involve a local community in the planning and development phases of their projects” (Rezaei & Dowlatabadi, 2016, p. 790).*

CRE projects are thought to provide a wide range of socioeconomic benefits to communities, however the mechanisms and context that generate these outcomes are not understood (Berka & Creamer, 2018). Thus, there is a need to understand how these benefits emerge and how communities can optimize the socioeconomic benefits of CRE projects.

Research on wellbeing in Northern and Indigenous communities has found that many non-economic factors play an important role in the economic development of Northern communities. The nation building approach, developed by Cornell and Kalt (1998), outlines the importance of self-governance, competent governance institutions, cultural match and strategic orientation as essential components of economic development in Indigenous communities. These four factors are thought to support Indigenous nations in taking control of their own future - also known as fate control. The importance of fate control has been emphasized by the Arctic social indicators report, which highlights it as an essential component of human development in the north (Larsen et al., 2013). The nation building approach provides a foundation for sustainable development from CRE projects by ensuring that communities and local governments are the drivers of development and their futures. However, the nation building approach is not sufficient to ensure long-term economic growth in rural Northern communities and additional factors must be considered to ensure that communities continue to gain indirect benefits from CRE projects.

Arguably the most important among these additional factors is human capital. While human capital development has been a proposed strategy for the North, it is not without challenges. Human capital is often measured by education level and individuals in remote Northern communities often face barriers to pursuing education (Hirshberg & Petrov, 2015). In addition, most Northern residents must leave their home community to pursue higher education and those who leave often permanently relocate in regional hubs or outside the region altogether (Hirshberg & Petrov, 2015; Seyfrit et al., 2010).

Many scholars, however, now argue for a broader interpretation of human capital, which encompasses more variables beyond education (Rossi, 2020). For example, Florida's (2002) creative class theory provides an alternative way to measure human capital beyond traditional

education metrics. The creative class is defined as “the collection of occupations that specialize in the novel combination of knowledge and ideas to solve problems or create value” (Wojan, 2014, para. 1). This definition suggests software engineers, architects, and academics; however, the creative class is much broader and includes hair stylists, artisans, and small business owners. In Northern and Indigenous communities, this can also include individuals who possess local and traditional knowledge and skills and individuals who generate economic value through subsistence activities. It should be noted that while Florida’s work has primarily been applied to urban areas in the US, the creative class theory has also been studied in rural areas and has been linked to economic growth in rural areas (Barrieau, 2006; Feihan et al., 2021; Herslund, 2012; McGranahan et al., 2011; Murtagh & Collins, 2017; Sands & Reese, 2008).

While the literature focusing on the social value of energy at the community level is growing, little research has focused on the mechanisms for CRE projects to serve as drivers of sustainable development. Using the nation building approach and the creative class concept, this paper advances a conceptual framework for understanding and approaching CRE as a driver of sustainable development. It begins with an overview of sustainable development in the Arctic and of renewable energy projects as a driver of sustainable development. This is followed by introducing the nation building approach and the creative class argument, including discussion of the limitations and criticisms of those approaches for rural Northern communities. The third section outlines the conceptual framework. Finally, the chapter concludes with a call for additional research into the role of renewable energy as a catalyst for enduring socio-economic development in the rural north.



## **Sustainable Development in the Arctic**

In recent decades there has been a growing debate over how to build sustainable and enduring economies in the region. Arctic economies are conceptualized in three parts: the market economy, which consists primarily of resource extraction for the international market; the local economy, which is based subsistence activities and small-scale production; and government transfers (Huskey et al., 2014). One of the major themes in the research is the role and impact of large-scale resource extraction on Arctic economies and how to further develop regional economies to ensure long-term well-being. The reliance on resource development leaves Northern communities vulnerable to the boom-bust cycle of the resource market and eventual depletion of natural resources (Glomsrød et al., 2021; Huskey et al., 2014; Larsen & Huskey, 2020). In addition, these projects are capital intensive and in many cases the investment and production of resources is done by external actors, which makes communities dependent on external decision makers and can lead to a drain of resources from the region (Abele, 2018; Durfee & Johnstone, 2019; Larsen & Huskey, 2020). At the same time, natural resource development can serve a critical role in supporting impoverished and underdeveloped Arctic communities and help to address immediate economic needs (Larsen & Huskey, 2020). For example, drawing on the Canadian Arctic context, Dylan et al. (2013, p. 18) state that “despite a variety of apprehensions, such as potential cultural and environmental losses, most key informants viewed the economic developments as a necessity” While large-scale resource development will continue to play a role in much of the Arctic, there is a growing interest in developing additional sectors of the Arctic economy, either in conjunction with resource development or as an alternative.

There are a variety of new and existing industries that have been proposed as pathways to sustainable economic growth. Renewable primary industries such as fishing and logging have been the mainstay of many Northern regions, both for local use and export (Larsen & Huskey, 2020). New and emerging industries such as Arctic tourism, technology manufacturing, renewable energy, and natural resource manufacturing have all seen growth in regions across the Arctic (Abele, 2018; Larsen & Huskey, 2015). However, these industries are unlikely to match the wealth generated by resource development and must be considered as components of a larger strategy of sustainable development. Concurrently, the concepts of human development and wellbeing are shifting rapidly across the Arctic. This shift is reflected in the Arctic Human Development Report (2004, 2015) and the Arctic Social Indicators (2010, 2013, 2015), which show the changing understanding of Arctic issues across a variety of disciplines, including economic and community development. An example of this is the role of the subsistence (also called informal or traditional) economy in furthering sustainable development. Previously, the mixed market-subsistence economy was considered a transitional phase of the Arctic economy, with the subsistence sector shrinking as the regional economy matured (Burnsilver et al., 2016). However, in the Arctic, the role of the subsistence economy has continued to be emphasized as an important component of sustainable development and as something that can contribute to overall social and cultural wellbeing (Burnsilver et al., 2016; Glomsrød et al., 2021; Huskey et al., 2014; Larsen & Huskey, 2020). This shift has also contributed to research articulating a more complex understanding of the costs and benefits of large-scale resource development projects, including those outside of traditional economic measurements (Abele, 2018; Southcott et al., 2018). In order to contribute to sustainable development, new projects, whether in resource

development or otherwise, must be considered across multiple facets, rather than only the traditional economic indicators.

Currently, billions of dollars are being invested by OECD countries in the global energy transition, and rural Northern communities are at the forefront of this transition. In the rural north, renewable energy projects are increasingly seen as a means to improve local energy security while also contributing to global emissions reductions. In Alaska and Canada, for example, many rural communities are not connected to the continental energy grids and instead are serviced by diesel generators. In Canada, energy costs for communities electrified by diesel generators are three times higher than in grid-connected communities (Rezaei & Dowlatabadi, 2016). In remote and rural Alaska, residents pay nearly 10% of their monthly total income towards utilities (Holdmann & Byrd, 2017). In addition to the high cost of energy, diesel-based generation, relying on imported fuels, can leave communities vulnerable to power outages and energy shortages. The high cost and lack of reliability have left many communities energy insecure, providing strong impetus for the pursuit of renewable energy options (MacKay et al., 2021).

The high cost and instability of energy in many remote Arctic regions has ripple effects into all aspects of community life (Hossain et al., 2016). For example, energy insecurity in the rural north has been linked to water and food insecurity (Eichelberger, 2010; Natcher & Ingram, 2021). For communities that are energy insecure, the benefits of renewable energy projects can extend beyond the direct project benefits of meeting immediate energy needs and can support increased human security in the community. Renewable projects have the potential to provide low-cost, reliable energy to rural communities while helping to build community wealth and capacity (OECD, 2012). However, there are additional, often indirect, benefits of renewable

energy development even for those communities that are energy secure and/or connected to a regional or continental electrical grid. Those benefits can include increased energy literacy or community empowerment. (Berka & Creamer, 2018). However, while there are many hypothesized socio-economic benefits of CRE projects, there is a limited understanding of how these benefits emerge (Berka & Creamer, 2018). Additionally, accounting for these indirect benefits can be elusive, and researchers often struggle to capture some of the more indirect benefits in their assessments (Okkonen & Lehtonen, 2016). Research on CRE projects in the north tends to focus on the challenges and barriers to the development of CRE projects and the retroactive evaluation of CRE projects and their potential and observed benefits. However, there is a limited understanding of how to generate the desired socio-economic outcomes of RE projects in the region. This chapter seeks to contribute to filling the gap by outlining a framework to help conceptualize and account for the benefits of RE projects.

### **Conceptual Background**

There is a growing need for new tools to help capture the broadened understanding of economic development in the Circumpolar north and identify the mechanisms that generate the desired socio-economic outcomes. This paper argues that the development of a Northern creative class framework, based on a synthesis of Florida's (2002) creative class and Cornell and Kalt's (1998) nation building approach, can be a useful tool to address this need. The nation building approach and the creative class are complementary and reinforcing pillars, both of which are needed to generate long-term sustainability. The nation building approach highlights the importance of self-governance and is closely tied to the concept of fate control, which has been identified as an essential component of Arctic human development (Cornell & Kalt, 1998; Larsen & Huskey, 2020). This approach lays the foundation for sustainable development, but it is

incomplete. A core challenge for rural Arctic communities in achieving long-term sustainability is local capacity. According to Petrov (2017), human capital can help Northern regions to “adopt and adapt innovations while developing their own body of economically relevant knowledge and skills based on local experiences and traditions” (p. 206). In many Northern communities, and particularly Indigenous communities, informal economic activities that rely on local knowledge, such as hunting or fishing, are often not accounted for in traditional economic measurements (Huskey et al., 2014). While human capital is not able to solve this issue in accounting, it can serve as a tool for individuals and communities to utilize their local knowledge in the formal economy. Both the creative class and the nation building approach have been identified as useful tools for supporting enduring sustainable development in Northern communities. This paper evaluates how these two approaches work together and how they can be used to identify the mechanisms that drive sustainable development in the region.

### ***The Nation Building Approach***

Cornell and Kalt (1998) introduced the concept of nation building in the context of American Indigenous communities, as a strategy for sustainable economic growth and community development. The nation building approach is a useful concept as it articulates a vision for the type of change that many rural or remote communities are hoping to develop. The nation building approach emphasizes the importance of long-term community wellbeing over short-term economic gains and measures success by improvements across all facets of community life, including social, political, cultural, and economic (Cornell & Kalt, 1998). Cornell and Kalt state that the opportunity is “a chance to rethink, restructure, reorganize, a chance not to start a business or exploit an economic niche but to substantially reshape the future” (Cornell & Kalt, 1998, p.187). The four factors of the nation building approach are self-

governance, strong governing institutions, cultural match, and strategic orientation (Cornell et al., 2005). For communities that follow the nation building approach, these four factors empower communities to “effectively shape their own futures, instead of having those futures shaped by others” (Cornell & Kalt, 1998, p. 212). Cornell et al. (2005), emphasize that this change does not occur through one project, even one that brings benefits to a community, but rather through “foundational change.”

Cornell and Kalt (1998) argue that the first step to nation building is self-governance which allows Indigenous communities to have genuine control over affairs and ensures local leadership is held accountable to the community. Self-governance is the first step in community building, but in order to truly benefit from this decision-making authority, local institutions must have the capacity to effectively govern (Cornell et al., 2005). To do this, institutions and local leadership must reflect local culture and values on how governance should be done (Cornell & Kalt, 1998). When local leadership reflects the cultural values of a community, they are more likely to gain legitimacy from the local community and undertake projects that are supported by the community (Cornell & Kalt, 1998). Furthermore, the cultural match allows local leadership to capitalize on shared values and history in order to advance community building (Cornell et al., 2005). Finally, nations benefit from long-term planning and sustainable approaches to problems, rather than addressing problems as they arise (Cornell et al., 2005). Both American Indigenous communities and Northern communities struggle with the pressing economic needs of their communities that often necessitate the pursuit of short-term economic gains, even if these gains undermine long-term sustainability (Cornell et al., 2005; Larsen & Huskey, 2020). However, Cornell & Kalt (1998) emphasize the importance of long-term development across multiple facets of community life as opposed to selecting projects based on short-term economic gains.

Strategic orientation encourages local leaders to articulate their vision for the community they are hoping to build, then select opportunities based on their contribution to that goal (Cornell et al., 2005). The nation building approach has been researched within the context of Indigenous self-governance, particularly among the CANZUS (Canada, Australia, New Zealand and United States) countries. This is sometimes also referred to as sovereignty, which while appropriate in the American Indigenous communities, carries different meanings depending on the national context. Thus, for this paper the term self-governance is used. While Cornell and Kalt's initial approach gave specific weight to the legal and governance changes that could empower American Indigenous communities, later research on the nation building approach has found that communities do not need specific governance structures or legislated rights to begin nation building (Smith, 2021).

The Circumpolar region includes both Indigenous, mixed, and non-Indigenous communities; the nation building approach has the potential to be applied across rural Arctic communities, even non-Indigenous ones. While self-governance may be less salient in non-Indigenous or mixed communities, many of the key themes of Arctic socio-economic development overlap with the nation building approach, such as fate control and cultural preservation. Fate control is used to describe the ability of individuals or communities to control their own futures. Fate control has been associated with improved socio-economic outcomes for Northern communities and has become an important component of the human development strategy in the Arctic (Kimmel, 2014). While the concept of fate control can be applied to individuals, the Arctic Social Indicators report has noted that collective fate control is most relevant for Arctic communities (2010). Research from the Arctic Social Indicators report also identified cultural vitality as an important component of Arctic development. They note that

while cultural vitality this is of particular importance for Indigenous communities, it is an important value for all Arctic communities. In this paper, the nation building approach is proposed as the foundation for sustainable development through CRE projects, including both Indigenous and non-Indigenous communities. Given the diverse communities and governance structures across the region, the nation building approach will be referred to instead as the 'community building approach' in order to articulate the benefits of this approach for all rural Northern communities, not only Indigenous nations.

### ***The Creative Class***

Richard Florida's *The Rise of the Creative Class* generated considerable debate and new scholarly inquiry around the question of why some urban areas thrive while others do not. The creative class concept asserts that cities should invest in attracting people, specifically creative class members, rather than businesses, and that these creative individuals will attract new businesses that rely on skilled labor and expand existing creative industries. The creative class is a subset of workers that are categorized "based on the occupation, specifically a set of occupations that make up the 'creative class', including science, engineering, arts, culture, entertainment and the knowledge-based professions of management, finance, law, healthcare and education" (Florida et al., 2008, p. 616). The deliberate strategy of creating the conditions for attracting and growing the creative class is essential for long-term, sustainable development. Florida argues that it is the creative class which promotes innovation, entrepreneurship and productivity improvements. Importantly, he notes that creative class members are highly mobile and thus cities must compete to attract the creative class. In addition to arguing the importance of the creative class to cities economic growth, the theory also argues that creative class members are highly mobile and have shared cultural values that determine their location choices. Given



this, cities should invest in their quality of place, which Florida calls ‘people culture’. People culture emerges from three conditions -tolerance, tech, and talent - which are thought to create the ideal dynamics of openness, innovation and quality of services that are desired by the creative class.

Florida (2002) argues that the three Ts (tolerance, tech, talent) are essential to developing people culture, and subsequently attracting the creative class. Talent is the number of individuals with advanced degrees or working in creative fields. Tech is used to represent the presence of knowledge intensive jobs and industry in a city. The cluster of highly skilled workers and knowledge intensive industries is what, according to Florida, drives innovation and generates economic growth for the region. Tolerance is argued to represent low barriers to entry and helps to attract new residents, who can contribute their creativity and innovation to the region. Finally, Florida (2002) asserts that each of the three Ts on its own is a necessary but not sufficient component of creative class development and argues that the synergy between the three indicators is what drives creative class development and economic growth.

The creative class has been heavily criticized by many in the field of urban economic development. This paper does not present a comprehensive overview of these criticisms; however, it does address those relevant to the application in the rural north. One of the major critiques of the creative class is that it is not useful outside of the North American urban context in which it was created. A study of the creative class in the Nordic region found that people culture was less important than economic factors in determining the location of the creative class (Andersen et al., 2010). The authors argue that the Nordic context - specifically the uniformity of services and amenities and the urban hierarchy - limits the applicability of the creative class to the region and caution against a ‘one size fits all’ approach to regional development. However,

the creative class theory can, and often is, adapted to fit the context of a city or region. Research from Denmark found that the creative class was important for Danish economic development, however the researchers argue that the specifics of people culture diverged from Florida's initial three Ts (Lorenzen & Andersen, 2012). These adaptations are also used when applying the creative class concept to rural areas. For example, a strong people climate for rural regions is associated with high quality of life factors, access to natural amenities, and a tourism industry (McGranahan & Wojan, 2007 b; Thulemark & Hauge, 2014).

Another criticism of the creative class concept is that it only replicates the existing ideas of human capital as measured by education level. Florida (2013) states that while there is overlap between human capital and the creative class the two are distinct in keyways. While the broader debate of human capital versus creative capital remains disputed and is outside the scope of this paper, in the context of the Arctic region this distinction appears important. Research from Petrov (2008) and Petrov and Cavin (2013) found that education level appears to be a less important indicator of talent in the Arctic when compared to communities further south. One reason cited is the high concentration of Indigenous and local knowledge found in many rural Arctic communities. By measuring based on occupation, those employed in occupations that draw on Indigenous knowledge (i.e., artisans) are included in the assessment of local talent. In addition, education can be a double-edged sword for many rural Arctic communities. While these communities would often benefit from expanding their skilled labor force, those who pursue higher education are more likely to relocate to regional hubs or outside of the region entirely (Hirshberg & Petrov, 2015).

Despite these criticisms, the core ideas of the creative class concept remain relevant for the Arctic region. While regional nuances and adaptations need to be made, research on

peripheral and rural areas has been consistent with the core creative class concept. This paper seeks to add to the nuances and adaptations of the creative class by conceptualizing it in the context of the renewable energy transition underway in the north. Current research on the Arctic creative class is limited and much of the research is focused on regional hubs, which while not urban in the national or global context, provide an important economic urban environment for the region (Andersen et al., 2010; Petrov, 2008; Petrov & Cavin, 2013). Those that have focused on rural Northern communities have focused on those with unique contexts with an already existing creative class base, for example, Alaska's North Slope Borough which includes the Prudhoe Bay Oil Field (Petrov & Cavin, 2013). Thus, the application of the creative class concept to rural Northern communities remains an important, but incomplete, framework for sustainable development.

### **The Community Renewable Energy Framework**

The CRE model draws upon both the creative class and community building approach to build a singular framework for rural Circumpolar regions. Both the creative class and the community building approach posit that job creation alone is not enough to motivate change in a region, and both argue for investments into the community of place to support long-term economic sustainability. However, these two components support different mechanisms, both of which are needed for sustainable communities. The community building model is essential for ensuring communities and local governance structures are prepared to undertake CRE projects and use them to motivate change. Additionally, the creative class framework works to ensure that the benefits of a project extend beyond its direct impact. This framework's development is informed by the three Ts (tolerance, talent, and technology) of creative class development. However, to better match the dynamics of rural Northern communities, this paper focuses on

retaining and developing local talent over attracting external talent. This shift is most strongly reflected in the replacement of tolerance with *trust*. Importantly, while the community renewable energy framework outlines the community building approach as the foundation of sustainable development, both the creative class and the community building approach are interrelated and mutually reinforcing. For example, creative capital provides communities with the capacity necessary to increase fate control and strengthen governance institutions (Petrov, 2017). In turn, this increase in community engagement and strong leadership help to attract and retain more creative capital in the region. Thus, while the community building approach is an important first step to developing sustainable communities, its impact is not limited only to the development phase of a CRE project. The community building approach emphasis on community of place and fate control is infused into each of the three Ts and helps to revise the concepts to better support the needs and goals of rural Northern communities.

### ***The Community Building Foundation***

Today, Northern rural communities, many of which are Indigenous communities, face a similar opportunity to the one referenced by Cornell and Kalt 25 years ago (1998). The renewable energy sector in the north is driven by increased pressure to reduce emissions via decentralized energy generation. Thus, the community building approach is useful for evaluating CRE projects as it articulates a vision for the type of change that many communities in the region are hoping to develop, and it can help provide a path to long-term economic development and overall community wellbeing. CRE projects appear particularly well suited to the community building approach as they contribute to local independence and, when locally owned, control over local resources.

In the Arctic, the reliance on external decision makers and investors, particularly with regards to resource extraction projects, hinders communities' ability to pursue sustainable development (Larsen & Huskey, 2020). The community development approach is the first step in catalyzing new futures from CRE projects. Like many economic development projects, CRE projects have the potential to reinforce current dynamics that limit local control and benefit from the development (OECD, 2012). Arguably, however, CRE projects, when supported by the community building approach, can lay the foundation for sustainable community development. A core theme of the community building approach is local leadership and governance in developing and undertaking projects, in that when local communities have self-governance and competent institutions, they are able to develop projects that reflect local values and ensure legitimacy.

Cultural and community fit play an important role in successful CRE projects. In its study of successful renewable energy projects in rural communities, the OECD (2012) found that local acceptance was essential for effective economic development from renewable energy and argue that a 'place-based' approach to designing renewable energy projects helped to increase their sustainability. In addition, the OECD found that embedding renewable energy projects into the existing local economy helped to increase the chances of success and increased the benefits to rural communities. Another important dynamic for successful renewable energy projects is that the scale and pace of development should allow for local capacity to develop alongside the project (OECD, 2012). Two of the key attributes that contributes to community building are knowledge sharing within and between communities and building effective partnerships with external actors (Cornell et al., 2005; Cornell & Kalt, 1998). The importance of partnerships is also seen in the literature on CRE projects. A study of successful CRE projects in rural Alaska,

for example, found that capacity for undertaking projects presented a real challenge for rural Alaskan communities and that the pooling of resources across communities can create a pathway for CRE projects to develop (Holdmann et al., 2022).

However, the community building approach on its own is an incomplete approach. The four factors of community building (self-governance, competent institutions, cultural match and strategic planning) help to ensure communities are able to undertake projects that can contribute to sustainable communities and economies. The community building approach is most relevant in the initial phases of CRE project development, where it can provide guidance on how projects should be structured, such as the ownership structure and project size, both of which have been shown to impact project success and local benefits (Hogan et al., 2022; OECD, 2012). To motivate change in rural Arctic communities, CRE projects must be able to provide spin-off and indirect benefits to communities that enable them to continue to pursue sustainable development.

### ***Replacing Tolerance with Trust***

Tolerance, according to Florida 2002), signals to outsiders that they will be able to integrate into a community. Florida's initial indicator of tolerance was measured through the gay index (male same-sex cohabitating couples), the bohemia index (individuals employed in arts and design) and the openness index (foreign-born individuals). These indicators have been criticized as rather measures of diversity, which is not necessarily linked to greater tolerance (Sands & Reese, 2008; Wimark, 2014). At the same time, many researchers applying the theory to different regions have often altered the measurement of tolerance to the local context (Hansen & Nedomysl, 2009; McGranahan et al., 2011; Sands & Reese, 2008). For example, measurements of tolerance in the North American Arctic include women in leadership and Indigenous population percentage as indicators (Petrov, 2008; Petrov & Cavin, 2013). However,

these studies also found that tolerance appears to be a poor indicator of creative talent and potential for Arctic communities. Rather than attempting to further refine the tolerance indicator, which has been shown to have a tenuous connection to the creative class in smaller North American and Arctic communities (Petrov, 2008; Petrov & Cavin, 2013; Sands & Reese, 2008), this paper proposes *trust* as a suitable substitute for tolerance in the rural Northern context.

Discussions around the merits of tolerance as an indicator remain, for the most part, outside the scope of this paper. However, the discussion helps to illuminate the core dynamics that tolerance is thought to bring to a community. Tolerance, according to Florida, is used to attract talented (creative) individuals through low barriers to entry. This perspective is further supported by the concept of ‘the strength of weak ties’ (Granovetter, 1973) which argues that diversity encourages creativity and innovation. The context of Northern and Indigenous communities is fundamentally different from those traditionally studied under Florida’s creative class. This thesis argues that in the rural North the focus should be on retaining and developing local talent, rather than attracting talent from elsewhere. Just as tolerance is thought to spur creativity and attract talent to urban centers, this thesis argues that trust has the potential to initiate the same dynamic in the rural circumpolar north.

Social capital appears to be an important factor for limiting out-migration from Northern communities, particularly for Northern Indigenous communities. In a study of the creative class in Newfoundland, researchers found that social ties were cited as an important aspect of creativity and economic security and that, for those who were local to the region and these ties helped to retain individuals despite better perceived economic opportunities elsewhere (Lepawsky et al., 2010). Additionally, a study of demographic changes in Nunavut found that the territory had a low out migration rate when compared to other western Arctic regions and

hypothesized that this is due to the strong ties to Inuit culture and land in the region (Hamilton et al., 2018). Access to subsistence activities, which are an important cultural activity for many Indigenous peoples of the Arctic, also appears to both increase social trust and help to prevent out-migration. A study on the role of social cohesion in Arctic Canada found that for Inuit residents' participation in subsistence activities strengthened social cohesion by promoting values of trust and reciprocity (Duhaime et al., 2004).

Currently research on social trust and CRE tends to focus on the level of social capital needed to develop CRE projects, particularly the role of social capital in energy cooperatives. However, CRE projects also have the potential to improve social trust both throughout and after implementation. In addition to the increased trust between community members, CRE projects can also support the development of trust between community leaders and residents. Indeed, much of the research dedicated to understanding how successful CRE projects emerge has cited the importance of local leadership and social capital for a project's success (Holdmann et al., 2022; Menghwani et al., 2022). Limited, if any, research has directly addressed how CRE projects increase local trust, yet many scholars have hypothesized the link between CRE projects and trust (Slee, 2015; Walker & Devine-Wright, 2008; Williams, 2022; Yildiz et al., 2015). Many of the socio-economic outcomes associated with CRE projects have been linked to increases in social trust including; increased community engagement (Islar & Busch, 2016), access to and participation in subsistence activities (Schmidt et al., 2021) and an increased sense of community sovereignty and independence (Holdmann & Byrd, 2017; Rezaei & Dowlatabadi, 2016).

Much like other benefits from CRE, the increase in community trust is not a guaranteed outcome but rather a potential one. Outside of academic literature, increasing social trust is not



typically considered as a benefit of CRE projects and subsequently project design does not generally include increasing social trust as an objective. The nation building approach articulates the need to develop a project that creates an environment in which people want to invest in their community (Cornell & Kalt, 1998). Increasing social trust, both within local communities and between local communities and their leaders, helps to develop this desire to invest in their community and its future wellbeing. Through this investment increasing community trust has the potential to contribute positively to the local creative class, both directly and through its influence on talent outlined in the coming section, by helping to stem the outflow of talent and increase local empowerment and investment.

### *Talent*

Talent development is a priority for the Arctic, with initiatives occurring at all levels of governance from local initiatives up to pan-Arctic initiatives. In many cases talent development is undertaken as part of a resource development project, which as part of its agreement, provides residents with job training to take up jobs provided by the project. In addition, there have been many education initiatives, both university and technical, that seek to increase talent in the North. Examples of this include the development of Arctic universities and Northern focused degrees and the development of satellite campuses which offer job training to address specific labor market gaps. In many cases, these initiatives are undertaken to address a specific need (i.e., to train individuals for careers in an incoming project) rather than a general investment in local talent. Like other talent development strategies, renewable energy projects have the potential to contribute directly to local talent through project specific training and capacity building initiatives. The number of jobs created by a project is linked to the type of renewable energy technology deployed and the scale of the project. Studies have found that when compared to

renewables with free energy input, such as solar or wind, biomass had greater job-creation potential (Dvořák et al., 2017; Holdmann & Byrd, 2017). While the jobs associated with such projects are not necessarily skilled labor, in many cases the direct jobs created from a project are only part of the overall impact. The reinvestment of renewable energy profits into the local community is associated with significant increases in the employment impacts of the project (Allan et al., 2011; Okkonen & Lehtonen, 2016). In Lolland, Denmark, the development of a renewable energy project led to declining unemployment across the island (Magnoni & Bassi, 2009). The OECD states that “the real employment benefits are less direct and stem from finding ways to use RE to enhance the competitiveness of local enterprises” (OECD, 2012, p. 94). Integration with the local economy plays an important role in job creation from renewable energy projects. In the case of Iceland, access to low-cost energy from renewables has led to the development of energy-intensive industries, such as smelting, in the country. However, in many cases this integration is done on a smaller scale. For example, the introduction of a biomass boiler in a rural Alaskan village not only provided jobs for rural residents to gather and process wood, but it also provided increased opportunities for subsistence activities, such as hunting, which are an important part of rural Northern economies (Holdmann & Byrd, 2017). This is particularly important as many Northern communities have seen an erosion of local knowledge. Local knowledge represents an important type of talent for Northern communities, not only for its contribution to the wage economy, but also in the form of subsistence activities that are an important sector of rural Arctic economies.

For rural Arctic communities, talent should not only include job creation, but also capacity building. A study of RE potential in Nunavut found that capacity, both generalized and industry specific, would be needed for successful renewable energy integration in the territory

(Mcdonald & Pearce, 2012). Current research on the Arctic creative class confirms that while Arctic communities have high rates of creative potential, they lack the opportunity to develop this talent into economic opportunity (Petrov, 2008; Petrov & Cavin, 2017). The OECD (2012) lists capacity building as one of the five potential benefits of renewable energy projects in rural areas. The implementation of renewable energy projects can contribute to capacity building and help to provide opportunities for residents to utilize their creative talents. For example, the undertaking of CRE projects has been shown to support the necessary capacity development needed to undertake additional community projects (Williams, 2022). The presence of strong local leadership appears to be an important component in the development of the Northern creative class (Petrov & Cavin, 2013) and the development of a CRE project could help to further local leadership capacity to support additional projects. In addition to the capacity built through a project's execution, the reinvestment of project profits into the community can create additional avenues for talent development, such as through investment in education and other capacity development programs. The opportunity to retain talent, reinforced by the trust developed, represents a unique strength of CRE projects and their role in local talent development.

CRE projects have the potential to increase local talent both directly and indirectly. Job creation and job training are commonly cited as potential benefits of CRE projects and are accounted for in project design and implementation. However, less attention has been given to the development of capacity, particularly local leadership capacity, through the projects. This capacity enables communities to develop additional projects that contribute to local talent. Thus, CRE projects should not limit their impact on talent to strictly jobs created, including those from

spillover effects, but rather seek to develop an environment that draws upon the creativity of residents and has the capacity to transform that creativity into local talent.

### *Technology*

Under Florida's model of the creative class, the presence of technology is thought to stimulate an environment of innovation that generates economic development. Current research supports the need for an entrepreneurial and innovative environment to develop the creative class in rural areas (Lepawsky et al., 2010; David Mcgranahan & Wojan, 2007; Petrov, 2008; Petrov & Cavin, 2013). However, the Arctic is not framed as a high-tech region and while innovation hubs in larger cities such as Oulu and Tromsø continue to develop their technology sectors, this development has not emerged in the rural regions. Northern Canada and Alaska have low levels of tech-intensive industry and high-tech employment opportunities (Petrov, 2008; Petrov & Cavin, 2013). While the presence of innovation is important for economic development in the rural Arctic, it is argued here that just the integration of a new technology, via a CRE project, into rural Arctic communities can support the development of the Arctic creative class. With the traditional creative class model, an increase in local talent drives an increase in technological innovation, which drives greater economic development. However, in the rural Arctic, the relationship is inverse. The introduction of a new technology into the community does not necessarily generate wealth through increased innovation, which can be exported to drive economic growth. Rather, in the region, the introduction of new technology can help to build out the need for skilled workers, which supports existing industries and can contribute to increased demand for skilled work. Thus, in the rural Arctic, the role of technology in creative class development is linked to its influence on talent, rather than its direct impact on local innovation.

The OECD (2012) states that the introduction of renewable energy projects into a rural region can support the development of jobs both directly from the project, and through further integration into the local economy. Depending on the type of CRE project and the nature of the facilitating technology, it can create skilled jobs in the community. In a study of community wind energy projects in Northern Scotland, researchers found that there were not only the direct employment benefits from the construction and operation of the wind plant, but that the reinvestment of profits into the community had the potential to increase the employment impact eightfold (Okkonen & Lehtonen, 2016). In Alaska, the introduction of biomass generators created skilled jobs in the harvesting and processing of forest resources and resulted in the local biomass operator expanding its operations into other industries, including construction (Menghwani et al., 2022). Finally, in Northern Norway, following the success of a local wind farm project, one municipality has plans for expanding the project into a local industrial park and expanding operations into areas such as fish farming and food production via greenhouses (Moen et al., 2021).

The introduction of new technology into rural Arctic communities provides the potential for increased demand for skilled labor in the region and thus enables talented individuals to stay or return to the local community. The type of technology selected will impact the number of jobs generated, both directly and indirectly. Thus, communities should consider local capacities and how well each technology will embed into the local labor market to maximize the benefits of the project (OECD, 2012). In addition, the increase in skilled jobs in the community has the potential to provide the necessary infrastructure to transform local creative capacities into economic opportunity. This is particularly relevant in Northern Indigenous communities where local and Indigenous knowledge can be used in the operation and management of renewable energy

projects. To increase the impact of renewable energy projects on creative class development, the type of renewable energy selected should not focus only on technological viability, but also on the ability of the associated technology to integrate with the local economy and existing skillsets.

## **Conclusion**

As the global energy transition continues and energy systems become more decentralized, rural Northern communities will be at the forefront of change. The high cost of energy in Northern communities, particularly for regions with low energy subsidies, enables renewable energy to be cost competitive with traditional generation methods (Holdmann, 2019).

Concurrently, the Arctic region is exploring new models of economic development in the region beyond the traditional three pillars (subsistence activities, government transfers, wage economy) and in the conceptualization of a sustainable economy. One of the proposed pathways is through the growth and development of human capital in the region. This paper attempted to align the impending global energy transition with existing models of human capital development and propose CRE projects as a driver of such development. The community renewable energy framework provides a potential pathway for CRE projects to serve as drivers of sustainable development in the Arctic. It highlights the importance of local governance and local engagement of CRE projects to ensure their cultural match and integration into the local economy. In addition, it draws attention to the role of capacity building in maximizing local socioeconomic benefits from CRE projects. Finally, this framework draws attention to the need to account for the indirect and more diffuse benefits of CRE projects during the planning process and to ensure that new projects are able to obtain these benefits. This paper represents a first step in understanding the mechanisms that generate the socioeconomic benefits of CRE projects.

However, more research is needed to advance the community renewable energy framework. This

could begin with case studies on current Arctic communities to see how well the framework translates to the different contexts across the region and across different types and scales of renewable energy projects.

### **Chapter Three- “It all started on a napkin at midnight” - A bottom-up initiative for a burgeoning energy community in Arctic Norway**

This chapter was written by Josie Ward with Dr. Berit Kristoffersen and supervised by Dr. Greg Poelzer. Josie Ward provided the interview data and the gray literature. Dr. Kristoffersen and her research team conducted the energy cafes. All data were translated and analyzed by Josie Ward. This chapter will be submitted to Polar Geography special issues on the Electric North.

#### **Abstract**

Understanding the energy transition as a political and economic project is a growing research field. At present, most of the focus has been on projects developed at the national and regional scale, but less attention is given to how projects develop at the local scale. This paper examines community dynamics and perspectives of Berlevåg, a small fishing village at the top of Arctic Europe. The community has a surplus of electricity from a new wind farm that has provided several opportunities for further development. These opportunities provide pathways to growth while also bringing new challenges. Based on participant observation (community events and energy cafes) in 2021 and 2022, and interviews with community members (2022), we found that residents anticipated a wide range of benefits from the project, including many non-economic benefits. This paper tests if the community renewable energy framework can support Berlevåg in reaching their goals. The results of this paper highlight many of the key benefits derived from the wind farm and subsequent spin off industries and articulate how these benefits support sustainable development in Berlevåg.



## **Introduction**

The global renewable energy transition is underway, and it is important to draw lessons across sites and scales. This paper focuses on community-based transition with investments and implementation of renewable energy projects. Renewable energy (RE) is being implemented globally to decrease emissions and it is important to understand how RE projects can also generate significant social and economic benefits for communities that enables a fast and inclusive energy transition (Newell et al., 2022). Currently, research is being done to understand how RE projects can bolster economic development in rural areas -effectively linking two policy goals of emissions reductions and local economic development (ECD, 2012). At present, there is research on the benefits (or potential benefits) on community RE projects in a diverse range of contexts, however, there is still limited research on how these benefits emerge and how to account for these benefits (Berka & Creamer, 2018). One proposed tool for evaluating and accounting for these benefits is a community renewable energy framework based on the community building approach and the creative class. The model's foundation, based upon the community building approach, identifies the necessary governance and leadership dynamics for sustainable development from RE projects.

This paper focuses on the municipality of Berlevåg, Norway, and the Raggovidda wind farm, with an installed capacity of 155 MW. The joint objective of the municipality and the wind farm owner, the publicly owned Varanger Kraft, is to use local renewable energy to develop existing and new local industries that enhance the economic values and opportunities in the community and the region more broadly. Berlevåg, a small coastal community in Finnmark county with just under a thousand residents, has an economy based mainly on local fisheries. For the past two decades the community has struggled with a declining population and with

recruitment to fisheries and local industries. To combat these dynamics the local municipality proposed developing the Raggovida wind park, which now produces an energy surplus for the municipality region. There are plans to expand the existing wind park and utilize this energy surplus in other commercial activities to further advance the municipality's socioeconomic goals. This includes plans for a new power line to transport energy outside of the region. However, there is considerable uncertainty about the path forward as it is controversial to build a new and more intrusive power line to the municipality. It will interfere with the Indigenous population – specifically Sami reindeer husbandry. Viable reindeer husbandry requires large areas, as a given pasture area can only sustain a limited number of reindeer and because reindeer use eight different seasonal pastures (Government of Norway, 2023). The Berlevåg area, including Raggovida, is used as a summer pasture, and a new power line would interfere with reindeer migration. The expansion of the wind park has been postponed until the issue of a bigger grid is either resolved or the municipality builds new industry to utilize the electricity surplus.

Conversations and interviews with locals and the municipality revealed a great deal of opportunity to pursue industrial development based on the wind power surplus. However, the key issue is that Berlevåg wants community development and there is a hope and ambition that the Berlevåg Industrial project could trigger a long-term opportunity for viable community development based upon renewable energy. The idea for the project began during a late night at the local pub; residents were brainstorming and wrote down the idea and how it could be realized on a napkin. This reflects how it is a bottom-up initiative, with the potential to address and incorporate both the material and social dimensions of renewable energy adoption (Svartdal & Kristoffersen, 2023).

In addition, the electricity in the Finnmark county has, for a long time, been the least expensive in Europe, and prices will probably continue to remain relatively low because of a surplus in production and a limited transfer capacity between Norway's Northern and southern power grids. Given this competitive advantage there is increasing national and international interest in investing in new industrial projects, including renewable energy, as well as other green measures, such as green hydrogen, in the region (Cheng, 2023). In a recent study conducted by Cheng (2023), hydrogen is perceived by residents of Northern Norway as better suited for transport fuel, compared to batteries, due to the cold temperatures. While there are concerns regarding potential leakages and explosions, the general attitude towards hydrogen is rather positive and focused on potential opportunities that may benefit their communities. However, the positive attitude of interviewees towards hydrogen may be because no hydrogen project in the region is fully operating yet and there has been little day-to-day interaction with the technology to understand the full safety implications (policymakers and locals).

This paper seeks to contribute answers to two interrelated questions regarding the wind farm in Berlevåg and contribute to the overall understanding of renewable energy projects on the local creative class.

- What are the hopes and fears of the RE project in Berlevåg?
- Does the community renewable energy framework support the actualization of these goals?

### ***Community Background***

Berlevåg is a community in the north of Norway with a population of 906 people in 2022 (Berlevåg, n.d.). In 2003 the local energy cooperative that is jointly owned by the municipalities

in the region, Varanger Kraft, presented the first plans for a wind power plant. In 2014 the wind turbines were installed in Raggovidda, just outside of Berlevåg. Since then, the project has become one of the most productive onshore wind farms in all of Europe (Fladvad & Patonia, 2023). However, the productivity of the wind farm, combined with a weak power grid, has led to the aforementioned surplus of energy that is unable to be transported elsewhere. In response to this, the municipality has proposed a business park which makes use of excess energy while also addressing other aspects of concern for the municipality. The initial wind farm was completed in 2014 with a total of 15 turbines and a total capacity of 45 MW. A planned phase two of the project will add an additional 12 turbines, for a total of 97 MW upon completion. Finally, there are plans for phase three of the project, which will add 103 MW of capacity to the wind farm for a total capacity of 200 MW. The wind farm's success, both from a technical and an economic point of view, has led to not only plans for an expansion of the wind farm, but also exploration into other industries, with the municipality playing the important role in managing and directing these initiatives. In 2018, the project was granted 5 million euros in EU funding to develop Project Haeolus (Olsen, 2019). According to the project website, "Haeolus is a EU project that proposes a new-generation electrolyser integrated within a state-of-the-art wind farm in a remote area with access to a weak power grid." (Haeolus, n.d., para.1). Since 2018, there has been a pilot hydrogen plant in Berlevåg which is expected to conclude in 2024. Regardless of the result of Haeolus project, the municipality is working towards realizing hydrogen production together with Varanger Kraft. Since hydrogen is an energy carrier, it can be used to store energy in periods when it is very windy in Berlevåg, but there is no space on the grid. If the plant becomes operational, the municipality has identified multiple potential consumers, either for hydrogen or ammonia, which is produced from hydrogen. However, at present, these options are all

hypothetical as there is not yet a commercial demand for hydrogen (Cheng, 2023). In addition to a potential hydrogen plant, the municipality has outlined plans for the Berlevåg Industrial Park (BIP). The BIP relies on the idea of the circular economy, for example, one byproduct of hydrogen production is oxygen and there are plans to use this oxygen to operate a fish farm in the industrial park. Additionally, there are plans for a greenhouse that uses the excrement from the fish as fertilizer in the production of locally grown produce.

The Berlevåg municipality's hope for the RE project and associated BIP is that it will contribute revenue for the municipality through property taxes on the industrial park, which can be used to help stop the outmigration from Berlevåg and to create a strong community atmosphere, particularly for present and new families and children (Moen et al., 2021). Stopping out-migration has been a longstanding priority for the municipality and for communities across Northern Norway. Since the 1980s the Norwegian government has implemented multiple incentive programs to encourage individuals to move to Finnmark and a few select areas in Troms County, but the results of these incentives have been mixed and has not been enough to reverse the trend of out-migration from the region, and many Northern communities are already experiencing a change in demographics as the population ages (Vennemo et al., 2022). Berlevåg is no exception: In 1986, the population of Berlevåg was 1533. Since then, there has been a steady decline with the 2022 population at 906 (Statistics Norway b, n.d.) The population of young people (aged 18-30) in the community has also diminished, from 303 in 1986 to 144 in 2022 (Statistics Norway b, n.d.). This project is an attempt to reverse this trend, however many uncertainties remain. It is unclear if the full scale of the project will be realized and, if so, if it will be effective in reversing the population trend.

Berlevåg is currently a community in transition, and as the hydrogen project and spin-off industries continue to grow, it is important to understand how RE projects can contribute to building strong and sustainable communities. This is particularly true for rural communities in the circumpolar north. Thus, it is important to evaluate the RE project in Berlevåg beyond the traditional measures used in economic development. The project in Berlevåg as such provides an opportunity to gain insight into how renewable energy can contribute to sustainable rural communities across the circumpolar north and the mechanisms that drive the wide-ranging benefits associated with RE projects.

### **Framework**

Currently, many of the initiatives for economic development in the Arctic region are focused on large-scale resource development. These projects often follow the ‘jobs and income’ approach outlined by Cornell and Kalt (1998). However, there are a growing number of calls to pursue additional approaches to economic development in the region and to broaden the understanding of Arctic wellbeing, either in conjunction with or in replacement of resource development (Huskey et al., 2014; Larsen & Huskey, 2020; Petrov, 2017). RE projects, and specifically community led RE projects, have been considered a potential driver of sustainable economies in the Arctic. However, there are limited tools for understanding the mechanisms that drive sustainable development through RE projects. The community renewable energy framework provides one such framework for identifying these mechanisms, which is based on the nation building approach and the creative class concept.

The nation building approach provides the foundation for developing sustainable economies under the community renewable energy framework. Cornell and Kalt’s (Cornell & Kalt, 1998) nation building approach is a strategy for economic growth and sustainable

community development for American Indigenous communities. However, rural Arctic communities, both Indigenous and non-Indigenous, share similar dynamics and opportunities as American Indigenous communities. Given that Berlevåg is a non-Indigenous community, in this paper the approach will be called the community building approach<sup>1</sup>. The community building approach identifies four key components that contribute to effective governance for sustainable development. They are self-governance, competent institutions, cultural match, and strategic orientation (Cornell et al., 2005). This approach encourages development across various components of wellbeing, as opposed to solely focusing on economic returns. According to the Arctic Social Indicators (ASI) report, fate control, cultural vitality, and contact with nature are all essential components of Arctic wellbeing that are not generally included in traditional metrics (Larsen et al., 2013). Fate control in particular is closely tied to the community building approach. Cornell et al. (2005) found that the four components of community building were important attributes of communities “seizing the future” (title). In addition, cultural vitality and cultural match are highly interrelated concepts. The ASI report defines cultural vitality as “a matter of being surrounded by and able to interact regularly with others who share belief systems, norms, and a common history” (Larsen et al., 2013, p. 16). Thus, cultural match can be seen as a contributor to cultural vitality, as it ensures that governance institutions and future projects are reflective of local culture and values. Importantly, while cultural vitality is most strongly associated with Indigenous communities, its value is not exclusive to these communities and is also relevant to non-Indigenous and mixed communities (Larsen et al., 2013). The community building approach represents the foundation of the community renewable energy framework as it ensures that the local government and institutions are involved in the project and ensures that it is aligned with the community’s long-term goals. The OECD (2012) states that

ensuring RE projects are an appropriate match for the host community is important for deriving economic benefits. In addition, local control over the project supports community acceptance and ensures that the pace of development is appropriate for the host community (OECD, 2012).

The community building approach provides the necessary components for effective governance of a project, which is most relevant in the initial phases of development. However, this approach is limited in helping to capture the potential spin-off benefits from projects. In order to motivate long-term change, local communities must also increase their capacity, so they are able to capitalize on additional opportunities. Human capital development has been shown to support sustainable economic development in peripheral regions (Mathur, 1999). Human capital development and retention has emerged as a priority for many Arctic regions and communities. Indeed, the 2023-2025 Norwegian chairmanship of the Arctic Council includes the priority of developing “resilient, diverse, and inclusive Arctic communities that are attractive places to live in, for everyone” and to “highlight sustainable economic development as an essential basis for social development in the Arctic” (Arctic Council, n.d., paras. 9-10)). Additionally, capacity building was an outlined priority for the Indigenous Peoples Secretariat for 2022-2023. One of the most common ways to measure human capital is through education level, however many scholars note that education may be less salient as an indicator of human capital in the Arctic due to the presence of local and Indigenous knowledge as well as the barriers to education in rural areas (Hirshberg & Petrov, 2015; Petrov, 2008). One alternative way to measure human capital is Florida’s creative class. The creative class is a set of occupations that, Florida argues, represent workers who apply their knowledge and skills in their careers to create value and address problems. The creative class was initially applied to major US cities; however, the theory has been applied to many regions around the globe including Scandinavia (Andersen et al., 2010;



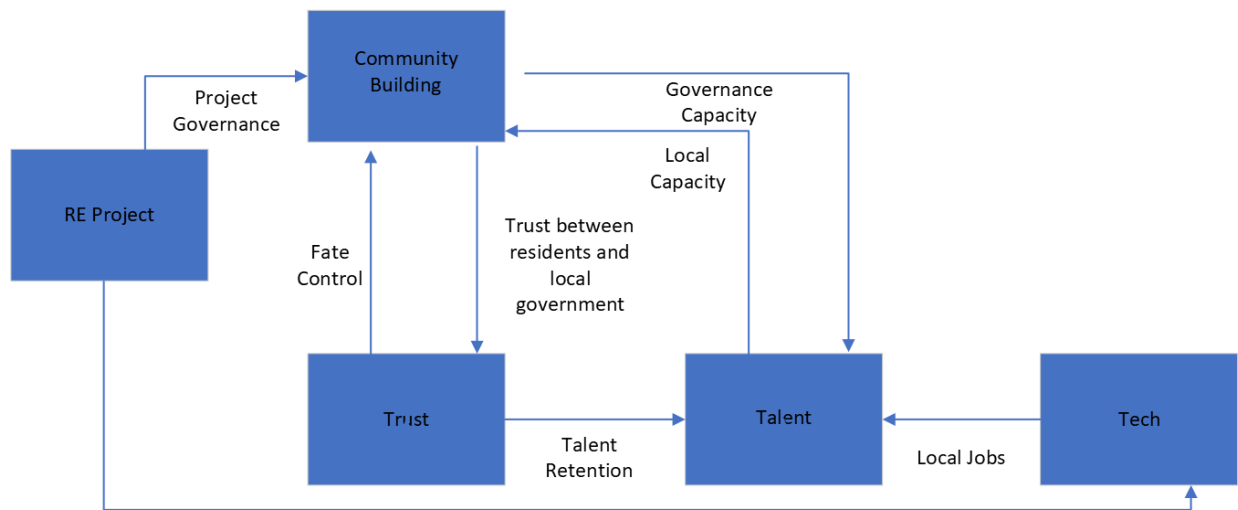
Asheim & Hansen, 2009; Hansen & Niedomysl, 2009; Mellander, 2006; Murtagh & Collins, 2017), Canada (Barrieau, 2006; Costa & Lynch, 2021) and China (Cui et al., 2023; Feihan et al., 2021) . In addition, there has been a small number of studies of the creative class in the Arctic (Petrov, 2008; Petrov & Cavin, 2017, 2013).

The creative class, with critical modifications, can be used in rural Arctic communities to assess the impact of RE projects on talent retention and development. The framework outlines three key components for RE projects to be able to build and retain the creative class which are:

**Trust:** The community renewable energy framework argues that trust is essential for the Northern creative class as it helps to stem the impact of outmigration. Social networks and cultural ties have been shown to help retain local talent, even when faced with better economic opportunities elsewhere. RE projects have the potential to generate trust between residents and their local leaders as well as contribute to a sense of community identity and pride and optimism for the community's future. Additionally, the reinvestment of the revenue generated from a RE project into community amenities provides an opportunity for an additional indirect boost of social trust.

**Talent:** The model focuses on capacity development as the key indicator of talent. This includes the investment in job-specific training programs or training programs developed to meet certain labor market needs, usually in response to an incoming project, as well as more general investment in education across all levels and disciplines. In addition, the framework also notes the potential for capacity development within local leadership and municipal governments that emerges from administering and managing a RE project.

**Tech:** Tech’s role in the development of the creative class is to develop the demand for skilled labor in a given community, primarily through the operation and maintenance of RE facilities and related infrastructure. In addition, when tech is well integrated into the local economy, it can support other existing industries in the community and help to drive greater demand for skilled labor.



*Figure 1: Visual Depiction of the Framework*

This paper seeks to apply the community renewable energy framework to the Raggovida wind farm, and associated BIP, to explore how the community sees renewable energy projects as a strategy for sustainable community development. The introduction of new technology into rural Arctic communities provides the potential for increased demand for skilled labor in the region and thus enables talented individuals to stay or return to the local community. In Berlevåg, this is a key motivation, where they will use the surplus energy from the wind park into hydrogen. As described in the empirical data, the municipality and the residents of Berlevåg see industrial development as a strategy to enhance social and economic values in the

community. This perspective suggests that when applying the community renewable energy framework in this context, the social value of energy should be at the center (see: Miller et al., 2018). To test this framework, we used participant observation in 2021 and 2022 by co-organizing community energy events, and interviews with community members (2022) along with gray literature and government reports to understand how the wind farm contributed to sustainable development in Berlevåg.

## **Methods**

### ***Data Collection***

The primary data collection took place in June 2022 in Berlevåg. During this time six in-person interviews were conducted. Participants were identified based on community contacts and the recommendation of other researchers in the field. Five of the six interview participants were not directly affiliated with the Berlevåg Industry Park and one participant was employed by an affiliated company. The interviews ranged from six to 25 minutes in length. Interviews were conducted using a semi-structured interview guide (Appendix). All participants were informed about the purpose of the study and their rights as participants and were given the opportunity to ask questions. All interviews were conducted in English. Interviews were digitally recorded and later transcribed.

Secondly, the participant observation included co-designing and carrying out two energy cafes with Varanger Kraft and Berlevåg municipality in 2021 and 2022 (the latter occurring in the same week as interviews were conducted). Social scientists and master students at the Arctic University of Norway (UiT) were the main facilitators and it was part of the CASES project. The energy cafes were conducted in Norwegian. During the first hour of the energy café, the local community members were introduced to the relevant updates on the projects, both relating to

technology and societal possibilities and pitfalls. During the second hour the community members discussed pre-designed questions (semi-structured discussion guide). The topic of the first energy café was how to co-create a future hydrogen community in Berlevåg and the topic of the second café which was conditions the community thought was necessary (environmental, socioeconomics) to accept such a large scales transformation of surplus wind to hydrogen/ammonia. The major motivation to co-create the energy cafes was to contribute to, and get data on, how a low-carbon transition should be responsive to responsible societal values, public concerns, and human needs, and whether there is space to explore the role of technology, talent, and trust (Chilvers et al., 2021). Given this, the data collection method was based on the model of an energy café. Energy cafes are two-hour workshops that begin with a presentation from a project partner. The ideas presented were then discussed in small groups using semi-structured interview guides (Svartdal & Kristoffersen, 2023). The energy café model was tested in the Smart Senja project (see: Svartdal and Kristoffersen, 2023). There were seven groups the first year (with about 100 participants) and four groups the second year (with about 50 participants). Each energy cafes had a table host and a referent from UiT. The data from the Energy Cafes are particularly useful in terms of capturing the hopes and fears of renewable energy developments in Berlevåg.

Due to the number of participants, additional data were collected in the form of grey literature and energy cafes to triangulate the results of the interview analysis. Reports were gathered from research partners also working in Berlevåg and the municipal government webpage. Additional information on each report is shown below in Figure 1. All selected reports were published in Norwegian.

Title	Translated Title	Year Published
Grønn industriutvikling i Berlevåg	Green Industrial Development in Berlevåg	2021
Kommunalt Veikart: Samspillet mellom næringsutvikling, kompetansebygging og samfunnet	Community Roadmap: The interaction between business development, competency development and community	2022
ØKONOMIPLAN 2023-2026 for Berlevåg Kommune	Economic Plan 2023-2026 for the Berlevåg Municipality	2022
Kommunedelplan for Berlevåg industripark	Municipal Plan for the Berlevåg Industrial Park	2021

Figure 2: Grey literature used.

**Data Analysis**

The interview analysis was conducted in three steps. First, the data was coded using initial coding (also called open coding). During this step, analytic memos were written to further assess the data and begin to identify key themes and concepts. Following the initial coding, preliminary themes were identified. Using these preliminary themes, the codes were sorted into themes and identified subthemes. Finally, the interviews were coded again using pattern coding to further refine the themes and subthemes (Saldaña, 2016).

Next, the selected documents and energy cafe data were coded using deductive coding based on the established themes from the interview data. This top-down approach allowed for the

filtering of relevant and salient information from the documents and helped to further support the themes identified from the interview data. The reports were translated into English using DeepL. The English translations were used for the initial read through of the report. Once the potential codes were identified they were confirmed in the Norwegian text to ensure accuracy. Finally, the codes were checked by a native Norwegian speaker. Both the Norwegian and English versions of the document were used to enhance the analysis. The conclusion from the document analysis was confirmed by a native Norwegian speaker.

## **Results**

Across the three data sets, there were three key themes that emerged during the analysis which are explored below in detail. The themes are community, industry, and governance.

### ***Community***

When articulating Berlevåg's future, many participants highlighted the importance of community in the town's long-term success. As one elderly participant expressed at the first energy café, this was the spirit of Berlevåg, where people line up to carry out joint activities (in Norwegian called "dugnad"). The declining population, which one interviewee described as "a slow death situation" (Interview 3, 2022), was a concern expressed by most participants. At present, Berlevåg has a relatively large and stable number of temporary workers, many of whom are non-Norwegian immigrants, who come for varying lengths of time to fill labor market gaps (for example in winter fisheries). There were some concerns among participants that the project would resort to using fly-in, fly-out jobs, where those employed by the BIP "do not contribute to building society and culture together with us in the local community over time" (Energy Cafe 4, 2023). However, there was a hope that the project – through job creation - would build a workforce that would contribute to more permanent relocation. This goal was summarized by a

participant who stated, “We must also make people thrive...We need people to stay, not just come for a year” (Energy Cafe 1, 2023). This has also been a goal for the municipality, who listed the desire to build a community atmosphere as one of their three priorities for the project (Moen et al., 2021).

When asked about how to attract residents, participants stated that the municipality should focus on free/cheaper preschool, afterschool programs and increasing the write off for student loan debt. One of the key factors that participants stated during both energy cafes (2021 and 2022) with regards to attracting families was the need for ‘jobs for two’, meaning that if a couple moves to Berlevåg, both should be able to find jobs in their respective fields. One participant stated that there should be a type of support program for partners to find work when relocating as this was often the hindrance for bringing the whole family to Berlevåg. In addition, participants emphasized that they were open to new residents and hoped that they would integrate into the broader community. One interviewee stated that he hoped that “maybe some of those who will come and work, maybe they can contribute to the cultural life, to sports etc.” (Interview 3). In one of the energy cafes, participants discussed how participation in community activities such as sports, clubs and other recreation was essential to integrating into the community.

The need for amenities and services was also highlighted as a priority to retain existing residents. One participant stated, “My children did not come back, they said there are no job opportunities for them here” (Energy Cafe 3, 2022). The natural amenities and weather were described as a double-edged sword for Berlevåg, with many participants highlighting the incredible natural amenities in the region, while also noting that the harsh weather – and constant strong wind - were a challenge for many. Participants also expressed concerns regarding the

decline in services available in the city, particularly for skilled trades. For example, one participant stated “In Berlevåg there is a lack of services, for example hairdressers, which means we must travel out of the city to get a haircut” (Energy Cafe 3, 2022). For local youth, education was seen as a key component in helping to retain young people. Participants felt that if students could “see” the opportunities brought in by the project, they would be more inclined to pursue education related to the project and stay in the community. As one interviewee stated that they hoped to be able to say to students “if you want to you could finish your elementary school and go to high school, become a mechanic, and then you can work at the plant that you're seeing right now” (Interview 3, 2022).

Overall, most participants expressed their hope that the community would grow, both in numbers and in vibrancy, because of the impacts of developing Berlevåg into a hydrogen community. In many cases this appeared to be just as, if not more, important than the economic impacts and job creation. The revenue generated from the project, along with the jobs, were often framed as tools to benefit community development, for example the reinvestment of tax revenue into local services and infrastructure.

### ***Industry***

Participants had a wide range of views on the role of industry, and which industries were most important for Berlevåg’s future. Many participants were hopeful that the project would boost industry in the community, but there was a lot of uncertainty regarding how much would come to fruition. Overall, participants appeared to have generally positive views on the existing wind park, which has been successful in generating revenue and thus has made a substantial contribution to the municipal budget. For many, there was an attitude of ‘why not’ with regards to the expansion of the project. For example, one interviewee stated, “We have a lot of wind



here, and I'm thinking 'why not use it if it doesn't destroy the nature' (Interview 2). However, there was disagreement on if and how the project should expand and what developments should be prioritized. One of the primary concerns expressed was the impact of new industry on the fisheries. Fisheries are the primary industry in Berlevåg, and most coastal Norway, and play an important role in the regional economy as well as cultural identity. Some participants expressed concern that the focus on hydrogen development is detracting from the existing fisheries. As one participant stated, "the fisheries are a little outside many of the visions" and argued that fisheries should remain the primary focus of the municipality (Energy cafes 5, 2022). However, others felt that the introduction of a new industry does not take away from the fishing industry, rather it provides Berlevåg with another "leg to stand on" and makes the community more resilient.

The status of the BIP project in Berlevåg likely contributed to the uncertainty and disagreements regarding the path forward. At the time of final data collection (June 2022), hydrogen production was a pilot project and the opportunities to transform this into a commercial operation were, and remain, uncertain. Many participants expressed their concern that hydrogen production would not be a benefit for Berlevåg, citing the potential for work to be done remotely. In addition, there is potential that the project will employ temporary workers, who work in Berlevåg for a set period only to return to their homes elsewhere, either rotationally or as one-off jobs. One participant stated their fears that Berlevåg would continue to be a supplier of raw materials as they, and the rest of Finnmark "always" had been (Energy Cafe 5, 2022). This concern is not unfounded, as the fishing industry has faced similar challenges as the processing of fish has been outsourced to other regions. However, while many participants expressed these concerns, they were often framed as challenges to overcome rather than a rejection of the project

altogether. Instead, these concerns tended to reinforce the need for investment in community and for the municipality to address these concerns.

At present, the role that industry will play in Berlevåg's development is still uncertain and the path forward remains a debated topic within the community. While participants did not share the same view on how industry should further develop in Berlevåg, they, for the most part, shared similar views on the goal of the BIP. Participants often linked their concerns for the development back to the desire to increase the population and strengthen the community. In this light, most participants share the same hopes and fears for the future of Berlevåg and the BIP and shared the desire for the municipality to address these concerns and ensure that industrial development is undertaken in a way that addresses community goals.

### ***Governance***

The final theme that emerged was the role of governance in the project across municipal, regional, and state actors. Residents' perceptions of the project were influenced by broader political factors in the region. Many participants expressed concerns that Berlevåg would be 'left behind' in the green energy transition. As one resident stated, "It is a big problem that many people don't think there will be a hydrogen factory here, that it will be moved from here" (Energy Cafe 6, 2022). Multiple residents echoed this sentiment and felt that the state government prioritized funding similar or competing projects in other municipalities. While this led to some pessimism regarding the future of the BIP, for some, it also appeared to increase their trust in the municipal government. In the individual interviews, multiple participants referenced that the municipality was one of the first to propose this type of project and had been advocating for Berlevåg and the project, even without broader support. One resident stated that "in the beginning it was like science fiction" but notes that 10 years later the project is still

moving forward (Interview 5, 2022). Conversely, while the perceived lack of support did lead some participants to be more pessimistic about the project, the engagement of other project stakeholders helped to boost confidence in the project. One participant stated ““It's getting closer to something, when UiT comes in with an energy café and Arctic Hydrogen comes along and Varanger Kraft gives an update, the investment decision [on the power line] is ready, then we feel that it is getting closer” (Energy Cafe 6, 2022).

On the macro-level participants appreciated the municipality’s initiative on the project and shared the same overall goals, however the specific path forward and the scale of the project were a source of contention between the municipality and residents. For some participants, the municipality had become too focused on hydrogen at the expense of other opportunities or paths. Additionally, some participants felt that the project had grown significantly in scale. One interviewee stated, “the last version of the size of the project that has been presented where every everything has become bigger as I see it ... and maybe [it] has ended up in dimensions which look a bit too big” (Interview 6, 2022). For the most part, participants felt that they had opportunities to voice their opinions and concerns, however many felt that this feedback did not impact how the project proceeded. Additionally, participants felt that the municipality should provide more frequent updates to residents and ensure that they are being disseminated through multiple channels to reach people. Even with their stated frustrations, participants appeared generally supportive of the municipality’s initiative, and even those who were more skeptical of the BIP noted that something needed to be done to reverse the current trends in Berlevåg. Interestingly, all participants appeared confident that any revenue generated by the municipality would be reinvested towards meeting the community’s goals.

Overall, residents appear content with the way that the project has been governed so far. While the perceived lack of support from the state and regional governments led to some pessimism, it also appeared to contribute to a sense of local control over the project and the community's future. While some participants expressed concerns and frustrations with the municipality, these did not appear to hinder their support for the project overall or their perception that the municipality was working to benefit the community.

## **Discussion**

The results of this study help to articulate the hopes and fears that residents of Berlevåg have with regards to the renewable energy transition in their community. In this section we apply these findings to the community renewable energy framework to understand how this framework reveal the challenges and opportunities for Berlevåg to reach its goals.

### ***Community Building***

The community building approach emphasizes the importance of self-governance and cultural match, particularly for Indigenous communities. Finnmark is a mixed county with a large Sami population, but Berlevåg is not an Indigenous community and thus the idea of autonomy is likely to be less salient in this context. Still, there was a clear sense of community identity and responsibility with regards to Berlevåg's future and, in line with data from the initial energy café in 2021, across the community residents appeared to agree with the overarching goals of the municipality. RE projects more broadly have been linked to greater levels of community confidence and optimism. For example, in a study of micro-hydroelectric projects in Wales, nearly 2/3 of respondents felt that “their micro-hydro project had fostered a belief that their community could bring about positive changes” (Bere et al., 2015, p. 35). The project appears to have increased residents' perception of fate control. In Berlevåg, participants also

expressed the idea that something needed to be done to prevent Berlevåg from “a slow death situation” and were overall happy that the municipality had been proactive in addressing the situation despite a perceived lack of support from the regional and state governments. The approach emphasizes the importance of community development and the establishment of strong governing institutions over profit-motivated development. In Berlevåg, the BIP project is conceptualized as a tool to meet the larger goals of the community, rather than a successful project being the end goal.

Participants, for the most part, appeared to feel that the municipality reflected local priorities and culture. Some participants expressed concerns that the project was distracting from the fishing industry, an important economic sector and cultural activity. While the wind farm is a new industry for Berlevåg, the broader goals of the BIP project and the spin-off industries are reflective of local cultural values. One such example is the importance of local education and particularly vocational education. Multiple participants emphasized the importance of providing education that is relevant for local industries and local businesses. More broadly, education was an important component of the broader municipal goal of making Berlevåg attractive to young families. Initiatives such as building housing and decreasing the cost of childcare were common suggestions from participants and are also reflected in the municipal goals for the BIP. In addition, spin-off industries are reflective of local priorities and culture. One of the proposed markets for hydrogen is the local fishing industry, which could utilize hydrogen powered boats for their fleets. In addition, one of the proposed spin-off projects is a fish farm, which would link the project to a key cultural industry.

Overall, the wind farm and associated BIP appear to be in line with community desires and the actions of the municipality reflect those desires. While the Berlevåg municipality does

not have self-governance in the way it is traditionally understood, they do have authority in key areas. Norway has a decentralized government and municipalities have authority over a wide range of government services (Eythórsson et al., 2018). This authority allows them to develop projects that are aligned with community goals and have acceptance from residents, which is reflected in the BIP project. However, Cornell and Kalt (1998) note that self-governance is a double-edged sword for local governments as it requires them to take on the risk and responsibility when things go wrong. The Berlevåg municipality appears aware of this risk, as one municipal leader stated “we are putting all our eggs in one basket” (Personal Communication, 2021). In addition, the municipality’s initiative on the project appeared to contribute to a sense of fate control, particularly when contrasted with the perceptions of regional and state governments. Finally, the municipality appears to have an effective long-term strategic plan for the community. The project has been ongoing for more than a decade and has evolved, but the municipality and residents retain the core goal of population growth and community development.

### ***Trust***

Trust, as defined in the Northern creative class, supports the development of social capital and social trust, which has been identified as a contributor to talent retention in Northern and Indigenous communities (Lepawsky et al., 2010; Wirsing, 2014), as well as an important component of successful CRE projects (Holdmann et al., 2022; Menghwani et al., 2022). Participation and engagement in the planning and execution of an RE project is often assumed or implied to increase or reproduce social trust (Slee, 2015; Walker et al., 2010; Yildiz et al., 2015), but there is limited research that specifically links an increase in social trust to RE projects. However, civic engagement more broadly has been widely associated with, and used as a

measurement of, social capital. One of the most noteworthy was Putnam's "Bowling Alone", which linked Americans' decline in participation in clubs, organizations and unions with the overall decline in social capital (2000). In Berlevåg, one of the key opportunities for local engagement in the project has been the energy cafés, which were held in the autumn of 2021 and summer of 2022. The energy cafés brought together project stakeholders, municipal leaders, and local community members for discussions on the project's progress as well as future plans. According to a report on the autumn 2021 energy café, residents were happy to receive more information about the municipalities plans and to have a forum to voice their concerns and questions regarding the project's progression (Moen et al., 2021).

In addition to the trust directly developed from community engagement, both the energy cafes and interviews affirmed the need for amenities and quality of life (QOL) factors. Florida (2002) calls these factors 'people culture' and in studies of the rural creative class, QOL factors play an important role in attracting and retaining local talent (McGranahan et al., 2011; D. McGranahan & Wojan, 2007). In their study of social capital in Northern Saskatchewan, Berdahl et al., states "well-functioning communities underpin economic engagements, and improving conditions at the community level is clearly key to any long-term" (2011, p. 92). For many rural communities, the investment in QOL indicators helps to facilitate the development of social capital through recreation and leisure activities. Many residents do not think the CRE project alone is sufficient to change Berlevåg's trajectory, but rather view investment in community amenities as an essential component to realizing the municipality's goal. One of the identified goals from the Berlevåg municipality was to create a strong community dynamic, particularly for families with children. Since the CRE project began in 2014, Berlevåg has invested in a new soccer field, a new pool and a new school building. While these projects were not directly linked

to the revenue generated from the wind farm, the project made substantial contributions to the overall municipal budget.

From this data, it is clear that the Raggiovida wind farm has contributed to the social trust in Berlevåg. This occurred both directly, from the energy cafés and ongoing community engagement in the project, and indirectly, through the reinvestment of revenue into community amenities and quality of life. Additionally, from the participants' points of view, there was a clear engagement and investment in the wellbeing of Berlevåg more broadly. While the full scope of the energy project in Berlevåg has yet to be realized, it has had a considerable impact on the social trust in the community and as the project continues many of these dynamics have the potential to strengthen more, both through further community engagement in the project and additional investments into local amenities and quality of life.

### ***Talent***

While the Raggiovida wind farm has made an impact on local trust, its impact on local talent is less clear. Talent attraction and retention is an important, if not the most important, goal for the Berlevåg municipality, however the actual impact of the project on talent appears to still be an anticipated benefit rather than a tangible one. Currently, the wind farm has provided a small number of local jobs at Varanger Kraft, the energy company in the region and owner of the Raggiovida wind farm. There are expectations that the project will contribute additional jobs both directly, through the operation of the plant, and indirectly via spin-off industries and the need for infrastructure development and maintenance. However, as outlined in the Northern creative class framework, talent development extends beyond job creation and into capacity building and talent development. One of the major concerns for talent development in Berlevåg is the retention of young people in the community. One concerning trend is that when students leave for university,



they often do not return to Berlevåg or even to Finnmark. The Norwegian government has tried to increase the migration of skilled workers to Finnmark by offering tax incentives, including the write-off of student loans, for those who settle in Finnmark, but these have had little impact on this trend (Vennemo et al., 2022). Like many other rural Northern communities, Berlevåg faces a double-edged sword when it comes to higher education, both needing to grow their population of skilled workers, while the pursuit of higher education or training by residents often takes them away from the community and they often do not return. However, there have also been some positive shifts brought upon by the wind farm to help attract and retain talent in Berlevåg.

The wind farm has generated revenue for the municipality that has been invested, in part, into the local education system. Reinvestment in social services, including education, has been shown to increase the employment impacts of a CRE project (Okkonen & Lehtonen, 2016). The investment in local education supports talent in two ways: by increasing the desirability of the local community, particularly for young families, and by helping to develop capacity in the local population by improved education quality. A study on the location choices of the creative class found that for smaller regions the strength of the local government services, including schools, is an important component of migration decisions (Zhao et al., 2020). Some research on the Nordic creative class argues that local amenities, such as school quality, are not as important in the region due to the Nordic welfare state (Andersen et al., 2010). However, a study in Sweden found that having a child increased the likelihood of those with tertiary education to relocate to a rural area and noted the importance of ensuring that “quality and availability of public primary and secondary education and childcare in rural areas is on par to urban areas are important” (Haley, 2016). In addition, the Norwegian education system is more decentralized than those of other Nordic countries and municipalities have a large degree of control in how they implement

the national curriculum (Germeten, 2011). In 2011, the national school system was changed to allow students to complete their high school degree in rural communities, such as Berlevåg, rather than needing to travel to a larger city. In addition, this change allows students to pursue technical degrees in Berlevåg, such as mechanics or welding. While this change was not related to the wind farm, as it was a state-wide initiative, it supports Berlevåg's goal of developing talent.

The Berlevåg municipality recently announced that it will develop a “competence hub” which will coordinate and support the education and training of residents to allow them to take up jobs related to the BIP (Berlevåg Kommune, 2022). Lødding & Paulgaard (2019) found that, in Finnmark, locally specific knowledge can provide an alternative path to gainful employment for young people who do not pursue higher education. Research on the Arctic creative class found that there was a high-level of creative potential among Arctic residents, but that there was limited opportunity to use that creativity to generate economic benefits (Petrov & Cavin, 2013). The education and training provided to residents, and the subsequent jobs taken up, can provide an opportunity for residents to use their creative potential to generate economic benefits. The competence hub will be designed to reach working aged adults, as well as those enrolled across all levels of the local school system. This will allow residents to pursue skilled work in a variety of sectors while also helping to bring them in to the local labor market. In addition, the competence hub will attempt to build connections with university and technical university students, raising awareness about career opportunities in Berlevåg and providing internships. The municipality has partnered with UiT (the nearest university) and NESO (the regional construction trade association) to provide these trainings.

Finally, while the direct impact on jobs and talent development has been minimal thus far, the wind farm also developed the capacity for the community to undertake the expansion of the wind farm and the spin off industries. According to Williams (2022), the process of developing a successful CRE project provides communities with the skills to undertake additional projects. In addition, studies of the Northern creative class have found that strong local leadership is associated with higher levels of the creative class (Petrov & Cavin, 2013). This has been the case in Berlevåg, where the initial wind farm did not produce a large increase in jobs, either directly or indirectly, but it has given the municipality the capacity to undertake these additional projects. Just as the hydrogen plant would not be possible without the wind farm, the institutional and leadership capacity of the wind farm has enabled the municipality to undertake this larger project and pursue potential spin-off industries.

While the impacts on talent remain in transition, there are positive trends emerging in Berlevåg. The focus and investment on education and capacity building from the municipality is a positive development towards the establishment of a local creative class. In addition, the first stage of the wind farm provided the municipality and local leaders with the capacity to expand the project and continue to increase the benefits for Berlevåg as the project scales and as additional opportunities arise, including those unrelated to the Raggovida wind farm.

### ***Technology***

The technology utilized in the project represents both the established technology for the wind turbines as well as new and emerging technologies for hydrogen and ammonia production. Both technology types have contributed to the increase of tech in Berlevåg. The role of technology in the Northern creative class is to build out the demand for high-skilled, or “creative” workers. In both the energy cafes and interviews, there was a clear concern around the

outsourcing of skilled labor, either to out-of-town labor or through remote management.

Currently, the CRE project has brought in the wind farm and the hydrogen plant, however there are also plans for increased tech in Berlevåg including a fish factory, greenhouse, and an additional power line.

Much of the Raggovida wind farm has been built by a temporary work force, rather than by residents. According to the OECD (2012), this is a frequent problem when pursuing renewable energy projects in rural communities. Often project timelines do not provide the local labor force with the necessary time to develop the capacity to fill these roles. The hydrogen plant has faced similar challenges, as the pilot plant was remotely managed by a company in Belgium. It is unclear if this will change when the plant is fully operational, but it has raised concerns among residents who fear that the impacts of the project will be limited due to outsourcing. These dynamics represent the challenges of tech in rural communities. While the technology can bring in additional demand for skilled labor, some of the specific and advanced needs are often outsourced (OECD, 2012). However, while the projects' technology may result in outsourcing, the Berlevåg municipality has also been innovative in using this technology to expand its existing industries. In Berlevåg, like many coastal Norwegian communities, the primary industry is fishing, and this represents an area where residents have a large level of skill and capacity. Currently, the municipality plans to develop an onshore fish farm using the heat generated from the hydrogen plant. This fish farm emerged directly from the impact of the wind farm and hydrogen plant.

In contrast to traditional creative class theory, the introduction of technology appears to have stimulated an innovation mindset, particularly within the municipality. In its 2022 report, the municipality included plans for a circular economy related to the potential large-scale

hydrogen plant. The report outlined multiple strategies for creating synergies between existing industries, the hydrogen project and expected (or potential) spin off industries. Berlevåg faces a similar challenge to many rural areas seeking renewable energy technology, as it lacks the local capacity to manage some of the technical aspects of the project. Despite this, community leaders have managed to leverage the new technology to support existing industries and extend the technology for use in areas of local competency (fishing). The integration of projects into the local economy is an important part of successful rural development via renewable energy (OECD, 2012).

### **Conclusion**

This paper outlines the hopes and fears of Berlevåg residents and tests if the community renewable energy framework can support the community's ambition. This paper first outlined the overall hopes and concerns of the BIP, through the perspective of Berlevåg residents. This perspective was then used to outline how the project has contributed to community building and the development of a local creative class.

The results of this research indicate that the project has benefitted from strong local governance institutions and leadership, which ensured that the project was aligned with residents' goals and provided the community a sense of fate control. In addition, the Raggovida wind farm contributed towards the three T's outlined, albeit with various scope and impact. The strongest contribution was to local trust which was developed through the planning and implementation of the project. The impacts to talent were more limited. There have been a small number of jobs created thus far, with potential for more. In addition, the local government has gained capacity from undertaking the Raggovida wind farm of the project, which enables the undertaking of the BIP. Finally, tech in Berlevåg refers to the wind farm and the hydrogen electrolyser both of

which help to build out the need for skilled jobs in the municipality. However, while residents and the municipality have an overall positive outlook on the project, core challenges remain with regards to realizing the long-term goals of the municipality (Table 2). Going forward, more research is needed to confirm if the increase in the three T's will effectively support the development of the creative class in Berlevåg, particularly as the BIP progresses over the coming years. More broadly, this research revealed how RE projects contribute to sustainable development in rural Northern communities. More specifically, the fusion of the community building framework and the creative class concept highlight the importance of designing RE projects around community goals rather than focusing exclusively on project economics. More research is needed to determine if the framework is applicable to other Arctic communities in different contexts.

<b>Key Opportunities</b>	<b>Key Challenges</b>
Increased revenue	Outmigration
Job creation	Conflict with fisheries
Fate control	Outsourcing of jobs
Capacity development	Perceived lack of support from regional and state government

*Figure 3: Key opportunities and challenges for Berlevåg as described by residents.*

## Chapter Four- Conclusion

Currently many rural Northern communities struggle to build the necessary conditions to build sustainable and enduring communities. Across the Arctic, and rural regions globally, there has been an increased focus on the necessary conditions that drive this type of development. Current strategies for Arctic economic development often undermine long-term sustainability in rural communities and leave communities reliant on external investment and market fluctuations (Larsen & Huskey, 2020). However, research on human development in the Arctic has gleaned insight into the factors that drive human and economic development in the region. CRE projects are one potential avenue for this and have the potential to motivate a new future for rural communities across the circumpolar north. CRE projects can provide socioeconomic benefits to communities while also helping to meet global emissions targets. While much of the literature on CRE highlight these potential socioeconomic benefits, there has been limited research on the mechanisms that produce these benefits and how to account for these benefits (Berka & Creamer, 2018; Lehtonen & Okkonen, 2016; Okkonen & Lehtonen, 2016). To address this need, this thesis builds upon the creative class concept (Florida, 2002) and the nation building approach (Cornell & Kalt, 1998) to advance a framework that conceptualizes CRE projects as a driver of the Northern creative class.

The first phase of this thesis was drafting a literature review. This review formed the foundation for the community renewable energy framework and is reflected in Chapter two of this thesis. The framework highlights the importance of strong governance and leadership of a project, particularly in the early stages of project development, to ensure that the project is aligned with community capacities and long-term goals. In addition, it highlights the value of potential spin-off benefits and how these benefits could emerge through the three Ts. Trust helps

to stop out-migration as it enhances the social and cultural ties that help retain talented individuals in local communities. Talent helps to build capacity in the community, both at the individual level and among community leadership. At the community level this can also translate into the capacity to take on additional projects, in RE or another sector. Finally, tech primarily helps to build out the demand for skilled jobs in a community particularly when well-integrated with local industries and capacities.

The second phase of this thesis applied the community renewable energy framework to a community in Northern Norway using data from energy cafes, interviews and grey literature. The case study emphasizes the potential for spin-off benefits to emerge from an RE project. Berlevåg already has a successful wind project, one which has produced benefits for the municipality, however it has been able to build upon the success of the project and expand into other industries. The case highlights the importance of fate control for Northern communities and trust between community members and their local leadership. In addition, the case shows how the infusion of a new technology into a community can be integrated with the local economy. While there has not been a large impact on local jobs thus far, the local government has developed the capacity to continue pursuing projects which can potentially provide additional job creation. This chapter also highlights some of the key challenges to building the creative class through CRE projects including a lack of support from higher levels of government, competition between existing and new sectors and the risk of outsourcing or fly-in fly-out work.

The results presented in this thesis provide insight into the mechanisms that drive sustainable development through CRE projects. However, the results are limited due to the limited number of interviews. To compensate for the small number of participants this thesis utilizes secondary data collected by other researchers. This secondary data was initially collected



to answer different questions and there is a potential absence of key viewpoints. In addition, the results of this thesis are limited by the fact that the author is a non-native Norwegian speaker. Finally, this paper is based on data from September 2021 to December 2022, with the primary data collection taking place in June of 2022. However, by 2023, the Berlevåg industrial project was facing challenges. In March of 2023, Varanger Kraft announced that it would not be able to invest further in the project without an increase in capacity of the local electricity grid (Bye, 2023). In September of 2023, Varanger Kraft secured a loan for 50 million NOK (4.63 million USD), a portion of which will be used for the hydrogen project in Berlevåg (Renewables Now, 2023). While these updates do not invalidate the results of this thesis, they do highlight the limitations of the results and the challenges of producing enduring socioeconomic benefits in rural Northern communities.

The community renewable energy framework employed in this thesis was designed to be applicable across Arctic communities. While Arctic communities share many similar characteristics, they also exist under a wide range of cultural, legal and political contexts all of which will impact how CRE projects are undertaken and how well they can contribute to sustainable development. This is exemplified in the Berlevåg case, where broader political and development strategies in Norway caused setbacks for the BIP. It also highlights the need for additional research to study communities over a greater period of time to understand the long-term impact CRE projects have. Finally, more research is needed to understand how the framework can be applied to other communities across the Arctic and how the framework can be employed in the planning stages of CRE projects to maximize the benefits to communities. In addition, future studies could be undertaken to identify indicators associated with the community renewable energy framework.

## Bibliography

- Abele, F. (2018). Regional development in the circumpolar north: What else do we need to know? (pp. 175–186). <https://doi.org/10.4324/9781351019101>
- Andersen, V., Bugge, M. M., Hansen, H. K., Isaksen, A., & Raunio, M. (2010). One Size Fits All? Applying the Creative Class Thesis onto a Nordic Context. *European Planning Studies*, 18(10), 1591–1609. <https://doi.org/10.1080/09654313.2010.504343>
- Asheim, B., & Hansen, H. K. (2009). Knowledge bases, talents, and contexts: On the usefulness of the creative class approach in Sweden. *Economic Geography*, 85(4), 425–442. <https://doi.org/10.1111/j.1944-8287.2009.01051.x>
- Barrieau, N. (2006). Creative class and economic development : the case of Atlantic Canada's urban centres. In D. J. Savoie 1947-, C. E. L. (Online service), U. de Moncton. C. I. for R. on P. P. and P. Administration, & A. C. O. Agency (Eds.), *Classe créative et le développement économique : le cas des centres urbains du Canada atlantique*.
- Berdahl, L., Beatty, B., & Poelzer, G. (2011). DEVELOPING COMMUNITIES IN NORTHERN SASKATCHEWAN Women and Youth in Aboriginal Community Development. *Journal of Aboriginal Economic Development*, 7(2), 90–101.
- Bere, J., Jones, C., & Jones, S. (2015). *The Economic and Social Impact of Small and Community Hydro in Wales Report for: Hydropower Stakeholder Group*.
- Berka, A. L., & Creamer, E. (2018). Taking stock of the local impacts of community owned renewable energy: A review and research agenda. In *Renewable and Sustainable Energy Reviews* (Vol. 82, pp. 3400–3419). Elsevier Ltd. <https://doi.org/10.1016/j.rser.2017.10.050>
- Berlevåg. (n.d.). Statistics Norway. Retrieved October 2, 2023, from <https://www.ssb.no/kommunefakta/berlevag>
- Burnsilver, S., Magdanz, J., Stotts, R., Berman, M., & Kofinas, G. (2016). Are Mixed Economies Persistent or Transitional? Evidence Using Social Networks from Arctic Alaska. *American Anthropologist*, 118(1), 121–129. <https://doi.org/10.1111/aman.12447>
- Cheng, C. S. W. (2023). Does time matter? A multi-level assessment of delayed energy transitions and hydrogen pathways in Norway. *Energy Research and Social Science*, 100. <https://doi.org/10.1016/j.erss.2023.103069>
- Chilvers, J., Bellamy, R., Pallett, H., & Hargreaves, T. (2021). A systemic approach to mapping participation with low-carbon energy transitions. *Nature Energy*, 6(3), 250–259. <https://doi.org/10.1038/s41560-020-00762-w>
- Cornell, S., Jorgensen, M., Kalt, J. P., & Spilde, K. A. (2005). *SEIZING THE FUTURE: WHY SOME NATIVE NATIONS DO AND OTHERS DON'T*. <http://www.ksg.harvard.edu/hpaied>
- Cornell, S., & Kalt, J. P. (1998). Sovereignty and nation-building: The development challenge in Indian country today. *American Indian Culture and Research Journal*, 22(3), 187–214. <https://doi.org/10.17953/aicr.22.3.lv45536553vn7j78>
- Costa, E., & Lynch, N. (2021). Sense of place on the periphery: Exploring the spatial practices of the creative class in St. John's, Newfoundland and Labrador. *Canadian Journal of Urban Research*, 30(2), 1–15.

- Cui, D., Hei, Y., Nijkamp, P., Wu, D., Li, G., Lv, S., & Liu, H. (2023). Spatial–temporal dynamics and determinants of creative class concentration—A study on urban agglomerations in China. *Population Space and Place*, 29(2), n/a. <https://doi.org/10.1002/psp.2615>
- Duhaime, G., Searles, E., Usher, P. J., Myers, H., & Fréchette, P. (2004). *SOCIAL COHESION AND LIVING CONDITIONS IN THE CANADIAN ARCTIC: FROM THEORY TO MEASUREMENT*.
- Durfee, M. H., & Johnstone, R. L. (2019). *Arctic governance in a changing world*. Lanham, Maryland: Rowman & Littlefield.
- Dvořák, P., Martinát, S., der Horst, D. Van, Frantál, B., & Turečková, K. (2017). Renewable energy investment and job creation; a cross-sectoral assessment for the Czech Republic with reference to EU benchmarks. In *Renewable and Sustainable Energy Reviews* (Vol. 69, pp. 360–368). Elsevier Ltd. <https://doi.org/10.1016/j.rser.2016.11.158>
- Eichelberger, L. P. (2010). Living in utility scarcity: Energy and water insecurity in Northwest Alaska. *American Journal of Public Health* (1971), 100(6), 1010–1018. <https://doi.org/10.2105/AJPH.2009.160846>
- Einarsson, N., Larsen, J. N., Nilsson, A., & Young, O. R. (Eds.). (2004). *Arctic Human Development Report*. Stefansson Arctic Institute.
- Eythórsson, G. T., Kettunen, P., Klausen, J. E., & Sandberg, S. (2018). Reasons for Inter-municipal Cooperation: A Comparative Analysis of Finland, Iceland and Norway. In F. Teles & P. Swianiewicz (Eds.), *Inter-Municipal Cooperation in Europe: Institutions and Governance* (pp. 105–129). Springer International Publishing. [https://doi.org/10.1007/978-3-319-62819-6\\_6](https://doi.org/10.1007/978-3-319-62819-6_6)
- Feihan, S., Haidong, D., Chongliang, Y., & Xumei, M. (2021). The Counter-Urbanization Creative Class and the Sprout of the Creative Countryside: Case Studies on China’s Coastal Plain Villages. *Journal of Economy, Culture and Society*, 2021(63), 297–315. <https://doi.org/10.26650/JECS2020-0084>
- Fladvad, B., & Patonia, A. (2023, January 27). *Grabbing the land or benefitting communities? renewable hydrogen in the Norwegian Arctic*. Research Institute for Sustainability. <https://www.rifs-potsdam.de/en/blog/2023/01/grabbing-land-or-benefitting-communities-renewable-hydrogen-norwegian-arctic>
- Florida, R. L. (2002). *The rise of the creative class : and how it’s transforming work, leisure, community and everyday life*. New York, NY : Basic Books.
- Florida, R., & Mellander, C. (2013). The creative class goes global. In *The Creative Class Goes Global* (pp. 1–7).
- Florida, R., Mellander, C., & Stolarick, K. (2008). Inside the black box of regional development - Human capital, the creative class and tolerance. *Journal of Economic Geography*, 8(5), 615–649. <https://doi.org/10.1093/jeg/lbn023>

- Glomsrød, S., Duhaimé, G., & Aslaksen, I. 1956-. (2021). *The economy of the North 2020 ECONOR*.
- Germeten. (2011). The new National Curriculum in Norway: A change in the role of the principals? In *Australian Journal of Education* (Vol. 55).
- Haley, A. (2016). Through a social space lens – Interpreting migration of the tertiary educated. *European Educational Research Journal*, 15(4), 480–490. <https://doi.org/10.1177/1474904116630316>
- Hamilton, L. C., Wirsing, J., & Saito, K. (2018). Demographic variation and change in the Inuit Arctic. *Environmental Research Letters*, 13(11). <https://doi.org/10.1088/1748-9326/aae7ef>
- Hansen, H. K., & Niedomysl, T. (2009). Migration of the creative class: evidence from Sweden. *Journal of Economic Geography*, 9(2), 191–206. <https://doi.org/10.1093/jeg/lbn046>
- Herslund, L. (2012). The Rural Creative Class: Counterurbanisation and Entrepreneurship in the Danish Countryside. *Sociologia Ruralis*, 52(2), 235–255. <https://doi.org/10.1111/j.1467-9523.2011.00560.x>
- Hirshberg, D., & Petrov, A. (2015). Education and Human Capital. In J. N. Larsen & G. Fondahl (Eds.), *Arctic Human Development Report* (pp. 349–394).
- Hogan, J. L., Warren, C. R., Simpson, M., & McCauley, D. (2022). What makes local energy projects acceptable? Probing the connection between ownership structures and community acceptance. *Energy Policy*, 171, 113257. <https://doi.org/https://doi.org/10.1016/j.enpol.2022.113257>
- Holdmann, G., & Byrd, A. (2017). *Biomass Heating Systems and Sustainable Village Economies*.
- Holdmann, G. P. (2019). *Renewable Energy Development in Alaska: Policy Implications for the Development of Renewable Energy for Remote Areas of the Circumpolar Arctic*.
- Holdmann, G., Pride, D., Poelzer, G., Noble, B., & Walker, C. (2022). Critical pathways to renewable energy transitions in remote Alaska communities: A comparative analysis. *Energy Research and Social Science*, 91. <https://doi.org/10.1016/j.erss.2022.102712>
- Hossain, Y., Loring, P., & Marsik, T. (2016). Defining energy security in the rural North—Historical and contemporary perspectives from Alaska. *Energy Research & Social Science*, 16, 89–97. <https://doi.org/https://doi.org/10.1016/j.erss.2016.03.014>
- Huskey, L., Mäenpää, I., & Pelyasov, A. (2014). Economic Systems. In J. N. Larsen & G. Fondahl (Eds.), *Arctic Human Development Report* (pp. 151–183).
- Islar, M., & Busch, H. (2016). “We are not in this to save the polar bears!” – the link between community renewable energy development and ecological citizenship. *Innovation: The European Journal of Social Science Research*, 29(3), 303–319. <https://doi.org/10.1080/13511610.2016.1188684>

- Kimmel, M. (2014). Fate control and human rights: the policies and practices of local governance in America's Arctic. *Alaska Law Review*, 31(2), 179.
- Larsen, J. N., & Fondahl, G. (Eds.). (2015). *Arctic Human Development Report: Regional Processes and Global Linkages* (Vol. 2). Nordisk Ministerråd.
- Larsen, J. N., & Huskey, L. (2015). The Arctic Economy in a Global Context. In B. Evengård, J. Nymand Larsen, & Ø. Paasche (Eds.), *The New Arctic* (pp. 159–174). Springer International Publishing. [https://doi.org/10.1007/978-3-319-17602-4\\_12](https://doi.org/10.1007/978-3-319-17602-4_12)
- Larsen, J. N., & Huskey, L. (2020). Sustainable economies in the Arctic. In *Arctic Sustainability, Key Methodologies and Knowledge Domains* (pp. 23–42). <http://ebookcentral.proquest.com/lib/usask/detail>
- Larsen, J. N., Schweitzer, P., & Petrov, A. (Eds.). (2013). *Arctic Social Indicators. ASI-II*. Nordic Council of Ministers.
- Larsen, J.N., Schweitzer, P., Petrov, A., & Fondahl, G. (2013). Introduction to Arctic Social Indicators: Tracking Change in Human Development in the Arctic. In J. Nymand Larsen, P. Schweitzer, & A. Petrov (Eds.), *Arctic Social Indicators. ASI-II* (Vol. 2, pp. 10–44).
- Larsen, J. N., Schweitzer, P., & Petrov, A. (Editor) (Eds.). (2015). *Arctic Social Indicators: ASI II: Implementation*. Nordisk Ministerråd.
- Larsen, J., Fondahl, G., & Schweitzer, P. (Eds.). (2010). *Arctic Social Indicators: A follow-up to the Arctic Human Development Report*. Nordic Council of Ministers.
- Lepawsky, J., Phan, C., & Greenwood, R. (2010). Metropolis on the margins: Talent attraction and retention to the St. John's city-region. *Canadian Geographer*, 54(3), 324–346. <https://doi.org/10.1111/j.1541-0064.2010.00315.x>
- Lorenzen, M., & Andersen, K. V. (2012). Different creative cities: Exploring Danish data to adapt the creative class argument to small welfare economies. *Creative Industries Journal*, 4(2), 123–136. [https://doi.org/10.1386/cij.4.2.123\\_1](https://doi.org/10.1386/cij.4.2.123_1)
- Lødding, B., & Paulgaard, G. (2019). Spørsmål om tid og sted: Mulighetsrom og kvalifiseringsbaner blant ungdom utenfor videregående opplæring i Finnmark. *Nordic Journal of Comparative and International Education*, 3(3), 75–90. <https://doi.org/10.7577/njcie.3273>
- Mathur, V. K. (1999). RESEARCH AND PRACTICE Human Capital-Based Strategy for Regional Economic Development. In *ECONOMIC DEVELOPMENT QUARTERLY* (Vol. 13, Issue 3).
- MacKay, M., Parlee, B., & Parkins, J. R. (2021). Towards energy security in the Inuvialuit Settlement Region: insights from community members and local residents. *Local Environment*, 26(9), 1128–1144. <https://doi.org/10.1080/13549839.2021.1964455>
- Magnoni, S., & Bassi, A. M. (2009). Creating synergies from renewable energy investments, a community success story from Lolland, Denmark. *Energies*, 2(4), 1151–1169. <https://doi.org/10.3390/en20401151>

- McDonald, N. C., & Pearce, J. M. (2012). Renewable Energy Policies and Programs in Nunavut: Perspectives from the Federal and Territorial Governments. In *ARCTIC* (Vol. 65, Issue 4).
- McGranahan, D. A., Wojan, T. R., & Lambert, D. M. (2011). rural growth trifecta: outdoor amenities, creative class and entrepreneurial context. *Journal of Economic Geography*, *11*(3), 529–557. <https://doi.org/10.1093/jeg/lbq007>
- McGranahan, D., & Wojan, T. (2007). Recasting the creative class to examine growth processes in rural and urban counties. *Regional Studies*, *41*(2), 197–216. <https://doi.org/10.1080/00343400600928285>
- Mellander, C. (2006). The creative class or human capital? : explaining regional development in Sweden. In R. L. Florida, C. E. L. (Online service), & J. L. R. S. of Management. M. P. Institute (Eds.), *Explaining regional development in Sweden*.
- Menghwani, V., Walker, C., Kalke, T., Noble, B., & Poelzer, G. (2022). Harvesting Local Energy: A Case Study of Community-Led Bioenergy Development in Galena, Alaska. *Energies*, *15*(13). <https://doi.org/10.3390/en15134655>
- Miller, C., Moore, N., Altamirano-Allende, C., Irshad, N., & Biswas, S. (2018). *POVERTY ERADICATION THROUGH ENERGY INNOVATION: A Multi-Layer Design Framework for Social Value Creation*.
- Moen, B., Pena, C. A., Russelvedt, E., & Meyer, A. (2021). *Grønn industriutvikling i Berlevåg*.
- Murtagh, A., & Collins, P. (2017). *Northern Peripheries & Creative Capital: The Nature of Creative Capital & Its Role in Contributing to Regional Development in Nordic Regions*.
- Natcher, D., & Ingram, S. (2021). A Nexus Approach to Water, Energy, and Food Security in Northern Canada. *Arctic*, *74*(1), 1–11. <https://doi.org/10.14430/arctic72045>
- Newell, P. J., Geels, F. W., & Sovacool, B. K. (2022). Navigating tensions between rapid and just low-carbon transitions. In *Environmental Research Letters* (Vol. 17, Issue 4). IOP Publishing Ltd. <https://doi.org/10.1088/1748-9326/ac622a>
- NORWAY'S CHAIRSHIP, 2023-2025*. (n.d.). Arctic Council. Retrieved October 2, 2023, from <https://arctic-council.org/about/norway-chair-2/>
- OECD. (2012). *Linking Renewable Energy to Rural Development*. OECD. <https://doi.org/10.1787/9789264180444-en>
- Okkonen, L., & Lehtonen, O. (2016). Socio-economic impacts of community wind power projects in Northern Scotland. *Renewable Energy*, *85*, 826–833. <https://doi.org/10.1016/j.renene.2015.07.047>
- Olsen, A. C. R. (2019, February 21). *Det er bare å sette seg i førersetet og trøkke på*. Forskningsrådet. <https://www.forskningsradet.no/horisont-europa/suksesshistorier/haeoulus-prosjektet/>
- Petrov, A. N. (2008). Talent in the Cold? Creative Capital and the Economic Future of the Canadian North. *Arctic*, *61*(2), 162–176. <https://doi.org/10.14430/arctic15>
- Petrov, A. N. (2017). Human Capital and Sustainable Development in the Arctic: Towards Intellectual and Empirical Framing. In G. Fondahl & G. N. Wilson (Eds.), *Northern Sustainabilities: Understanding and Addressing Change in the Circumpolar World* (pp. 203–220). Springer International Publishing. [https://doi.org/10.1007/978-3-319-46150-2\\_16](https://doi.org/10.1007/978-3-319-46150-2_16)



- Petrov, A. N., & Cavin, P. (2017). Creating a New Path through Creative Capital: Theories and Evidence from the Northern Periphery. *Journal of Rural and Community Development* . [www.jrcd.ca](http://www.jrcd.ca)
- Petrov, A. N., & Cavin, P. A. (2013). Creative Alaska: Creative capital and economic development opportunities in Alaska. *Polar Record*, 49(4), 348–361. <https://doi.org/10.1017/S0032247412000289>
- Population and land area in urban settlements*. (n.d.). Statistics Norway. Retrieved October 2, 2023, from <https://www.ssb.no/en/statbank/table/05212/tableViewLayout1/>
- Putnam, R. D. (2000). *Bowling alone : the collapse and revival of American community*. New York : Simon & Schuster.
- Reindrift*. (2023, April 13). Norwegian Government. <https://www.regjeringen.no/en/topics/food-fisheries-and-agriculture/reindeer-husbandry/reindeer-husbandry/id2339774/>
- Rezaei, M., & Dowlatabadi, H. (2016). Off-grid: community energy and the pursuit of self-sufficiency in British Columbia’s remote and First Nations communities. *Local Environment*, 21(7), 789–807. <https://doi.org/10.1080/13549839.2015.1031730>
- Rossi, F. (2020). Human capital and macroeconomic development: A review of the evidence. In *World Bank Research Observer* (Vol. 35, Issue 2, pp. 227–262). Oxford University Press. <https://doi.org/10.1093/WBRO/LKAA002>
- Saldaña, J. (2016). *The coding manual for qualitative researchers* (3E [Third edition].).
- Sands, G., & Reese, L. A. (2008). Cultivating the creative class: And what about nanaimo? *Economic Development Quarterly*, 22(1), 8–23. <https://doi.org/10.1177/0891242407309822>
- Schmidt, J. I., Byrd, A., Curl, J., Brinkman, T. J., & Heeringa, K. (2021). Stoking the flame: Subsistence and wood energy in rural Alaska, United States. *Energy Research and Social Science*, 71. <https://doi.org/10.1016/j.erss.2020.101819>
- Seyfrit, C. L., Bjarnason, T., & Olafsson, K. (2010). Migration intentions of rural youth in Iceland: Can a large-scale development project stem the tide of out-migration? *Society and Natural Resources*, 23(12), 1201–1215. <https://doi.org/10.1080/08941920903278152>
- Slee, B. (2015). Is there a case for community-based equity participation in Scottish on-shore wind energy production? Gaps in evidence and research needs. In *Renewable and Sustainable Energy Reviews* (Vol. 41, pp. 540–549). Elsevier Ltd. <https://doi.org/10.1016/j.rser.2014.08.064>
- Smith, D. (2021). Thematic Introduction Concepts, Issues and Trends. In D. Smith, A. Wighton, S. Cornell, & A. Vai Delaney (Eds.), *Developing Governance and Governing Development : International Case Studies of Indigenous Futures* (pp. 109–118). Rowman & Littlefield Publishers.
- Southcott, C., Abele, F., Natcher, D., & Parlee, B. (2018). Beyond the Berger Inquiry: Can Extractive Resource Development Help the Sustainability of Canada’s Arctic Communities? *Arctic*, 71(4), 393–406. <https://doi.org/10.14430/arctic4748>

- Svartdal, I. H., & Kristoffersen, B. (2023). Why in my backyard (WIMBY): Forging the link to community futures when energy transition projects are met with indifference. *Energy Research and Social Science*, 101. <https://doi.org/10.1016/j.erss.2023.103138>
- The Project In Brief*. (n.d.). Haeolus. Retrieved October 2, 2023, from <https://www.haeolus.eu/>
- Thulemark, M., & Hauge, A. (2014). Creativity in the recreational industry: Re-conceptualization of the Creative Class theory in a tourism-dominated rural area. *Scandinavian Journal of Public Administration*, 18(1), 87.
- United Nations (2015). *Transforming our world: the 2030 Agenda for Sustainable Development*. <https://wedocs.unep.org/20.500.11822/9814>.
- Vennemo, H., Bjørkås, E., Skille Mariussen, M., Ørbeck, M., Skulstad, A., Camilla Schreiner, R., Olav Thoresen, T., & Torsvik, G. (2022). *Evaluering av personrettede virkemidler i tiltakssonen i Finnmark og Nord-Troms*.
- Walker, G., & Devine-Wright, P. (2008). Community renewable energy: What should it mean? *Energy Policy*, 36(2), 497–500. <https://doi.org/10.1016/j.enpol.2007.10.019>
- Walker, G., Devine-Wright, P., Hunter, S., High, H., & Evans, B. (2010). Trust and community: Exploring the meanings, contexts and dynamics of community renewable energy. *Energy Policy*, 38(6), 2655–2663. <https://doi.org/10.1016/j.enpol.2009.05.055>
- Williams, S. (2022). *Energised Welsh communities: Examining the development and social impacts of community renewable energy in Wales*.
- Wimark, T. (2014). Is it really tolerance? Expanding the knowledge about diversity for the creative class. *Tijdschrift Voor Economische En Sociale Geografie*, 105(1), 46–63. <https://doi.org/10.1111/tesg.12044>
- Wojan, T. (2014). Creative Class (Richard Florida). In A.C. Michalos (Eds.), *Encyclopedia of Quality of Life and Well-Being Research* (pp. 1330-1332). Springer. [https://doi.org/10.1007/978-94-007-0753-5\\_3332](https://doi.org/10.1007/978-94-007-0753-5_3332)
- Wirsing, J. (2014). POPULATION, CHANGE, AND THE CANADIAN ARCTIC: DEMOGRAPHICS OF NUNAVUT'S COMMUNITIES. In *Diplom (Geographie)*.
- Yildiz, Ö., Rommel, J., Debor, S., Holstenkamp, L., Mey, F., Müller, J. R., Radtke, J., & Rognli, J. (2015). Renewable energy cooperatives as gatekeepers or facilitators? Recent developments in Germany and a multidisciplinary research agenda. In *Energy Research and Social Science* (Vol. 6, pp. 59–73). Elsevier Ltd. <https://doi.org/10.1016/j.erss.2014.12.001>
- Zhao, K., Zhang, Y., & Zhao, J. (2020). Exploring the complexity of location choices of the creative class in Europe: Evidence from the eu labor force survey 1995-2010. *Sustainability (Switzerland)*, 12(4). <https://doi.org/10.3390/su12041687>



## Appendix

### Interview Guide

#### **Theme 1: Understanding of the CRE project and its potential benefits**

1. Can you tell me a bit about the proposed energy project in your community?
2. What benefits do you think the community will gain from the project?  
*Depending on their response probe more with these questions*
  - a. Do any of these stand out as particularly important?
  - b. Why do these seem more important to you?
  - c. Do you think any benefits are being overlooked?
  - d. Do you think there is too much attention being paid to one area of benefits?

#### **Theme 2: Talent Development and the proposed project**

1. Do you think the local projects will require more training and education for residents?
2. Do you think that these local projects will encourage young people to stay?  
*Depending on response, probe more on why individuals are leaving and if the project is able to help stop this.*

#### **Theme 3: Developing Trust through the proposed project**

1. Have local residents engaged in the planning of the project?
2. Have you thought about how the project will interact with other aspects of community life?
3. Other industries?
4. In Alaska they are using biomass for heat & power, but also for greenhouses to grow local produce. Do you know of any examples from other communities or think of any opportunities like this for your community?

#### **Theme 4: Tech Development**

1. In Cordova, Alaska, they have been able to expand their existing forestry industry by using new technology. Do you see the potential for the project to bring new technology to existing industries?
2. Does the project fit well with other industries in the area?