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1 Introduction

Renewable economies in the Arctic

David C. Natcher and Timo Koivurova

Introduction

Arctic economic development has long been synonymous with resource extraction. For centuries, the Arctic has been exploited for its vast minerals, fisheries, marine mammals, water, oil, gas, and timber resources. While non-renewable resource extraction has created considerable wealth for some, the extraction of non-renewable resources has also left a wake of devastation in Arctic ecosystems and has threatened the wellbeing of Indigenous and other Arctic peoples who are left to bear the costs of past developments. In Canada, Justice Thomas Berger (1977, p. 123) forewarned nearly a half-century ago that “[i]t is a self-deception to believe that large-scale industrial development [will] end unemployment and under-employment of people in the North. We have never fully recognized that industrial development has, in itself, contributed to social, economic, and geographical dislocation.” Despite these warnings, non-renewable resource extraction continues to hold a prominent role in the development strategies of Arctic states and continues to be promoted by those of influence as the most expedient route to improving the socio-economic conditions of Arctic communities.

While non-renewable resource extraction remains the economic linchpin of most Arctic states, local communities across the Arctic are making important strides in diversifying their economies through new and innovative ways, all of which hold great promise for the sustainable development of Arctic regions. There are a number of drivers that justify the transition from extractive to renewable Arctic economies. The ethical and environmental values are of extreme importance and are at the core of the United Nations’ Sustainable Development Goals (SDGs). Adding additional urgency are the findings of the Intergovernmental Panel on Climate Change Special Report 4 that calls for action to limit global warming to no more than 1.5°C by 2030. In the Arctic, where the impacts of climate change are projected to be most extreme, local action is not only warranted but critical. In response to these global challenges, Arctic communities are making novel technological advancements in digital technologies, renewable energy capabilities,

sustainable food systems, and other social economy enterprises. These advances are creating a paradigm shift in Arctic development where new technical and entrepreneurial skills are emerging. This is particularly apparent in the many small- and medium-sized enterprises that have developed around the circular economy and industrial biotechnologies.

Notwithstanding the important advances being made in renewable economies, many parts of the Arctic continue to be challenged by under-developed and badly depreciated infrastructure. Arctic communities have also established tenuous relationships and ineffective interaction with research and development organisations. Some Arctic regions are also being affected by declining and limited skilled labor forces, inadequate education and training opportunities, and ineffective legislative and policy support. These and other constraints have made it difficult to diversify local economies and lessen their dependence on non-renewable resource extraction. While much of the transitional burden will be on communities whose responses will be place-based and challenge-led, there will remain an important role for governments and international organisations to provide the necessary legislation and policy support. This will be particularly necessary to overcome the infrastructure and labor constraints noted above. Yet, there is also a need for governments to disseminate practical information that can inform local actions and decision making. The sharing of knowledge and business development experiences can inform the efforts of others in ways that may lead to scalable outcomes across the Arctic.

This commitment is well reflected in Arctic Council's Sustainable Development Working Group (SDWG) Strategic Framework (2017), where it has reaffirmed its commitment to supporting self-sufficient, resilient, and healthy Arctic communities. This commitment includes protecting the Arctic environment and to ensure the sustainable development of local livelihoods and the preservation of cultural traditions. These commitments are premised on the harmonisation of three core elements of Arctic sustainable development: social equity, economic development, and environmental protection. To facilitate this harmonisation, the SDWG has set out to compile practical knowledge that can be used by Arctic communities as they transition to more sustainable forms of development. This volume is an outcome of that commitment.

This volume was led by the SDWG's Social, Economic, and Cultural Expert Group (SECEG) in their capacity to provide practical knowledge that can be used to advance the social, economic, and cultural well-being of Arctic peoples through sustainable and integrated approaches to renewable economic development. This is the first in a planned series of publications that will address various themes of Arctic sustainable development. In this inaugural volume, we have drawn on the expertise of scholars from across the Arctic, asking them to explore the challenges and unique opportunities that exist for renewable economies in Arctic regions. This volume offers various perspectives on Renewable Economies in the Arctic and how

these forms of economy are being supported scientifically, economically, socially, and politically. This volume is designed to provide the reader with a broad understanding of the current status and contribution of renewable resources to the Arctic economy and to create a foundation of knowledge on which to build policy, practice, and future research. We believe this can be an important contribution to scholarship, policy, and future economic development in the Arctic.

Our intention was to provide a holistic Arctic perspective, against the backdrop of prevailing social, economic and climatic related challenges. However, a challenge in achieving this holistic perspective is to adequately capture the enormous geographical, cultural, and economic complexity that defines the Arctic. The diversity of the Arctic means the different regions will have their own assets and challenges, which require appropriate place-based responses that elude generalisation. Given the enormity of this challenge, we make no claims of absolute representation. Rather, we intend only to provide a glimpse, albeit well-informed by a group of international experts in their respective fields, of the breadth of advances being made in the Arctic's renewable economic sectors. Undoubtedly some important examples have been excluded, and we encourage others to take up the challenge of bringing them to light for others to learn from. We hope the 14 chapters presented here serve that purpose.

Chapter outlines

Following this introductory chapter, Tim Pasche and Olaf Kuhlke explore digital creative entrepreneurship as it is impacted by data connectivity and communication infrastructure in remote communities of the North American Arctic. In addition to summarising details related to access, data speeds, and bandwidth in specific regions of the North, this chapter looks at values-based Arctic digital entrepreneurial curricular development, collaborative possibilities between Nunavut and Alaska, and cites opportunities and challenges for the Arctic's Indigenous creative economy. Similarities and differences between the United States and the Canadian Arctic in terms of opportunity and networking based on digital connectivity and cost of access are also explored. The chapter offers specific examples related to opportunities and barriers for Arctic small business development given variances in digital access. The chapter concludes with a number of important policy recommendations for government and industry.

In [Chapter 3](#), Ken Coates and Carin Holroyd show that Arctic regions have a great deal to gain and, equally, much to lose from the twenty-first century-onslaught of new technologies. Led globally by such large firms as Samsung, Apple, Nokia, Panasonic, Alphabet/Google, Microsoft, Sun Systems, Cisco, TenCent, and Huawei, the recent technological and economic transformation has had profound effects on the global economy. New technologies like food factories, small modular nuclear reactors,

autonomous vehicles, and drones are already disrupting existing industries, while high-speed Internet and satellite systems provide the foundation for radical changes in health care, education, governance, and business. Advocates of Artificial Intelligence (AI) argue that AI, along with 5G wireless capabilities, will have profound economic and social effects globally. Yet, the impact of these technologies on the Arctic is rarely mentioned in international discussions, and it remains unclear if the Arctic will see net benefits, dramatic losses, or mixed results from them. To some extent, the impact will depend on how Arctic states and communities approach the challenges and opportunities these new technologies represent.

In [Chapter 4](#), Timo Jokela and his co-authors examine the impact of creative industries on renewable economies in the Arctic. Until recently, understanding of the frameworks of the creative industry and renewable economy has remained vague, especially in the field of art and design. In this chapter, the potential of art and design in promoting renewable economies is explored, using the concepts of ecosystem services, particularly cultural ecosystem services, and place-making as our theoretical and practical framework. This framework allows us to rethink the ways that creative entrepreneurs, businesses, and communities may collaborate, through art and design, in place-based development in the rapidly changing Arctic. By presenting case studies drawn from Alaska (United States), Canada, Finland, and Russia, the authors not only share experiences and findings but also suggest future lines of enquiry. The takeaway finding from this chapter is that creative, renewable economies in the fields of art and design can play an important role in the future of sustainable development in peripheral and remote areas in the Arctic.

Patrick Maher and his colleagues ([Chapter 5](#)) continue this discussion in their examination of Arctic tourism. Viewed through the lens of the “destination,” this chapter explores the various ways tourism has developed, and continues to develop, in the Arctic. Many Arctic actors assume that the publicity of a specific place or region will lead to increased number of tourists and investors. But this has not proven to be the case. Rather, an important success criterion for the tourism industry is to provide the right experience to the right visitor. For this to happen, the image of the Arctic alongside the realities of small communities must be addressed.

In [Chapter 6](#), Chris Southcott reviews the role of the social economy in Nunavut, Canada. The social economy is made up of organisations in the not-for-profit sector that seek to enhance the social, cultural, health, economic, and environmental conditions of communities. These organisations continue to be an important part Nunavut’s effort to resist an overdependence on extractive resource development in the region. While extractive resource industries will continue to be an important part of Nunavut economy, this chapter offers direction for how communities can leverage those resource revenues to hasten the transition to renewable economic development opportunities.

In [Chapter 7](#), Martin Olsen argues that smaller institutions of higher learning within the Arctic must play a significant role in tackling the issues facing the region in a more *practical* sense. Olsen proposes that educational institutions should work with geographically embedded knowledge in a real work setting and focus on solutions relevant to the area and its stakeholders. However, for this to become a reality, changes to how many small Arctic universities currently operate must be made. To that end, an outline of an operational framework is offered that universities in the Arctic can consider as they strive to minimise reliance on input resources in order to maximise their sustainability output. Most instructively, this chapter describes a basic framework, and provides a point-by-point analysis of each step in the process, outlining a theoretical basis and practical considerations.

Norma Shorty ([Chapter 8](#)) extends the knowledge-economy discussion through an exploration of Indigenous-led research that embraces Indigenous knowledges, philosophies, methods, and healing. In order for Indigenous knowledge to be sustainable, Indigenous peoples must return to their philosophies, methods, and heritage in order to fully embrace what their ancestors left behind for them to decipher and put to use. This chapter makes a call for long-term Indigenous-led research, for the purpose of articulating, defining, and implementing Indigenous Knowledge as a critical and the most historically relevant renewable resource in the Arctic.

In [Chapter 9](#), Karin Buhmann and her colleagues examine how climate change has spurred projects in Arctic countries to shift to low-carbon renewable energy sources. Several of these projects have been met by protests by local communities including Indigenous groups concerned with environmental and social impacts. These tensions underscore the need for stronger and meaningful involvement of communities and Indigenous peoples in impact assessments and consultation processes in order to identify and address concerns from the local perspective. Based on cases from Sápmi, Greenland, and Canada, this chapter shows that in some cases renewable energy projects can have perversely negative impacts on community health and safety as well as the traditions and income-generating activities of Arctic Indigenous groups. The authors argue that the need for energy justice highlights the importance of approaching climate change responses and renewable energy transitions in ways that adequately address local concerns, needs, and rights in a manner that is meaningful to those who may be adversely affected.

Dorothee Campou and Greg Poelzer ([Chapter 10](#)) carry this discussion forward by exploring the extent to which Indigenous communities participate in the transition to renewable energy in the Arctic region. Using the concept of energy justice, this chapter provides legal and empirical arguments to demonstrate the need to consider energy justice in order to ensure that the transition to renewable energy in the Arctic region addresses the rights of Indigenous peoples. In so doing, the authors outline the importance of renewable energy as a means to achieving sustainable development

and to fulfilling human rights in accordance with the international commitments of Arctic states adopted under the auspices of the 2030 Agenda and the SDGs in 2015. Second, the chapter outlines the broader contexts and corresponding patterns of renewable energy development in the Arctic. Against this backdrop, the chapter examines the actual state of play of the energy transition and its impact on Indigenous peoples in the Arctic based on illustrative examples. For this purpose, the chapter includes examples from Canada, Alaska, and Russia and in the Nordic countries of Norway and Sweden. Based on this appraisal, the authors offer important recommendations for policymakers and business leaders to achieve greater justice for Arctic Indigenous peoples during this current period of the global energy transition.

In [Chapter 11](#), Bjørg Helen Nøstvold, Ingrid Kvalvik, and Morten Heide share the results from a study they completed on “Arctic Origin” as a marketing opportunity for food producers in Arctic Norway. The assumption was that it is possible to achieve added value based on Arctic origin in strategic marketing, but to do this, it is vital to know what consumers perceive as Arctic qualities. The chapter shows that consumers associate reindeer, seafood, and game as Arctic species, and associate food from the Arctic as natural, pure, healthy, tasty, and traditional. The perception is quite similar in the north and south of Norway. This means that producers generally can use the same branding, unless they have a strong focus on a local food image. Furthermore, many of these characteristics are in line with current international food trends related to health and environmental sustainability.

In [Chapter 12](#), Catherine Chamber and her colleagues examine fisheries that center on both capture fisheries and its related industries (e.g., fish processing, gear manufacturing, harbor operations, etc.) and subsistence fisheries that contribute to local mixed economies. The Arctic marine socio-ecological ecosystem is experiencing a continuous, rapid change including shifts in the range of fisheries, decreasing sea ice coverage, increased risk of pollution, and varying forms of economic development and governance changes that can have both positive and negative impacts. The specific objective of this chapter is to use the best available data to contribute to scholarship, policy, and future development by identifying opportunities and threats for current and fisheries and aquaculture activities in the Arctic. The chapter concludes by identifying key considerations for Arctic communities and decision-makers interested in renewable economies that include fisheries and aquaculture.

In [Chapter 13](#), David Natcher and his co-authors present the results of their recently completed study on the Arctic’s food producing potential. The aim of the project was to assess the potential for increased production and added value of foods originating in the Arctic, with the overarching aim of improving northern food security, and enhancing the social and economic conditions of Arctic communities. The results of the project

affirmed that the Arctic region is a considerable producer of commercial foods. Food industries are producing large volumes of food commodities that are culturally compatible with Indigenous/local food preferences and also have high export value. However, the research also found that the Arctic foods value chain is challenged by a host of social, economic, logistical, and political obstacles. While these challenges are experienced unevenly across the Arctic regions, Arctic food industries: (1) tend to be fragmented; (2) have tenuous professional connections; and (3) have limited communication streams. In this chapter, the authors make a call for a cluster-based approach to food innovation that can draw together Arctic food producers with governments, Arctic Indigenous communities, universities, research centers, vocational training providers, and industry associations. A cluster-based approach to food innovation would be guided by the combined efforts to respond to regional challenges in food security and renewable economic development.

In the concluding chapter ([Chapter 14](#)), Natcher and Ingram present the results a regional study that examined the nexus between water, energy, and food systems in northern Canada. In 2017, the Arctic Council, under the Finnish Chair, adopted the United Nations' SDGs to inform its strategic policy direction; noting that the SDGs are global in scope but are amenable to the sustainable development of Arctic regions. In that same year, the Arctic Council's SDWG made a commitment to use SDG targets as guideposts for advancing its sustainable development agenda. However, before those guideposts could be determined, the SDWG emphasised the need to better understand the nexus—or the connections and interactions—that occur between SDG targets. The SDWG cautioned that failing to consider the nexus between SDG targets could result in ill-informed and unintended policy outcomes, whereas an accurate accounting of the synergies and trade-offs between SDG targets could inform more sustainable policy solutions. With this direction, Natcher and Ingram examined the nexus between SDG 2—Ending hunger and achieving food security for all, SDG 6—Ensuring the availability and sustainable management of water and sanitation for all, and SDG 7—Ensuring access to affordable, reliable, sustainable, and modern energy for all. Their focus on WEF-related SDGs is particularly warranted in northern Canada, given the high rates of WEF insecurities experienced by Indigenous communities. By assessing the positive and negative interactions between the WEF-SDGs, Natcher and Ingram concluded that 87 percent of interventions to alleviate WEF insecurities would be synergistic at some magnitude, meaning that efforts to address insecurity in one WEF sector will have positive spillover effects toward the others. With synergies significantly outweighing trade-offs, this chapter demonstrates that important opportunities exist to simultaneously address WEF insecurities through mutually beneficial actions that capitalise on and promote synergetic policies.

Summary

A theme that runs throughout all chapters in this volume is the notion that Arctic economic development has historically been weighted by “southern-based” investments and influenced by a development discourse originating in the global south. While parallel experiences of colonisation, environmental stress, remote access, resource constraints, and food insecurity can be found, opportunities to amplify Arctic perspectives and resilient economic strategies warrant deliberate attention. The lessons learned from the chapters in this volume represent our intentional efforts to shape research and introduce a development discourse that is unique to the people and conditions of the Arctic. To that end, we call upon the Arctic Council and Arctic States to help facilitate local and international relationships, investments in research capacity, and the utilisation of research results to guide future Arctic economic policy. Through such a development platform, emerging and well-established renewable economies can have enduring benefits and can be a critical component to promoting the future prosperity and wellbeing of all Arctic communities.

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