BREAKING BARRIERS TO RENEWABLE ENERGY PRODUCTION IN THE NORTH AMERICAN ARCTIC

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As climate change continues to affect our lives, the communities at the northern extremes of our world have witnessed the changes most profoundly. In the Arctic, where climate change is melting permafrost and causing major shoreline erosion, remote communities in Alaska and northern Canada are particularly vulnerable. Furthermore, these communities have limited access to electrical grids and bear oppressive energy costs relying on diesel generators. While some communities have started to incorporate renewable energy into their hamlets and villages, progress has generally been limited with the notable exception of Canada's Northwest Territories and some coastal communities in western Alaska. During its latest stint as chair of the Arctic Council, the United States outlined community renewable energy in the Arctic as one of its primary goals. This Note focuses on regulatory and practical policy solutions to make that goal possible. It draws on examples from industrialized countries, such as Canada and the United Kingdom, as well as examples from developing countries, such as India and Peru, to examine solutions for the technical, economic, regulatory, and community engagement problems that Arctic communities in Alaska face when setting up new energy projects. Additionally, this Note describes the current political structure of Alaskan villages under the Alaska Native Claims Settlement Act and argues that Alaska Native Corporations should play a role in developing clean, cheap energy sources for their shareholders. Finally, this Note argues that public-private partnerships, like the non-profit Arctic Energy Alliance in the Northwest Territories, shows that clean, renewable energy projects for rural Arctic villages are possible throughout the Arctic. This Note draws lessons from other communities throughout the world and attempts to apply them to the unique situations that remote northern Alaska communities face regarding access to clean, renewable energy.

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INTRODUCTION

Unalakleet, Alaska is a small community on the edge of the United States. Situated along the Bering Sea, just south of the Seward Peninsula in western Alaska, this village of about 700 residents was once saddled by some of the highest energy costs for any village in the nation.[1] For many rural Alaskan villages like Unalakleet, energy costs have been astronomical, reaching up to one dollar per kilowatt-hour when the national average is twelve cents.[2] The use of costly and inefficient diesel generators that burn imported fuel during the long, cold winter months accounts for much of this expense.[3] In 2009 however, Unalakleet installed enough wind turbines to produce 600 kilowatts of power, thus reducing the village's demand for diesel fuel by thousands of gallons.[4] It is in villages like Unalakleet where "[e]conomics, not the environment, are driving a shift to renewables."[5] Therefore, extensive wind resources available along the western Alaska coastline have become perfect places to experiment with small renewable power microgrids advocated for by groups like the Renewable Energy Alaska Project.[6]

Rural Alaskans are not the only people who experience these drastic economic fuel costs. Colville Lake is a community in Canada's Northwest Territories that endured a power crisis starting in 2015.[7] Not only was Colville Lake one of the most expensive communities to power according to the Northwest Territories Power Company, it was powered exclusively by dirty, unreliable diesel generators.[8] Even though the community was spending over $140,000 on diesel to power a town of 190 people annually,[9] the power source was so unreliable that the community experienced an average of one power outage per week, caused by power spikes from events as innocuous as too many stoves cooking dinner.[10] Additionally, residents complained about the "smelly" air hanging low around the

1. David W. Shaw, *What Rural Alaska Can Teach the World About Renewable Energy*, SCI. AM. (Mar. 26, 2017), https://www.scientificamerican.com/article/what-rural-alaska-can-teach-the-world-about-renewable-energy/.
2. *Id.*
3. *See id.* (discussing the importation of fuel).
4. *Id.*
5. *Id.*
6. *Id.*
7. *See Colville Lake, N.W.T., Now Powered by Solar/Diesel Hybrid System*, CBC (Feb. 10, 2016, 7:00 AM) [hereinafter *Colville Lake*], http://www.cbc.ca/beta/news/canada/north/colville-lake-solar-diesel-hybrid-power-1.3441205.
8. *Id.*
9. *Id.*
10. Robyn Burns, *Colville Lake, N.W.T., Turns to Solar for Reliable Power*, CBC (Dec. 29, 2014, 9:23 AM), http://www.cbc.ca/news/canada/north/colville-lake-n-w-t-turns-to-solar-for-reliable-power-1.2833892.

hamlet and the poor air quality caused by continually operating diesel generators.[11]

To solve this problem, the community banded together and worked with the Arctic Energy Alliance (AEA), a government affiliated non-profit society that implements community energy plans, to create a solar/diesel hybrid system that powers the community today.[12] The current system may have cost $7.7 million to construct, but the Northwest Territories government only paid $1.3 million.[13] The payment structure by the AEA promotes self-sufficiency and self-determination for villages without outside subsidy. Currently, the AEA works primarily in the Northwest Territories to coordinate between various governmental departments and agencies to provide a "coordinated approach to public education and delivery of energy conservation services."[14] It is precisely these types of success stories—created by partnerships between village tribal councils and governmental non-profits—that could be established throughout the Arctic if other countries can create organizations like the AEA, which enable Arctic communities to develop their own strategies for clean, cheap, renewable power.

Climate change has hit Arctic communities hard over the last ten years. Villages in western Alaska have even had to relocate to the mainland as their historical towns, built on spits into the Bering Sea, have completely eroded.[15] Additionally, as discussed above, many of these communities rely entirely on diesel generators.[16] Despite these crippling

11. *Id.*

12. *Colville Lake*, *supra* note 7; *see generally Community Energy Plan: Behdzi Ahda First Nation (Colville Lake) 2010*, ARCTIC ENERGY ALLIANCE (2010), http://aea.nt.ca/communities/colville-lake (follow "Community Energy Plan" hyperlink).

13. *Colville Lake*, *supra* note 7.

14. *About AEA*, ARCTIC ENERGY ALLIANCE, http://aea.nt.ca/about-us (last visited Mar. 17, 2018).

15. *See* Christopher Mele & Daniel Victor, *Reeling From Effects of Climate Change, Alaskan Village Votes to Relocate*, N.Y. TIMES (Aug. 19, 2016), http://www.nytimes.com/2016/08/20/us/shishmaref-alaska-elocate-vote-climate-change.html?_r=0 (describing Shishmaref, Alaska's decision to move its village); *see also* Alex DeMarban, *$15 million from feds a 'dream come true' as Alaska village plans relocation*, ANCHORAGE DAILY NEWS (Mar. 26, 2018), https://www.adn.com/alaska-news/rural-alaska/2018/03/26/15-million-in-spending-bill-a-dream-come-true-as-alaska-village-plans-move/ (describing relocation of Newtok, Alaska nine miles inland to Mertarvik).

16. *See supra* text accompanying note 7. Some of the larger communities that have year-round road access do have some natural gas but still have energy costs of over $8000 a year per capita (calculated based on the total population of Inuvik—3615—and the total cost of energy for the village—$30 million). ARCTIC ENERGY ALL., Inuvik Energy Profile 2007/08, (Mar. 30, 2010), http://aea.nt.ca/communities/inuvik/ (follow "Community Energy Profile" hyperlink). Most of the communities run entirely on diesel and have energy costs up to 275% higher than the average American. Graelyn Brashear, *Rural Alaska communities to get $16*

energy costs, the growth of renewable energy projects in these rural communities throughout much of the Arctic has been slow.[17] As chair of the Arctic Council between 2015 and 2017, the United States outlined community renewable energy in the Arctic as one of its primary goals.[18] This Note will focus on practical suggestions to make that goal a reality.

While there are many commonalities between Arctic communities worldwide, for the purposes of focusing on policy solutions in Alaska's villages, narrowing the scope of this paper will help eliminate variables irrelevant in Alaska. First, by concentrating primarily on Canada and Alaska, this Note focuses on common law jurisdictions that share similar regulatory structures and court proceedings, which do not exist in other Arctic countries rooted in the civil law tradition.

Moreover, within Canada, the Northwest Territories is most like western Alaska because the majority of the communities in both areas are isolated, roadless, and currently use diesel generators as their primary form of power.[19] These "energy islands" are the focus of this Note because they are the communities disproportionately affected by high energy costs and the current regulatory structure that favors large energy producers.[20]

In addition, both of these regions have similar levels of infrastructure to support energy improvements, unlike the northeastern Canadian territory of Nunavut, which lags behind Alaska and the Northwest Territories for programs available for energy development.[21] Yukon is

million in federal energy grants, ALASKA PUB. MEDIA (Jun. 23, 2016), http://www.alaskapublic.org/2016/06/23/rural-alaska-communities-to-get-16-million-in-federal-energy-grants/.

17. *See supra* notes 1–2 and accompanying text. For a more in-depth look at current fuel costs, see *infra* Part I. The Strategic Technical Assistance Response Team (START) program through the U.S. Department of Energy has supported a handful of projects in western Alaska. *See* U.S. DEP'T. ENERGY, *Alaska Native Community Energy Planning and Projects* (June 2013), https://www.nrel.gov/docs/fy13osti/58879.pdf. The Northwest Territories have many communities that have created community energy plans; these are organized together on the Arctic Energy Alliance's website. *See* ARTIC ENERGY ALL., http://aea.nt.ca/ (last visited Feb. 26, 2018).

18. David Hayes, *As chair of Arctic Council, US could help the North replace costly, unhealthy diesel*, ANCHORAGE DAILY NEWS (Aug. 24, 2014), http://www.adn.com/commentary/article/chair-arctic-council-us-could-help-north-replace-costly-unhealthy-diesel/2014/08/25/; *see* U.S. ARCTIC COUNCIL TEAM, ONE ARCTIC (2015), http://www.arctic-council.org/images/PDF_attachments/US_Chairmanship/Chairmanship_Brochure_2_page_public.pdf (discussing the role of the United States in chairing the Arctic Council).

19. *See infra* Part I.

20. *See* Frank R. Lindh & Thomas W. Bone, Jr., *State Jurisdiction Over Distributed Generators*, 34 ENERGY L.J. 499, 500–01 (2013) (discussing the "question of federal versus state jurisdiction over the activities of . . . generators").

21. *See* PATHS TO A RENEWABLE NORTH: A PAN-TERRITORIAL RENEWABLE

also not a good fit as a comparison to western Alaska because of its significant hydroelectricity capacity, which decreases territory-wide energy costs dramatically and reduces the need for more investment in renewable resources.[22]

Even though the Northwest Territories and Alaska are similar in geographic and demographic make-up, they also have some differences. The Northwest Territories is not a province of Canada, which means that the territory can only exercise powers delegated to territories by the Parliament of Canada.[23] Alaska, on the other hand, not only has greater control over the policies it can pursue, but also has the native corporation structure as a convenient way to create public-private partnerships.[24] Finally, the United States and Canada have different political cultures, as well as different official postures on climate change and the need for renewable energy.[25] However, even with all of these differences, this Note will attempt to bridge the gap between the two communities to tease out solutions to community energy problems and improve the communities as a whole.

ENERGY INVENTORY 9, 54, 57 (2011), https://www.eia.gov.nt.ca/sites/eia/files/northern_vision_1.pdf (Northwest Territories & Nunavut); *see also Map of Renewable Energy Installations*, RENEWABLE ENERGY ALASKA PROJECT, http://alaskarenewableenergy.org/index.php/clean-energy-in-alaska/map-of-re-installations/ (last visited Mar. 31, 2018) (map of Alaska renewable energy projects as of 2016).

22. *See* YUKON ENERGY CORP., YUKON ENERGY: 2016 RESOURCE PLAN iv (2017), http://resourceplan.yukonenergy.ca/media/site_documents/Yukon_Energy_2016_Resource_Plan.pdf (describing the Yukon electric grid as "predominately hydro"). Hydroelectricity is feasible for the majority of the population in the Yukon because of the concentration of the population around the upper Yukon River. While western Alaska and the Northwest Territories have major rivers, the widely dispersed population and the lack of roads and other transportation infrastructure makes major hydroelectricity infeasible for many of the smaller communities, even though micro-hydro projects have been used in some communities. *See Second Largest Island in U.S. Goes 100% Renewable*, ECOWATCH (May 20, 2015, 11:05 AM), https://www.ecowatch.com/second-largest-island-in-u-s-goes-100-renewable-1882043985.html (showing that around 50 smaller hydro projects exist throughout Alaska, but most communities still use diesel generators for power).

23. *Provinces and Territories*, GOV'T OF CANADA, https://www.canada.ca/en/intergovernmental-affairs/services/provinces-territories.html (last modified Aug. 21, 2017).

24. *See* discussion *infra* Part III.A.

25. *Compare* Emily Holden, *Climate Change Skeptics Run the Trump Administration*, POLITICO (Mar. 7, 2018, 5:07AM), https://www.politico.com/story/2018/03/07/trump-climate-change-deniers-443533, *with* Shawn McCarthy, Robert Fife, & Gloria Galloway, *Trudeau Reaches Historic Deal on National Climate Plan*, THE GLOBE AND MAIL (Apr. 11, 2017), https://www.theglobeandmail.com/news/politics/national-climate-deal-reached-trudeau-provinces/article33281195/.

Because these areas have more significant similarities than they do differences, this Note will outline some of the legal and policy barriers in Alaska and use different Canadian jurisdictions, especially the Northwest Territories, to outline potential solutions to the current barriers. Part I will outline the current state of energy production in remote villages in Alaska and northern Canada. Part II will describe the various barriers to renewable community projects in the Arctic and recommend solutions to these problems by highlighting programs that are already working to ameliorate these issues in the United Kingdom, India, and South America. Part III will focus on the different structures that are currently in place in Alaska and Canada designed to help native communities take control of their energy futures. This section will begin by comparing the corporate structures of the native corporations established by the Alaska Native Claims Settlement Act (ANCSA) to the Makivik Corporation in northern Quebec. Additionally, Part III will briefly discuss the AEA in the Northwest Territories as a case study for the proliferation of community energy plans throughout the Arctic. Throughout Parts II and III, this Note will summarize some of the most promising solutions to these barriers and make policy recommendations for the United States and the Arctic Council to consider moving forward.

While there is not any one solution or set of solutions that can solve the problem of energy dependence in rural Arctic communities, looking comprehensively at the problem may spark discussion about these issues in multiple forums to tease out some solutions. This Note is aimed at policy makers, international NGOs, market participants, and local community leaders, all of whom must play an integral role in helping rural, isolated Arctic communities.

I. CURRENT ENERGY PRODUCTION IN ALASKA AND ARCTIC COMMUNITIES

A. Canada

The Canadian Arctic falls primarily under the governance of three Canadian territories: the Yukon, the Northwest Territories, and Nunavut. The Yukon Territory borders Alaska and is the smallest of these territories in land area. However, the city of Whitehorse is the largest population center in the Canadian Arctic, with 23,276 people. The Northwest Territories is centrally located in the Canadian Arctic, between the Yukon to the west and Nunavut to the east. The Northwest Territories is the most populous of the northern territories, and it is the second largest in land area. Its capital of Yellowknife is the second largest city in Canada's far north. Nunavut is the largest of the northern territories in terms of area,

containing most of the far northern Canadian islands. It is also the least populated and poorest (in terms of gross domestic product) of the northern territories.[26]

Energy use in northern Canada is markedly different from other parts of Canada. Nearly seventy-five percent of Canadian energy consumption is a "by-product of refined oil."[27] The majority is either fuel for heating or diesel for electricity generation.[28] While natural gas is the primary energy source in all of Canada, only twelve percent of northern Canada's energy is generated by natural gas, mostly around the Arctic Ocean bordering communities of Norman Wells and Inuvik in the Northwest Territories.[29] There are likely three hundred (or more) isolated Canadian communities that rely on diesel electricity generation.[30] Nunavut is entirely powered by diesel generators.[31]

Energy costs in the Arctic are also much higher than the rest of Canada, and per capita energy use is nearly double the Canadian average.[32] Many communities are not accessible by road systems.[33] There are no permanent highways in Nunavut.[34] These communities are only accessible by small planes or marine vessels in the short open water season.[35] Heating costs in these remote communities can be nearly ten times the heating cost in the northern Canadian city of Edmonton.[36] With

26. *Compare Gross Domestic Product of Nunavut, Canada from 2000 to 2016 (In Million Canadian Dollars)*, STATISTA (2018), https://www.statista.com/statistics/577582/gdp-of-nunavut-canada/ ($2.443 billion in 2016), *with Gross Domestic Product of Northwest Territories, Canada from 2000 to 2016 (In Million Canadian Dollars)*, STATISTA (2018), https://www.statista.com/statistics/577578/gdp-of-northwest-territories-canada/ ($ 4.739 billion in 2016) *and Gross Domestic Product of Yukon, Canada from 2000 to 2016 (In Million Canadian Dollars)*, STATISTA (2018), https://www.statista.com/statistics/577569/gdp-of-yukon-canada/ ($2.8 billion in 2016).

27. *Energy Use in Canada's North: An Overview of Yukon, Northwest Territories, and Nunavut*, NAT'L ENERGY BD., https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/archive/2011nrgsncndnrthfct/nrgsncndnrthfct-eng.html (last modified Mar. 15, 2017).

28. *Id.*

29. *Id.*

30. *Id.*

31. *Id.*

32. *Id.*

33. *Id.*

34. *Id.*

35. *Id.*

36. GOV'T OF NW. TERRITORIES, ENERGY FOR THE FUTURE: AN ENERGY PLAN FOR THE NORTHWEST TERRITORIES 10 (2007), www.iti.gov.nt.ca/publications/2007/energy/Energy%20for%20the%20future.pdf (on file with author).

costs soaring upwards of $10,000 per person, energy costs for villagers who rely primarily on subsistence as a way of life can lead to widespread energy poverty[37] for many northern residents.[38]

Because of these high costs and inefficiencies, the northern territories have identified energy efficiency as a top priority.[39] The Yukon has three hydroelectric plants that generate seventy-five megawatts of electricity and the Northwest Territories and Nunavut have hydroelectric potential, especially mini-hydro projects that do not require the level of finance required for major projects.[40] Wind is also being investigated, but the "long term reliability, grid integration ability, and economic feasibility are not yet established."[41] As noted, solar/diesel hybrid generators are already in use in some communities in the Northwest Territories to reduce the reliance on fossil fuels.[42] Biofuels, such as wood, are also used in some communities for heat production, and high efficiency pellet stoves are being considered as a potential renewable energy source.[43]

37. "Energy poverty" is a term that social scientists use to designate populations who do not have stable access to energy in developed nations. *See* KENNETH P. GREEN ET AL., FRASER INST., ENERGY COSTS AND CANADIAN HOUSEHOLDS: HOW MUCH ARE WE SPENDING? 9 (2016), https://www.fraserinstitute.org/sites/default/files/energy-costs-and-canadian-households.pdf. Recently, however, researchers have further defined the term as "the percentage of households in counties where electricity and natural gas expenditures exceed 10 percent of household income; and the percentage of households in counties where electricity spending alone exceeds 10 percent of household income." *Id.* at 10 (quoting JONATHAN A. LESSER, CTR. FOR ENERGY POL'Y & THE ENV'T AT THE MANHATTAN INST., LESS CARBON, HIGHER PRICES: HOW CALIFORNIA'S CLIMATE POLICIES AFFECT LOWER-INCOME RESIDENTS 9 (2015), https://www.manhattan-institute.org/pdf/eper_17.pdf).

38. *See id.* at 14–20 (evaluating energy poverty within particular provinces in Canada).

39. *See, e.g.*, YUKON GOV'T, ENERGY STRATEGY FOR YUKON 3 (2009), http://www.energy.gov.yk.ca/pdf/energy_strategy.pdf ("Energy efficiency and conservation will be a priority to reduce energy consumption, energy costs and emissions."); GOV'T OF NUNAVUT, IKUMMATIIT: THE GOVERNMENT OF NUNAVUT ENERGY STRATEGY 10 (2007), https://www.gov.nu.ca/sites/default/files/ikummatiit_energy_strategy_english.pdf (stating the strategy is to "encourage the adoption of energy conservation and efficiency").

40. ENERGY STRATEGY FOR YUKON, *supra* note 39, at 16; NUNAVUT ENERGY STRATEGY, *supra* note 39, at 15 (2007).

41. Hayes, *supra* note 18.

42. *See supra* note 7 and accompanying text.

43. *See* GOV'T OF NW. TERRITORIES, ENV'T & NAT. RES., *NWT BIOMASS ENERGY STRATEGY* 1 (2010).

B. Alaska

Many rural communities in Alaska also rely primarily on diesel generators for power. Alaska ranked second only to Hawaii in the United States for its share of electricity generated by diesel generators.[44] Even though Alaska's population is the fourth smallest in the United States, the state's per capita energy use is third in the country due to the cold winters and energy-intensive industry.[45] Rural communities in the state have no access to a grid and instead derive power from "rural power providers," primarily using diesel electricity generators.[46] In the larger communities in Alaska, natural gas is the primary power source, accounting for half of Alaska's power generation, with hydroelectric and petroleum liquids each making up a fifth of the power supply.[47] Wind and wind-diesel hybrid programs are emerging in some rural communities throughout the state.[48] Additionally, biomass fuels, such as wood, wood pellets, and fish oil are important renewable energy resources for Alaska.[49]

For rural communities, diesel-generated power plants are "the heart" of the power grid.[50] The size of these plants varies from small thirty-five kilowatt generators to large 1.5 megawatt generators in the larger communities.[51] Purchasing and storing fuel in these communities is typically very costly, as many of these communities must barge in diesel or even fly in fuel on tanker planes.[52] Many communities further suffer costs because they only receive a single delivery of fuel each year.[53] All of these factors create extremely high energy costs.[54] In 2015, the average cost of a kilowatt/hour in rural Alaska was forty-nine cents, almost five times the national average.[55]

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44. U.S. ENERGY INFO. ADMIN., *Alaska State Energy Profile,* http://www.eia.gov/state/print.cfm?sid=AK (last updated Oct. 19, 2017). The Energy Information Administration report uses "petroleum liquids" rather than diesel generators. *Id.*

45. U.S. ENERGY INFO. ADMIN., *Alaska: Profile and Energy Estimates: Profile Analysis*, https://www.eia.gov/state/analysis.php?sid=AK (last updated Oct. 19, 2017).

46. *See supra* note 16 and accompanying text.

47. *Id.*

48. ALASKA ENERGY AUTH., RENEWABLE ENERGY ATLAS OF ALASKA 16 (2013).

49. *Id.* at 6.

50. Alaska Center for Energy and Power UAF, *Diesel Power Plants*, YOUTUBE (Oct. 19, 2016), https://www.youtube.com/watch?v=liDUS39r2xs&feature=youtu.be.

51. *Id.*

52. *Id.*

53. *Id.*

54. *Id.*

55. *Id.*

Due to the high energy costs in both Alaska and Canada, rural communities are turning to renewable sources to supplement their diesel energy generation and reduce this heavy burden. In fact, twenty-one small-scale wind farms now exist or are in development, primarily along the Bering Sea coast.[56] Many of these projects have been funded, in part, by the Renewable Energy Grant, which supplies $50 million a year until 2023 to "develop renewable energy projects across the state, particularly in areas with the highest energy costs."[57] Even with this progress, the technical, financial, regulatory, and community barriers to making these changes remain vast. However, these challenges must be addressed individually if rural community energy projects ever hope to generate momentum in western Alaska.

II. BARRIERS AND SOLUTIONS TO COMMUNITY ENERGY PROJECTS IN THE RURAL ARCTIC

One might think that the high costs of fuel, as well as the social costs of dirty diesel generators, would push rural communities to find alternative energy solutions much more quickly than what is actually occurring. However, the expense of transitioning to alternative sources of energy and the remoteness of these communities has made change slow for many Alaskan and Canadian villages. First, technology for efficient microgrid systems powered by solar and wind technology is relatively new and has not been implemented until recently. In fact, failed first generation technology that was used in some rural communities has damaged public opinion on renewable energy, making it harder for projects to engender community support.[58] Yet, efficient new technologies developed by organizations like the Arctic Remote Energy Networks Academy (ARENA), the University of Alaska-Fairbanks' energy consortium, have made huge strides to overcome the climatic and remoteness problems for community renewables.[59]

56. ALASKA ENERGY AUTH., *supra* note 48, at 18.

57. *Id.*

58. A good example of this is the wind projects in Nunavut in the mid-1990s and early 2000s. The wind technology twenty years ago was not nearly as efficient as it is today. However, these rural communities are wary of the risks of new renewable energy experiments. *See* Gov't of Nunavut, *Wind Resources*, IKUMMATIIT, http://www.nunavutenergy.ca/en/node/18 (last visited Jan. 26, 2018).

59. *See* Arctic Remote Energy Networks Academy, 2017 Brochure, http://arena.alaska.edu/media/92134/arena-brochure_web.pdf [hereinafter ARENA 2017 Brochure] (last visited Jan. 26, 2018) (describing ARENA's renewable energy education and outreach program for Arctic communities).

Now, the technology has become viable, technologically and financially, for many of these communities.[60] It has thus become important to create efficient ways to help rural communities invest in their infrastructure to reduce energy costs in the future. In Alaska, the native corporations set up by ANCSA, with their statutory mandate to provide for the general welfare of their shareholders, are a promising institutional framework to channel money back to the villages.[61] In Canada and Alaska, non-profit organizations like the AEA can also play a vital role—empowering rural villages to take charge of their own destiny by working hand-in-hand with community leaders and tribal councils to build systems tailored to their specific community's needs.[62]

This section, however, considers some of those financial barriers to community energy projects, including the initial capital funding, financing, and eventual collecting on the investment after system installation.[63] Both initial funding and collection have been barriers to these types of rural energy projects not just in the Arctic, but around the developing world.[64] Projects like the Solar Electric Light Company in India have made financing and collection easier for companies looking to invest in rural communities.[65] This section will also look at Alaska's 2017 property assessed clean energy (PACE) legislation, which is intended to serve as a financing mechanism for rural energy projects.[66] While this is not an exhaustive list of the different types of funding mechanisms that could be used for rural energy projects in the Arctic,[67] these programs are a good place for energy policymakers to start as they can all be easily implemented at a minimal cost to state or local governments.

Another major hidden cost to these projects, especially in the United States, is the National Environmental Policy Act (NEPA),[68] which requires

60. *Id.*
61. *See infra* Part III.A.
62. *See infra* Part III.C.
63. As promising as investment by ANCs is for future renewable energy projects in Alaska, the for-profit nature of these corporations may be a stumbling block because many of these projects may not provide the highest return on investment for ANCs. *See infra* Part III.A.
64. Richard L. Ottinger & John Bowie, *Innovative Financing for Renewable Energy*, 32 PACE ENVTL. L. REV. 701, 702 (2015) (arguing that funding in the developing world for renewable energy projects is hampered by high transaction costs, limited return on investment, high initial investment, and lack of long-term data on successful projects).
65. *See infra* Part II.B.
66. *See* H.B. 80, 30th Leg., 1st Sess. (Alaska 2017).
67. For a more exhaustive list of potential funding mechanisms, *see* Richard Ottinger & Bowie, *supra* note 64.
68. Pub. L. No. 91-190, § 102, 83 Stat. 852, 853–54 (1970) (codified as amended at 42 U.S.C. § 4332 (2012)).

an Environmental Impact Statement for any "major federal action."[69] While many traditional energy producers have received various shortcuts to streamline the NEPA process, renewables still must incur the full cost of NEPA analysis for any project involving federal action.[70] If the federal government updated NEPA to allow for a more streamlined clean energy policy approach, renewable energy projects in Alaska would likely have a better chance of success.[71] Even making small changes to NEPA to allow monitors more discretion to require follow-up analysis, rather than through rigorous initial viability studies as Canada's Environmental Assessment Act does, could help get energy projects off the ground instead of tied up in legal purgatory for years.[72]

Finally, the last major barrier to community energy projects in the Arctic is community involvement. Getting communities to be active in the implementation of these projects is essential to their long-term success. Projects fade quickly without strong community support, especially due to the harsh conditions in the Arctic.[73] However, the cooperative nature of many native villages, with the local council and the village native corporation, could be a potential source of community support, much like the cooperative wind farms in Wales and Scotland have been a success in close-knit rural communities.[74]

With strong leadership and awareness of the potential challenges of generating economically viable and long-lasting energy projects throughout the Arctic, the transition to alternative energy sources is more than possible. To work towards this goal, policymakers at every level of government must bring down these barriers so that community energy projects can be successful throughout Arctic communities to provide clean power for future generations.

69. *See infra* Part II.C.

70. Irma S. Russel, *Streamlining NEPA to Combat Global Climate Change: Heresy or Necessity?*, 39 ENVTL. L. 1049, 1049 (2009).

71. *Id. Cf.* Bradley C. Karkkainen, *Toward a Smarter NEPA: Monitoring and Managing Government's Environmental Performance*, 102 COLUM. L. REV. 903, 929 (2002) (contrasting NEPA's "one-time-only comprehensive prediction requirement" with the ability of corporate CEOs to "constantly reevaluate and revise plans and strategies as conditions change").

72. *See* Karkkainen, *supra* note 71, at 949 (describing the "Monitoring and Central Coordination" process under Canada's Environmental Assessment Act).

73. *See* Steven M. Hoffman & Angela High-Pippert, *From Private Lives to Collective Action: Recruitment and Participation Incentives for a Community Energy Program*, 38 ENERGY POL'Y 7567, 7573 (2010) (concluding that the successful energy programs researched in the paper had at least some community engagement).

74. *See* Gordon Walker, *What are the Barriers and Incentives for Community-Owned Means of Energy Production and Use?*, 36 ENERGY POL'Y 4401, 4403 (2008) (describing the Baywind cooperative wind farm in Scotland and future projects based on Baywind).

A. Technical Problems and Viability

Before even considering financial, organizational, or community barriers, renewable energy projects must be technically viable. Without the development of technology that can overcome the challenges of extreme weather, inaccessibility to the grid, and limited access to technical and maintenance assistance, renewable energy projects in the Arctic would not be viable.[75] While the technical science is outside the bounds of this Note, microgrid technology[76] and other innovative new power sources, like solar-diesel systems, are in operation and are reliable enough to be used in the extreme Arctic environment.[77] And as these technologies continue to become more efficient, it is important that our regulatory system likewise adapts to encourage, rather than inhibit, the growth of microgrid technology worldwide.[78] This section of the Note will describe microgrid technology in general, and then describe the work of ARENA, headquartered at the University of Alaska-Fairbanks, to consider how this technology can be implemented in the Arctic.

Microgrids are based on the concept of distributed generation, referring "to the production of electricity by a small-scale source located at or very near the end users it serves."[79] While these grids commonly are used as supplements to the existing power grid, they can also exist off-grid.[80] A major benefit of microgrids is that they allow real-time management of electric resources by end users.[81] The final visions of the microgrid concept take this real-time management to the individual user, creating a peer-to-peer system for power distribution that can exist without any central distribution network.[82] Nationally, the optimization of microgrid systems is headed by the Consortium for Electric Reliability

75. See *supra* Part I for a more detailed description of the climate and circumstances in northern Canada and Alaska.

76. *See generally* S. Chowdhury et al., *Microgrids and Active Distribution Networks*, INST. ENG'G & TECH. (2009) (describing microgrid technology as a potential solution for sustainable, energy-efficient growth designed to reduce greenhouse gas emissions).

77. *See* ARENA 2017 Brochure, *supra* note 59; *Colville Lake*, *supra* note 7.

78. *See, e.g.*, Sara C. Bronin, *Curbing Energy Sprawl with Microgrids*, 43 CONN. L. REV. 547, 565–74 (2010) (describing the barriers to microgrid technology throughout United States' jurisdictions).

79. *Id.* at 559.

80. *Id.*

81. In fact, one Dutch company has created a system that allows end users to look at their energy usage in real time. *See Smart Energy*, QURRENT, https://www.qurrent.nl/slim-met-energie (last visited Jan. 26, 2018). This could be especially useful for remote villages who can manage their energy use together using tracking software like Qurrent.

82. *See* R.H. Lasseter, *Microgrids and Distributed Generation*, 133 J. ENERGY ENG'G 144, 146 (2007) (describing the concept of a peer-to-peer network grid).

Technology Solutions (CERTS).[83] CERTS was formed to promote transmission reliability for the American electrical grid as the country moves away from centrally planned utilities to a more distributed power network.[84] To facilitate this transition, CERTS works with industry and research institutes to ensure grid reliability while supporting competitive markets for distributed energy generators.[85] CERTS' mission is to "provide microgrid functionality . . . at much lower costs than traditional approaches by incorporating peer-to-peer and plug-and-play concepts for each component within the microgrid."[86] These cost saving measures are not exclusive to microgrid systems in big cities tied to the grid; microgrids in small, rural communities can experience cost savings as well.

In Alaska, ARENA's mission is similar to that of CERTS nationally: developing microgrid technologies that will work in the extreme climes of the Arctic.[87] The program is endorsed by not only the United States, but also Finland, Iceland, the Gwich'in Council International, and the Aleut International Association.[88] In fact, the program collaborates with other renewable energy groups throughout the Arctic, including the AEA, to work on developing microgrids and other electricity systems for rural Arctic communities.[89] However, one of the biggest differences between ARENA and CERTS is the former's focus on community outreach and education. While CERTS holds technical symposia for engineers and experts in microgrid and distributed energy technology,[90] ARENA has short webinars and on-site education programs designed to teach village community leaders the hands-on benefits of these programs in order to help build community support.[91] This webinar series teaches community

83. *Distributed Energy Resource Microgrids,* CONSORTIUM FOR ELECTRIC RELIABILITY TECHNOLOGY SOLUTIONS, https://certs.lbl.gov/research-areas/distributed-energy-resource-0 (last visited Jan. 26, 2018) [hereinafter CERTS].

84. *About CERTS*, CONSORTIUM FOR ELECTRIC RELIABILITY TECHNOLOGY SOLUTIONS, https://certs.lbl.gov/about-certs (last visited Mar. 23, 2018).

85. *Id.*

86. CERTS, *supra* note 83.

87. *See* ARENA 2017 Brochure, *supra* note 59.

88. *ARENA Home Page*, ALASKA REMOTE ENERGY NETWORKS ACADEMY, http://arena.alaska.edu/ (last visited Mar. 23, 2018).

89. *Team Collaborators*, ALASKA REMOTE ENERGY NETWORKS ACADEMY, http://arena.alaska.edu/team/ (last visited Mar. 23, 2018). In fact, George Roe, ARENA's technical lead for the Alaska Center for Energy and Power, was a speaker at the Arctic Energy Summit that took place in Helsinki in September 2017, underscoring the international nature of the ARENA program. *See Speakers,* INSTITUTE OF THE NORTH, THE ARCTIC ENERGY SUMMIT, http://arcticenergysummit.com/speakers?max=100&sort=title&order=asc (last visited Mar. 23, 2018).

90. *See* CERTS, *supra* note 83 (describing the dates of symposia and the hyper-technical papers associated with these events).

91. *About ARENA Webinar Series*, ALASKA REMOTE ENERGY NETWORKS ACADEMY, http://arena.alaska.edu/webinars/ (last visited Jan. 26, 2018).

leaders about the current reliability and efficiency of these technologies when compared to historical project failures, which have left many communities leery of new technology in the largely traditional, subsistence-driven villages.[92] ARENA even goes further with community outreach by creating on-site programs where around twenty people participate in a nine-month program to educate Arctic community leaders on how to develop community-scale renewable energy initiatives.[93] This program has also included visits to Yellowknife, Fairbanks, and Reykjavik, Iceland throughout the nine months to see how different communities approach renewable energy projects in the Arctic.[94] These community outreach programs not only enrich the individuals who participate in them but also the communities they serve and the circumpolar community as a whole in an effort to "move towards our shared goal of a sustainable future."[95]

B. Innovative Financing Mechanisms to Overcome Financial Barriers

Property Assessed Clean Energy Programs

Property Assessed Clean Energy (PACE) programs, which are a relatively new and innovative form of financing for clean energy projects, have quickly become controversial.[96] Many of the original PACE programs encouraged homeowners to invest in renewable energy projects, such as solar panels, because they allowed for long repayment periods and low interest rates compared to a traditional loan.[97] Originally, municipalities enacted PACE programs modeled after an enabling statute passed by the state legislature.[98] While the basic structure of these laws

92. For more information on this topic, ARENA has a webinar series for all of the particular technical systems involved in diesel power generation, renewable resources, and the ability to combine the two. *Id.*

93. *See* ARENA 2017 Brochure, *supra* note 59.

94. *Id.*

95. *Id.*

96. *See* Michael A. Wrapp, Note, *Property Assessed Clean Energy (PACE): Victim of Loan Giants or Way of the Future?*, 27 NOTRE DAME J. L. ETHICS & PUB. POL'Y 273, 276 (2013); *see also* Jeffrey Hoops, Note, *Setting the Pace for Energy Efficiency: The Rise, Fall, and (Potential) Return of Property Assessed Clean Energy*, 89 WASH. U. L. REV. 901, 901 (2012); Ian M. Larson, Note, *Keeping PACE: Federal Mortgage Lenders Halt Local Clean Energy Programs*, 76 MO. L. REV. 599, 599 (2010).

97. Jason R. Weiner & Christian Alexander, *On-Site Renewable Energy and Public Finance: How and Why Municipal Bond Financing is the Key to Propagating Access to On-Site Renewable Energy and Energy Efficiency*, 26 SANTA CLARA COMPUTER & HIGH TECH. L.J. 559, 574 (2010).

98. Jonathan B. Wilson, Maura A. Marcheski & Elias B. Hinckley, *The Great PACE Controversy: Renewable Energy Financing Program Hits a Snag*, 25 PROB. &

has not changed, Fannie Mae and Freddie Mac's rejection of housing mortgages burdened by residential PACE loans has changed the focus of these programs to commercial and smaller scale residential assessments in order to receive federal underwriting.[99] This second wave of PACE projects now encompasses seventeen states and the District of Columbia, with another fourteen states currently in the process of enacting PACE-enabling legislation.[100] This section describes how PACE programs work, examines the legal challenges to PACE programs and the effect this has had on state PACE programs, and then considers the recently passed Alaska PACE legislation and proposes some changes that could make the program more attractive to rural native Alaskan populations.[101]

PACE programs allow local governments to offer property owners low-interest loans in exchange for capital improvements relating to energy efficiency on their property.[102] These property owners then repay the loan through additional property-tax assessments by the municipality.[103] United States Congressmen Henry Waxman and Barney Frank praised these programs for allowing property owners to make expensive capital improvements without incurring upfront costs.[104] Furthermore, these tax assessments run with the property, dispelling property owners' concerns that loan repayment requirements will restrict any transfer of the property.[105] Additionally, these assessments take the form of government liens against the property that become senior to the primary mortgage against the house, reducing the securities risks for banks making these loans and reducing the interest rates on the PACE loans.[106] Essentially, these programs allow property owners to make improvements on their house, saving the owner in energy costs without the large initial investment costs.[107]

As PACE programs were adopted by many states and local governments, the Federal Housing Finance Agency (FHFA) became increasingly concerned about the seniority of these liens relative to the primary mortgages, stating that PACE loans "present a significant risk to lenders and secondary market entities" and that the FHFA will place

PROP. 38, 39 (2011).

99. *See* Prentiss Cox, *Keeping PACE?: The Case Against Property Assessed Clean Energy Financing Programs*, 83 U. COLO. L. REV. 83, 117–18 (2011).

100. *PACE Programs Near You*, PACENATION, http://pacenation.us/pace-programs/ (last visited Jan. 26, 2018).

101. *See* H.B. 80, 30th Leg., 1st Sess. (Alaska 2017).

102. *See* Wilson et al., *supra* note 98, at 38.

103. *Id.*

104. *Id.* at 39.

105. *Id.*

106. *See* Wrapp, *supra* note 96, at 277.

107. *Id.*

severe restrictions on these types of senior liens.[108] This decision led to challenges against municipal PACE programs in jurisdictions across the country, resulting in waves of PACE litigation.

After the FHFA's decision to restrict Fannie Mae and Freddie Mac from underwriting housing loans burdened with PACE liens, the municipal PACE programs were decimated.[109] In response, many NGOs and municipalities sued seeking declaratory relief, arguing that PACE liens are "assessments" rather than "loans" and enjoining the restrictions FHFA had placed on PACE liens.[110] All of these initial cases alleged violations of the Administrative Procedure Act and NEPA due to FHFA's broad and unilateral decision to exclude PACE-burdened liens without any public notice and comment or environmental analysis.[111] The circuit courts that have ruled on PACE challenges, however, have either vacated district court rulings[112] or dismissed the lawsuits, holding that FHFA's unilateral action was within its authority as conservator of Fannie Mae and Freddie Mac under the Housing and Economic Recovery Act of 2008.[113] Furthermore, the courts ruled that vacating any district court's decision would not even redress the plaintiffs' problems since the banks undertaking these loans could voluntarily back out at any time.[114] Subsequently, FHFA stopped its informal rulemaking process altogether and relied instead on these courts' holdings in support of its decision not to underwrite PACE liens.[115]

108. Statement, Fed. Hous. Fin. Agency, FHFA Statement on Certain Energy Retrofit Loan Programs (July 6, 2010), https://www.fhfa.gov/Media/PublicAffairs/Pages/FHFA-Statement-on-Certain-Energy-Retrofit-Loan-Programs.aspx; *see also* Cox, *supra* note 99, at 103 (stating "that mortgages that originated in a jurisdiction with a PACE program would be subject to significant restrictions").

109. *See* Wrapp, *supra* note 96, at 285 (describing the negative impact of restrictions imposed by FHFA, Fannie Mae, and Freddie Mac).

110. *See, e.g.*, Town of Babylon v. Fed. Hous. Fin. Agency, 790 F. Supp. 2d 47 (E.D.N.Y. 2011), *aff'd*, 699 F.3d 221 (2d Cir. 2012); Nat'l Res. Def. Council, Inc. v. Fed. Hous. Fin. Agency, 815 F. Supp. 2d 630 (S.D.N.Y. 2011), *aff'd sub nom.* Town of Babylon v. Fed. Hous. Fin. Agency, 699 F.3d 221 (2d Cir. 2012); People *ex rel.* Harris v. Fed. Hous. Fin. Agency, 894 F. Supp. 2d 1205 (N.D. Cal. 2012), *vacated sub nom.* Cty. of Sonoma v. Fed. Hous. Fin. Agency, 710 F.3d 987 (9th Cir. 2013).

111. See Wrapp, *supra* note 96, at 287–94 for a more in-depth look at these cases.

112. Cty. of Sonoma v. Fed. Hous. Fin. Agency, 710 F.3d 987 (9th Cir. 2013).

113. Town of Babylon v. Fed. Hous. Fin. Agency, 699 F.3d 221 (2d Cir. 2012); Leon Cty. v. Fed. Hous. Fin. Agency, 700 F.3d 1273 (11th Cir. 2012).

114. *See Town of Babylon*, 699 F.3d at 230 ("Nothing in the OCC Bulletin compelled national banks to take any action. The Bulletin is labeled 'Supervisory Guidance,' and is couched in entirely permissive language.").

115. While never codified, the proposed rule advocated for stricter underwriting standards as a way to protect banks and mortgage-holders from the secondary loan in the form of a PACE bill. *See* Enterprise Underwriting Standards,

However, since these initial setbacks, more narrowly tailored legislation has been affirmed in state courts, even when the seniority of the lien was called into question.[116] After the demise of the initial PACE programs, many states rebooted their PACE programs to address the FHFA concerns. One solution that the FHFA has backed is PACE liens that are junior to primary mortgages.[117] In fact, the Department of Energy released a "best practices" guide in 2016 that recommended a number of changes to state PACE legislation, including stricter underwriting standards, tighter restrictions on qualifying projects, more transparent fees and information to consumers, and notification of mortgage holders when a PACE lien is taken out.[118] Additionally, some critics of the early PACE laws have called for lower ceilings on PACE loans to put them on par with traditional tax assessments, as well as for the creation of fees designed to lessen the administrative burden PACE liens put on local governments.[119] Finally, some states have focused on commercial buildings, which tend to be less risky for mortgage holders and have been wildly successful.[120] Texas, for example, has created an open market system for PACE loans headed by a non-profit that some of its major counties and cities have adopted over the past three years.[121]

Notwithstanding prior setbacks, PACE programs have proven successful in incentivizing homeowners to invest in clean energy technology. In particular, PACE programs have increased community involvement in clean energy technologies and increased access to these technologies that were once out of reach for many lower-income households.[122] This increase in community involvement could mean that

77 Fed. Reg. 36,086 (proposed June 15, 2012) (the rule was not adopted).

116. *See* Erin L. Deady, *Property Assessed Clean Energy: Is There Finally a Clear Path To Success?*, 90 FLA. BUS. J. 114 (2016) (discussing recent court cases upholding the Florida PACE legislation against creditors in the residential context); *see also* Fla. Bankers Ass'n v. Fla. Dev. Fin. Corp., 176 So.3d 1258 (Fla. 2015) (limiting the scope of the Florida Development Finance Corporation, but upholding the assessment process in the PACE legislation).

117. *See* Ottinger & Bowie, *supra* note 64, at 728–29 (describing the Vermont PACE program); *see also* Wrapp, *supra* note 96, at 295–96 (including Maine, Oklahoma, and New Hampshire as other states that have made PACE liens junior to mortgages).

118. *See generally* U.S. DEP'T OF ENERGY, BEST PRACTICE GUIDELINES FOR RESIDENTIAL PACE FINANCING PROGRAMS (2016), https://www.energy.gov/sites/prod/files/2016/11/f34/best-practice-guidelines-RPACE.pdf.

119. *See* Cox, *supra* note 99, at 116.

120. *See Where is PACE?*, TEXAS PACE AUTHORITY (2017), https://www.texaspaceauthority.org/ (last visited Mar. 23, 2018).

121. *Id.*

122. *See* Cox, *supra* note 99 (finding that even in families that did not ultimately use PACE as a way to fund energy projects, the homeowners credited PACE with their decision to invest in solar power privately). *But see* Wrapp, *supra* note 96, at

PACE programs are not just important as programs designed to finance clean energy, but are also important as a way to encourage the community as a whole to participate in clean energy reform. Additionally, the Texas open market model could be an effective system for poorer, rural communities that cannot afford the administrative costs associated with a PACE system that includes government assistance at the lending and contracting phase.[123] Unfortunately, federal support for PACE, which was once championed by President Obama and Vice President Biden,[124] has been rolled back in the Trump administration, and federal programs to insure some homes with PACE loans have been eliminated.[125]

The Alaska Legislature passed House Bill 80, which adopted PACE legislation for Alaska in 2017.[126] However, the law is severely limited because only "municipalities" could adopt its provisions, which enables only larger communities in the state to implement the program and restricts the use of PACE programs in Alaska's many unincorporated villages.[127] Further restricting the applicability of this legislation for rural communities is the limitation of PACE loans to commercial or industrial properties.[128] Rural communities normally have few commercial or industrial buildings that would qualify under this law. However, the program also includes parts of the open market model, allowing for third party financing while also allowing for additional funding through municipal bonds.[129] The law also requires application fees on the part of

281–82 (noting that PACE programs can only be used by property owners and that poor local governments do not have the administrative funds to support PACE programs).

123. Under the Texas model, owners are able to choose their source of private capital, reducing transaction costs for individual counties. *See What is PACE?*, TEXAS PACE AUTHORITY, https://www.texaspaceauthority.org/what-is-pace/ (last visited Mar. 23, 2018); *Local Government FAQ*, TEXAS PACE AUTHORITY, https://www.texaspaceauthority.org/resources/faqs/local-government-faq/ (last visited Mar. 23, 2018).

124. *See* THE WHITE HOUSE, POLICY FRAMEWORK FOR PACE FINANCING PROGRAMS (2009), https://obamawhitehouse.archives.gov/sites/default/files/PACE_Principles.pdf (supporting use of federal funds for pilot programs of PACE financing).

125. *See* U.S. DEP'T HOUS. & URB. DEV., Mortgagee Letter 2017-18 4 (Dec. 7, 2017), https://www.housingwire.com/ext/resources/files/Editorial/HUD-PACE-letter.pdf.

126. *See* H.B. 80, 30th Leg., 1st Sess. (Alaska 2017) ("authorizing municipalities to establish programs to impose assessments for energy improvements in regions designated by municipalities; imposing fees; and providing for an effective date").

127. *See id.* at 3, 11 (restricting application of the law to "home rule and general law municipalities").

128. *Id.* at 3.

129. *Id.* at 4.

the property owner, which can increase the transparency of the program while providing funds to alleviate the administrative burden.[130]

Improvements to the new law to better support rural communities going forward, however, are reasonable and achievable. First, the legislature could act to provide subsidies and incentives at the state level for lenders to invest in rural communities.[131] This could be achieved through public-private partnerships with native corporations and the village corporations, emphasizing the community nature of PACE funding and its ability to help communities as a whole.[132] PACE programs can also be used in conjunction with the other financing mechanisms, discussed below, to create a comprehensive community energy plan.[133] Furthermore, the risks created by the PACE system could be dispersed across the entire community in the form of a "system charge," lowering lender risk and interest rates.[134]

While these suggestions are relatively major changes to the current law, implementing these more inclusive structures would offer native corporations and their shareholders a better opportunity to participate in PACE as one piece of a comprehensive community energy plan using many financing techniques.

Margin Money Financing

Apart from PACE programs, other alternative loan structures exist throughout the developing world to help alleviate the burden of the initial upfront cost of energy improvements.[135] One solution that has proven

130. *Id.*; *see also* Cox, *supra* note 99, at 116–17 (arguing in favor of a direct fee to program participants to increase transparency in costs and funding); Wrapp, *supra* note 96, at 300 (arguing that greater transparency in costs and funding, via direct fees, would make participation in the program more appealing).

131. *See* Cox, *supra* note 99, at 116 (suggesting that private financing, contractor services, and "the like" might feel encouraged by government-sanctioned offers for energy investment).

132. Weiner & Alexander, *supra* note 97, at 583 ("PACE financing arguably enhances the tax base of a community through higher property values.").

133. *See* Cox, *supra* note 99, at 120 ("A small loan PACE program might be especially effective if it could be quickly broadened to reach more people by combining it with a series of other highly targeted government mandates and services.").

134. *See id.* at 121 (arguing in favor of a "system charge" to all utility customers to fund a partial rebate of the costs for purchasing energy-saving equipment). This type of dispersal could also be combined with the prepaid meter approach, *infra* Part II.B, to reduce the transaction costs for lenders dealing with small rural villages.

135. *See generally* Ottinger & Bowie, *supra* note 67 (describing various innovative financing schemes that have been used throughout the developing world).

successful in India is margin money financing.[136] Essentially, margin money financing helps homeowners seeking to borrow money who can make the term payments on a project loan but are unable to afford the down payment.[137] Margin money financing makes up the difference by supplying a loan for the down payment.[138] Historically, these were government-sponsored programs due to the high risk of default.[139] But as climate change becomes a more serious issue, think tanks and other groups have recommended funding in the "undersupplied" areas, including "households . . . wishing to invest in slightly more capital intensive but energy efficient buildings."[140] Most importantly, however, "margin money financing bootstraps investment, as new owners use the benefit of their first installation to purchase additional units [of green power generation] under their own financing."[141]

One particular success story for this program was in the small Indian weaving village of Doddaullarthi.[142] To provide electricity to the village, the Solar Electric Light Company (SELCO), launched a margin money financing program in 2008 to provide lighting to the village in order to allow weavers to work after sundown.[143] SELCO had partnered with regional rural banks and microfinancing institutions to create the financing opportunities for the rural villages.[144] SELCO's margin money program bundles the margin financing into the primary loan, where the margin money typically amounts to between fifteen and twrnty-five

136. *See, e.g.*, SELCO, ACCESS TO SUSTAINABLE ENERGY SERVICES VIA INNOVATIVE FINANCING: 7 CASE STUDIES 8 (2008) [hereinafter SELCO CASE STUDY], http://www.selco-india.com/pdfs/selco_booklet_web.pdf (describing how an Indian village financed the purchase of solar lights through margin money financing).

137. *See* Ottinger & Bowie, *supra* note 64, at 710 (describing the traditional loan structure of margin money financing); *see also* CHRIS GROOBEY ET AL., PROJECT FINANCE PRIMER FOR RENEWABLE ENERGY AND CLEAN TECH PROJECTS (2010), https://www.wsgr.com/PDFSearch/ctp_guide.pdf (describing the importance of project finance to investments in the clean technology sector and emerging markets).

138. Ottinger & Bowie, *supra* note 64, at 710.

139. *Id.*

140. Thomas Spencer et al., *Mapping Issues and Options on Climate Finance in 2015* (Inst. for Sustainable Dev. and Int'l Relations, Working Paper No. 08/15, 2015), http://www.iddri.org/Publications/Collections/Idees-pour-le-debat/WP0815_TS%20et%20al._finance%20climate%20agreement.pdf.

141. Ottinger & Bowie, *supra* note 64, at 710.

142. *See* SELCO CASE STUDY, *supra* note 136 (describing how the community financed and purchased solar lights).

143. *Id.* at 4–5.

144. *See* Ottinger & Bowie, *supra* note 64, at 711 (describing how SELCO worked with a variety of financial institutions to support its margin money program).

percent of the loan.[145] Essentially, SELCO provides a down payment on the project and allows the village to make the payments as they begin to see increased efficiency and productivity because of the improvements.[146] This financing scheme also matches repayment to the savings achieved by the renewable energy assets, to reduce the risk for banks and governments who underwrite these loans.[147]

Margin money financing could also be a beneficial strategy for North American Arctic villages who are looking at renewable financing measures. Like India, many Arctic villages rely on diesel generators for their power. Furthermore, in Alaska, native corporations could be a bridge between government-sponsored programs and renewable resources contractors in the same way microfinance and regional rural banks facilitated the margin money financing for SELCO in India. Amortizing measures, like those SELCO has used to tie payments to energy cost savings realized as a result of renewable energy assets, could further dispel concerns of default.[148] Likewise, limiting the amount of margin money financing to less than fifteen percent of the total loan would reduce the risk to lenders in the same way that limiting the value of PACE loans has reduced the risk for those financing measures.[149] While margin money financing is a new and relatively unknown financing measure, the unique position that Alaska's native corporations can play as a public-private partner with native village shareholders could make this system administratively and financially feasible.

Subsidized Capital Funding

Third, while direct funding may not be innovative, it is a critical part of the funding scheme for many large-scale energy projects. Direct funding has already been implemented in Alaska for renewable projects, but has not been used in conjunction with the other funding mechanisms described above.[150] Indeed, the Alaska Energy Authority has funded over $257 million worth of projects though its Renewable Energy Fund since

145. *See also* SELCO CASE STUDY, *supra* note 136, at 2.
146. *Id.*
147. Ottinger & Bowie, *supra* note 64, at 712.
148. *See id.* ("By amortizing initial costs, margin money financing matches repayment to the long-term income producing nature of renewable energy assets.").
149. *See id.*; SELCO CASE STUDY, *supra* note 136; *see also supra* Part II.B for a look at successful solutions to the PACE financing program.
150. *See, e.g.*, Brashear *supra* note 16 (reporting that the U.S. Department of Agriculture's Rural Development agency in 2016 issued $16 million in federal grants to fund energy projects in Alaskan communities).

2008.[151] However, the Alaska Energy Authority has not received any funds from the state government since 2015 because of the State's current fiscal challenges.[152] To make subsidized capital funding more effective when the State has less money to invest, Alaska should follow the model of organizations like the AEA. The AEA provides funding not only based on objective factors, such as technical viability and the availability of matching funds, but also subjective factors about the level of community engagement in the project. There is a need to ensure the community can support the energy project after it has been installed and the technicians leave for the winter.[153] Organizations like Alaska Native Corporations (ANCs) could play a role in an effective subsidized funding scheme, acting as a funnel for government funds already earmarked to help Alaskan villages.

However, to make subsidized capital funding effective, the regulations and conditions on the money given to the ANCs needs to be minimal, so that the ANCs can use their ability to quickly react to the market by changing programs that are not working.[154] In Alaska, village corporations could function like municipal power cooperatives, managing the energy projects on the ground and working with regional corporations to quickly react to problems with the current system.[155] Regional native corporations could act as project managers, changing the scope of the project depending on the success and progress made by the village corporation.[156] This integrated approach to subsidized funding allows for greater efficiency than a traditional government-led approach, resulting in lower bills, and additionally empowers community members to select the renewable power sources that they believe would be best for them.[157] Funding should also be allocated to the Alaska Energy Authority,

151. ALASKA ENERGY AUTH., *Renewable Energy Fund Status Report* 2 (Jan. 2018), http://www.akenergyauthority.org/Portals/0/Programs/RenewableEnergyFund/Documents/2018-REF%20Status%20Report.1.27.18.pdf.

152. *Id.*

153. *See infra* Part III.C and accompanying notes (describing the process the AEA uses to select projects); *infra* Part III.D (describing the need for community engagement in project design).

154. See *infra* Part II.C for an in-depth look at some regulatory barriers to funding alternative energy projects.

155. This type of distribution has been called Community Choice Aggregation and has been used to encourage local choice for renewable energy projects, which can help not only with initial community support but also subsequent support of the program. *See* Paul Fenn & Samuel Golding, COMMUNITY CHOICE AGGREGATION 2.0: STRATEGIES FOR DISTRIBUTED ENERGY RESOURCES IN CCA ENVIRONMENTS, at 5–6 (2004), http://localpower.com/whitepaperCopyright2011byLocalPowerInc.pdf (using California CCAs as examples of the distribution's success).

156. *See infra* Part III.A and accompanying notes for a more in-depth discussion about the relationships between regional and village corporations.

157. *See* Ottinger & Bowie *supra* note 64, at 752–53. Programs like this have

especially based on its success in promoting renewable energy projects over the last ten years.[158] By partnering with ANCs to provide funding for projects, the State may be able to ensure more matching funds than are available through the Alaska Energy Authority, whose projects have stalled without consistent government funding since 2015.[159]

Whenever new technology is developed to protect a common good, government funding is a critical piece of the equation. However, traditional government funding has proven too slow and unresponsive to battle against climate change.[160] Instead, direct funding through organizations like the AEA or ANCs allows for a quick response to changing conditions. Additionally, this section has shown that this direct funding is only a small piece of the mosaic of funding programs that can be employed to work on renewable energy projects in remote Arctic villages. In the twenty-first century, we need to use technology and corporate structures together to efficiently spend the dollars we are throwing at renewable energy.

Prepaid Meters – Billing at the Village Scale

Some of the biggest problems with creating village-scale systems do not come from the initial funding of a renewable energy project, but collecting on that initial investment.[161] This problem was exacerbated in the past by primitive and costly communication networks.[162] However, modern communication and online payment methods have significantly decreased the logistical challenges and transaction costs for collecting

already developed in some west coast states, resulting in increased funding in renewable energy resources. *See* Hoffman & High-Pippert, *supra* note 73, at 7567 (outlining state and regional programs designed to encourage renewable energy investment such as the West Coast Governors' Global Warming Initiative).

158. *See* ALASKA ENERGY AUTH., *supra* note 151, at 2 (accounting for over 30 million gallons of fuel displaced in 2016 alone, a savings of over $60 million).

159. *Id.* (showing that projected fuel displacement will be relatively stagnant through 2019 without more state funding).

160. See *infra* Part II.D for a more detailed look at community engagement.

161. This threat has been identified primarily in sub-Saharan Africa but can be transported to any area where there is a significant disparity between the creditworthiness of the villagers and the wealth of the companies providing the energy programs. U.N. ENV'T PROGRAMME FIN. INITIATIVE, FINANCING RENEWABLE ENERGY IN DEVELOPING COUNTRIES 42 (2012), www.unepfi.org/fileadmin/. . ./ Financing_Renewable_Energy_in_subSaharan_Africa.pdf. ("The poor creditworthiness is often explained by poor billing and payment collection systems, limited innovation, and prices that reflect neither costs nor demand, but are determined on political grounds.").

162. *See id.* (arguing that poor billing and payment collection systems in sub-Saharan Africa contributed to the poor creditworthiness of state-owned utilities).

payments in remote locations.[163] Importantly, these new "cloud billing" services can help electrical service providers and investors support remote village power systems without logistical problems or theft of power due to a lack of oversight by the power provider.[164] Because of their remote location, village microgrids could fall victim to illegal "power theft, tampering with meters, or unauthorized splitting of electricity feed lines allowing electricity to be diverted to non-paying resident[s]."[165]

One way to avoid power stealing is using a prepaid meter system that requires payment of electricity upfront, and shuts off when the credits expire, much like a parking meter.[166] Furthermore, these systems operate in the cloud, reducing the cost of implementing the system.[167] These benefits make investing in renewable resources in remote villages more attractive to investors concerned about regular profit and lower risk.[168] One company, in fact, has used prepaid meters in conjunction with cell phone apps and online bill pay to provide access to electricity in the developing world, providing energy to approximately half a million people worldwide.[169]

Using this type of prepaid system in Alaska and the Northwest Territories may entice power investors to invest past the initial capital investment stage. While these systems are more typical in the developing world, the far north has similar characteristics, and the same problem with policing illegal activity, which make prepaid systems particularly attractive.[170] Providing a cloud-based, pay-as-you-go system for energy

163. *See* Ottinger & Bowie, *supra* note 64, at 720 ("Fortunately, advances in wireless communications, cloud accounting software, and the efforts of a variety of Internet startup companies are simplifying and securing the billing process.").

164. *See* Rene Sotola, *Billing in the Cloud: The Missing Link for Cloud Providers*, 3 J. OF TELECOMM. MGMT. 313 (2011) (discussing the general advantages of cloud billing); *see also* James Grundvig, *Detecting Power Theft by Sensors and the Cloud: Awesense Smart System for the Grid*, HUFFINGTON POST (Apr. 15, 2013, 12:44 PM), https://www.huffingtonpost.com/james-grundvig/detecting-power-theft-by-_b_3078082.html (describing a startup that sells mobile-cloud software to utilities to detect power theft and inefficiencies in the transmission lines).

165. Ottinger & Bowie, *supra* note 64, at 721.

166. *See* R.K. Pillai, *Prepaid Electricity Meters and Issues Related to Implementation of Prepaid Metering Systems*, ENERGY CENTRAL (July 26, 2005), http://www.energycentral.com/c/iu/prepaid-electricity-meters-and-issues-related-implementation-prepaid-metering (explaining prepaid meters for electricity).

167. Ottinger & Bowie, *supra* note 64, at 722.

168. *Cf. id*. at 723 (stating that energy producers utilizing pre-paid meters would benefit by reductions in "arrears in accounts receivable and operation and financial costs").

169. *See* LUMETER NETWORKS, INC., http://www.lumeter.net/ (last visited Jan. 23, 2018) (describing Lumeter's "pay-as-you-go" business model).

170. In Alaska, for example, one state trooper may be assigned to multiple villages hundreds of miles apart only accessible by bush plane in the summer or

would also encourage efficient energy use by consumers who would know their energy costs upfront. There is considerable concern that the seasonal extremes of the Arctic could make the system too draconian due to the harshness of shutting off an Arctic customer's power in the dead of winter. However, the benefit of a system like this to investors, who could analyze their business decisions regarding the investment in real time, could be enough to entice new investors into the market.[171]

Currently the biggest barrier to implementing prepaid metering in Alaska is access to reliable, affordable, broadband services.[172] In fact, a 2015 Federal Communications Report found that eighty-one percent of rural areas in Alaska had no access to broadband services.[173] However, the FCC has made rural access to broadband a priority and has announced a billion dollars in subsidies to Alaska telecommunications companies to increase competition and access to high-speed broadband for rural communities.[174] GCI, one of the largest telecommunications companies in Alaska, has used this money to construct the microwave Internet connections that now connect eighty-four villages throughout western rural Alaska.[175] However, Internet connections in these villages are still very expensive with a speed of just six megabytes per second costing up to $149.99 per month.[176] For comparison, twenty-five megabytes per second costs around $55 per month in New York City.[177]

snow machine in the winter.

171. Lumeter, for example, has been very successful as a for-profit company in this sector and is currently scaling to bigger production worldwide. *See* Lumeter Networks, Inc., Energy Maps, http://energymap-scu.org/lumeter-networks-inc/ [https://perma.cc/ZWA9-MR34] (describing Lumeter's expansion plans).

172. Jeannette Lee Falsey, *For rural Alaska broadband, the 'middle mile' is everything*, ANCHORAGE DAILY NEWS (Mar. 18, 2017), https://www.adn.com/features/business-economy/2017/03/18/for-rural-alaska-broadband-the-middle-mile-is-everything/ (describing the monopoly that Alaska telecommunications company GCI has over rural internet and the resulting monopolistic price schemes).

173. FEDERAL COMMC'NS COMM'N, BROADBAND AVAILABILITY IN AMERICA: WITH RURAL AMERICANS LOOKING FOR HIGH-SPEED SERVICES, ADEQUATE BRODBAND SPEEDS REMAIN OUT OF REACH FOR MANY 5 (Jan. 30, 2015), https://apps.fcc.gov/edocs_public/attachmatch/DOC-331734A1.pdf.

174. Tim Ellis, *Feds Offer $1 Billion to Improve Broadband Access in Rural, Remote Alaskan Communities*, KUAC (Sept. 9, 2016), http://fm.kuac.org/post/feds-offer-1-billion-improve-broadband-access-rural-remote-alaskan-communities.

175. Amy Nordrum, *109 Microwave Towers Bring the Internet to Remote Alaska Villages*, IEEE Spectrum (Nov. 30, 2017, 6:14 PM), https://spectrum.ieee.org/telecom/wireless/109-microwave-towers-bring-the-internet-to-remote-alaska-villages. These connections range throughout western Alaska from Kotzebue to the Bristol Bay Region. *See* Falsey, *supra* note 172 (showing a map of the TERRA grid in western Alaska).

176. Nordrum, *supra* note 175.

177. *Id.*

With these price disparities, it is unlikely that prepaid metering excels as a payment mechanism in western Alaska. However, as competition for providing rural services increases among Alaskan telecommunications companies, this price may drop, making prepaid metering a smart solution for prudent investors.[178]

C. Regulatory Barriers: The National Environmental Policy Act and Canada's Environmental Assessment Act

Apart from technical and economic challenges, federal regulatory structures, such as NEPA,[179] complicate communal ownership and impose barriers to growth of rural Alaskan villages.[180] This section will describe the regulatory costs imposed by NEPA in the United States, and then briefly compare it to Canada's Environmental Assessment Act (CEAA)[181] to argue that NEPA should be modified to provide an emphasis on post-project reassessment over pre-project comprehensive assessments for alternative energy projects such as wind-diesel and solar projects. These changes to NEPA would adapt the nearly fifty-year-old statute to a system more in line with modern corporate structures, giving regulators and market participants the ability to adapt as programs are developed.[182]

178. *See* Ellis, *supra* note 174 (reporting that other companies like the Arctic Slope Telephone Association Cooperative and the Alaska Telephone Company are looking to increase their networks as a result of the FCC subsidies).

179. National Environmental Policy Act of 1969, Pub. L. No. 91-190, 83 Stat. 852 (1970) (codified as amended at 42 U.S.C. §§ 4321-47 (2012)).

180. *See, e.g.*, Russel, *supra* note 70 (arguing for a streamlined approach to NEPA for "green" energy programs to have the same competitive advantage as conventional energy programs which have streamlined approaches as it stands); Hoffman & High-Pippert, *supra* note 73 (describing the challenges to communal ownership posed by the current SEC regulations).

181. In 2012, as part of an omnibus budget bill, the Canadian Parliament passed a sweeping change to the CEAA. Canadian Environmental Assessment Act, 2012, S.C. 2012, c. 19, s. 52 [hereinafter CEAA 2012].

182. *See* Karkkainen, *supra* note 71, at 929 (contrasting NEPA's "one-time-only comprehensive prediction requirement" against corporate CEOs who "can constantly reevaluate and revise plans and strategies as conditions change").

The National Environmental Policy Act

NEPA has been hailed as "the Magna Carta of U.S. environmental law,"[183] spawning sister statutes in numerous jurisdictions around the world.[184] Nevertheless, NEPA has also been criticized as a procedurally driven disaster whose primary effect is to generate paperwork without any real impact.[185] Despite the spotty results, NEPA nonetheless has forced agencies to take a "hard look" at the environmental impacts of federal programs.[186]

NEPA requires an environmental impact analysis whenever a federal agency undertakes a "major Federal action[] significantly affecting the quality of the human environment."[187] To sufficiently analyze a "major federal action," the agency must prepare an Environmental Impact Statement (EIS), which requires the agency to take a "hard look" at all the potential environmental effects.[188] This nebulous standard creates incentives for agencies to avoid EIS statements by any means necessary, normally by preparing a preliminary Environmental Assessment, followed by a Finding of No Significant Impact (FONSI) to avoid full-blown EIS analysis.[189] This perverse incentive structure leads

183. Ray Clark, *NEPA: The Rational Approach to Change*, *in* ENVIRONMENTAL POLICY AND NEPA: PAST, PRESENT, AND FUTURE 15, 15–16 (Ray Clark & Larry Canter eds., 1997); *see also* COUNCIL ON ENVTL. QUALITY, THE NATIONAL ENVIRONMENTAL POLICY ACT: A STUDY OF ITS EFFECTIVENESS AFTER TWENTY-FIVE YEARS 3 (Jan. 1997) ("NEPA has been emulated by more than 25 states and over 80 countries around the world, and serves as a model for environmental impact assessments . . . .").

184. COUNCIL ON ENVTL. QUALITY, *supra* note 183 (NEPA has been emulated in over 80 countries); *see also* Richard K. Morgan, *Environmental Impact Assessment: The State of the Art*, 30, No. 1 IMPACT ASSESSMENT AND PROJECT APPRAISAL 5, 5–6 (2012) (describing how Canada, Australia, Sweden and New Zealand all have sister statutes and a number of international conventions contain similar planning conditions).

185. *See, e.g.*, Sally K. Fairfax, *A Disaster in the Environmental Movement*, 199 SCIENCE 743, 743–45 (1978); Clark, *supra* note 183, at 23.

186. Karkkainen, *supra* note 71, at 910.

187. 42 U.S.C. § 4332(2)(C) (2012).

188. *See, e.g.*, Robertson v. Methow Valley Citizens Council, 490 U.S. 332 (1989) (finding that a "hard look" was taken even if the mitigation measures for the proposed ski resort were not including a "worst case scenario"). *But see* Neighbors of Cuddy Mountain v. United States Forest Serv., 137 F.3d 1372, 1378–81 (9th Cir. 1998) (finding EIS did not contain sufficient detail regarding the cumulative impacts on the surrounding old growth forest); California v. Block, 690 F.2d 753, 767–79 (9th Cir. 1982) (considering eleven alternatives was not sufficient because "obvious" alternatives were excluded).

189. *See* Karkkainen, *supra* note 71, at 909–10 (noting that roughly 50,000 EAs are prepared each year compared to 500 EISs).

federal agencies to prepare 50,000 Environmental Assessments that end in FONSIs.[190] By contrast, only about 500 EISs are produced each year.[191]

In the energy sector, cumbersome EIS statements can dissuade companies and investors from applying for federal permits to invest in new energy projects without a bulletproof EIS to avoid litigation.[192] Furthermore, because of the roughly thirty-three months it takes the Department of Energy to issue the average permit, streamlining is necessary to make alternative energy projects attractive for private investors and ANCs.[193] For example, the Oil Shale, Tar Sands, and Other Strategic Unconventional Fuels Act of 2005 (the Unconventional Fuels Act) has streamlined the process for controversial hydrofracturing and tar sand refinement to let oil companies use the newly developed technology.[194] The Unconventional Fuels Act even steps outside of NEPA, prioritizing land exchanges with land outside of shale basins,[195] and requiring the Department of Interior "to coordinate and accelerate" the development of "oil shale and tar sands resources within the United States."[196] Finally, the Unconventional Fuels Act allows the Secretary of Energy to identify potential commercial production technologies for oil shale and tar sand oil production,[197] and provide technical and cost-sharing assistance to quickly implement the technology.[198] All of these

190. COUNCIL ON ENVTL. QUALITY, ENVIRONMENTAL QUALITY: 25TH ANNIVERSARY REPORT 51–52 (1996), https://clinton4.nara.gov/media/pdf/25th_ann.pdf.

191. *Id.*

192. *See* Karkkainen, *supra* note 71, at 913 (outlining the costs of the NEPA process as including "costly and time-consuming lawsuits; disciplining congressional responses including budget reductions [for agencies], legislative amendments, or oversight hearings; and disciplining personnel, policy, or budget moves by the White House"); *see also* NAT'L ACAD. OF PUB. ADMIN., MANAGING NEPA AT THE DEPARTMENT OF ENERGY III.B (1998), https://energy.gov/sites/prod/files/G-Oth-Managing_NEPA_DOE.pdf (highlighting the need to bulletproof an EIS to avoid unnecessary litigation).

193. *See* Karkkainen, *supra* note 71, at 919 (describing the length of time an EIS requires); Russel, *supra* note 70, at 1052 (advocating for streamlining).

194. *See* 42 U.S.C. § 15927(b) (2012) (justifying the streamlining on the basis of energy security "with an emphasis on sustainability"). Specifically, the Unconventional Fuels Act opened federal land to oil shale development, expanded the amount of acres a single leaseholder could develop, and required the Department of Interior to issue a Programmatic EIS for the entire oil shale leasing program. *Id.* § 15927. As Russell notes, "[t]ogether these regulations allow an agency to complete an EIS analysis on a relatively small section of land (perhaps a thousand acres), and then through adoption apply the results to tens or hundreds of thousands of additional acres." Russell, *supra* note 70, at 1060.

195. 42 U.S.C. § 15927(n)(1).

196. *Id.* § 15927(h)(1).

197. *Id.* § 15927(*l*)(1).

198. *Id.* § 15927(*l*)(2)(A), (C). Some oil and gas leases have been completely removed from NEPA analysis by using Categorical Exclusions (CEs). 40 C.F.R. §

policies have significantly reduced NEPA-imposed transaction costs for leases and permits, aiding in the United States' energy independence.[199]

While traditional energy resources have enjoyed a partial reprieve from the rigors of NEPA analysis over the past ten years, renewable energy sources have no streamlined policies that would help reduce their cost.[200] Although the Obama Administration's 2008 economic stimulus package provided direct funding for many green energy projects,[201] the market remains disincentivized to choose renewable projects over traditional energy resources absent a reduction in the transaction costs of renewable energy programs.[202] As the climate continues to change, the United States must reform its regulatory policies to put carbon-neutral technologies on a level playing field with traditional energy resources. This is even more critical for Arctic communities, which are experiencing a rapid deterioration of their environmental stability from greenhouse gas emissions.[203] To reduce greenhouse gas emissions and allow communities to localize energy production though microgrids based on wind or solar technology, the United States needs to allow green energy programs to rapidly proceed through the federal regulatory process. Deregulation must go beyond assisting the traditional energy producers. It must also spur green technologies. In Alaskan rural communities, this regulatory effort would not only reduce emissions, but incentivize investment in marginalized communities, a hallmark of environmental justice.

1508.4 (2012); Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594 (codified as amended at 42 U.S.C. § 15942 (2012)). While this would be the most comprehensive and sweeping way to exempt renewable resources from costly NEPA analysis, expansion of CEs is dangerous and undercuts the purpose of NEPA. *See, e.g.*, Jeffery A. Berger, *False Promises: NEPA's Role in Airport Expansions and the Streamlining of the Environmental Review Process*, 18 J. ENVTL. L. & LITIG. 279, 318–20 (2003) (discussing the expansion of CEs during the George W. Bush administration).

199. Russell, *supra* note 70, at 1059 ("Many agencies have developed regulations that streamline the NEPA process, truncating or curtailing the application of NEPA."). Oil and gas is not the only energy sector that benefited from a streamlined NEPA process. The Nuclear Regulatory Commission has also released regulations allowing for the categorical exclusion of numerous nuclear power plant activities, including waste disposal and inspections. 10 C.F.R. § 51.22(c).

200. Russell, *supra* note 70, at 1066.

201. *See id.* at 1067–68 (describing in detail the different policies the Obama Administration implemented).

202. *See id.* at 1051–52 (stating that NEPA's procedural requirements are time consuming and expensive for both traditional and renewable energy projects and should be streamlined to encourage "rapid transition to clean energy").

203. *See* Marguerite E. Middaugh, Comment, *Linking Global Warming to Inuit Human Rights*, 8 SAN DIEGO INT'L L.J. 179, 184–86 (2006) (documenting the effect climate change has had on northern people around the world).

Canada's Environmental Assessment Act

Unlike NEPA, which has both EIS and EA, the CEAA now has one standard environmental impact statement and environmental assessment process that agencies can use.[204] Furthermore, the CEAA allows agencies the discretion to suggest follow-up monitoring of the projects if the environmental outcomes of the project are uncertain at the outset.[205] While this follow-up monitoring is discretionary,[206] Canada's CEAA has begun turning the environmental permitting process into an ongoing study rather than a one-time analysis unable to predict environmental dangers that appear over the course of a project.[207]

The CEAA is not without its shortcomings though. The James Bay project in northern Quebec, for example, had a pre-project environmental impact statement that miscalculated the downstream effects of a dam on the estuarine environment and caribou migration routes, which the local Cree Indians depend on for subsistence.[208] These failures underscore the need to reduce the emphasis on pre-planning and replace it with a stronger emphasis on post-planning monitoring to adapt to the changing conditions on the ground.[209] Learning from these mistakes, Canada has created the Canadian Environmental Assessment Agency, which accumulates summaries and contact information for environmental impact statements in a searchable database.[210] This program is an "active information hub," identifying the "best practices" and reference standards for future impact assessments so that actors do not repeat past

204. Meinhard Doelle, *CEAA 2012: The End of Federal EA As We Know It?*, 24 J. ENVTL. L. & PRAC. 1, 7 (2012). The CEAA also contains a "panel review" option, but the 2012 Act has significantly narrowed this provision and it is not relevant to my analysis here. *Id.* at 8–10.

205. *See* Karkkainen, *supra* note 71, at 949 (outlining the discretionary procedures for the CEAA).

206. Only about half of the Canadian federal impact statements included some form of monitoring. *Id.* at 949 n.161.

207. *See id.* at 949–50 ("Canada has done some important pioneering work by identifying the shortcomings of a purely predictive approach to environmental impact assessment, placing post project monitoring and assessment squarely on the policy agenda.").

208. *Id.*; RICHARD K. MORGAN, ENVIRONMENTAL IMPACT ASSESSMENT: A METHODOLOGICAL PERSPECTIVE 182–83 (1998).

209. The Deepwater Horizon blowout is another classic example of the failure of pre-planning as the estimates for the "worst case scenario" blowout were a fraction of the final spill. *See* Marcia K. McNutt et al., *Assessment of Flow Rate Estimates for the Deepwater Horizon*, U.S. DEP'T OF THE INTERIOR (Mar. 10, 2011), http://large.stanford.edu/courses/2011/ph240/mina1/docs/FRTG-final-report3_10_11-final-pdf.pdf.

210. Canadian Environmental Assessment Act, S.C. 2012, c 19, § 78 (Can.).

mistakes.[211] Congress should amend NEPA to include provisions allowing for continued post-project monitoring and a searchable database of EISs to reduce the backlog of redundant information and poor predictions that have previously plagued NEPA analyses.[212]

Interestingly, environmental reviews have not been a major regulatory issue for the AEA in the Northwest Territories.[213] Electrical inspectors have taken up the role of a regulatory body for many projects, which can cause some delays when new technologies are introduced.[214] However, the lack of hassle with bureaucratic environmental assessments is a boon for organizations trying to implement new technologies because predictive pre-project assessments are inaccurate since many of these projects are new and can only be assessed once the project is implemented. This hands-off approach was thought to be changing as Justin Trudeau campaigned on a platform to reinvigorate the CEAA after Prime Minister Stephen Harper had reduced its significance for many projects throughout Canada.[215] Increased environmental regulation, especially increased consultation with indigenous peoples during the assessment process, was included in Prime Minister Trudeau's first discussion paper on the environment in June 2017.[216] Lamentably, the paper speaks only in broad strokes and a specific plan to overhaul the CEAA has yet to be implemented.[217] Hence, neither the Canadian federal

211. Karkkainen, *supra* note 71, at 950.

212. *See id.* at 931 (recommending the implementation of post-project monitoring and "'adaptive mitigation' measures" when faced with uncertainty); *id.* at 922–23 (describing the "avalanche" of lesser quality information crammed into EISs as an "exhaustive compilation[] of recycled information").

213. The Canadian Environmental Assessment Agency does not have jurisdiction in the Northwest Territories. It has been replaced with the Mackenzie Valley Environmental Impact Review Board, a First Nation, Northwest Territories board. This shift was part of land claim settlements in the Northwest Territories. MACKENZIE VALLEY ENVIRONMENTAL IMPACT REVIEW BOARD ANN. REP. 1999-2000 (on file with author) [hereinafter MVEIRB].

214. Telephone Interview with Louie Azzolini, Former Executive Director, Arctic Energy Alliance (Jan. 6, 2017).

215. *See* Tamsyn Burgmann, *Justin Trudeau Unveils Liberals' Environmental Platform*, TORONTO STAR (June 29, 2015), https://www.thestar.com/news/canada/2015/06/29/justin-trudeau-unveils-liberals-environmental-platform.html (noting that Trudeau planned to restore environmental review).

216. GOV'T OF CANADA, ENVIRONMENTAL AND REGULATORY REVIEWS: DISCUSSION PAPER 8 (2017), https://www.canada.ca/content/dam/themes/environment/conservation/environmental-reviews/share-your-views/proposed-approach/discussion-paper-june-2017-eng.pdf.

217. *See id.* ("The federal government's response to bold recommendations for reforming the Canadian Environmental Assessment Act . . . is 'underwhelming'"); *e.g.*, Carol Linnitt, *Is Trudeau Quietly Turning His Back on Fixing Canada's Environmental Laws?*, DESMOGCANADA (Sept. 12, 2017, 10:34 AM), https://www.desmog.ca/2017/09/12/trudeau-quietly-turning-his-back-fixing-canada-s-environmental-laws (noting the gaps in the government's plan).

government nor the Canadian Environmental Assessment Agency will likely regulate Arctic energy programs in the near future, leaving the AEA to continue working under the current regulatory scheme.[218]

While the Canadian system of environmental review does allow for more diversity in its pre-planning approach, even allowing some jurisdictions to regulate with their own boards,[219] both systems can still cause delay, which is problematic for the health of local communities. In the United States especially, the lack of streamlining procedures for renewable energy resources hampers the impact of renewable energy spending, and reduces the incentives for the private market to invest in green energy.[220] As the weather around the globe continues to become increasingly extreme, the United States needs to play a leading role in the rapid expansion of renewable energy resources by streamlining the process so the private market can flourish.

D. Community Involvement and Grassroots Engagement

Even with superior technology, profitable funding schemes, and a streamlined regulatory scheme, successful alternative energy systems will only be successful if the communities benefitting from the programs work to support and maintain the project. To make alternative energy programs successful in rural Arctic villages, the local communities need to be involved in every phase of the implementation in order to ensure the programs will be self-sustaining. This section will discuss several case studies from around the world and the AEA, and use those examples to recommend solutions to the barrier of community involvement.

Personalized Recruitment Strategies

One way to implement a healthy, self-sustaining energy program is to encourage the already-interested members of communities to recruit their neighbors to support green energy projects.[221] A prime example of these personal recruitment strategies is the Clean Energy Resource Team

218. *See* Meinhard Doelle, *supra* note 204, at 6 ("[The Canadian Environmental Assessment Agency] is given broad discretion to determine whether a federal [environmental assessment] is required for that particular project.").

219. *See* MVEIRB, *supra* note 213 (explaining that the Mackenzie Valley Environmental Impact Review Board is responsible for environmental assessment in the Mackenzie Valley).

220. *See* Russell, *supra* note 70, at 1066 ("NEPA presents a significant barrier to development of green energy, particularly in light of the streamlined process already in place for some fossil fuels and nuclear energy.").

221. *See* Hoffman & High-Pippert, *supra* note 73, at 7569 (describing the effectiveness of community recruitment strategies).

("Resource Teams"), created in 2003 by the Minnesota Department of Commerce, the University of Minnesota, and the non-governmental organization Minnesota Project.[222] Six regional Resource Teams were created to promote renewable and energy conservation throughout Minnesota.[223] During Resource Teams' startup phase, organizers invited potential local participants to community meetings via direct mail and online marketing; interested individuals were then added to the Resource Teams' mailing list.[224] Additionally, the Resource Teams identified people in the community who were members of environmental organizations and had prior experience working towards conservation and renewable energy.[225] This strategy of personally appealing to participants led to a highly successful campaign for the Resource Teams.[226] In fact, over sixty percent of the people that joined Resource Teams said they learned about it from a particular person or organization.[227] These programs have been most successful in communities, like those in the rural Arctic, where the population is less transient and more invested in the health of the community.[228]

The AEA already uses this technique in their own work in the Northwest Territories, even if they do not call it "personalized recruitment." The message of the AEA is to hold communities and community leaders accountable for their own success within their community energy profile.[229] By encouraging the community to participate, the AEA puts pressure on community leaders to work towards programs for the community's success based on the village's relative well-being to its participatory nature.[230] The communal nature of Arctic village life also places pressure on communities who do not participate, where recalcitrant leaders are seen as hurting the community and society as a whole by not participating.[231] Personalized recruitment of villages, while different from the person-to-person contact used in the Resource Teams, has been successful in compelling community leaders to

222. *Id.* at 7568; *see generally* SIDNEY VERBA ET AL., VOICE AND EQUALITY: CIVIC VOLUNTARISM IN AMERICAN POLITICS (1995) (describing the idea of "personalized recruitment" in the political organization context).
223. *See* Hoffman & High-Pippert, *supra* note 73, at 7568.
224. *Id.* at 7569.
225. *Id.*
226. *Id.*
227. *Id.* at 7569–70.
228. *Id.* at 7570 (extolling the idea of "neighborly communities" as the perfect environment for personalized recruitment strategies).
229. *See infra* Part III.C and accompanying notes.
230. *See infra* Part III.C and accompanying notes.
231. *See infra* Part III.C and accompanying notes.

interact with the AEA to create programs similar to those implemented by their neighbors, who have more comfortable lives because of their new energy projects.[232]

Using Existing Social Institutions to Create Community Support

Another important strategy for community support is to use the existing structures within the community to grow the community's communal assets.[233] These programs could be particularly successful in rural Alaska, where villages may have a village corporation and community buildings,[234] which can be the first buildings connected to the new energy source. Over time, these "green" buildings within the community can build a sense of pride and encourage further development of alternative energy sources.[235]

Community ownership schemes were successfully replicated in the United Kingdom, starting with the Scottish program Energy4All, which was initially set up in Baywind.[236] This cooperative ownership scheme is now prevalent throughout the United Kingdom,[237] and the model could be particularly successful in communities with a longer history of communal ownership, like Alaskan villages, and in remote communities where the drive to diversify and promote local economic growth, however small, is crucially important.[238]

The obvious application of communal ownership in the Alaskan context is the ANC corporate structure. Using the ANC as an already existing form of communal ownership that local villagers share can be another way to stimulate community-wide support for a project that could help local villagers personally and their stock generally. Also, communal programs have been most successful in rural areas, like western Alaska, where villagers have a stronger sense of community and pride for their land, which can be fostered by projects that not only keep money in their pockets but bring pride to the community and its leaders.[239]

232. *See infra* Part III.C and accompanying notes.

233. *See* Hoffman & High-Pippert, *supra* note 73, at 7570 (describing the benefits of various local community projects centered on renewable energy as a way to foster community support).

234. *See infra* Part III.A and accompanying notes.

235. *See* Hoffman & High-Pippert, *supra* note 73, at 7570.

236. *See* Walker, *supra* note 74, at 4401 (2008).

237. *Id.* at 4403 (discussing how the program in Wales, Oxfordshire, and Aberdeenshire was slow to develop, taking over ten years).

238. *Cf. id.* (noting this model "is particularly valuable for remote communities where diversification and regeneration needs are high, or when rural towns and villages become galvanised around a low-carbon agenda").

239. Another part of the community that could be tapped for communal

The Need for Strong Democratic Actors

Successful renewable energy programs in rural Arctic villages will also depend on strong democratic actors who are proud to engage both economically and personally within local communities.[240] Creating strong civic culture to foster energy projects will require strong action, including constant communication between ANCs and their village constituents; land bargaining between communal interests held by village corporations, regional ANCs, and the federal government; timetables in community energy plans to hold villages, ANCs, and contractors responsible for their projects; and community leaders acting as the voice of their village when programs do not go as planned.[241] Most people who will participate in programs such as these are not motivated by personal gain, but by a sense of pride in place and time.[242] A well-known commercial for the Bristol Bay Native Corporation uses the tagline, "from a place that's always been," to impress upon people the notion that western Alaska is a special and unique place for the communities and people who choose to live there.[243] As climate change continues to alter the Earth in ways that are expected to worsen over the coming half century, we must be mindful of the hard work and sacrifice required by people in northern climates to adapt to their changing landscape. Making these changes will require hard work and sacrifice from the men and women who call these remote areas home. A sense of pride in their own community and the Arctic as a whole will be an important factor in creating successful community energy projects in Alaska and throughout the Arctic.

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ownership is local missions and churches, who could make their mark on the community by fostering some form of renewable energy on their church grounds. *See* Hoffman & High-Pippert, *supra* note 73, at 7570 ("In the case of climate change, for instance, members of various faith communities are being called upon to undertake personal actions that extend well beyond formal lobbying or appeals for letters to elected representatives.").

240. BENJAMIN R. BARBER, STRONG DEMOCRACY: PARTICIPATORY POLITICS FOR A NEW AGE 132 (1984) (arguing that strong democratic actors create "a political community capable of transforming dependent, private individuals into free citizens and partial and private interests into public goods.").

241. *See id.*; *see also* Hoffman & High-Pippert, *supra* note 73, at 7572 (emphasizing the importance of "developing a system of public participation involving the communication of shared interests, bargaining over those interests that are not held in common, agenda setting and other less explicitly political activities").

242. *See* Hoffman & High-Pippert, *supra* note 73, at 7572 ("[T]hose people likely to participate in a voluntary, community-based initiative are motivated by an appeal to the notion of community, rather than personal benefit.").

243. BristolBayNativeCorp, *BBNC Balance TV Ad*, YOUTUBE (Sept. 20, 2013), https://www.youtube.com/watch?v=T0LFtg2yZk0.

III. VILLAGE GOVERNMENTAL STRUCTURES: CORPORATE CULTURES AND COMMUNITY ENERGY PROGRAMS

After looking at the potential barriers to renewable energy production and solutions to these problems, this Note turns next to the solutions and considers some of the current economic and governmental programs in place designed to help native communities achieve self-determination. The difficulty of imposing the western economic structure of corporations upon historically subsistent cultures is well known and understood.[244] However, the corporate form, while still controversial, has become increasingly profitable for native communities as the law around ANCSA matures.[245] In fact, the corporate form has been praised as collective property structure that can be profitable while still allowing native traditions over communal ownership and decisionmaking to flourish.[246] Over time, native corporate structures have become more profitable as the law surrounding the unique system has developed.[247] Consequently, the corporations have gained more political power (in

244. *See, e.g.*, Gigi Berardi, *Natural Resource Policy, Unforgiving Geographies, and Persistent Poverty in Alaska Native Villages*, 38 NAT. RESOURCES J. 85 (1998); Douglas M. Branson, *Square Pegs in Round Holes: Alaska Native Claims Settlement Corporations Under Corporate Law*, 8 ALASKA L. REV. 103 (1979); Marilyn J. Ward Ford, *Twenty Five Years of the Alaska Native Claims Settlement Act: Self Determination or Destruction of the Heritage, Culture, and Way of Life of Alaska's Native Americans?*, 12 J. ENVTL. L. & LITIG. 305 (1997) (discussing the way ANCs have sold rights to old growth timber to make short term profits, betraying the cultural mandate of the historical village culture); Martha Hirschfield, Note, *The Alaska Native Claims Settlement Act: Tribal Sovereignty and the Corporate Form*, 101 YALE L.J. 1331 (1992); John F. Walsh, *Settling the Alaska Native Claims Settlement Act*, 38 STAN. L. REV. 227 (1985); *see generally* Michael M. Pacheco, *Toward a Truer Sense of Sovereignty: Fiduciary Duty in Indian Corporations*, 39 S.D. L. REV. 49 (1994) (arguing that the differences between traditional federal Indian Law and Corporate Law cannons of construction at the state level require a federal Indian Corporations Act to alleviate the confusion).

245. Stephen Colt, *Alaska Native and the "New Harpoon": Economic Performance of the ANCSA Regional Corporations*, 25 J. LAND RESOURCES & ENVTL. L. 155, 162–63 (2005) (numbers have shown steady growth since the early 1990s). *But see* Gavin Kentch, *A Corporate Culture? The Environmental Justice Challenges of the Alaska Native Claims Settlement Act*, 81 MISS. L.J. 813, 829–30 (describing how some projects profit the region at the expense of individual communities).

246. For a thoughtful and in-depth look into this idea from the Canadian perspective, *see* Richard Janda, *Why Does Form Matter? The Hybrid Governance Structure of Makivik Corporation*, 30 VT. L. REV. 785 (2006). This theory has also been advanced towards Alaskan Native Corporations. *See* Linda O. Smiddy, *Responding to Professor Janda – The U.S. Experience: The Alaska Native Claims Settlement Act (ANCSA) Regional Corporation as a Form of Social Enterprise*, 30 VT. L. REV. 823 (2006).

247. James D. Linxwiler, *The Alaska Native Claims Settlement Act at 35: Delivering On the Promise*, 53 ROCKY MTN. MIN. L. INST. 1, 3 (2007).

Canada)[248] and become more involved in governmental contracting (in the United States).[249] This political and economic clout, however, is rarely used to provide funding and community support for alternative energy growth.[250]

There are some examples, however, of ANCs that have started initiatives to curb fossil fuel usage and promote renewable energy.[251] These programs show great strides in the right direction, and some have started to develop grassroots movements among neighboring villages.[252] These programs are not only good ways to save money on energy and reduce emissions, but also provide jobs for citizens of these rural villages.[253]

Even though these programs have been successful, all of these corporate structures have a mandate to improve the social conditions of native villagers and could use this mandate as a means to efficiently fund and channel money into programs to make renewable energy programs possible.[254] While the projects already started are encouraging, and their

248. *See* Janda, *supra* note 246, at 806–08.

249. *See* Colt, *supra* note 245, at 163.

250. *See* U.S. ENERGY INFO. ADMIN., *supra* note 45; *see also* Thierry Rondon & Stephan Schott, *Towards a Sustainable Future for Nunavik*, 50 POLAR RECORD 1, 12 (2013). Nunavik "depends 100% on fossil fuel supplies from the south that are very expensive and are steadily increasing in price." *Id.* Additionally, all of the communities that are part of the Makivik Corporation are separated from the electric grid of Quebec and have not developed any renewable resources. *Id.*

251. *See, e.g.*, FIRE ISLAND WIND LLC, http://fireislandwind.com/ (last visited Mar. 17, 2018); *Renewable Energy*, NANA, http://nana.com/regional/resources/alternative-energy/ (last visited Mar. 17, 2018); *Bering Straits Development Company (BSDC)*, BERING STRAITS NATIVE CORPORATION (last visited Mar. 17, 2018); *Calista Corporation – 2016 Project*, OFFICE OF ENERGY POLICY AND PROGRAMS, https://www.energy.gov/indianenergy/calista-corporation-2016-project (last visited Mar. 17, 2018). Sealaska completed a renewable energy feasibility study in 2003. SEALAKSA CORP., RENEWABLE ENERGY FEASIBILITY STUDY (2003), https://www.energy.gov/sites/prod/files/2016/02/f29/sealaska_tep_nov03.pdf.

252. Anna Rose MacArthur, *Calista region looks to Kuskokwim Bay villages for energy innovation*, ALASKA PUB. MEDIA (Apr. 24, 2017), https://www.alaskapublic.org/2017/04/24/calista-region-looks-to-kuskokwim-bay-villages-for-energy-innovation/.

253. *Id.* ("There's another way strengthening the village's renewable energy system has strengthened the ability to subsist—by providing jobs.").

254. *See* Alaska Native Claims Settlement Act of 1971 (ANCSA), Pub. L. No. 92-203, 85 Stat. 688 (codified as amended at 43 U.S.C. §§ 1601–1629 (2012)); 43 U.S.C. §§ 1601, 1605(b) (2012) (explaining one of the purposes of the settlement is to improve the "real economic and social needs of Natives."). The Makivik Corporation has been described as a "hybrid form." Janda, *supra* note 246, at 786. It advertises its corporate objective "to promote the welfare, advancement, and education of the Inuit" on its website. Makivik Mandate, MAKIVIK CORP., http://www.makivik.org/corporate/makivik-mandate/ (last visited Feb. 25, 2018).

apparent success is exciting, all ANCs and Canadian native corporations should be investing in renewable energy resources. It is precisely this corporate institutional structure that should now be used to implement many, if not all of the policy recommendations made in Part II of this Note.

A. The Alaska Native Claims Settlement Act

The Alaska Native Claims Settlement Act (ANCSA)[255] was enacted in 1971 in order to extinguish all native land claims in Alaska.[256] ANCSA established thirteen for-profit regional corporations and two hundred and twenty-five for-profit village corporations and conveyed to them around forty million acres of land and a trust fund of $962.5 million.[257] While the village corporations are not subsidiaries of the regional corporations, the regional corporations do approve village corporate plans and distribute money to them.[258] The dualism of the corporate structure continues in the land ownership, with village corporations owning the surface rights and regional corporations owning the subsurface rights.[259] In 1987, ANCSA was amended to create settlement trusts, intended to insulate "land and other assets from the business risks of operating a for-profit business corporation."[260]

These three organizations—regional corporations, village corporations, and settlement trusts—work together to achieve ANCSA's purposes: to improve the economic well-being of the villages with resource development projects,[261] and to provide for "the real economic and social needs of Natives . . . with maximum participation by Natives in decisions affecting their rights and property."[262] Some have argued that these social needs extend beyond general quality of life to include

255. Pub. L. No. 92-203.
256. *See* Linxwiler, *supra* note 247, at 2.
257. 43 U.S.C. § 1618.
258. § 1606(i).
259. §§ 1606(i), 1611(a), (e)–(f).
260. Smiddy, *supra* note 246, at 828; Alaska Native Claims Settlement Act Amendments of 1987 § 10, Pub. L. No. 100-241, 101 Stat. 1788 (codified as amended at 43 U.S.C. § 1629e (2000)).
261. Linxwiler, *supra* note 247, at 4. Prior to ANCSA, Alaska Native populations were so poor that one New York Times reporter wrote, "The worst slums in the United States are not in the racially turbulent quarters of New York, Cleveland, Chicago, or Los Angeles. By all available indices of poverty, they are sparsely strewn, like garbage on an ice floe, along the nation's desolate sea frontier with the Soviet Union." Homer Bigart, *Eskimos in Alaska Turn to Politics*, N.Y. TIMES, July 31, 1966, at A1.
262. 43 U.S.C. § 1601(b).

conservation and environmental justice.[263] Considering the extreme cost of fuel in rural Alaskan villages, the introduction of renewable energy resources, would not only reduce villages' carbon footprint, but also reduce the cost of living, ameliorating the poverty in native villages and allowing villagers to spend money on other necessities for a subsistence lifestyle.[264] Many ANCs now have sufficient financial stability to be able to focus on these social and environmental goals to further the purposes of the original vision of ANCSA: to see native communities financially solvent and socially stable for generations.[265]

Furthermore, investment in Alaskan native villages is not a losing economic investment for many ANCs.[266] Poverty, spurred in part by cost-of-living expenses, is a core barrier to economic self-determination for native villages, and investment in energy infrastructure could empower Alaska Natives to work for their community improvement.[267] In fact, ANCs' investments in villages, while small in scale, have been lucrative, even though the size of the communities limits the gross local investment.[268] While the corporations also experienced rapidly diminishing returns on investment in rural communities, recovery of investment and returns could be higher with modern Internet technology assisting in communication with distant villages.[269] NANA Regional Corporation, the native corporation in northwestern Alaska, has already proven that economic investment in water, sewer, and electric utilities can spur economic development, owning all the utilities in the North Slope area to provide jobs and still turn a profit for its shareholders.[270] As these

263. *See* Kentch, *supra* note 245, at 819 (discussing the tension between the ANCs' duties to develop and to conserve the land).

264. *See* MacArthur, *supra* note 252 (showing that heating savings can be spent on other necessities, such as gasoline, needed to subsist in the modern arctic); *see also Renewable Energy*, NANA, http://nana.com/regional/resources/alternative-energy/ (last visited Mar. 17, 2018) ("With the soaring cost of energy, many residents find themselves in a position of having to choose between heating their homes and feeding their families.").

265. *See* Colt, *supra* note 245 at 163 (discussing corporations' financial gains in the 1990s); Linxwiler, *supra* note 247, at 4 (noting the corporations' financial achievements by the mid-2000s); 43 U.S.C. § 1601 (explaining the Act's dual mandates).

266. *See* Colt, *supra* note 245, at 164 (running a regression analysis that determined regional corporations made money in local village enterprises from 1976 to 1994).

267. *See* Smiddy, *supra* note 246 at 838; Lee Huskey & Thomas A. Morehouse, *Development in Remote Regions: What Do We Know?*, 45 ARCTIC 128, 134 (1992).

268. *See* Colt, *supra* note 245, at 164 (finding local investment had an annual estimated average return of twenty-one percent of book equity from 1976 to 1992).

269. *See supra* Part II.B and accompanying notes.

270. *See* Colt, *supra* note 245, at 161; Smiddy, *supra* note 246, at 851.

examples illustrate, the established regional ANCs' duty to invest in the economic infrastructure of their shareholders' villages does not need to be a profit loss as well.

These programs will undoubtedly face challenges. The dynamic between village corporations and regional corporations has been difficult for some ANCs,[271] and the entrenched political voices on corporate boards of directors are hard to overcome.[272] While the splitting of surface and mineral rights was intended to give some additional control to the villages over their land to prevent majority rule by the largest communities within each region, the legal complications have led to bankruptcy for at least one ANC, leaving the village corporations as their creditor.[273] This legal wrangling between village corporations and their regional counterparts underlies the system created under ANCSA and the confusion over rights and responsibilities inherent in a new system.[274] NANA, however, has overcome this confusion and turmoil by incorporating the village corporations within its own corporate structure.[275] This streamlined approach may be one way to reduce the inefficiencies within the ANCSA corporate system, and create a

271. *See* Smiddy, *supra* note 246, at 842 (noting that village corporations have been less successful than their regional counterparts at achieving social progress).

272. *See* Kentch, *supra* note 245, at 824 (entrenched interests can lead to a feeling of disenfranchisement by shareholders). For a case study of these entrenched interests occurring at the village corporation level, look at the case study of the Eyak tribal members lawsuits over the sale of old growth timber within tribal lands. *See* Ford, *supra* note 244, at 328–33.

273. *See* Colt, *supra* note 245, at 161 (describing the plight of the Bering Straits ANC, which signed over its property rights to the village corporations in Chapter 11 bankruptcy proceedings).

274. *See* Linxwiler, *supra* note 247, at 16 (discussing the litigation that has followed ANCSA's regulatory requirements for village eligibility); *see generally* Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621 (1998) (describing the inefficiencies in a market system when competing interests do not know their roles within a property scheme). Another problem within this system has been the prohibition against descendants receiving stock, if they were born after 1971. 43 U.S.C. § 1604(a) (2012). While subsequent amendments have allowed ANCs to amend their bylaws to admit shareholders born after that date, 43 U.S.C. § 1606(g)(1)(B)(i)(I), only six corporations have done so to date. *See* Kentch, *supra* note 245, at 824; Ben Matheson, *Calista shareholders vote to enroll 'Afterborns'*, ALASKA PUB. MEDIA (July 12, 2015), https://www.alaskapublic.org/2015/07/13/calista-shareholders-vote-to-enroll-afterborns/. As the descendant population grows relative to the aging shareholder population, animosity between the village communities and the regional corporations will likely increase without a more unified message. Unsurprisingly, the corporations that have included descendants include two of the ANCs that have been most successful economically, Arctic Slope Regional Corporation (ASRC) and NANA.

275. *See* Smiddy, *supra* note 246, at 849–51 (describing NANA's unique structure among the ANCs and how it has led to more inclusion and political power).

streamlined structure that will improve the participation by village corporations while at the same time helping regional corporations be more responsive to their shareholders' needs.[276]

ANCs' original goals under ANCSA were to provide for native communities economically, socially, and environmentally.[277] While ANCs have become economically powerful and are now some of the largest companies in Alaska,[278] they have not done enough to create social stability in many rural communities.[279] Renewable energy programs are not only economically viable ANC investments, but would also reduce the poverty of their shareholders by reducing their consumption of expensive diesel fuel and reducing the village carbon footprint to achieve environmental justice for marginalized communities "along the nation's desolate sea frontier."[280]

B. The Makivik Corporation of Northern Quebec

Canada has also experimented with the corporate form as a way to empower rural native cultures. The Makivik Corporation of Nunavik, in northern Quebec, is considered a success for providing significant political and economic clout to the people of the Nunavik region.[281] Unlike the ANCs, the Makivik Corporation was designed as a not-for-profit corporation.[282] ANCs and Makivik, however, were both designed to incorporate traditional communal governance structures of native tribes with the western market economy in order to aid the transition between the two worlds.[283]

276. This incorporation will only occur, however, if the village corporations see the freestanding power of the regional corporations and trust their internal leadership, which could be hard if the corporations are not successful.

277. 43 U.S.C. § 1601(a)–(b).

278. *See* Linxwiler, *supra* note 247, at 4.

279. Even NANA has had trouble balancing the economic success of the Red Dog Mine with the subsistence needs of the nearby town of Kivilina. *See* Kentch, *supra* note 245, at 827–34 (describing how the Kavilina villagers were excluded from the decision-making process regarding the mine, despite its environmental and general health impacts); *see also* Adams v. Teck Cominco Alaska, Inc., 2006 U.S. Dist. WL 2105501 (D. Alaska July 28, 2006) (rejecting plaintiffs' claims of increased lead levels in the soil around the access road to the mine within Kivilina's subsistence hunting zone).

280. Bigart, *supra* note 261, at A1.

281. Bernard Simon, *Canada's Indians Pondering How to Invest Land Payouts*, N.Y. TIMES. (Nov. 6, 2003), https://www.nytimes.com/2003/11/06/business/canada-s-indians-pondering-how-to-invest-land-payouts.html.

282. An Act Respecting the Makivik Corporation, R.S.Q., c S-18.1, § 16 (Can.); James Bay and Northern Quebec Agreement, Nov. 11, 1975, *in* James Bay and Northern Quebec Agreement and Complementary Agreements No. 1 (1998).

283. *See* Janda, *supra* note 246, at 786 (detailing how Makivik was intended to bridge the Inuit and contemporary market cultures).

Makivik has experienced even more success than most ANCs in creating social and political communities within Nunavik that have political clout in Quebec City.[284] However, on energy reform, Nunavik communities are still cut off from the Quebec electric grid, and a recent decision by Hydro Québec to raise heating oil rates for off-grid communities underscores the lack of political capital expended by Makivik for providing cheaper, greener energy for its communities.[285]

Makivik was chartered in 1978 as a not-for-profit corporation, thereby exempting it from taxation.[286] Since incorporation, Makivik has donated over eighty million dollars towards its corporate mandate: to relieve poverty; promote welfare and education of the Inuit; develop, and improve Inuit communities; and "to foster, promote, protect, and assist in preserving the Inuit way of life, values and traditions."[287] While Nunavik has a regional government, the elections to the board of Makivik are perceived as the most important elections in Nunavik, making Makivik the "de facto government of Nunavik."[288] Makivik has been a steady conservative investor, which has, over time, increased its corporate portfolio to include two airlines, Nunavik Creations (a clothing and art company for local artisans), Nunavik Furs, Halutik Enterprises (a fuel and heavy equipment company for Nunavik), and Kautaq Construction.[289] Unlike many ANCs, which have diversified into finance and companies outside the state of Alaska, Makivik's portfolio focuses on businesses and services that will directly benefit the Nunavik communities.[290]

This corporate form has benefited the Nunavik people by creating smooth transactions between western contractors and the communities of the corporation.[291] Unlike the complicated village-regional split under ANCSA, the single, not-for-profit form has provided an established blueprint for western companies to work with the villages of Nunavik.[292]

284. *See id.* at 806–09 (describing the author's impression that Makivik has enhanced the capacity of Nunavik's Inuit peoples to engage in public government).

285. Press Release, Makivik Corp., *Hydro Québec's Second-Tier Rate Increase Will Hurt Nunavik Residential Consumers* (Nov. 4, 2016), http://www.makivik.org/hydro-quebecs-second-tier-rate-increase/.

286. *See* R.S.Q., c S-18.1, § 4.

287. *Id.* § 5.

288. Janda, *supra* note 246, at 789.

289. *Subsidiary Companies*, MAKIVIK CORPORATION, http://www.makivik.org/subsidiary-companies/ (last visited Feb. 21, 2018).

290. *See* Linxwiler, *supra* note 247, at 4; *Subsidiary Companies*, *supra* note 289 (describing each subsidiary company as representing "the interests of its shareholders, who are the Inuit of Nunavik.").

291. *See* Janda, *supra* note 246, at 796–800 (explaining how Makivik's corporate form has led to reduced transaction costs associated with the agreements it enters into).

292. *Id.* at 793.

Since Makivik is a not-for-profit corporation, it uses the money many ANCs would use for shareholder dividends to invest in projects and companies within the Nunavik region.[293] This structure has been easier to adopt because of the pre-existing law around not-for-profit corporations, unlike ANCs, which dealt with prolonged litigation about the exact contours of ANCSA.[294]

Politically, Makivik has gone even further than ANCs in trying to combine the traditional native structure with the corporate form by including an advisory board of elders for the Board of Directors.[295] This inclusion has resulted in the perception that Makivik is not only an "entrepreneurial"[296] economic body, but also an entity that has a relationship with the traditional ways of the Inuit peoples, unlike the boards of regional ANCs, which have been occasionally sued for breaches of fiduciary duty by their shareholders.[297] This unified message has led to a strong political presence at the provincial level as well, creating a functioning self-governance structure for the Nunavik people.[298]

Despite all of this success, the Makivik Corporation has not been able to provide for renewable power projects for its Nunavik villages, which still rely on heating oil to provide energy for their homes.[299] Furthermore, the recent decision by Hydro Québec to increase the heating oil rates in these communities shows how Makivik has not focused on energy as a major goal of environmental justice for Nunavik peoples.[300] Since 1994, Makivik has provided a subsidy program for heating oil in Nunavik villages.[301] However, as climate change and poverty persist in the villages

293. An Act Respecting the Makivik Corporation, R.S.Q., c S-18.1, §§ 4–5, 7–10 (Can.).

294. *See* Linxwiler, *supra* note 247, at 3; Janda, *supra* note 246, at 796–800.

295. Janda, *supra* note 246, at 795.

296. *Id.*

297. *See* Ford, *supra* note 244, at 326–33 (describing various legal disputes between ANCs and their shareholders).

298. *See* Janda, *supra* note 246, at 807–08. Not all Native Corporations in Canada have been as successful. The Nunavut Tunngavik, Inc. (NTI) was established as a private corporation for Nunavut in 1993, six years before the creation of the territory. Unlike Makivik's clear social welfare mandate and ANCSA's clear economic mandate, NTI's bylaws were "bathed in rights-focused language" giving the organization a weak economic structure. *Id.* at 810. While this has given NTI a major role in Nunavut's social development programs, it has not been able to divest itself from the political structure of the Nunavut government, reducing the effectiveness of the corporate form as a driver of economic self-determination. *See About Nunavut Tunngavik Incorporated,* NUNAVUT TUNNGAVIK, INC.; Janda, *supra* note 246, at 812–13.

299. Rondon & Schott, *supra* note 250, at 11.

300. *See* Makivik Corp., *supra* note 285.

301. *Heating Oil Subsidy Program*, MAKIVIK CORPORATION (Apr. 23, 2014), http://www.makivik.org/heating-oil-subsidy-program/.

of Nunavik, it will be interesting to track whether Makivik will include climate change and environmental justice of the northern communities within its social justice corporate mandate under its bylaws.[302]

In sum, while the Makivik Corporation's not-for-profit status and its focus on intertwining village elders within the decisionmaking process has led to a unified message for increased social and political capital in Nunavik, Makivik has not been able to leverage this into clean energy programs in the region. Like ANCs, the focus has been on social and cultural programs, which, while benefiting the community, have not substantially alleviated widespread poverty in the northern villages.

C. Arctic Energy Alliance and Community Energy Programs

As an alternative to the corporate structure of the Makivik and ANCSA corporations, the Northwest Territories created the AEA twenty years ago to address their rural communities' needs for cheap, effective, and efficient energy sources.[303] This organization has become the "lead not-for-profit organization helping communities, consumers, producers, regulators, and policymakers to work together to reduce the cost and environmental impacts of energy usage in the Northwest Territories."[304] Shunning direct involvement with native groups, the AEA in many ways has become the anti-structure of the traditional native corporate structure, empowering native communities to take responsibility for their own needs, while providing needed assistance when asked to.[305]

Currently, the AEA employs twenty-two full time staff in five regional offices throughout the Northwest Territories.[306] The AEA has a working budget of around $3.2 million, which was spent on a multitude of projects throughout thirty-two different rural villages in the Northwest Territories.[307] AEA's basic approach to community energy planning involves a six step process: (1) forming a group of community members interested in energy, (2) creating an overview of how energy is used in the community, (3) evaluating potential projects and partnerships, (4)

302. An Act Respecting the Makivik Corporation, R.S.Q., c S-18.1, § 5 (Can.).

303. *About Us*, ARCTIC ENERGY ALLIANCE, http://aea.nt.ca/about-us (last visited Feb. 21, 2018).

304. ARCTIC ENERGY ALL., AEA ANNUAL REPORT 2015-2016, at ix (2016) [hereinafter AEA ANNUAL REPORT].

305. Telephone Interview with Louie Azzolini, Former Executive Director, Arctic Energy Alliance (Jan. 6, 2017).

306. AEA ANNUAL REPORT, *supra* note 304, at ix.

307. For a detailed look at the various programs that the AEA is involved in, including retrofitting and installation of efficient heaters, promotion of wind-diesel power, and commercial energy conservation, see *Programs*, ARCTIC ENERGY ALLIANCE, http://aea.nt.ca/programs (last visited Feb. 21, 2018).

assembling the promising projects in a Community Energy Plan (CEP) call to action, (5) implementing and monitoring the projects listed in the CEP, and (6) revising the plan as needed.[308] This seemingly simple plan is tailored to each village to create a plan to work for the individuals in the community.

Unlike other government programs working in this industry, the AEA compels community involvement by holding individual communities responsible for half of the funding for CEPs. In one instance, all the communities around a village received assistance for installing efficient heating units except for one village that did not come through with its share of the funding.[309] The AEA thereby creates accountability, as it catalyzes community action when leaders fail to hold up their job to procure the benefits the AEA can provide. Further, since community members have invested their own time and money into the program, there is assurance that AEA benefits will be used and appreciated.[310] This forced participation seamlessly plays into the communities' desire to reduce their "dependence upon high cost, carbon-intensive diesel generation"[311] toward programs that will allow community members to spend money on other necessities for life in the Arctic.[312]

Another unique feature of the AEA is its cultural neutrality. Unlike the Makivik Corporation and the ANCs, the AEA is not involved with any native groups and therefore can run the organization independently, without any eye towards employment of shareholders (in the case of ANCs) or towards cultural improvement (in the case of the Makivik Corporation). This not only helps unify the message of the AEA, but also clarifies the purpose towards providing support on clean energy and allows the AEA to hold true on its vision as a pragmatist organization by staying impartial and objective.[313] It is noteworthy that even without this cultural connection to the communities the AEA is serving, participation rates in the community programs in the Northwest Territories are the highest among the community programs throughout Canada.[314] This level of involvement and pragmatism could also be achieved by ANCs

308. *Communities*, ARCTIC ENERGY ALLIANCE, http://aea.nt.ca/communities (last visited Feb. 21, 2018).

309. Telephone Interview with Louie Azzolini, Former Executive Director, Arctic Energy Alliance (Jan. 6, 2017).

310. *Id.*

311. Genevieve St. Denis & Paul Parker, *Community Energy Planning in Canada: The Role of Renewable Energy*, 13 RENEWABLE & SUSTAINABLE ENERGY REV. 2088, 2094 (2009).

312. *See* MacArthur, *supra* note 252.

313. Telephone Interview with Louie Azzolini, Former Executive Director, Arctic Energy Alliance (Jan. 6, 2017).

314. St. Denis & Parker, *supra* note 311, at 2094.

and the Makivik Corporation by creating a subsidiary corporation which could focus exclusively on community energy programs to keep the message clear, consistent, and reliable.[315]

The AEA is a true success story for community energy programs in the Arctic and could be duplicated in other jurisdictions. However, to catalyze such a program, there needs to be a central figure to spearhead the effort. In the Northwest Territories, J. Michael Miltenberger filled this role when he launched the AEA and supported it through the Northwest Territories legislature.[316] He then served as the finance and environment minister for the Northwest Territories until 2015.[317] The AEA's efforts to expand into Nunavut have been successful, but the push for a similar organization in the territory has not been advocated at the policy level to the point of creating a sister organization.[318] If these types of hybrid programs—taking the best from the native corporate structure and infusing it with a pragmatic government structure—are ever to take hold, politicians in Arctic jurisdictions will need to push these programs and foster them though the early years to create lasting change in energy policy for rural Arctic villages.

D. Renewable Energy Alaska Project Moves Towards the AEA Model

While Alaska may not have a program as robust or as established as the Northwest Territories' AEA, the Renewable Energy Alaska Project (REAP) is an organization with many of the same goals and a similar model to the AEA. Not surprisingly, REAP has been at the forefront of many of the renewable energy programs that have been set up throughout Alaska and will likely be a significant player in creating new

315. *See, e.g.*, *Wind Resources*, ENERGY SECRETARIAT, DEPT. OF ECON. DEV. & TRANS., GOV'T OF NUNAVUT, http://nunavutenergy.ca/node/18 (last updated 2016) (discussing the failed wind projects in Nunavut in the late 1990s and early 2000s); *see supra* Part II.A (discussing the advancements in renewable energy technology).

316. Telephone Interview with Louie Azzolini, Former Executive Director, Arctic Energy Alliance (Jan. 6, 2017).

317. Chris Windeyer, *Voters Deliver a Blunt Demand for Change*, CBC (Nov. 24, 2015), http://www.cbc.ca/news/canada/north/nwt-election-analysis-demand-change-1.3332112.

318. Another interesting feature of the AEA is its loose interpretations of its own bylaws. While the bylaws only allow Northwest Territories organizations to be members of the organization, *see* AEA Bylaws 1 (June 29, 2007) (on file with author), Nunavut has been a member of the AEA for the last few years and plans to continue to be a member into the future. This loose interpretation of their own bylaws underlies how responsive the AEA is to the changing conditions on the ground responding to what the constituencies are asking for without the bureaucracy typical of government programs.

renewable energy opportunities throughout the state.[319] REAP has emphasized efficiency within the community before anything else and has employed a unique approach for each village, much like the community energy plans relied on by the AEA.[320] By engaging community leaders and crafting unique solutions to each individual villages' problems, REAP has followed AEA in creating an energy efficient culture in many Alaskan villages.

REAP was founded in 2004 by Chris Rose "with the goal of promoting the use of renewable energy in Alaska."[321] Since then it has grown to include more than eighty organizations, including ANCs, utilities, and governmental agencies.[322] Unlike the AEA, however, REAP is focused on more than just rural energy projects. REAP also sponsors educational programs in primary schools throughout the state and promotes collaboration between business and utilities to create partnerships in renewable resource generation throughout the state.[323] REAP also acts as an advocacy program for lien energy programs throughout the state by lobbying the Alaska Legislature to adopt programs like PACE and other energy projects such as a Green Bank of Alaska and Railbelt Reform.[324] While the diverse approach is necessary, and the work REAP does is extremely valuable for renewable energy in Alaska, an organization dedicated to working with rural villages like AEA may be needed to really see the full buy-in needed to make rural renewable energy projects the norm in Alaskan villages in the coming decades.

CONCLUSION

The barriers to renewable energy in the Arctic take many forms. The technical challenges of creating diesel engines that are at once efficient on their own and able to connect to renewable resources when available is a barrier that organizations like ARENA have been able to overcome with efficient solar-diesel and wind-diesel generators. The financial barriers to

319. *See* Shaw, *supra* note 1 (noting the numerous renewable power projects REAP has initiated in remote communities, particularly those incorporating wind turbines).

320. *Id.*

321. *About Renewable Energy Alaska Project (REAP)*, RENEWABLE ENERGY ALASKA PROJECT, http://alaskarenewableenergy.org/index.php/about-reap/ (last visited Mar. 30, 2018).

322. *Id.*

323. *See, e.g.*, SUSTAINABLE SOUTHEAST PARTNERSHIP, http://sustainablesoutheast.net/ (last visited Feb. 21, 2018); ISLANDED GRID RESOURCE CENTER, http://islandedgrid.org/ (last visited Feb. 21, 2018).

324. *REAP Programs,* RENEWABLE ENERGY ALASKA PROJECT, http://alaskarenewableenergy.org/index.php/programs/ (last visited Mar. 30, 2018).

fund renewable projects in Alaska are hard to come by with Alaska's current budget constraints after the fall of oil prices and the current federal administration's push to reduce government spending. But programs like PACE, margin money financing, direct funding, and pay-as-you-go services through ANCs can overcome this barrier with innovative thinking and a positive eye towards the future of clean energy in rural villages; forward-thinking politicians like Michael Miltonberger in the Northwest Territory, who has doggedly pursued the establishment of the AEA and watched the organization become a renewable energy success story, can break regulatory barriers; calls to reform and streamline the NEPA process for clean energy to put traditional and renewable resources on a level playing field should fall in line with the new administration's goals to deregulate and encourage innovation; empowering and holding rural villages accountable for their own development goals will help encourage outside funding and native corporations to invest in their communities; and, finally, investment in these communities can help community members to obtain jobs or, at a minimum, a sense of pride in the development of their village.

As we continue to develop new and innovative ways to create technical solutions and creative financial programs, we must always remember that as a global society we are in this battle to adapt to climate change together, and every solution and innovation can make a difference. While few people live in the Arctic regions of Canada and Alaska, these are perfect places, surrounded by stable governments and financial institutions, to test out different microgrid and renewable technologies so we can institute these policies world-wide. This Note is not intended to be the final say on any issue, it is rather a guide, a starting point for further research, as we all embark together to help solve the world's energy problems one diesel generator at a time.