TOWARD A POSITIVE ENERGY FUTURE IN NORTHERN AND REMOTE COMMUNITIES

SUMMARY REPORT

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QUEST

Government of Northwest Territories / Gouvernement des Territoires du Nord-Ouest

Nunavut

Canada

Yukon

British Columbia

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Additionally, we would like to thank the more than 60 participants who attended the event and provided thoughtful and meaningful input. All three territories were well represented along with the provinces of BC, Alberta and Newfoundland. Nunavut participants included Qulliq Energy Corporation and the Hamlets of Kugluktuk, Gjoa Haven and Pangnirtung. Northwest Territories participants included the NWT Association of Communities, the Community Government of Whati and the City of Yellowknife. Yukon participants included the Yukon Research Centre, Kluane Community Development LP, and Gúnta Business Consulting.

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INTRODUCTION

Canada's northern and remote communities[1] have a critical dependence on energy services – heating, transportation, and electricity – for their safety, sustainability, and economic growth. These communities are on the cusp of change. For instance:

- Most of the existing built environment was developed starting in the middle of the last century and will be in need of ongoing renewal for decades to come;
- With the onset of climate change, traditional transportation systems including winter roads are under threat, which impacts access to reliable fuel sources;
- Many communities are experiencing a shift in demographics and accompanying this shift are growing demands for stringent cost management; and,
- Innovations in technology are influencing lifestyle preferences and business practices which are reshaping energy use patterns.

As a result, northern and remote communities will acquire a new and different look and feel, and all of this will impact how these communities will use, move and produce energy.

Driven by the need to respond to a rapidly changing economic environment and improve quality of life, northern and remote communities are exploring and implementing local measures that will reduce their current and future energy needs.

In order to explore the unique energy challenges and opportunities of northern and remote communities, QUEST, Natural Resources Canada (NRCan), and the governments of the Northwest Territories, Nunavut, Yukon, and British Columbia partnered to deliver the *Supporting the Energy Transition in Northern and Remote Communities* workshop on June 28, 2018 in Yellowknife, NWT in preparation for the 2018 Energy and Mines Ministers' Conference (EMMC) on August 12-14, 2018 in Iqaluit, NU.

Bringing together more than 60 First Nation, territorial, provincial, and federal governments; regional indigenous organizations; community representatives, utilities; and, local industry stakeholders, the workshop was divided into three organizing themes: Capacity Building and Investment, Energy Use and Energy Efficiency, and Energy Production and Supply.

Based on the discussions, a series of key messages and considerations were developed for policymakers to be shared at EMMC. A thematic overview of the workshop discussions captured in real time are presented in Figure 1 – Supporting the Energy Transition in Northern and Remote Communities.

[1] The use of the term communities for this report is inclusive of Indigenous Communities.

KEY MESSAGES AND CONSIDERATIONS FOR POLICYMAKERS

From the conversations held, the following key messages and considerations emerged for policymakers:

1. Ensure future energy transition programming and services appropriately respond to northern and remote community needs and priorities.

– Future energy transition programming should be flexible and adaptable, be based on the identified needs and build on new and all past input from communities and industry, recognizing every community is unique.

– Develop an energy transition narrative that is founded on and respectful of the priorities of northern and remote communities - safety, appropriate housing, health and welfare, economic prosperity, and self-determination - and can be championed by northern and remote communities.

– Engage community members in program design, and offer northern and remote stakeholders the opportunity to evaluate programming for its appropriateness to meet priorities for the north before formalizing.

2. Through collaboration, ensure human resources and skills are in place to implement an energy transition.

– Develop a defined energy transition plan for northern and remote communities through wide and collaborative strategies, partnerships and funding among all levels of government, industry and communities.

– Create an intergovernmental working group to facilitate cross-learning, operational and financial efficiencies, and to support the development and implementation of an energy transition plan for the north.

– Simplify administrative processes for energy transition programming especially for northern and remote communities, and ensure new funding is invested in capacity building to empower local community champions in implementing the energy transition.

> *Briefings are not consultation. Utilities and governments need to engage and include northern and remote community and indigenous members before and during program development and as part of the implementation.*
>
> ***Bill Williams***
> *Economic Development Officer, Hamlet of Kugluktuk*

3. Actively invest in and contribute to the sharing of information and lessons learned to advance implementation of projects for an energy transition.

– Evolve policy and create programming that makes data and information from government and industry more accessible to northern and remote communities. Work with industry to develop partnerships and tools to inform thinking and support the implementation of projects.

– Invest in meaningful capacity building activities and partnerships, including with industry, that enable northern and remote communities to share lessons learned and best practices, support economic development and local job creation, and help one another with the energy transition in the north.

FACILITATING ENERGY TRANSITIONS IN NORTHERN AND REMOTE COMMUNITIES

> *Once you've been to one northern community, you've only been to one northern community.*
>
> ***Cathy Cottrell***
> *Senior Energy Planner,*
> *Yukon Government - Energy Branch*

Based on interactive panel discussions the following insights were captured:

CAPACITY BUILDING AND INVESTMENT

Building capacity and expanding and evolving investment for community energy projects is essential to help northern and remote communities transition to a lower carbon economy. Some of the common barriers include: limited access to training – resulting in lower technical and analytical skills, low energy literacy, and business case knowledge – limited resources to apply for funding and oversee project implementation, and funding programs that do not adequately address the needs, realities, and timelines of northern and remote communities.

20/20 Catalysts Program, ICE Network

The 20/20 Catalysts Program is an interactive hands-on mentoring and peer-learning program designed to support Indigenous communities embarking on clean energy projects. Working collaboratively with the guidance of Indigenous leaders and clean energy practitioners from across the country, Catalysts gain the skills and tools needed to maximize the social and economic benefits communities gain through clean energy project development – including: energy efficiency, solar, wind, hydro, biomass, and geothermal, both on and off-grid.

Sustained investment is essential to build support and ensure capacity for the long-term

Across the north, there is a high turnover of technical expertise and staffing. Although communities have the will to implement projects, they struggle to advance with continuous changes in programming, and the inability to maintain institutionalized knowledge of energy services or to access expertise and experience. Organizations like the Arctic Energy Alliance, the Nunavut Arctic College, and programs such as Catalyst 20/20, are working to establish essential skills, talent and capacity.

However, with a vast territory to cover, the pace of uptake and transformation is slow. Capacity building activities are best directed at projects which can be incorporated into the daily operations or fabric of the community, such as the harvesting and use of biomass for thermal energy, and those that employ a wide range of people including youth.

Invest in local champions and support knowledge transfer across the north

The most impactful energy projects – those that are increasing self-determination of communities, enhancing reliability, and creating economic benefits – are taking place at the local level. To realize the full benefits of community-based energy projects in the north, local champions need to be nurtured and invested in so that communities can lead their own way in reaching their energy-related goals. Local champions provide the local knowledge needed to ensure the project meets the communities' needs, provide project implementation support, and ensure knowledge is transferred to all stakeholders so that a project continues successfully. Knowledge sharing between communities and governments will ease the development burden of subsequent projects, especially for communities with limited capacity.

Create and leverage innovative and local partnerships wherever possible

It does not serve anyone to advance energy projects individually. Working with non-traditional partners creates a community ecosystem of support increasing motivation and strengthening social, community and leadership capital and drives investment in energy projects. Agencies responsible for funding need to offer flexibility to allow for multi-year projects, technical and legal support, capacity development, and support for innovation and knowledge sharing, including through the use of partnerships. Utilities can increase the uptake of their services by reaching out to communities to learn about their needs, land use and design offerings. Communities can partner with local educational institutions to build technical capacity. And local businesses, industry and organizations can be involved by providing human resource capacity.

ENERGY END-USE AND ENERGY EFFICIENCY

Reducing energy demand and energy consumption is foundational to helping all communities – not just northern and remote ones – transition to a lower carbon future. However, with inadequate housing stock, lower energy literacy, difficulty acquiring energy efficiency technologies/building materials, and difficulty in administering programs across a vast area, northern and remote communities often face unique challenges realizing the benefits of energy efficiency and conservation.

Iqaluit Energy Retrofit Pilot Project

The pilot energy retrofit project focused on 40 government buildings in Iqaluit, Nunavut with a goal to reduce energy consumption by at least 20 percent across all buildings. Fifty energy efficiency measures were implemented in government buildings, including HVAC retrofits, the installation of motion sensors, LED lights, waterless urinals and motor efficiency upgrades. A solar wall exterior preheating system was also installed on one building as were boiler stack heat recovery systems. The project resulted in 20 percent reduction in annual electricity costs, 23 percent reduction in fuel oil costs, 23 percent reduction in annual water consumption, and 20 percent reduction in GHG emissions (1550 tonnes).

Energy efficiency measures can help address housing challenges

While it is true that if energy conservation gains are to be fully realized, adequate and appropriate housing is needed, it is also conversely true that decreasing energy costs today would enable additional funding to be directed to increasing the number and quality of housing options and related operational and maintenance costs in northern and remote communities. Therefore, rather than striving for only energy efficiency gains, involving housing corporations in strategies to reduce energy costs while initiating complementary initiatives, such as increasing energy literacy, implementing energy efficiency programs and services, and strengthening bylaws and building codes should be done in parallel.

Increase access to all forms of energy efficiency products, services, and approaches

Energy efficiency and conservation is a recognized priority by all northern and remote communities to reduce energy consumption, energy costs and emissions, while also improving resilience and prosperity. Many of the energy efficient products available in southern communities are not often available in or suited to northern and remote communities, making it challenging to fully implement energy programs especially as it relates to heating and transportation. While good progress is beingmade by organizations like the Arctic Energy Alliance and the Energy Solutions Centre in the Yukon, as well as government agencies across all territories, sustained investment, services for energy retrofit programs, and support for the development of new high-performance buildings remains intermittent.

> *Instead of saying 'Hi, I'm from Ottawa and am here to help', say, 'Hi, I'm from Ottawa and am here to learn.*
>
> ***Gordon van Tighem***
> *Chair, Northwest Territories Utility Board*
> *Former Mayor of Yellowknife*

Every northern and remote community has unique energy and socio-economic needs

One size fits all approaches do not work for northern and remote communities. Each community has its own set of energy needs and socio-economic issues which require access to a range of tools and instruments (from procurement strategies, to financing options, to expertise, to templates for contracting and power purchases) to realize their own community and corporate goals. Government representatives would benefit from travelling to northern and remote communities, asking questions, learning what makes them unique, and working collaboratively to design programs and services that are flexible enough to support the needs of northern and remote communities. Program and service flexibility should include a range of tools and options – for example, training, incentives, and peer learning meetings; less prescriptive conditions so communities can decide for themselves what is the best way to implement an initiative; and, adjustable timelines.

ENERGY PRODUCTION AND SUPPLY

Canada's northern and remote communities are dependent on energy services - heating, electricity, and transportation - for their safety, sustainability, and economic prosperity. Across all territories, there are important lessons that have been learned and best practices with regards to fuels and technologies for providing these essential energy services. While increased investments are being made in the north, such as for the Arctic Energy Fund, improved transportation access by shipping and roads, and other physical infrastructure, there is an acknowledged gap in social capacity and educational programming required to benefit from the advancements made in new fuels and technologies for the north.

Energy transition solutions must account for geography, be right-sized and site-specific

The building season in northern and remote communities is short. This places increased pressure on already sparse equipment, labour (which often has to be flown in) and shipping opportunities. Projects need to be planned well in advance and require funding to be in place (typically years in advance) to accommodate shipping timelines. In the case of winter road access, procurement and staging can require even more lead time. The pace and scale of energy projects need to align with each community's ability to engage. This approach contributes to long-term economic development and real opportunities to generate local source revenue and skills that stay in a community.

Oujé-Bougoumou District Heating System

The Oujé-Bougoumou First Nations community in Quebec takes the waste sawdust from sawmills operating in the region and converts that industrial waste into heat, which is then distributed to the entire community for space and water heating using a district energy system.

Enable self-determination

Residents of northern and remote communities believe strongly in the ability to have self-determination. Governments, utilities, and service providers can enact enabling policies for communities to implement local projects and realize economic benefits, enhanced well-being, and capacity building from these projects. Across communities, there are successes being realized at the local level stemming from community involvement in and, especially, ownership of energy projects. Communities, governments, utilities, and other stakeholders should hold conversations to identify what is needed to achieve self-determination, then act on what was heard. Permitting independent power and thermal production to occur, providing innovation funding for utilities and technologies, and implementing solutions that match local climate and land conditions, are tools that enable economic growth, build inclusive and resilient communities, and support a low carbon economy.

Ramea Island Wind-Hydrogen-Diesel System

The remote island community of Ramea Island, in Newfoundland and Labrador, will offset its need for diesel by generating electricity with wind turbines and using a hydrogen electrolyzer to store excess energy when wind supply exceeds demand. A Hydrogen Powered Generator (250kW) then converts the stored hydrogen into electricity when needed. The wind capacity will contribute towards the goal of meeting 100 percent of the Island's electrical demand with clean sources in certain circumstances.

Old Crow Solar Project

The objective of the Old Crow Solar Project is to develop an alternative to diesel generation in Old Crow, Yukon in order to reduce air transportation of fuel to the community and associated environmental risks; and secondarily, to demonstrate the viability of First Nation owned, high-penetration solar projects in Canada's North. The Old Crow Solar Project consists of 940 kW of solar generation installed in an east/west orientation to maximize the long daylight hours and wide arc of the Arctic summer sun. The project will provide 650 MWh/year to the electrical grid. Solar generation will reduce the amount of fuel used by the community's generators by 190,000 L diesel/year and reduce greenhouse gas emissions 680 Tonnes CO_2e/year and generate discretionary income that will be directed toward community development initiatives.

Leverage local resources and accessible fuels whenever possible

Power in northern and remote communities is increasingly being met by cleaner sources, including solar and hydroelectric, and by the use of battery storage where it makes sense. Small Modular Reactors (SMRs) may become an option communities could consider in the future. SMRs are small nuclear reactors - both physically and in terms of power output - that could potentially provide electricity as well as other services like heating for homes, greenhouses, and water desalination. Most heating, which is the dominant form of energy demand in the north, continues to be met by conventional energy sources, such as diesel and heating oil. However, access to local renewable energy sources is becoming more mainstream. For instance, biomass was successfully integrated throughout the Yukon and Northwest Territories as a primary heating fuel and biomass projects are being undertaken in collaboration with local utilities and provincial agencies. “Megaprojects” are less realistic in the majority of northern and remote communities where energy demand is modest and where incremental increases in demand are most efficiently met by marginal increases in local supply.

Local access to natural gas and the option for transporting liquefied natural gas are also viable fuel solutions for northern and remote communities to reduce reliance on diesel and heating oil (all forms)[2] for heating in the Yukon and Northwest Territories. Ensuring the economic viability of natural gas for domestic use and export can be enhanced with the establishment of long supply chains which aggregate demand.

Inuvik LNG Project [3]

Inuvik has two power plants, one designed to run on diesel and one designed to run on natural gas. Ikhil, a natural gas well in the Mackenzie Delta, powered the gas plant from 1999 to 2012, when gas stopped flowing. Inuvik’s diesel generators, used as standby power for the town, generated the town’s power in 2013, while NTPC looked for solutions. As of November 2013, the gas generators are running on liquid natural gas (LNG), imported from southern Canada by truck on the Dempster Highway. Liquid natural gas has a safety record going back to 1964 and is a safe, clean fuel that costs about 10 to 15 percent less than diesel, and reduces greenhouse gas emissions by about 25 percent. NTPC is currently investigating the potential to supply other communities on the road system with liquid natural gas, to fuel community generators in combination with diesel.

Kluane First Nation District Heating System

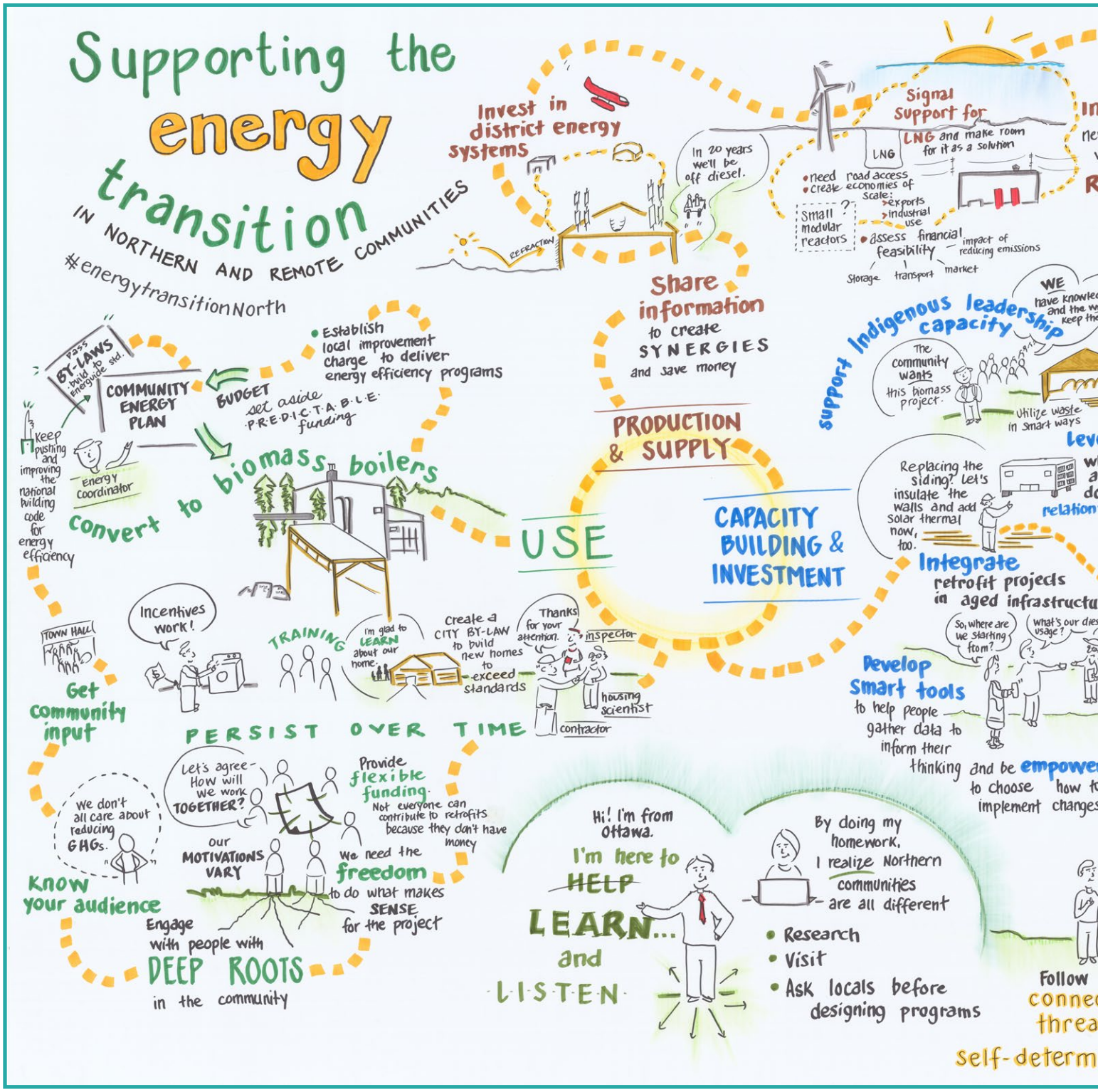
Since 1998, the Kluane First Nation community has been converting wood waste created by local forest fires and insect infestations into heat and distributing it using a district energy system for local space heating needs in Burwash Landing, Yukon. The waste wood is burned in a boiler to heat glycol, which runs through the district energy system to radiators to provide space heating for three local buildings, including the community’s main administration building, a carpentry building, and the Jacquot Building which holds a community hall, daycare, youth and elder centre, and a gym - a total of roughly 17,000 sq. ft. The Community plans to add two more buildings to the system in the future, which total an additional 1,900 sq. ft. The buildings also have backup boilers and oil burners in case of an outage.

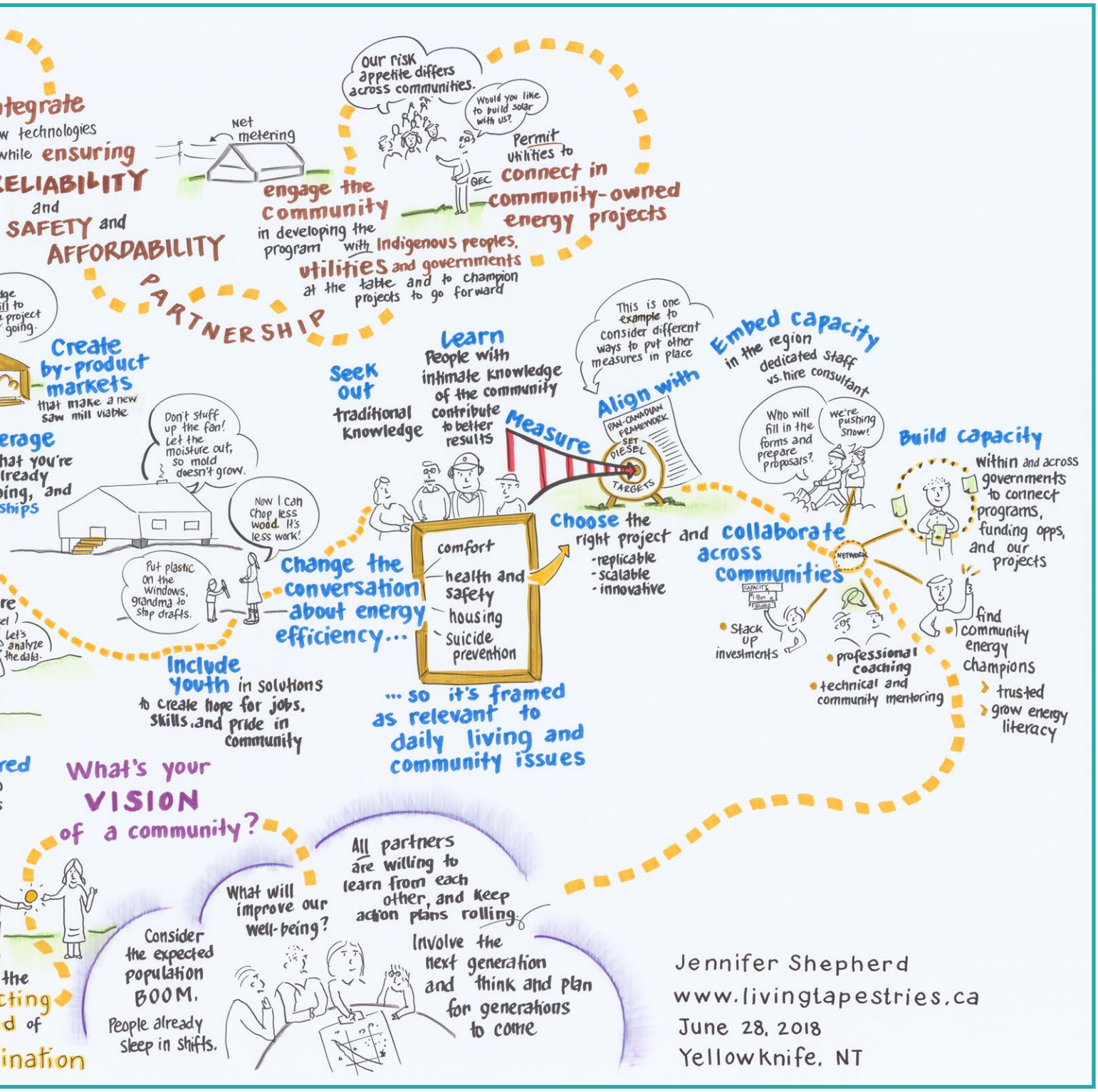
> *Listen to us. We [northerners] keep on talking about the same things with government year after year, but policies and programs don’t reflect what the north needs.*
>
> ***Colin Asselstine***
> *General Manager,*
> *Kluane Community Development LP*

[2] Heating Oil is a generic industry term that covers a variety of potential products, formulations, and compositions. Standard Road Diesel #2, Diesel #1, Kerosene, K-1, Jet Fuel, JP-1, Agricultural Diesel, Diesel #2, Home Heating Oil / Fuel Oil #4, or Home Heating Oil / Fuel Oil #6 may be sold and used for heating.

[3] Source: https://www.ntpc.com/smart-energy/how-to-save-energy/inuvik-lng-project

Figure 1: Supporting the Energy Transition in Northern and Remote Communities




tegrate
w technologies
while ensuring
RELIABILITY
and
SAFETY and
AFFORDABILITY
Net metering
Our risk appetite differs across communities.
Would you like to build solar with us?
Permit utilities to connect in community-owned energy projects
engage the community in developing the program with Indigenous peoples, utilities and governments at the table and to champion projects to go forward
PARTNERSHIP
Create by-product markets that make a new saw mill viable
erage
hat you're
lready
ing, and
ships
Don't stuff up the fan! Let the moisture out, so mold doesn't grow.
Now I can chop less wood. It's less work!
Put plastic on the windows, grandma to stop drafts.
Let's analyze the data.
Seek out traditional knowledge
Learn People with intimate knowledge of the community contribute to better results
Measure
Align with
PAN-CANADIAN FRAMEWORK
SET
DIESEL
TARGETS
This is one example to consider different ways to put other measures in place
Embed capacity in the region
dedicated staff
vs. hire consultant
Who will fill in the forms and prepare proposals?
we're pushing snow!
Build capacity
within and across governments to connect programs, funding opps, and our projects
change the conversation about energy efficiency...
comfort
health and safety
housing
suicide prevention
choose the right project and
- replicable
- scalable
- innovative
collaborate across communities
NETWORK
CAPACITY
Stack up investments
professional coaching
technical and community mentoring
find community energy champions
trusted
grow energy literacy
Include youth in solutions to create hope for jobs, skills, and pride in community
... so it's framed as relevant to daily living and community issues
red
What's your VISION of a community?
the
cting
d of
ination
Consider the expected population BOOM.
People already sleep in shifts.
What will improve our well-being?
All partners are willing to learn from each other, and keep action plans rolling.
Involve the next generation and think and plan for generations to come
Jennifer Shepherd
www.livingtapestries.ca
June 28, 2018
Yellowknife, NT

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