Fort McPherson Biomass District Heating Project

ADVANCED ENERGY CENTRE
MaRS Cleantech | Ontario, Canada

FAST FACTS: HAMLET OF FORT MCPHERSON

- Gwich'in community (pop. 808 - 93% Indigenous)
- Located 120km Southwest of Inuvik (latitude 67°N)
- Abundant supply of local willow along banks of Peel River

BIOMASS DISTRICT HEATING SYSTEM

- 85kW KOB tri-fuel [cordwood, pellets, or wood chips]
- 101,130kWh of heat in first season, offset 11,000L of heating oil
- Designed for 50% of peak-heating load, with oil burners
- Supply heat to Band Office and community health centre
- Intention to create local biomass industry (wood chips)

PROJECT OBJECTIVES

- **Heat two local buildings** with biomass (eventually wood chips)
- **Create local jobs** (e.g. harvesting willow, heat plant manager)
- **Improve local economy** by retaining dollars in community
- **Develop skills, knowledge, and capacity** in Fort McPherson
- **Reduce dependence on imported fuels**, reduce GHG emissions
- **Enable a more self-reliant economy**, enhance community pride
- **Test the economic feasibility** of a local biomass industry
- **Understand price of local wood chips**, vs. imported oil or pellets
- **Apply traditional knowledge, resources and values** through establishment of a local sustainable energy industry

The Advanced Energy Centre is grateful for generous input from Johnny Kay (Teetl'it Gwich'in Council), Margaret Mahon and Sheena Adams (Arctic Energy Alliance), Jim Sparling (GNWT), Jen Hiscock, (NRCan), Berkhardt Fink, and the thesis of Lawrence Keyte (Trent University)

Photo: Lawrence Keyte

CHALLENGES ENCOUNTERED

- Establishing supply chain (transition from pellets to woodchips)
- High capital cost for project development and implementation
- Limited local capacity (e.g. accounting, maintenance/operations)

FACTORS FOR FUTURE SUCCESS

- Continued community support, influenced by traditional connection to harvest of wood for heating, drying meat and fish, and shelter.
- Ongoing focus on new local employment, through harvesting, processing, operating biomass system, with a local supply chain
- Expand pilot project; always start small and only expand when ready
- Continued support from project champions within community (Johnny Kay), government (Bryan Pelke, Matt Kennelly), and NGOs such as the Arctic Energy Alliance (John Carr, Margaret Mahon)

POLICY INNOVATION

The Fort McPherson biomass project was developed with supportive policy promoting use of clean biomass heating across northern Canada.

- NWT Energy Action Plan: reduction of fossil fuels, reduce energy costs, use of renewable energy (2013)
- NWT Biomass Energy Strategy & Greenhouse Gas Strategy both enable biomass projects (2011/2012)
- Financial support from AANDC ecoENERGY, GNWT, and CanNor's Targeted Investment Program

TECHNICAL SOLUTIONS

Strong vendor relationships and many feasibility studies have brought the project to technical functionality; crucial for long-term success.

- Strong 24/7 support from Fink Machines (boiler supplier) for ongoing troubleshooting and operations
- Extensive feasibility and impact studies with GNWT Energy and Natural Resources (4+ years)
- Challenges with consistent heat supply to buildings with large cordwood; led to confusion with customer

LOCAL CAPACITY

Since inception, the project has has focused on local economic development by establishing skills and jobs in the biomass industry.

- Leadership from project champion and enthusiastic support from Teetl'it Gwich'in Council members
- Community education and training workshops for residents with Arctic Energy Alliance and GNWT ENR
- Local woodchip supply chain under development and expected to replace pellet fuel in 2016/2017

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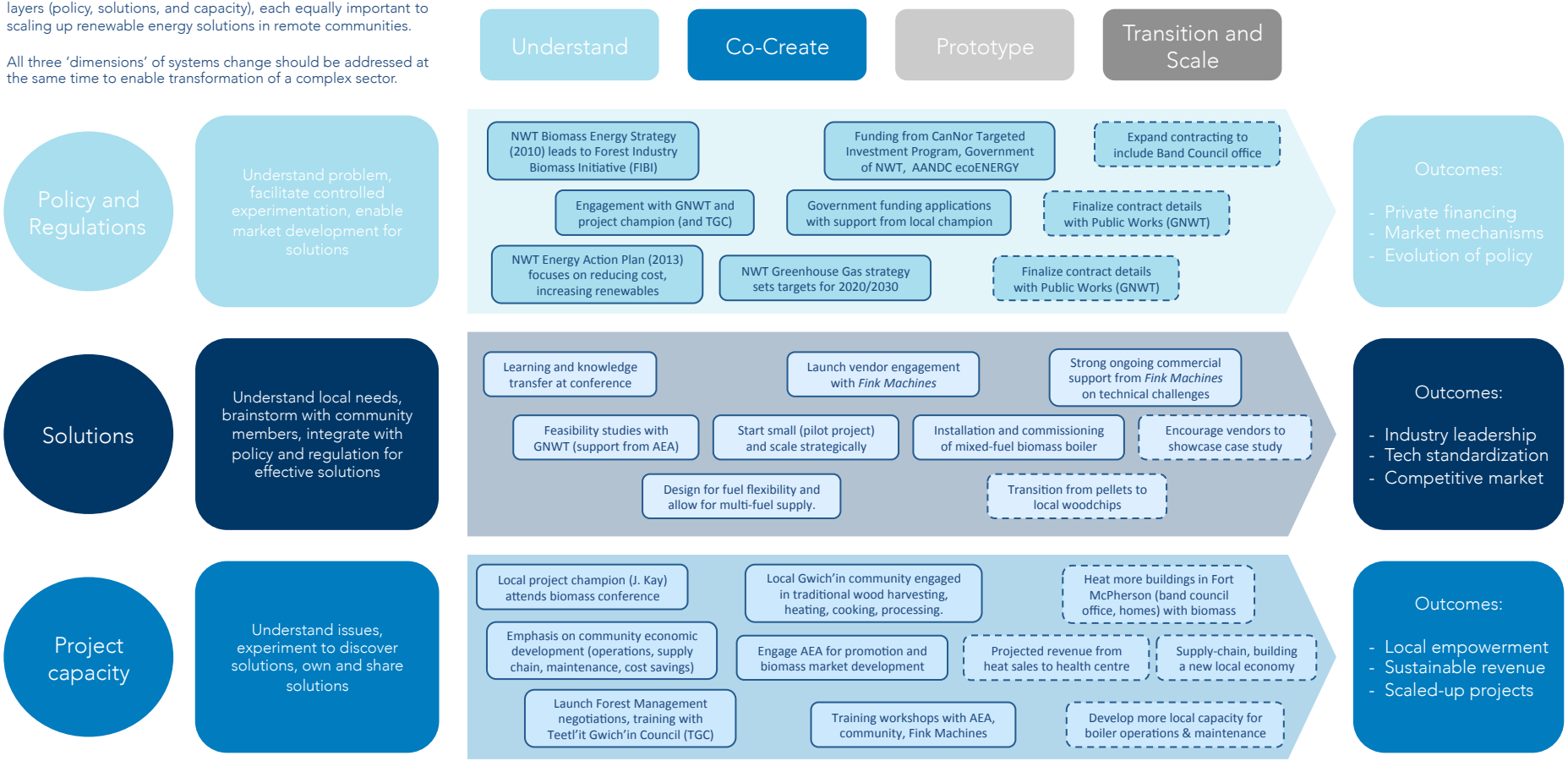
The Fort McPherson biomass project can be viewed in three layers (policy, solutions, and capacity), each equally important to scaling up renewable energy solutions in remote communities.

All three 'dimensions' of systems change should be addressed at the same time to enable transformation of a complex sector.