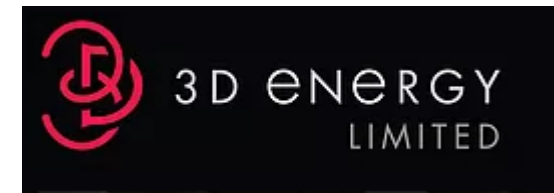


Managing Sustainability in Alberta's Indigenous Communities

Adam Trovato- Operations Manager, 3D Energy





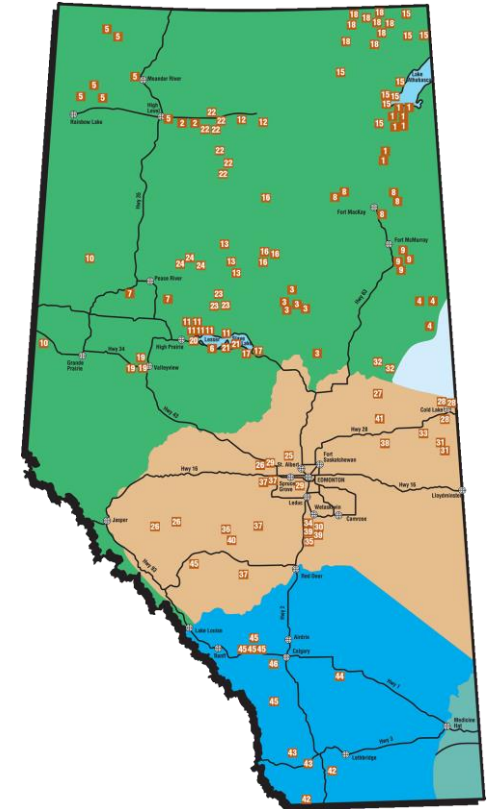
Presentation Agenda

- Background of work in Indigenous Communities
- What I discovered working with Indigenous Groups
- What resources are available to Indigenous Communities through Sustainability
- What these programs can achieve
- Program specific details and case studies
- Typical Challenges
- Lessons Learned



Work in Indigenous Communities

- Started managing one Métis Settlement and one First Nation
 - Energy auditing of commercial buildings
- Soon thereafter, our clients began asking for additional services
 - Began making partnerships and hires to satisfy wider range of services
- Began working with over 20 Communities to apply for 6 Alberta Climate Leadership Programs
 - Worked with Métis Settlements, Treaty 6, 7, 8 Communities, Tribal Councils, Friendship Centres
- Have helped Indigenous Communities access several million dollars of funding
 - Energy audits
 - Retrofits
 - Solar PV
 - Community planning and feasibility studies
 - Training and education



What I Discovered

- Each Community is unique and functions slightly differently
 - Communities are at different stages and have different levels of capacity
 - Facilities/Homes have wide range of conditioning
- Advantages and disadvantages
 - Location, capacity, finances, relationships with industry, political will, etc.
- Different Priorities
 - Economic
 - Social
 - Environmental
 - Technical
 - Political
- All have opportunities to better their current situation



Why Should Communities Care/Act?

Communities can act to satisfy a variety of motives:

- **Social**
 - Employment
 - Work on sustainable projects
 - Trickle down business to community trades/services
 - Sustainable businesses
 - Education and training
 - Add capacity and leadership
- **Technical**
 - Micro-grids/off-grid Communities
 - Improved facilities
 - Comfort and overall performance
 - Energy performance
- **Economic**
 - Construction projects
 - Energy independence
 - Competitive utility rates/Fair pricing
 - Economic development
 - Green energy projects
- **Environmental**
 - Reduced Greenhouse Gases
 - Add renewable energy to electrical grid
- **Political**
 - Get re-elected!



What Programs Are Available?

- Alberta Climate Leadership Programs (see image)
 - Alberta Indigenous Community Energy
 - Alberta Indigenous Climate Planning
 - Alberta Indigenous Energy Efficiency Retrofit
 - Alberta Indigenous Green Energy Development
 - Alberta Indigenous Green Employment
 - Alberta Indigenous Solar
 - Alberta Indigenous Climate Capacity
- Indigenous Off-diesel Initiative Development (NRCan)
- Indigenous Homes Innovation Initiative (NRCan)
- Capital Facilities and Maintenance (ISC)
- First Nation Adapt (ISC)
- First Nation Infrastructure Fund (ISC)
- First Nation Student Success (ISC)
- First Nations and Inuit Skills Link (ISC)
- First Nations and Inuit Summer Work Experience (ISC)
- Indigenous Community-Based Climate Monitoring (ISC)
- Reserve Lands and Environment Management (ISC)



Why Do These Programs Exist?

- To provide opportunities to Indigenous Communities that:
 - Reduce the Community's energy load
 - Improve the Community buildings
 - Improve housing conditions
- Develop renewable energy projects that tie into the Alberta electrical grid
- Provide training and education to Albertans/Canadians
- Add capacity to Communities
- Employ Indigenous people
- Stimulate Albertan economy
- Provide planning and guidance to Communities



What Can These Programs Achieve?

Communities have seen:

- Improved facilities
 - Improved homes and Community buildings
- Economic stimulation and development
 - New construction
 - Building retrofits
 - Solar PV and renewable energy development
- Education and Training
 - Sustainability/Construction
- Short and long-term employment
- Reduced energy rates
- Increased community capacity
- Long-term planning and vision
 - Improved understanding of facilities and energy
 - Can be used to leverage additional funding in future



AICCP



Alberta Indigenous Climate Capacity Program



- Program for developing internal capacity within Indigenous Communities/Organizations
 - Builds technical and leadership capacity
- \$100,000 of available funding
- Train and employ the “Community Climate Champion”
 - This individual becomes the Community’s go-to resource for sustainability
 - Sourcing funding, interacting with contractors/consultants, developing project scopes, managing existing projects, etc.
- Educate the Community as a collective
 - Increase local awareness and local actions that can be taken in response to these programs
 - Host workshops and information sessions about sustainability

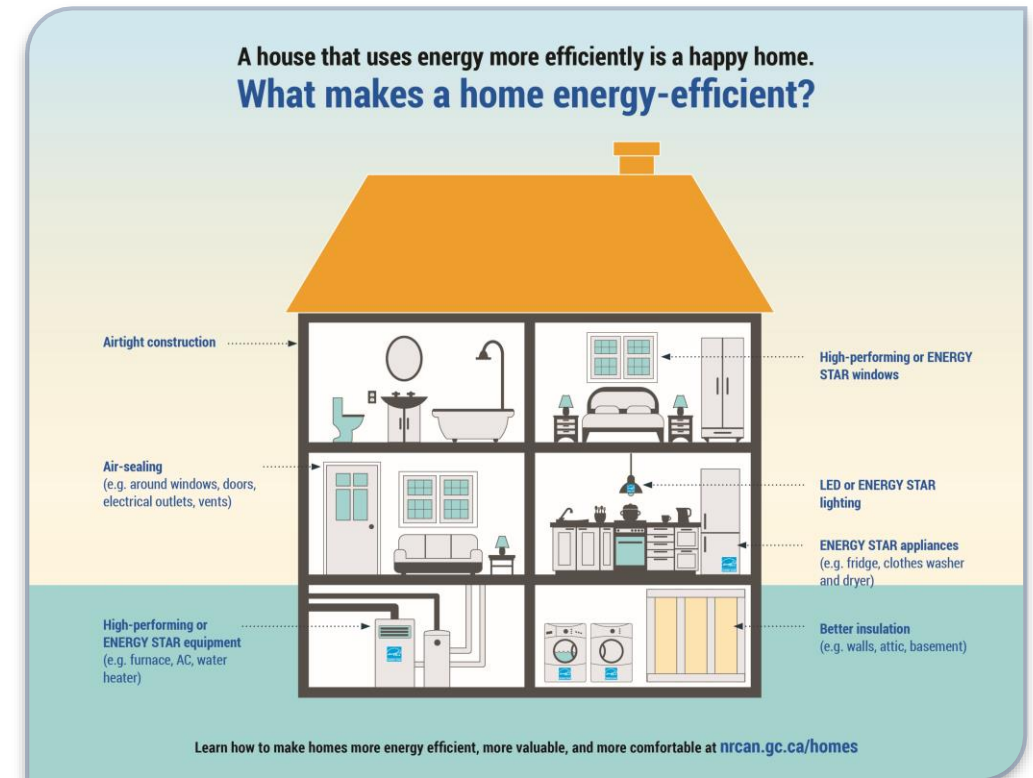


AICEP

- \$200,000 for energy audits on Community buildings
 - Residential, commercial, or industrial
- Analysis includes:
 - Energy bills
 - Energy performance of building systems
 - Windows, walls, doors, HVAC, lighting, water, appliances, etc.
 - Provides recommendations based on energy model and financial data
- Highly subscribed program
- Required in order to access retrofit funding
- Most Communities in Alberta now have audited buildings



Alberta Indigenous Community Energy Program



AICEP



Facility	Natural Gas Consumption (GJ)	Natural Gas Cost (\$)	Power Consumption (kWh)	Power Cost (\$)
Administration	882	7,730	70,064	11,210
Adult Handicap Home	200	958	18,774	2,047
Elders Lodge	2,324	20,358	166,391	26,623
Health Centre	987	9,330	74,904	13,274
IRC	207	2,197	13,734	1,813
Social Development	1,033	9,050	69,402	11,104
TLE	96	837	34,367	5,859
Black Bear Gas Station	210	1,840	53,993	9,179
Total	5,939	52,300	501,629	81,109

Industry Relation Corporation	Social Development	Health Centre	Administration	Adult Handicapped Home	Elders Lodge	Tribal Land Entitlement
LED LIGHTING UPGRADE	LED LIGHTING UPGRADE	LED LIGHTING UPGRADE	LED LIGHTING UPGRADE	LED LIGHTING UPGRADE	LED LIGHTING UPGRADE	LED LIGHTING UPGRADE
PROGRAMMABLE THERMOSTATS	PROGRAM NIGHTLY SETBACK TEMPERATURE	PROGRAM NIGHTLY SETBACK TEMPERATURE	PROGRAMMABLE THERMOSTATS	PROGRAMMABLE THERMOSTATS	PROGRAM NIGHTLY SETBACK TEMPERATURE	PROGRAMMABLE THERMOSTATS
AIR CONDITIONER UPGRADE	FURNACE UPGRADE	DOOR SEALS AND SWEEPS	DOOR SEALS AND SWEEPS	DOOR AND WINDOW UPGRADE	MAKEUP AIR UNIT UPGRADE	DOOR SEALS AND SWEEPS
LOWFLOW WATER FIXTURES	LOWFLOW WATER FIXTURES	LOWFLOW WATER FIXTURES	WINDOW UPGRADE	WALL UPGRADE	DOOR AND WINDOW UPGRADE	FLOOR INSULATION UPGRADE
	HEAT RECOVERY VENTILATOR (HRV)	VARIABLE FREQUENCY DRIVE (VFD)	ROOF/ATTIC UPGRADE	LOWFLOW WATER FIXTURES	RETROCOMMISSIONING	FURNACE UPGRADE
			TANKLESS WATER HEATER	HEAT RECOVERY VENTILATOR (HRV)	ROOF/ATTIC UPGRADE	WINDOW UPGRADE
					LOWFLOW WATER FIXTURES	LOWFLOW WATER FIXTURES
					VENTILATION FAN CONTAMINANT SENSOR	TANKLESS WATER HEATER

- Lighting Upgrades
- HVAC & Envelope Upgrades
- Water Upgrades
- Other Upgrades

AICPP



Alberta Indigenous Climate Planning Program



- Program for developing a tangible action plan as to how to effectively utilize energy and sustainability as a vehicle to achieve greater Community goals
- \$100,000 of funding available
- Community plan will look at the following:
 - Energy audits/energy data
 - Land use
 - Roads/transportation
 - Employment, social concerns, education, etc.
 - Community finances
 - Renewable energy opportunities/Energy generation opportunities
 - Population growth
 - Energy rates

AICPP



Buildings



Energy Supply



Infrastructure



Economic

2019

- Complete energy audits on remaining commercial and residential buildings.
- Implement ECMs on audited buildings using AIEERP funding.

- Pre-feasibility on utility scale solar, remaining rooftop space and CHP system.

- Feasibility study on road paving to determine budget.
- Feasibility study on waste management solution.
- Pre-feasibility study on industrial park.

- Complete energy audit on data center.
- Move forward with cannabis facility.
- Prioritized projects that create jobs for AFN.

2020

- Implement ECMs on Remaining audited buildings using AIEERP funding.
- Complete audits on remaining buildings

- Feasibility study on utility scale solar, remaining rooftop space and CHP system.
- Apply for AISP funding.

- Apply for funding to pave roads.
- Apply for funding to implement waste management solution.
- Feasibility study on industrial park.

- Implement ECMs on data center.
- Explore solar PV on cannabis facility.
- Prioritized projects that create jobs for AFN.

2021

- Implement ECMs on Remaining audited buildings using AIEERP funding.
- Explore energy monitoring options.

- Implement utility scale solar PV, rooftop solar PV and/or CHP system depending on results of feasibility studies.

- Implement road paving depending on results of feasibility study.
- Implement waste management solution.
- Implement of industrial park feasibility results.

- Market data center as energy efficient to renters.
- Continue to develop into cannabis space.
- Prioritized projects that create jobs for AFN.

2022

- Track building energy reduction and analyse for new ECMs.
- Complete audits on remaining buildings

- Continue with installation of energy supply systems if incomplete.
- Monitor energy supply systems.

- Continue with infrastructure upgrades if incomplete.
- Provide training for waste management jobs.

- Maintain data center building and marketing campaign.
- Continue with ~~Ravenquest~~ cannabis relationship.
- Prioritized projects that create jobs for AFN.

2023

Update community energy plan

- Update community energy plan with the most accurate and up to date information.
- Update goals and vision to reflect recent changes within the community.
- Create new recommendations, next steps and 5-year timeline to improve energy efficiency on AFN.

Long-Term Opportunities

Opportunity	Recommendation	Details	Current Reasoning
Buildings	Explore Net Zero for new builds	Net Zero refers to a building that generates as much electricity as it uses on an annual basis. This should be explored as a standard.	The immediate focus should be to update existing buildings with recommended ECMs and for new builds to be built to code.
	District energy connection	The connection of more buildings to the district energy system.	Further study on the feasibility of a district energy system is currently recommended.
	Continue energy audits	Completing energy audits every 5 years will reveal weather ECMs are working as expected and help detect problems.	The audits that have been completed and will be completed soon should be kept for comparison to future audits.
Energy Supply	Solar PV on residential buildings	Explore the feasibility and interest in installed solar PV on all or some residential buildings.	The current focus regarding solar PV should be on community buildings and utility scale.
	Integration of Energy Storage	Energy storage, such as batteries, can improve the reliability of the energy supply in the community.	Currently, the cost is prohibitive.
	Explore Solar Thermal feasibility	Solar thermal technology can reduce energy consumption due to hot water.	At this time, the low price of natural gas makes this option financially not feasible.
	Explore geo-exchange feasibility	Geothermal heating can be used to supplement the district heating system with renewable energy.	District energy system should be explored in a feasibility study to determine viability.
Infrastructure	Net Zero community	Net Zero can also refer to a community that generates as much electricity as it uses on an annual basis.	Currently, steps should be taken with this goal in mind such as solar PV installation and ECM implementation.
	Alexander Transit System (ATS)	Explore the feasibility of public transportation throughout AFN and to nearby towns and job sites.	Roads should be paved before a reliable public transport system is designed.
	Promote Low Emission Vehicles	Promote low emission hybrid and electric vehicle adoption through education programs and installation of vehicle plug-ins.	Roads should be paved before it is expected that citizens are expected to shift to low emission vehicles.
Economic	Further improvement of waste management	Fully automated pickup of waste, recycling, and compost. Backyard Composting. Waste reduction education programs.	Semi-automated waste pickup should be trialed before recycling and compost are included.
	Expansion of rental income	In addition to the data center, AFN should continue to assess the demand for rental space.	Currently, the data center should be retrofitted and filled with a renter before new builds are considered.
Economic	Stimulate job growth for AFN residents	Creating jobs for residents should always be prioritized when selecting projects.	This is a priority on the current CEP and should be a priority moving forward
	Increasing cannabis industry presence	If the relationship with Ravenquest becomes profitable for AFN, expansion should be considered.	The cannabis industry and the relationship between AFN and Ravenquest is relatively young.

AIGEDP



- Program made to assist in the development of large-scale renewable energy projects
 - Solar PV, Wind, Biomass, etc.
- Program operates in phased approach
 - Pre-feasibility > feasibility > implementation
- Projects must be greater than 1 MW
- These projects can employ community members short and long-term
- No funding maximum



Stage Description	2019												2020											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pre-Development Phase																								
Review Project Prefeasibility Study																								
Community Approval																								
Engage Project Development Partner																								
Development Phase																								
Small Scale Generation Application																								
Environmental Studies																								
Geotechnical Studies																								
Detailed System Design & Engineering																								
DFO Interconnection Studies																								
Complete Technical Documentation & Feasibility Study																								
Secure Project Financing																								
Establish Owner/Operating Structure																								
Final Project Investment Decision																								
Construction Phase																								
Equipment Procurement																								
Contractor Contract/Award																								
Project Construction																								
Interconnection to WSP																								
Final System Commissioning																								

AIEERP

- Program for implementing energy efficient recommendations from the audit reports
 - Also can be used to fund upgrades in new builds
- Improve housing, commercial buildings, or new-buildings
- Funds have no maximum and can be in excess of \$1 million
- **Project Example: Fishing Lake Métis Settlement**
 - Complete HVAC upgrade to Communiplex
 - Complete building envelope upgrades to Firehall/Administration Building
 - Lighting upgrades to all commercial buildings



Alberta Indigenous
Energy Efficiency (Retrofit) Program



AISP



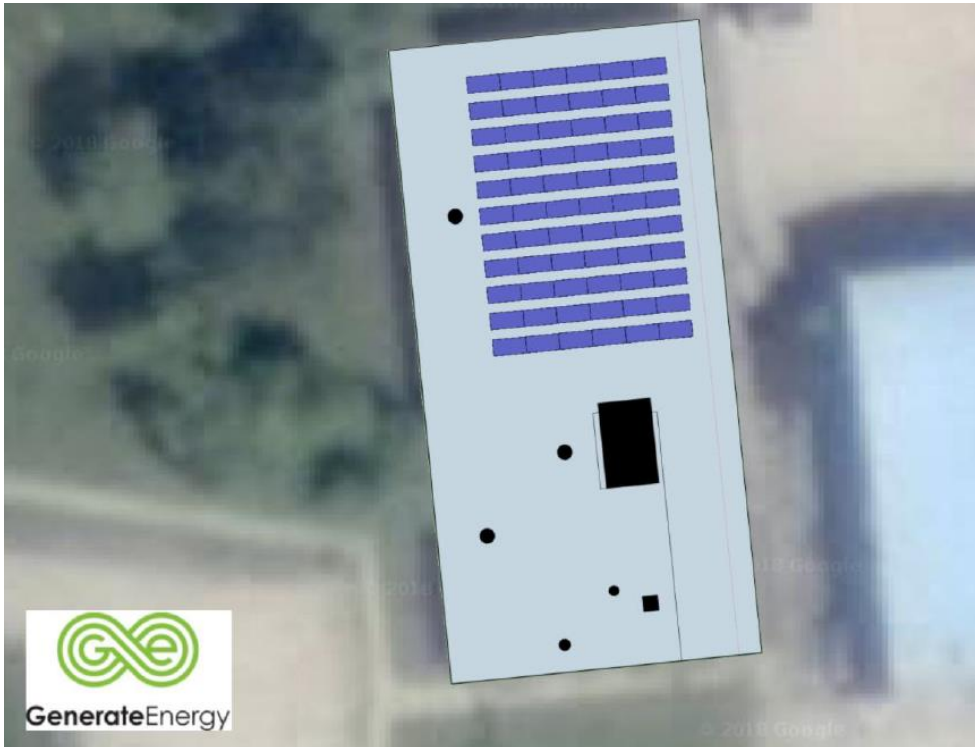
Alberta Indigenous Solar Program



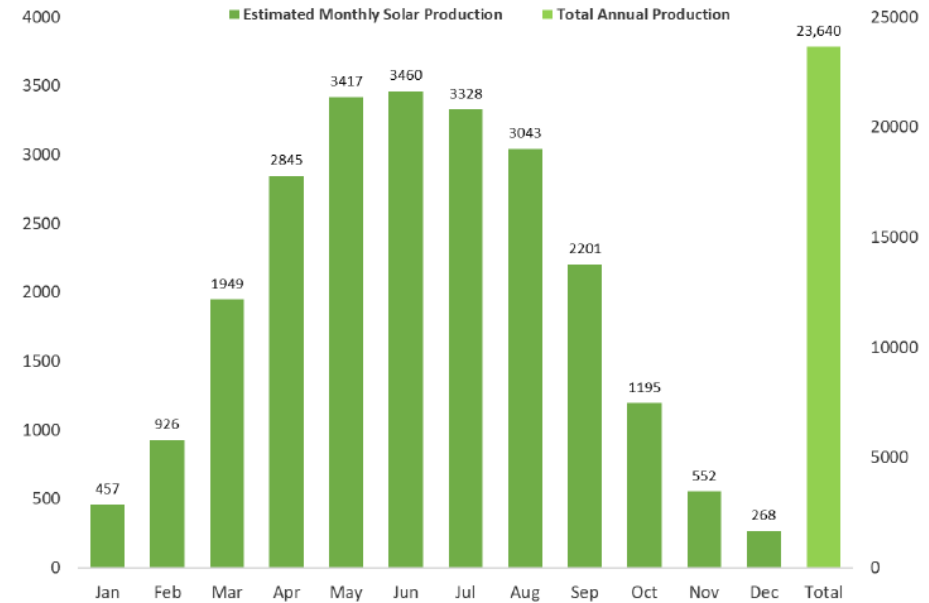
- Program for installing solar PV arrays
- 80% of total project costs up to \$200,000
 - Can often find the other 20% through ISC
- Can ensure Community members work on the project/receive training
- Highly subscribed program
- Can often offset large amount % of building's load

Building Proposed for Solar PV	Array Capacity (kW)	Eligible Annual Electricity Production (kWh)
Elders Lodge	40.1	43,400
Administration	41.0	36,184
Social Development	42.0	50,250
Health Centre	51.0	52,470
Tribal Land Entitlement	12.8	15,515
Adult Handicapped Home	7.0	6,558
Band Office	22.4	23,640
Community Center	28.6	27,200
Industry Relation Corporation	9.1	8,200
Total	254	263,417

AISP



Solar PV Production (kWh)



AIGEP



Alberta Indigenous
Green Employment Program



- Program that provides:
 - Training
 - Green employment opportunities
 - Labour market and workforce planning activities
- 75% of costs must be for direct training costs
- Allows Communities to supply training to members that prepare them for the industry
 - Solar PV installation
 - Pre-trades/Trades
 - Energy advisor training
 - Engineering/technologist training



A LEADING POLYTECHNIC
COMMITTED TO STUDENT SUCCESS



YELLOWHEAD
TRIBAL
COLLEGE

ISC Process

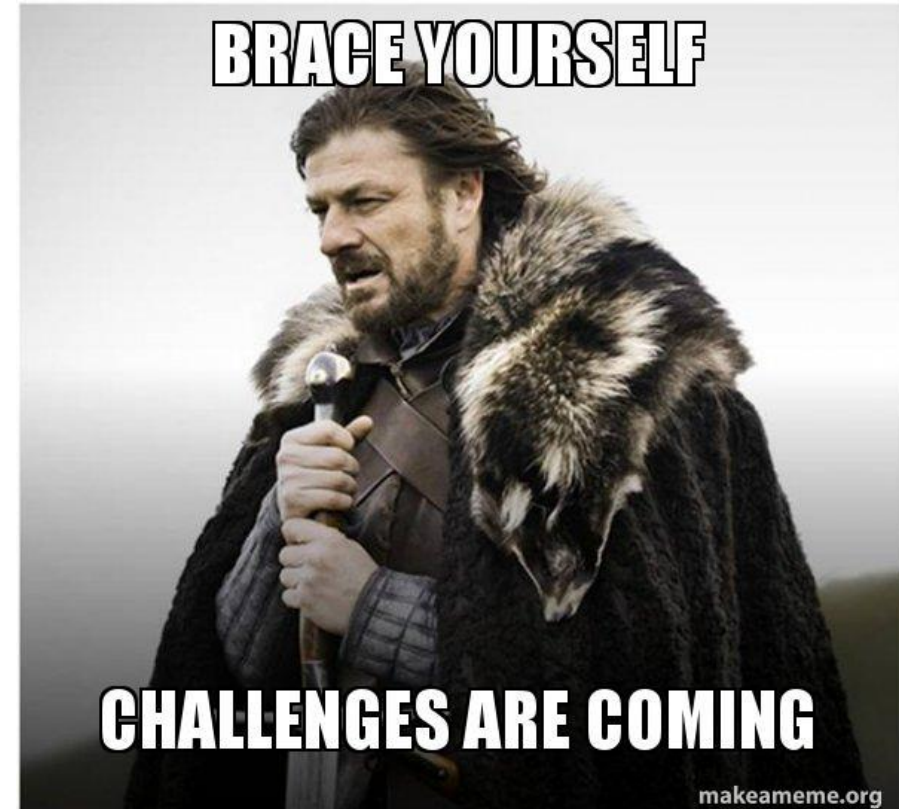
- Indigenous Services Canada develops infrastructure projects in the following order:
 - Stage 1: Identification
 - Stage 2: Planning
 - Stage 3: Design
 - Stage 4: Construction
 - Stage 5: Completion
- Infrastructure includes:
 - Water and wastewater facilities
 - Waste management systems
 - Schools
 - Energy systems
 - Houses
 - Culture and recreation centres
 - Roads, bridges, etc.



Indigenous Services Canada

Challenges

- No plan in place
- Lack of Community capacity
- Lack of Community engagement
- Funding allocation
- Land-use designations
- No financial partners in place
- Leadership buy-in/perceived risk
 - Band council resolutions
 - Political risk associated with false promises
- Lack of education and training
 - Lost momentum on training/little follow-through
- Changing government programs
 - New Ministers/Deputy Ministers
 - New program employees



Lessons Learned

- Community must have two things:
 - A champion
 - Need someone to bridge the gap (internal or trusted partner)
 - A plan
 - Critical for two reasons:
 - Getting a common goal and roles/responsibilities to achieve them
 - Access additional funding. Gives teeth to a request.
- Active and open dialogue between leadership and government
- Funding expert and funding partnerships are key
- Trusted partners in industry
 - Competitive pricing, align with other industry partners, analyze project feasibility, etc.
- Sustainability can be used as a vehicle to achieve larger goals
- Programs will come and go, but they will always exist



THANK YOU!

**Thoughts, Comment or
Questions?**