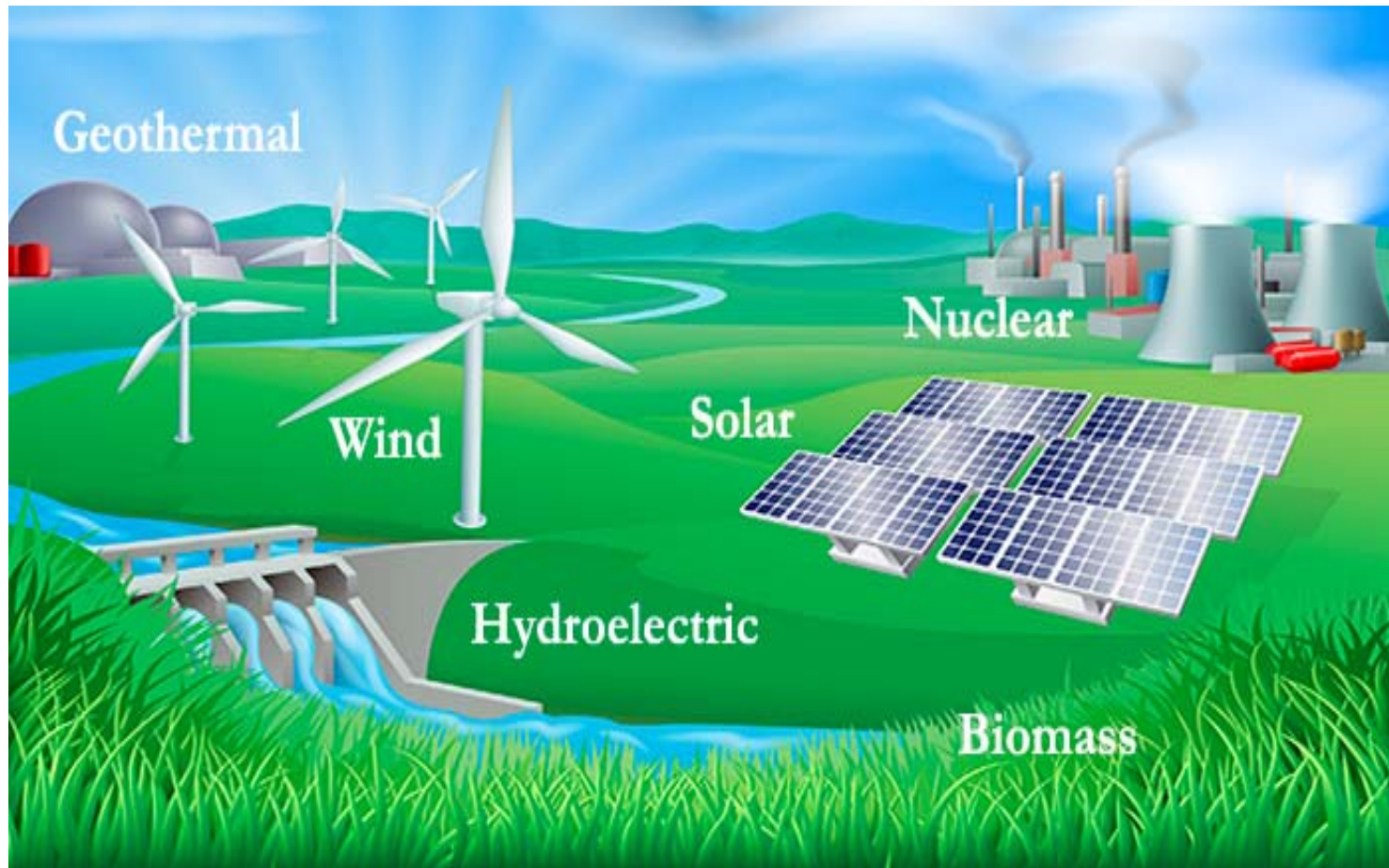
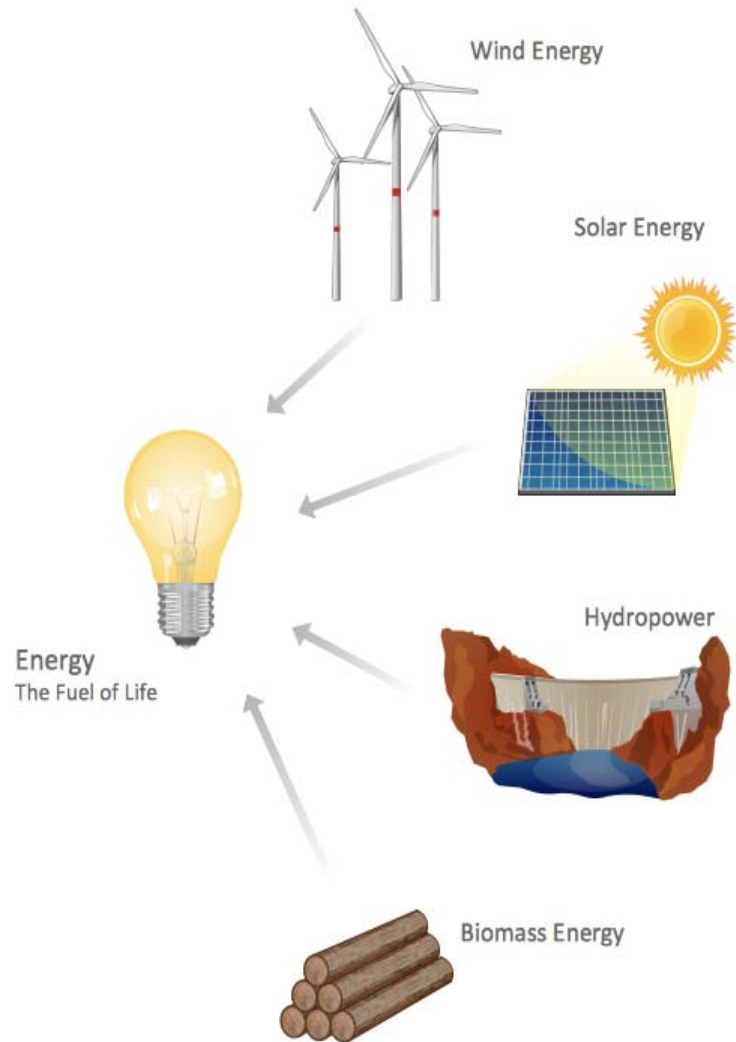


SEIZE THE RENEWABLE POWER

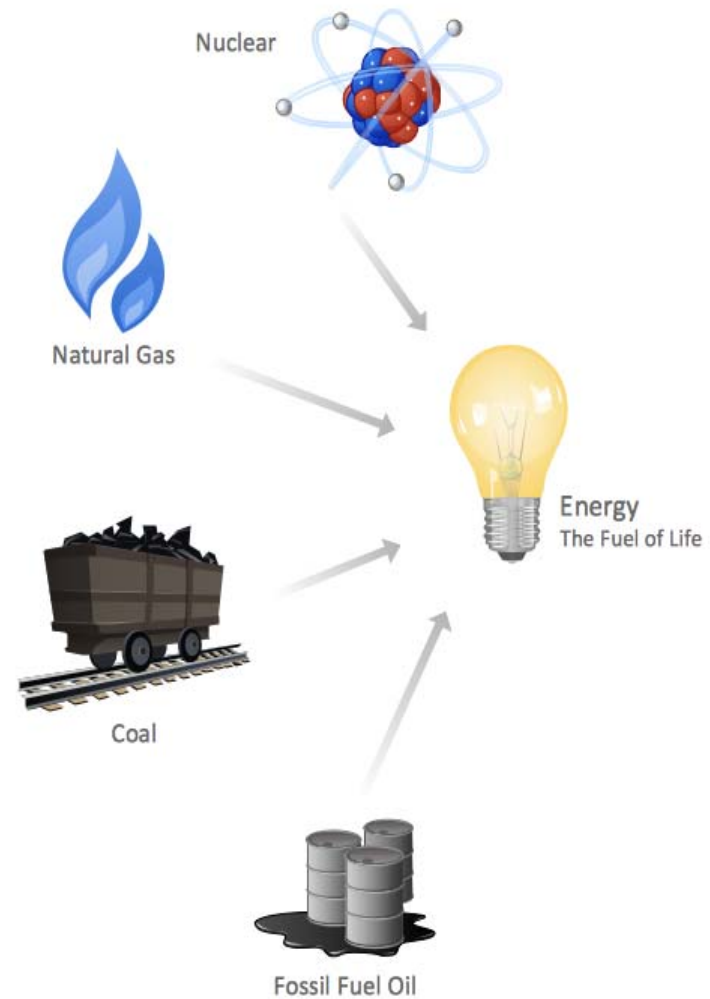


WE STILL HAVE A CHOICE!!

Renewable Energy



Non-Renewable Energy



First Nation and Northern Perspective: Why RE ??

- Improving energy efficiency
- Taking advantage of renewable energy forms a
 - Energy security
 - Energy Independence
 - Getting off diesel

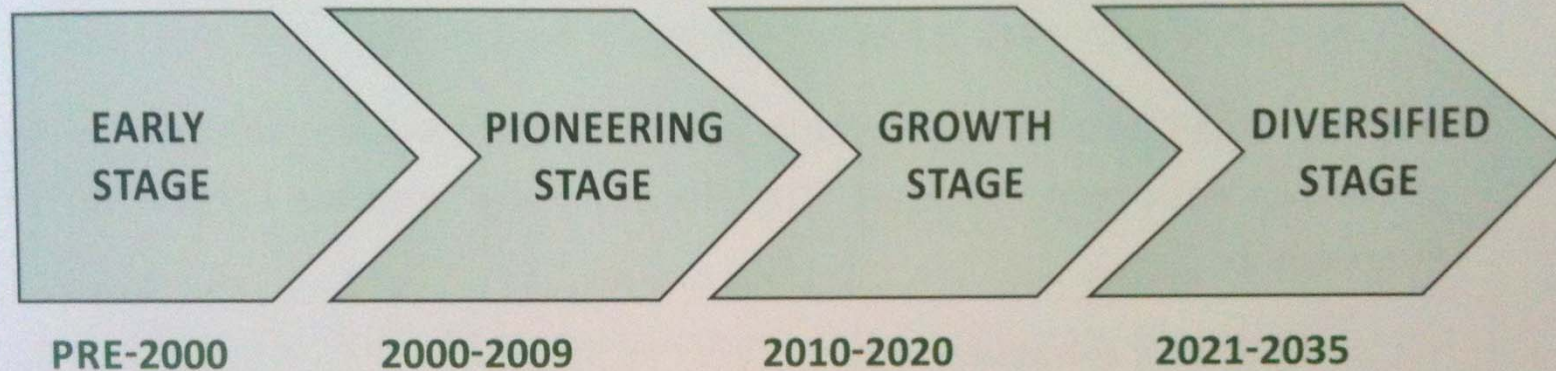
Northern Impacts

- Impact of climate change
- Increasing temperatures melt glaciers, decrease ice cover, affecting lifestyle
- N. communities rely on winter roads
- Ecosystems and wildlife are affected, impacts habitat & migratory patterns
- Fragile permafrost conditions susceptible to minor changes in climate patterns.
- In winter, energy costs are high because transporting fuel to sites and due to the long, cold winters and short hours of daylight.

Cultural Values

- Strong and direct role-spiritual and cultural values
- Strong dependence on natural resources
- Belief: One should not take more from the earth than one needs and that when one does take from the earth, an offering should be made in return.
- Planning with the best interests of future generations is also quite prevalent.

Four Stage Timeline – The Numbers & Impacts



Number of Projects			
3	13	60+	45
	Average investment \$16M	Estimated average investment \$110M	Estimated average investment \$750M

Estimated Capital Investment			
18M	208M	\$6.6B	\$33.8B

RANGE OF **BENEFITS** FOR FIRST NATIONS FROM CLEAN-ENERGY PROJECTS

One-Time Payments:	Arising from factors such as grievance settlements or performance payments
Annual Royalties:	Based on set sums, or a percentage of revenue or earnings
Community Supports:	One-time or ongoing payments for various community social, health, youth and seniors needs
Granted Equity:	Carried interests or equity “granted” to the First Nations community without any investment requirement
Purchased Equity:	Equity “bought” by the First Nations community with its own funds, government programs, or through loan-for-equity mechanisms
Equity Buy-In Rights:	An option to buy-in more project equity in the future, under specified conditions
Profit sharing:	Sharing of annual profits between partners
Land and Water Fees:	Payments for use of reserve or traditional lands for generation and/or transmission
Green Power Premiums:	Payments arising from the sale of green power or greenhouse gas offset credits
Development Rights:	First Nations rights to construction contracts or co-ownership of the project construction firm
Infrastructure Benefits:	Spin-off benefits from the project for other community infrastructure (eg: roads, bridges)
Economic Funds:	Capital allocations into an economic development fund for First Nations project related to the project and generally
Employment Targets:	Set job targets or processes to maximize First Nations employment
Operational Goals:	Employment, infrastructure and other benefits over the course of project operations
Capacity-Building:	Managerial and trade skills development and training throughout the project
Environmental Impact:	Clean and Green Earth!!!



SOLAR ENERGY

SOLAR ENERGY is generated when photovoltaic (PV) cells convert heat from the sun directly into electricity.

PROS

- Nonpolluting
- Most abundant energy source available
- Systems last 15–30 years

CONS

- High initial investment
- Dependent on sunny weather
- Supplemental energy may be needed in low sunlight areas
- Requires large physical space for PV cell panels





HYDROELECTRIC

HYDROELECTRIC POWER is generated when flowing water turns turbines to run generators that convert energy into electricity.

PROS

- No emissions
- Reliable
- Capable of generating large amounts of power
- Output can be regulated to meet demand

CONS

- Environmental impacts by changing the environment
- Hydroelectric dams are expensive to build
- Dams may be affected by drought
- Potential for floods





WIND POWER

WIND POWER is generated when wind turns turbines to run the generators that convert energy into electricity, which is then stored in batteries.

PROS

- No emissions
- Affordable
- Little disruption of ecosystems
- Relatively high output

CONS

- Output is proportional to wind speed
- Not feasible for all geographical locations
- High initial investment
- Extensive land use





BIOMASS

BIOMASS is produced from vegetable oils, animal fats, recycled restaurant greases, and other byproducts of plant, agricultural, and forestry processing or industrial and human waste products.

PROS

- Abundant supply
- Fewer emissions than fossil fuel sources
- Can be used in diesel engines
- Auto engines can easily be converted to run on biomass fuel

CONS

- Source must be near usage to cut transportation costs
- Emits some pollution
- Increases nitrogen oxides, an air pollutant emissions
- Uses some fossil fuels in conversion



FIRST NATIONS RENEWABLE ENERGY SYSTEM: SUCCESS STORIES

Technology	Community	Highlights
Small Hydro	Pic River First Nation	<ul style="list-style-type: none"> power sold to the provincial grid, hydro plants located off reserve lands income re-invested in community and to finance additional power projects active participation in approvals and management has built capacity for future endeavours
	Deer Lake First Nation	<ul style="list-style-type: none"> First Nation driven, perseverance in obtaining partnerships and backing power sold to provincial grid under contract future plans for expansion
Wind Power	Piikani Nation	<ul style="list-style-type: none"> operation under harsh Northern environment displaces use of diesel fuel
	Rankin Inlet	<ul style="list-style-type: none"> pre-heated ventilation air saves on heating fuel Solarwall provides short payback period for low capital outlay low maintenance
Solar Energy	Alaittuq High School, Rankin Inlet	<ul style="list-style-type: none"> Solarwall combined with heat recovery ventilation
	Recreation Centre, Fort Smith	<ul style="list-style-type: none"> Photovoltaic system performs reliably for over seven years
	Nunavut Arctic College, Iqaluit	

District Heating - Wood	Kluane First Nation	<ul style="list-style-type: none"> • central boiler heats four community buildings • local fuel source - wood chips from waste trees left by local forest fire • step towards self-sufficiency • retains money in community, provides local employment
	Grassy Narrows First Nation	<ul style="list-style-type: none"> • district heating system installed to reduce electrical load associated with new school and delay transmission line upgrade • geographically compact area of heat loads • cost-effective strategy for obtaining biomass • lowered environmental risk of fuel oil spills connected with transportation and storage • dramatic decrease in house fires
	Oujé-Bougoumou Cree Nation	<ul style="list-style-type: none"> • use of sawmill waste material consistent with sustainable practices • local employment, trucking and system operation • savings in heating costs for residents
Energy Efficiency - Housing	Mohawks of the Bay of Quinte	<ul style="list-style-type: none"> • begin at grassroots level, listen to the people, build community support • seek opportunity for improvement, develop high standards • training of work crews • use of R-2000 standards and other resources
	Kahnawake Mohawk Territory	<ul style="list-style-type: none"> • broad definition of sustainability, includes materials of construction • need to raise awareness, change perceptions • sweat equity, training and knowledge transfer • sharing the knowledge, First Nations as leaders in the areas of sustainable development and renewable energy
Waste Heat Recovery	Fort McPherson	<ul style="list-style-type: none"> • cooling jacket water from diesel generator heats five community buildings • commitment to environment • partnership of an Aboriginal company with territorial utility • customer sees guaranteed savings
	Fort Severn First Nation	<ul style="list-style-type: none"> • waste heat from generators provide freeze protection for water distribution system • First Nation sees 50 percent cost savings • reduces wear and tear on radiator and cooling fan • implementing community-wide energy efficiency program

Study

Assessment of environmental and socio-economic conditions for sustainable renewable energy initiatives in Remote First Nation communities

Student

Roopa Rakshit

Advisor

Dr. Chander Shahi

Committee Members

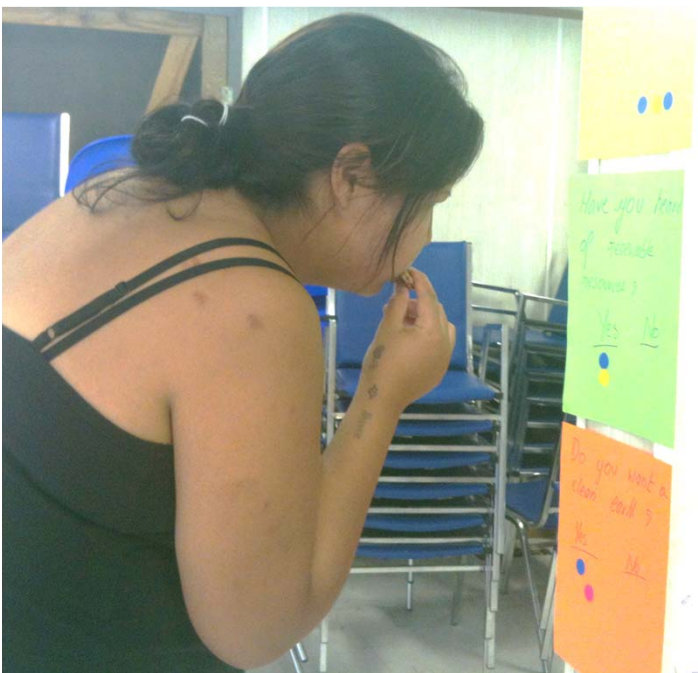
Dr. M.A. (Peggy) Smith

Dr. Adam Cornwell



- **Scope socio-economic, cultural drivers and indicators for sustainable alternate energy initiatives in select First Nation communities.**
- Explore and examine **community perspectives** for realistic, affordable and profitable renewable energy (RE) solutions.
- Demonstrate **role** of the **community** in the decision making process in energy mix development.
- Develop **energy framework/guidelines.**

- i. Map community profile.**
- ii. Determine baseline energy consumption and forecast.**
- iii. Scoping socio-economic and cultural drivers and barriers for RE development.**
- iv. Developing knowledge tools to enhance energy literacy and to build capacities to undertake RE initiatives**
- v. Develop an energy framework.**







HOW SOLAR WORKS

