

Presentation to Renewable Energy Symposium at Acadia University

Dan Roscoe
Chief Operating Officer
Scotian WindFields Inc
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Outline

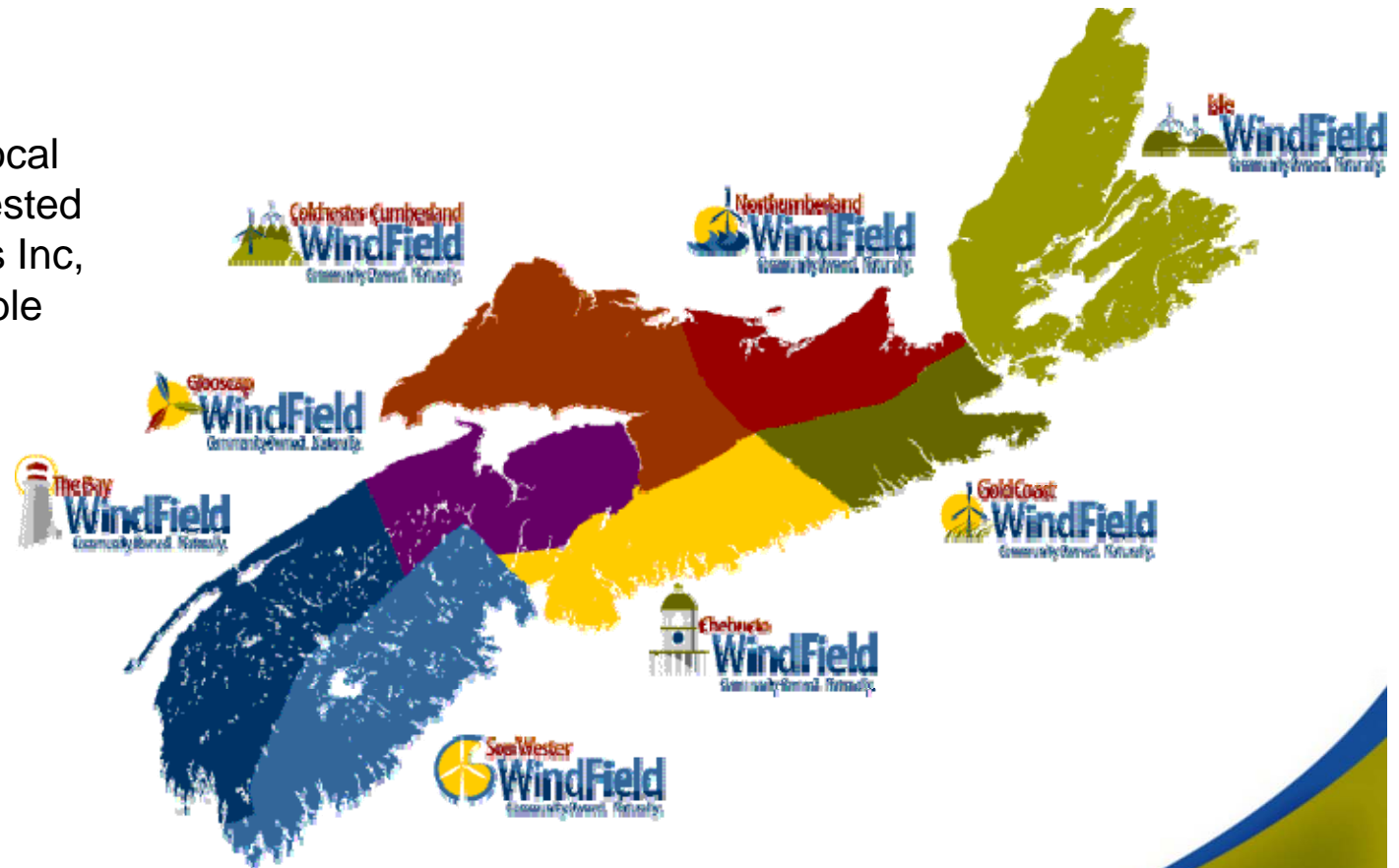
- About Scotian WindFields
- 3 Energy Issues
- Basics of Renewable Energy
- Onsite Applications of Wind and Solar Energy for Acadia

ABOUT SCOTIAN WINDFIELDS



The Scotian WindFields Family

Each of the active local WindFields have invested in Scotian WindFields Inc, to develop renewable energy projects



Benefits of Community Ownership

- Increased economic prosperity and employment
 - Five times greater than “out-of-area” ownership*
 - Stable and affordable source of energy to support local businesses
- Increased community input and consultation
- Community members are both customers and voters
- Greater acceptance of development

What we do...

- Community WindFields
 - Raise investment
 - Promote renewable energy
- Scotian WindFields Inc
 - Developer of renewable energy projects
 - Utility Scale Wind
 - Embedded wind generation
 - Small Wind
 - Solar Thermal



3 ENERGY ISSUES



3 Challenges

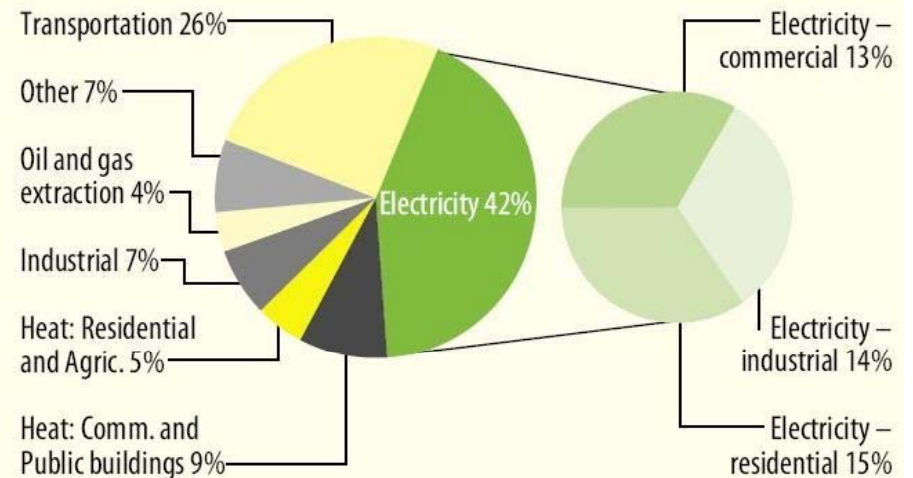
- 3 main challenges
 - **GHG** emission reduction commitments
 - 10% below 1990 levels by 2020 (EG&SP Act)
 - Increasing and volatile **cost** of energy (fossil fuels)
 - Scarcity of Supply
 - Instability from geopolitical and climate events
 - Energy **Security**

GHG Emissions By Sector

- Electricity
 - (75% Coal, 10% Hydro, 15% NG, 1% Wind)
 - 42% of GHG emissions
- Heating
 - Mostly Oil (Diesel)
 - 14% of GHG emissions
- Transportation
 - 26% of GHG emissions

Sources of Greenhouse Gas

Nova Scotia 2005

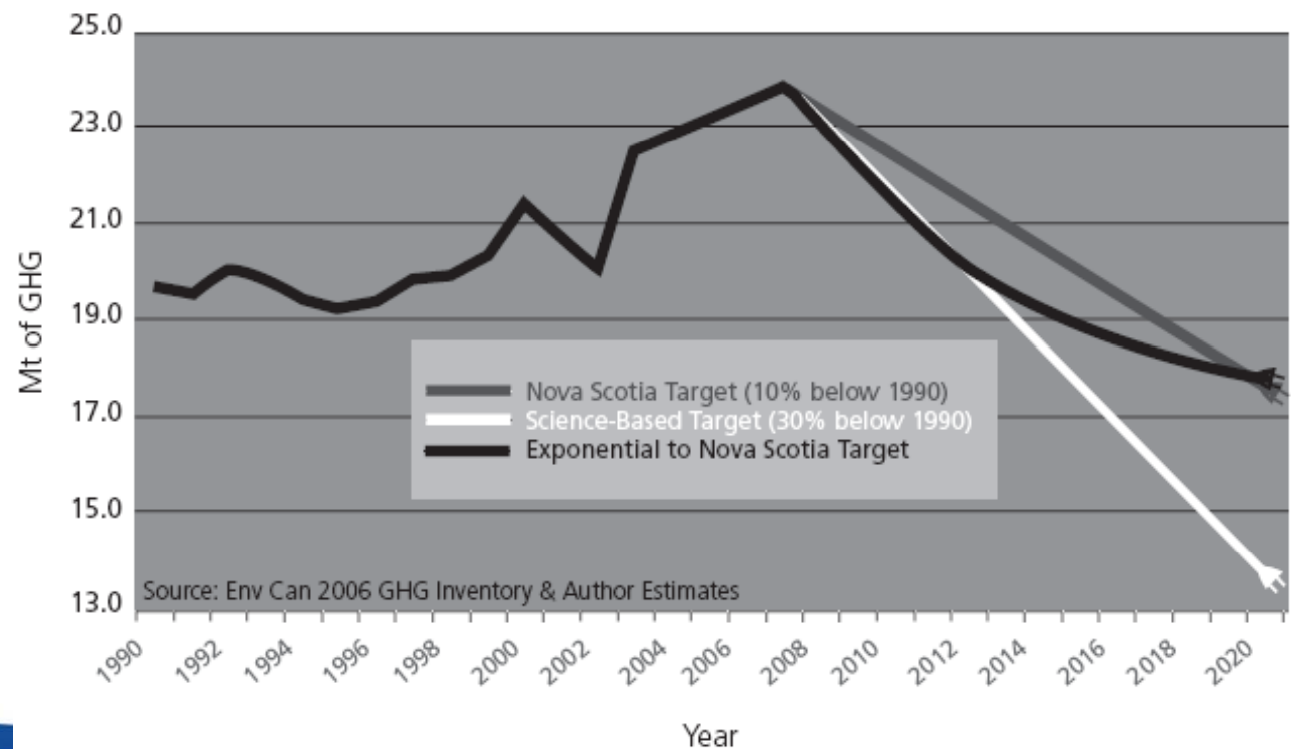


Source: Natural Resources Canada (2006)

GHG Emissions – big picture

- 2005 NS GHG Emissions = 22.7Mt
- 10% below 1990 Levels = 17.5 Mt
- 5.2 Mt in 12 years, or 430,000t/year!

Nova Scotia GHG Reduction Paths to 2020



Energy Costs

- Electricity – 40% increase in 7 years
- Heating Oil – 100% increase in 4 years
- What will energy prices be in 2020??
- What were energy prices 12 years ago??

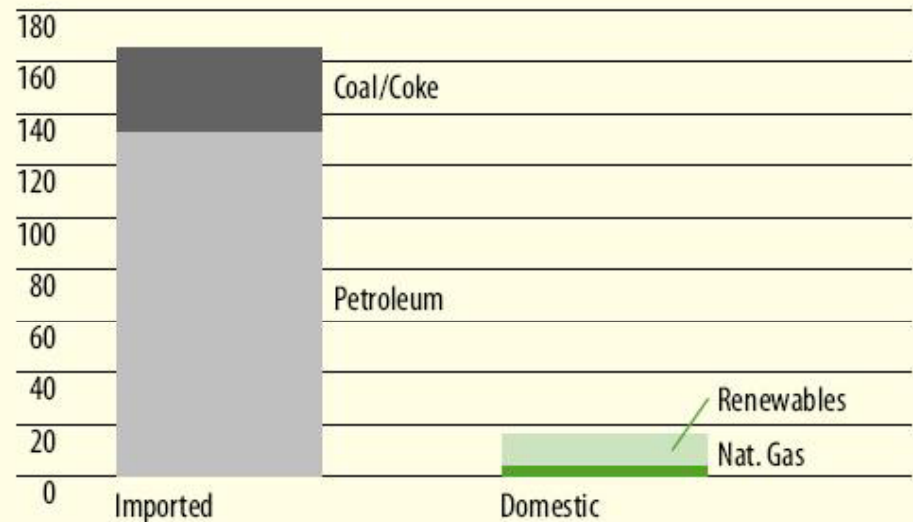
	1996	Mar-08	Total Increase	Yearly Increase	Nov-08	New Yearly
Oil (Barrel)	\$ 18	\$ 101	561%	15%	\$ 60	11%
Natural Gas(Mbtu)	\$ 2.50	\$ 9.20	368%	11%	\$ 6.30	8%
Unleaded Gas (L)	\$ 0.475	\$ 1.18	247%	8%	\$ 0.85	5%
Coal (t)	\$ 29	\$ 100	345%	11%	\$ 160	15%

Energy Sources

- Electricity
 - Coal – Columbia, Venezuela
 - Natural Gas – Local (until 2018)
 - Renewables - Local
- Heating Oil
 - Venezuela, North Sea
- Gasoline
 - Venezuela, Middle East, North Sea, NFLD

Nova Scotia Total Energy Use

Import and Domestic 2005 (petajoules)



3 Tools to solve the puzzle

- Efficiency – Use better
- Conservation – Use Less
- Clean and sustainable energy – Use Cleaner

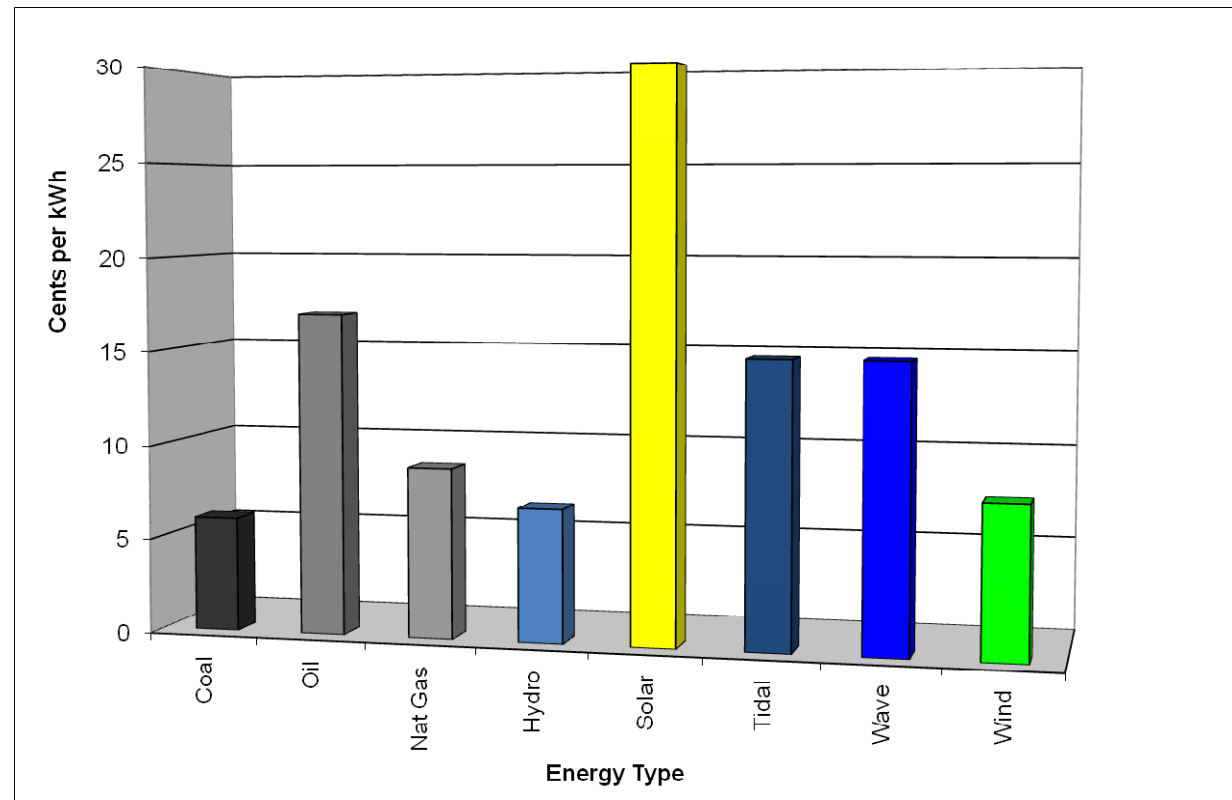
Status Quo will not suffice!

RENEWABLE ENERGY BASICS

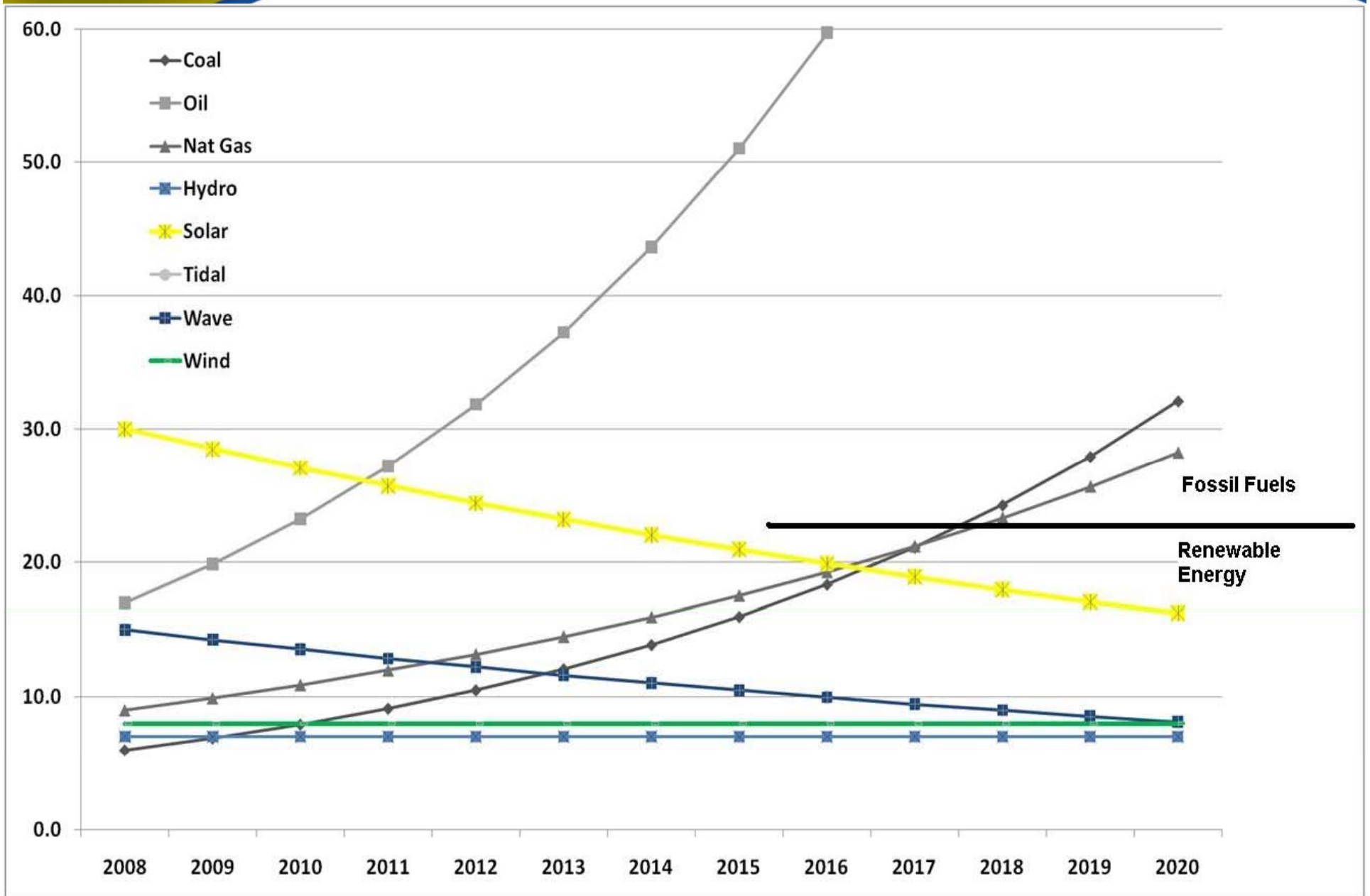


Renewable Energy Basics

- GHG Emission Free
- Local resources and benefits
- Stable and low cost



Future Forecast



ONSITE APPLICATIONS AT ACADIA



Wind Energy @ Acadia



- On-site wind turbine(s) to feed into building electrical system
 - For Lights, ventilation, heating etc
- Net-metered application (limit of 100kW per property)
- Average location for wind energy
 - 5.5-6m/s
 - Decent set backs from residential areas
- Acadia consists of two properties – 1 turbine per property

Wind Energy @ Acadia con't



- Equipment:
 - Northern Power – Northwind 100
 - 100kW rating
 - 38m tower
 - Direct-drive, variable speed
 - Very quiet and efficient

Wind Energy @ Acadia con't



- Financial Model
 - Cost per turbine: \$425,000
 - Estimated Energy Production 225,000kWh/year
 - Design life: 20years
 - Average cost per kWh – 0.11cents/kWh
 - Annual GHG reductions – 191tonnes/year

Solar Energy @ Acadia

- Basics of Solar Thermal Energy
 - Panels heat water using the sun's energy
 - Most often used to pre-heat water prior to entering existing systems
 - System cost incentives up to **40%**
 - Panels designed and manufactured in Nova Scotia



Solar Energy @ Acadia

- Acadia's Hot Water Usage
 - Central Steam plant near Stadium
 - 4 Boilers burning Bunker C to heat water to steam
 - Annual water losses of 1.9 Million Gallons /year
 - Losses account for 775MWh/year, or \$86,000/year



Solar Energy @ Acadia

- Application
 - Use solar thermal panels to preheat make-up water
 - System could be anywhere from 10-300 panels
 - System costs would be approx. \$2000/panel
 - 25 Year Design Life
 - Average cost of 5cents/kWh, or \$14/GJ



Solar Energy @ Acadia

- Application – Examples

Panels	Gross Cost	Net Cost	Annual Fuel Oil Offset (\$2008)	Annual GHG reduction (tCO2e)
10	\$ 20,000.00	\$ 13,000.00	\$ 1,524.71	14.17
50	\$ 100,000.00	\$ 65,000.00	\$ 7,623.53	70.83
100	\$ 200,000.00	\$ 130,000.00	\$ 15,247.06	141.67

- Biggest challenge is where to put them

In Conclusion...

- On-site renewable energy can play an important role in reducing the operating costs of Acadia University
- Renewable energy can also increase public awareness of Acadia University and renewable energy in general
- Scotian WindFields is interested in working with the design and developing team to optimize the role of renewable energy and coordinate with other local opportunities.



Any
Questions?