

# Nova Scotia Energy Sources in 2020

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Atlantic Climate Change Conference 2008





## Issues

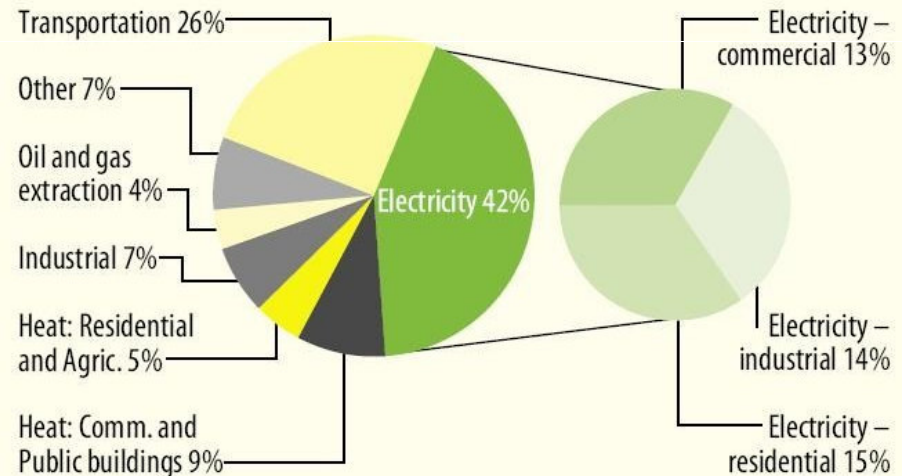
- 3 main issues
  - **GHG** emission reduction commitments
    - 10% below 1990 levels by 2020 (EG&SP Act)
  - Increasing and volatile **cost** of energy (fossil fuels)
    - Scarcity of Supply
    - Instability from geopolitical and climate events
  - Energy **Security**

## 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*

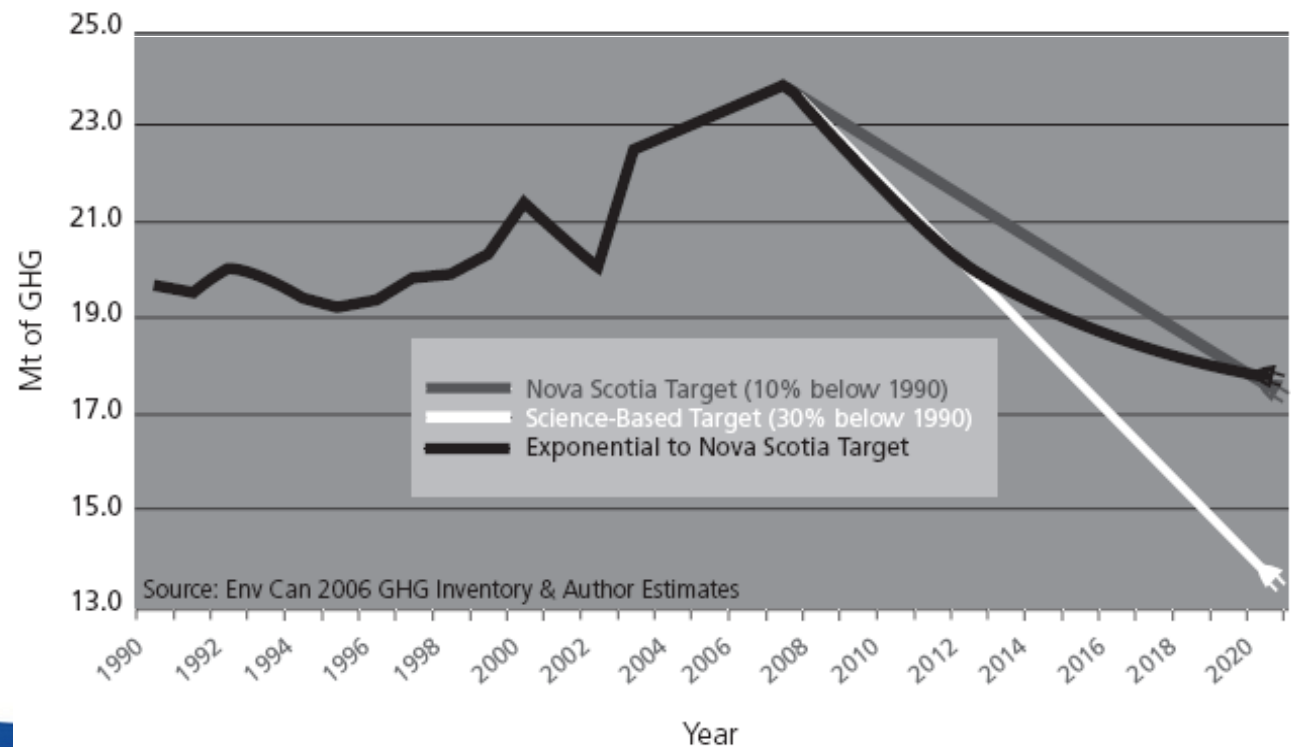


Source: Natural Resources Canada (2006)

## 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 – 30% increase in 6 years
- Heating Oil – 100% increase in 4 years
- What will energy prices be in 2020??
- What were energy prices 12 years ago??

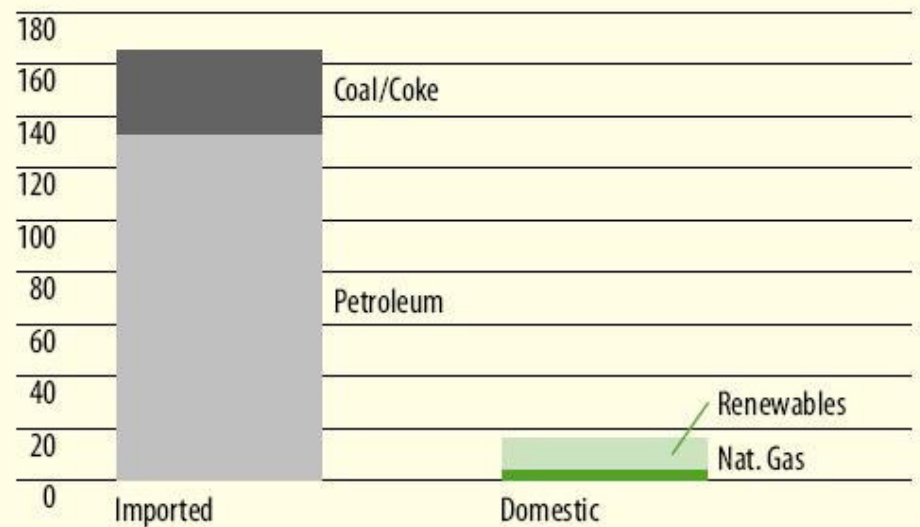
	1996	2008	Total Increase	Yearly Increase
Oil (Barrel)	\$ 18	\$ 101	561%	15%
Natural Gas(Mbtu)	\$ 2.50	\$ 9.20	368%	11%
Unleaded Gas (L)	\$ 0.475	\$ 1.18	247%	8%
Coal (t)	\$ 29	\$ 100	345%	11%

# 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

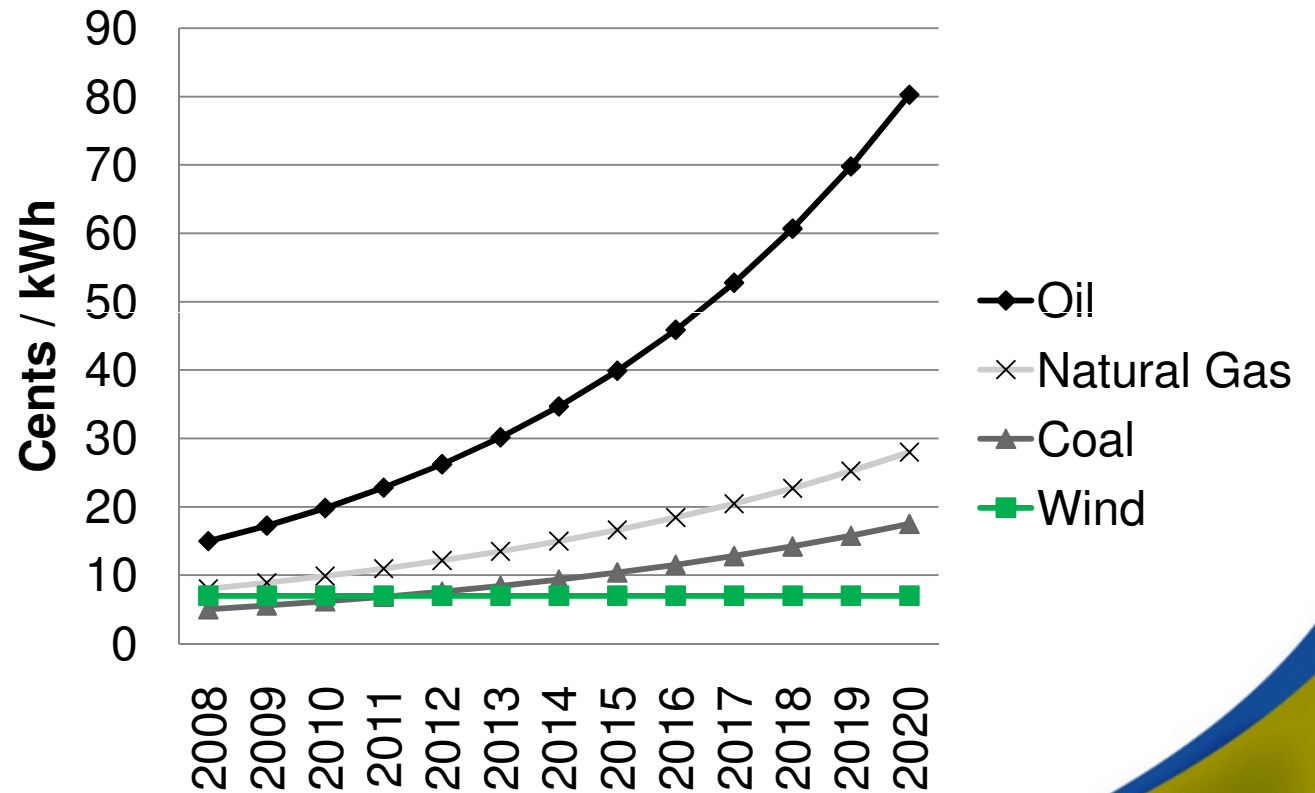
Status Quo will not suffice!



# Renewable Energy Basics

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

## Energy Price Forecast



## Scotian WindFields' solution

- Community owned renewable energy
  - Fantastic Resources
- Renewable Applications (Electricity/Heat)
  - Embedded Generation (inside the fence)
  - Small Scale
  - Large Scale
- Transportation?
  - Hybrids ~ Plug in Hybrids ~ REEVs
  - Electric mass transportation



## Embedded Generation - Process

- Installation of renewable energy onsite
- Power sold directly to user
- Wind and solar thermal work best
- Test and model system to suit needs
- Result:
  - Lower and stable energy costs
  - Reduced emissions
  - “Green marketing”

## Embedded Generation – Application

- Industrial
  - Factories, Mills, Shops
- Public Infrastructure
  - Schools, water treatment, waste management,



## Embedded Generation – Application

- Commercial
  - Shopping malls, Business parks, Big Box Stores
- Residential
  - Multi-unit facilities, Suburb developments



## Embedded Generation - Requirements

- Increase net metering limits
  - Current limit is 100kW
  - No technical merit for limit under 2MW
  - A Simple Approval process could be implemented
- Establishment of “spill rates”
  - Currently, any surplus energy is provided to the grid free of charge
  - Example rates:
    - 10cents/kWh for residential
    - 7cents/kWh for commercial and industrial

## Small Scale - Process

- Home or Business owner purchases unit for their own use
  - Wind
    - Connected to electrical panel
  - Thermal (Solar, Geothermal)
    - For hot water
    - For heating
- Results
  - Lower energy costs, lower emissions

# Small Scale - Application



 **Scotian  
WindFields**  
Community Owned. Naturally.

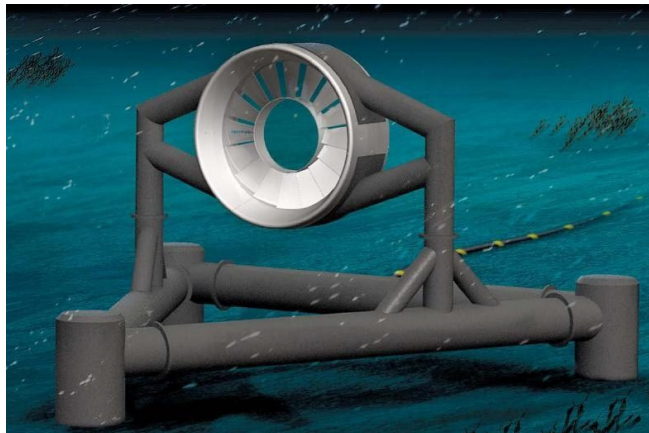


## Large Scale - Process

- Large renewable power installation connected to the grid
  - Sold to utility/Independent System Operator (ISO)
  - Sold directly to consumers
  - Exported
- Sold at
  - Low cost tendering price
  - Standard/guaranteed price (SOC, ART)
  - Market Rate

## Large Scale - Application

- Wind
- Wave
- Tidal
- Distributed Sources and Locations of production essential!



## Large Scale - Requirements

- Access to Buyers
  - Increased financial viability if producers can sell directly to customers
- Access to Sellers
  - Customer choice of power supply would increase competition and favour clean and stable priced energies
- More dynamic transmission and distribution grid

## In 2020?? (GHG Reductions in Brackets)

- Embedded Generation
  - Commercial and industrial areas powered by Renewable Energy (3.5Mt)
- Small
  - 50% homes have solar thermal (1Mt)
  - 100% of farms produce twice their needs (.3Mt)
- Large scale
  - All grid sources at least 30% renewable (2Mt)
  - 50,000 customers with access to 100% renewable (.5Mt)

## Recommendations

- Cap and Trade Emission systems
  - Formulate Cap to reach our EG&SP Act Goals
  - Encourage clean energy development
  - Incorporate other jurisdictions (NE Prov. and states, or Ont PQ Man and BC), to allow import of investment in exchange for reductions
- Increased Net Metering limits from 100kW to 2MW
- Development of “spill” rates for residential and commercial/industrial applications

## Recommendations

- Access to buyers and sellers
  - Operation of electrical grid independent of generation sources
  - Consumer choice for 100% renewable sources
  - Development of Distribution Tariff

## Summary

- Addiction to Fossil Fuels is hurting our economy and our environment
- Our renewable resources can play a large role in reducing our GHG emissions, our dependence on imported fuels and revitalizing our economy with sustainable prosperity



Any  
Questions?