

**100% Renewable Energy –
a viable and cost effective solution for Atlantic Canada**

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September 10th, 2008



About Scotian WindFields

- Community Owned Group of Nova Scotian Companies
- 8 Local Groups raising investment and awareness for/of renewable energy
 - Each formed under the Community Economic Development Investment Fund (CEDIF) initiative
- Investment pooled to run community developer and operator Scotian WindFields Inc
- Involved in all sizes of wind and solar thermal projects



Outline

- Definition of “viable solution” with respect to energy
- Cost analysis of Fossil Fuels versus Renewable Energy
- Available Renewable Energy resources in Atlantic Canada
- Technical Feasibility
- Conclusions

WHAT IS A “VIABLE SOLUTION”



Definition of “Viable Solution”

- To be viable, energy must:
 - Be **cost** effective
 - Have the **available resources**
 - Be **technically feasible**
- Needing a solution implies having a problem, what is the problem???
 - Increasing costs
 - Price and supply volatility
 - GHG Emissions

COST ANALYSIS – FOSSIL FUELS VS. RENEWABLE ENERGY

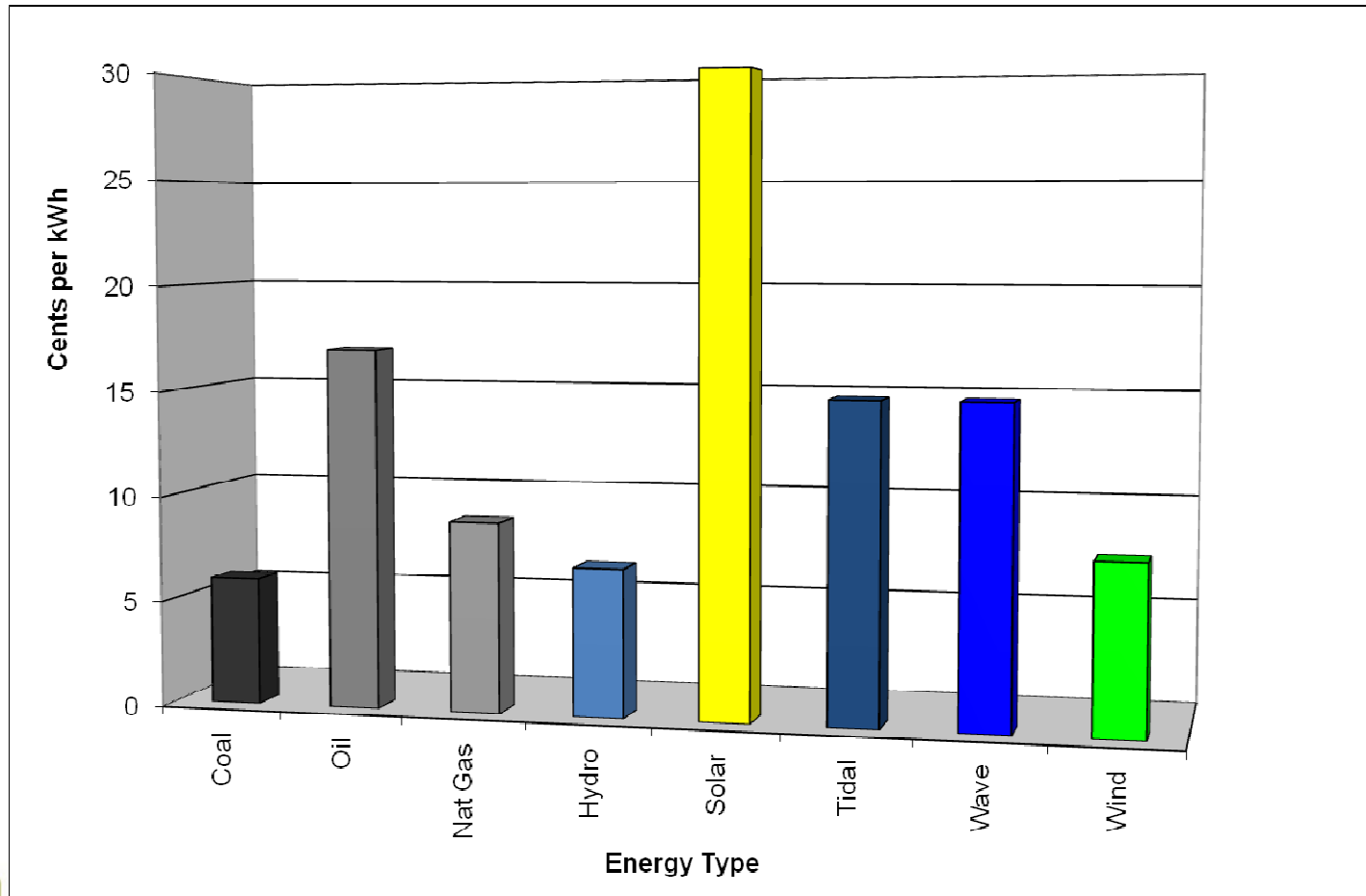


Fossil Fuel prices since 1996

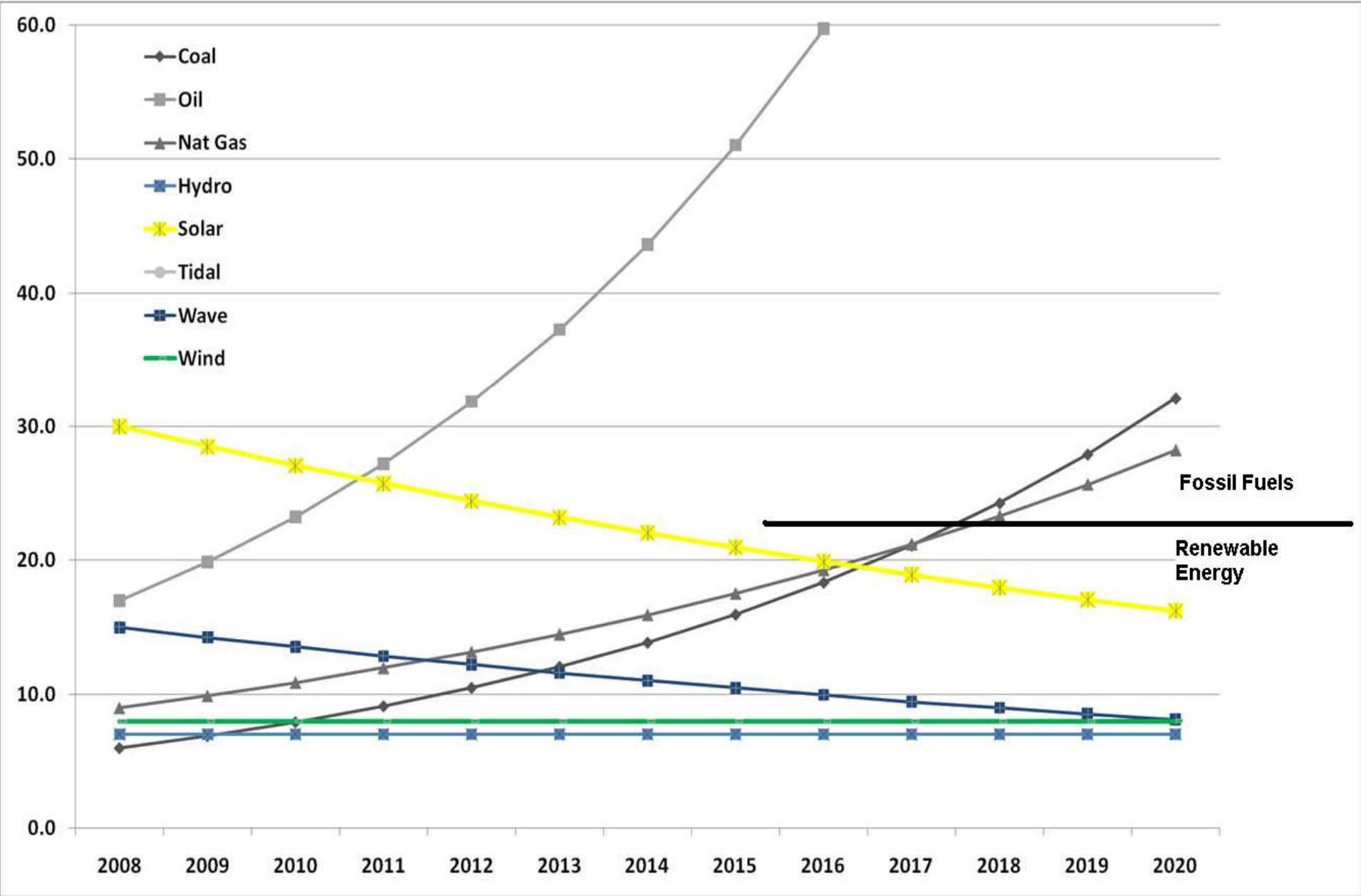
	1996	2008	Total Increase	Annual Increase
Oil (Barrel)	\$ 18	\$ 121	672%	17%
Natural Gas(Mbtu)	\$ 2.50	\$ 8.20	328%	10%
Unleaded Gas (L)	\$ 0.475	\$ 1.31	276%	9%
Coal (t)	\$ 29	\$ 155	534%	15%

*2008 Prices as of August 20th, 2008

Current kWh Comparison



Future Forecast



Carbon Liability

- A price on carbon emissions is inevitable
 - Exactly how is still being debated
- Coal, Natural Gas and Oil all have associated GHG emissions
 - Coal 1.05 cents/kWh per \$10/tCO₂
 - Natural Gas 0.55 cents/kWh per \$10/tCO₂
 - Oil 0.87 cents/kWh per \$10/tCO₂
- These factors were not included in the previous calculations

AVAILABLE RENEWABLE ENERGY RESOURCES



Wind Energy Potential

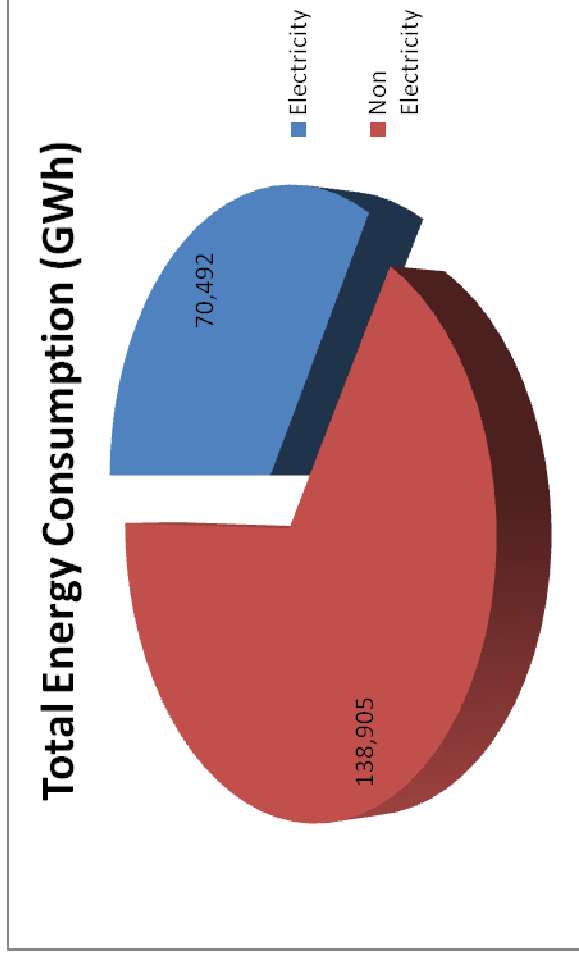
- New Brunswick: 4,500MW or 11,800 GWh
- Nova Scotia 7,500MW or 19,700 GWh
- PEI 1,000MW or 2,600 GWh
- NFLD and Lab 10,000MW or 26,300 GWh
- TOTAL 23,000MW or 60,400GWh
- Total current usage is 70,500GWh

Other Renewable Energy Sources

- Hydro – Lower Churchill 2824MW or 16,700 GWh
- Tidal – Bay of Fundy 500MW or 2,000GWh
- Wave Energy 1000MW or 4,000GWh
- Solar Thermal 1 Panel per Household 1,5000GWh
- Geothermal ???
- Biomass ???

Non-Electrical Energy

- Other Energy types, like heating fuels and transportation fuels, have little renewable energy alternatives
- Clean Electricity can help bring these energy sources on to the electrical grid



TECHNICAL FEASIBILITY



The Main Issue

- “What happens when the wind stops blowing??”
- Wind, Solar, Tidal and Wave energy all vary according to atmospheric conditions, with varying levels of predictability
- Hydro and Biomass are completely dispatchable
- Many existing technologies and techniques can resolve this issue

Technical Solutions

- Distributed Locations and Technologies
- Smart Grid technologies and pricing schemes
- Advanced Forecasting Techniques (Satellite analysis)
- Increase Transmission interconnection
- Energy Storage
 - Pumped Hydro
 - Compressed Air
 - Flow Batteries
 - Kinetic Storage (Flywheel etc)

CONCLUSION



Conclusion

- Wind is certainly a viable solution
 - Cost competitive and stable
 - Sufficiently Abundant
 - Technically feasible
- 100% Renewable Energy is not just viable, it will be inevitable

Thank you very much



Scotian
WindFields
Community Owned. Naturally.