

# The Future of Coal in Ontario

Queen's Institute for Energy and Environmental Policy

2007 May 10

## **Cleaning Up Coal's Act**

Tom Adams, Energy Probe

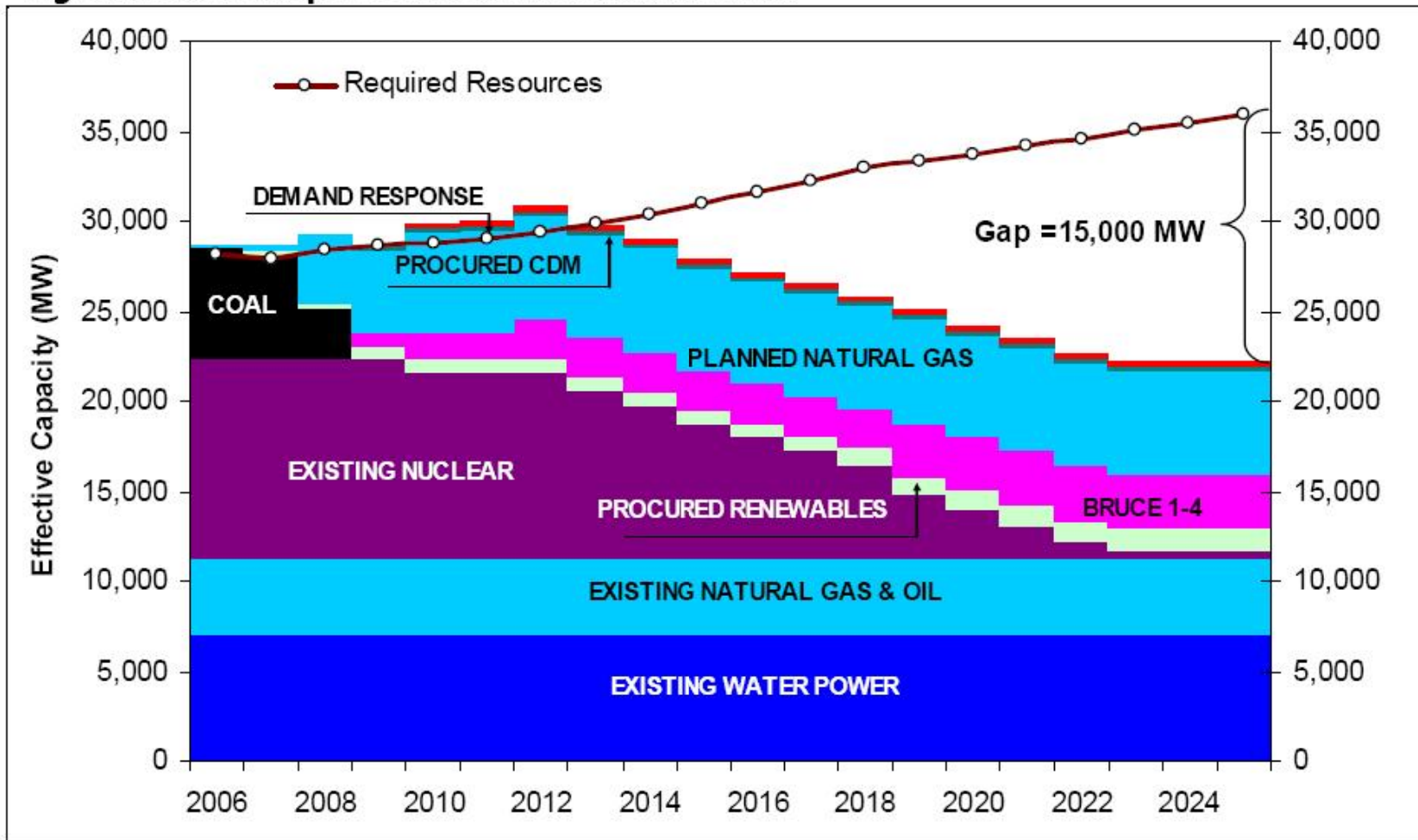
# Outline

- Need for new generation
- History of Ontario's coal exit policy
- Review of generation alternatives – wind, nuclear, gas and coal
- Cleaner coal options

# Generation Requirement: Official View

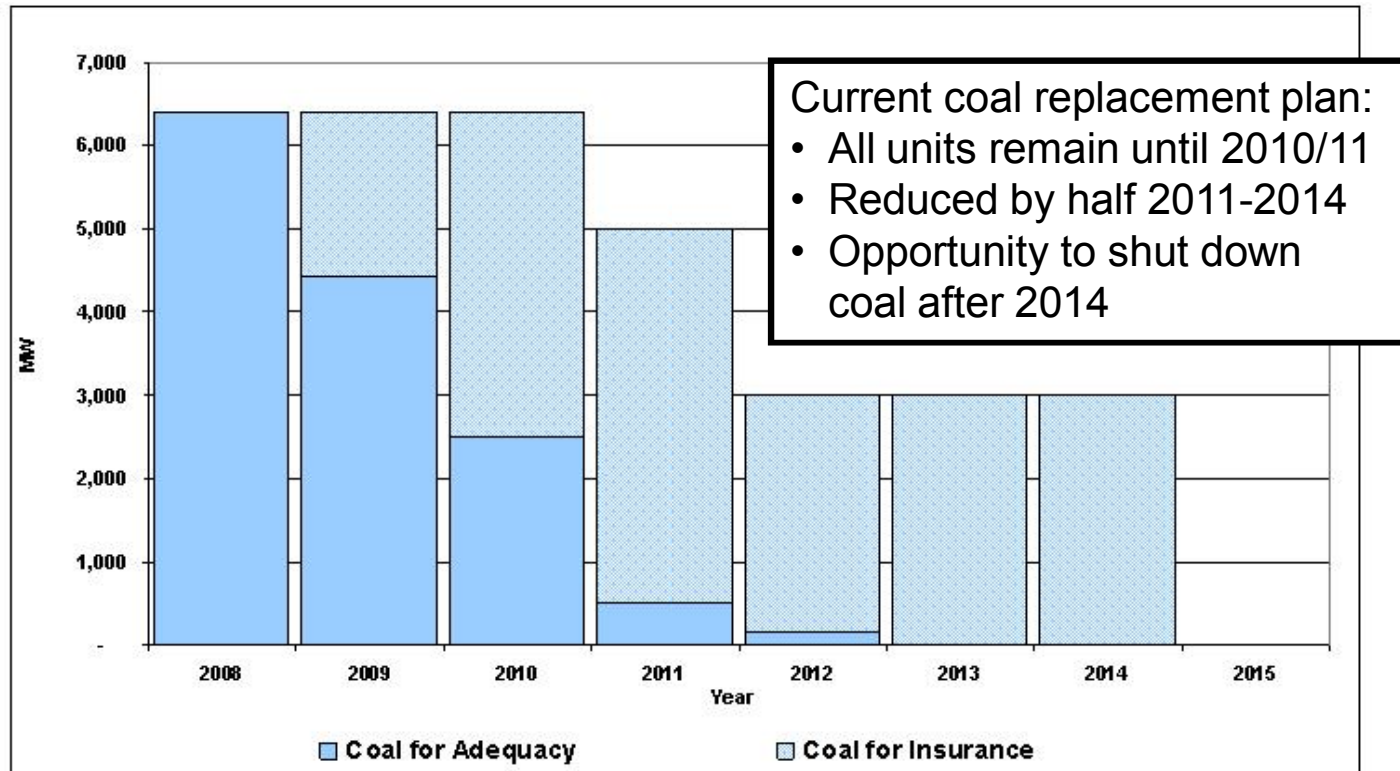
# Significant additional generation

Figure 1.2.12: Gap In 2025 After Procurements



Source: OPA

# Coal is replaced by natural gas and renewables

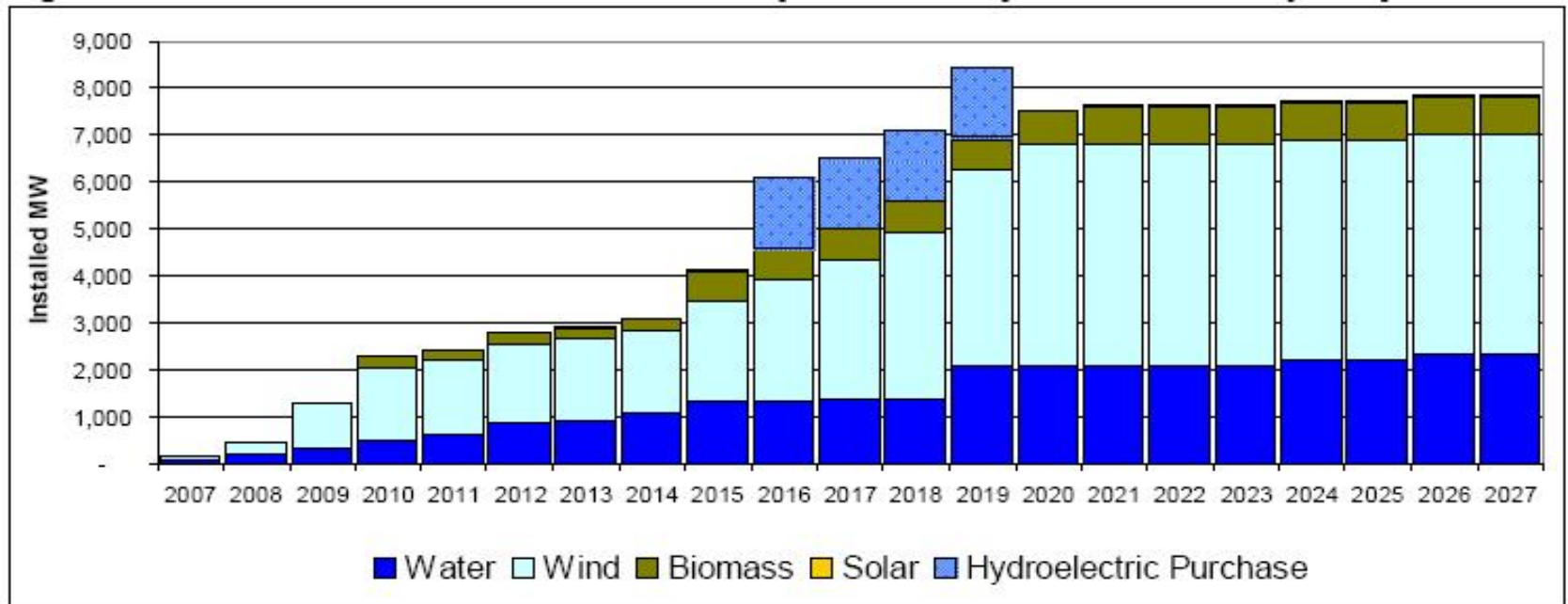


# History of Ontario's Coal Exit Policy

- During the market opening period 1998-2002, Conservative government promised phase-out by 2015,
- 2001 regulation passed requiring Lakeview to stop using coal in 2005
- NDP committed to “off coal by 2007” – Liberal copies policy in run-up to 2003 election
- Energy Minister Dwight Duncan announced on June 14, 2005 that this was no longer possible, and that the that Nanticoke Coal Plant will not close until 2009 – further date changes followed

# Ontario's Generation Options

# Official View: New Renewables

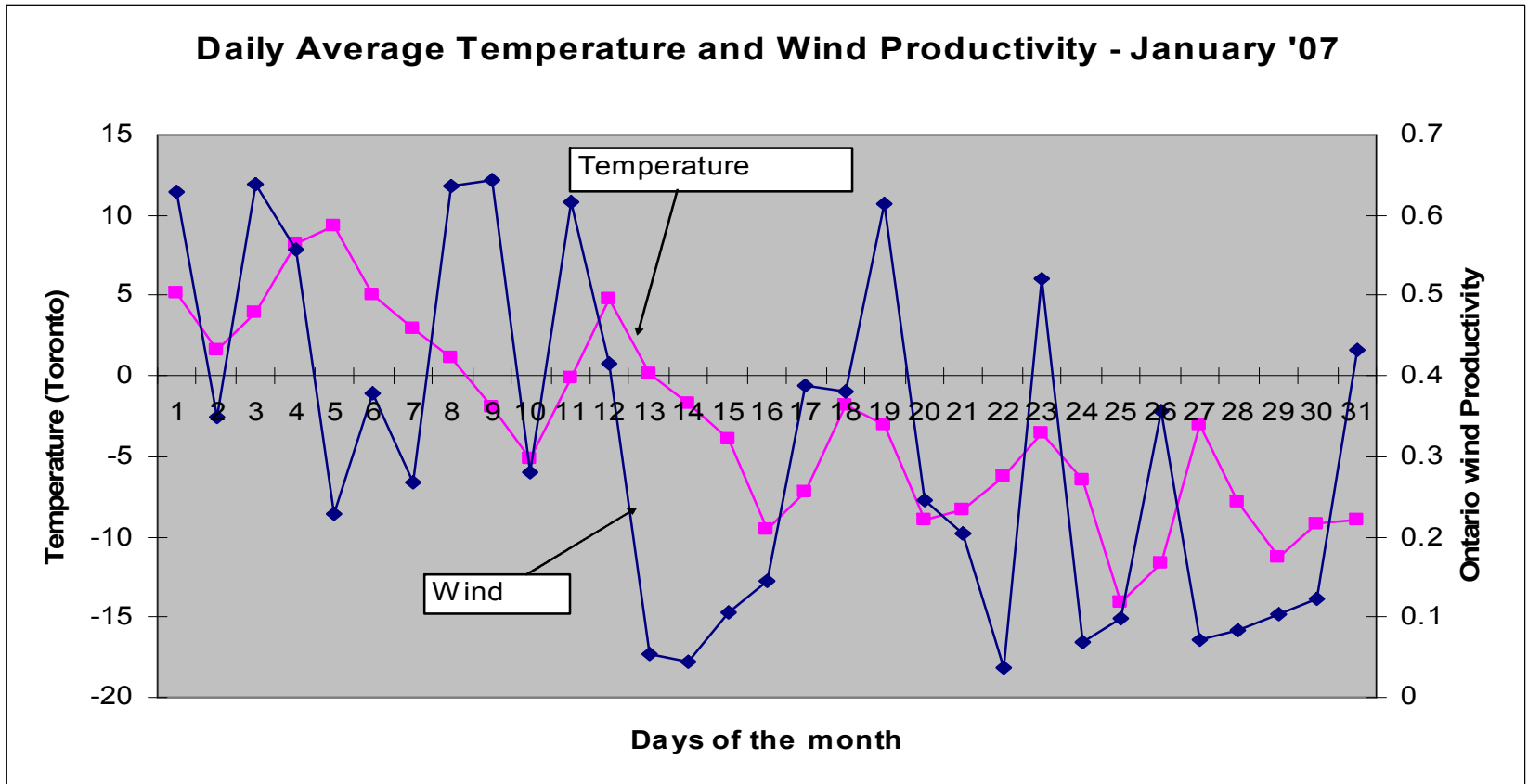




# Wind Challenge: Cost

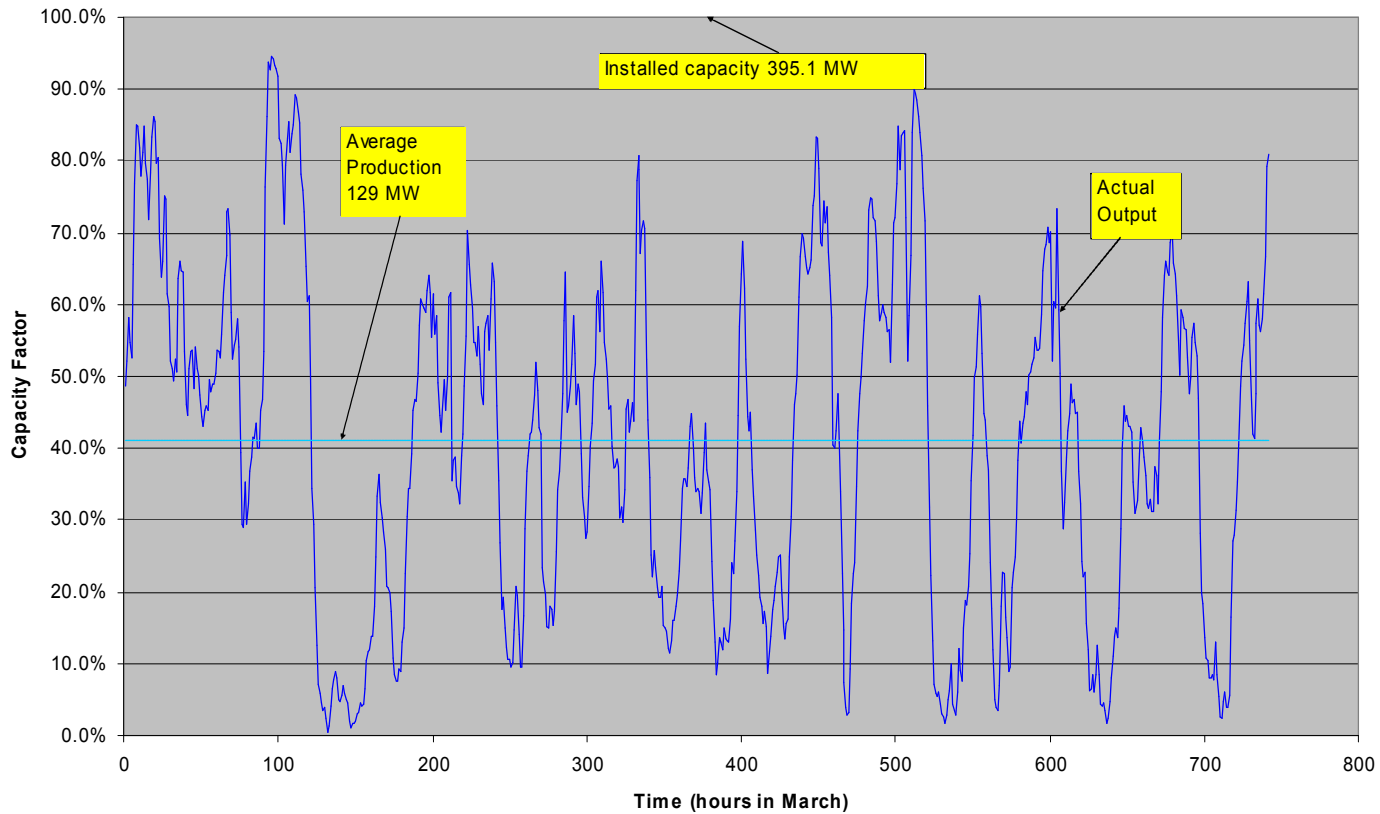
- 2004: 8 cents/kWh (auction, 20 yr contract)
- 2005: 8.6 cents/kWh (auction, 20 year contract)
- 2006-2007: 11 cents/kWh (non-competitive process designed in consultation with wind industry interest groups)

# Wind Integration Challenge: Supply/Demand Coincidence

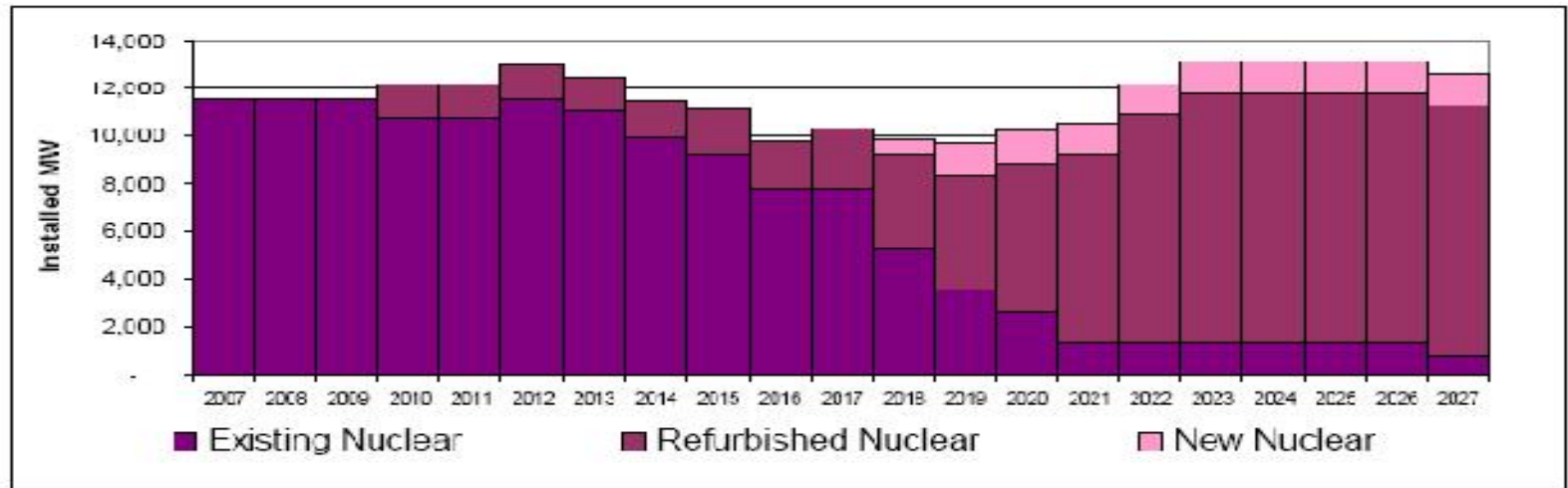


# Wind Integration Challenge: Variability

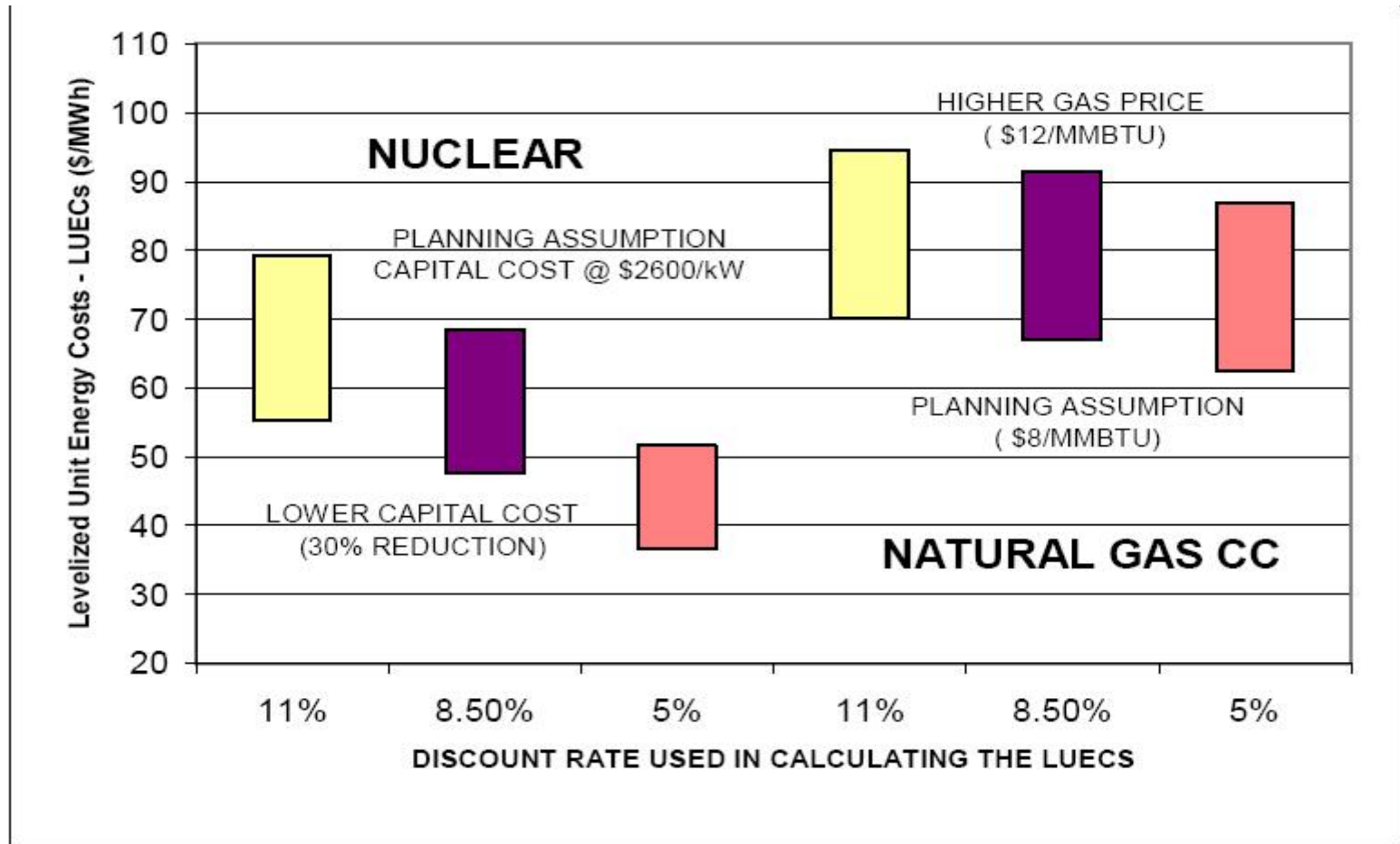
March 07 Ontario Large Wind Farm Hourly Output



# Official View: Restore and Maintain Nuclear



# Official View: Nuclear is Cheap



Source: OPA and CERJ; Note: Based on 85% Average Capacity Factor

# Olkiluoto-3 Cost Experience

- During political debate (1992) official price estimate €2.5B
- Contracted price (2004): €3.2B fixed
- Overruns so far: €507M (declared by Areva '06)
- Canadian equivalent so far: \$3,563 kW (\$1=€0.65)
- Delays as of December 2006 since construction began in August 2005 (18 months): 18 months

# Olkiluoto-3 Cost Drivers

- Delays in finalizing designs, skilled labour shortage, subcontractors inexperienced with nuclear requirements, exotic materials unavailable or slowly available
- Summary in English of the Finnish nuclear safety authority report on the problems at Olkiluoto-3.

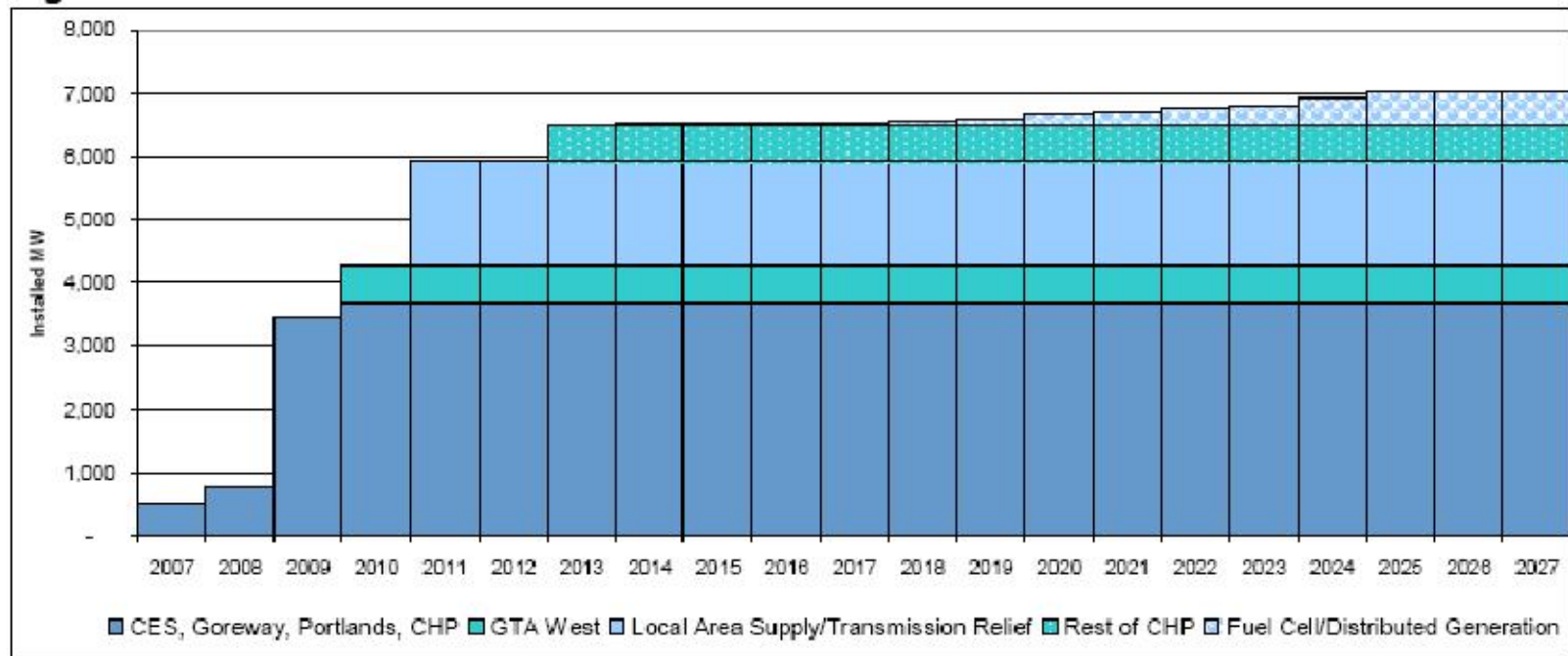
[http://www.stuk.fi/stuk/tiedotteet/2006/en\\_GB/news\\_419/](http://www.stuk.fi/stuk/tiedotteet/2006/en_GB/news_419/)

# Direct and Indirect Government Subsidies

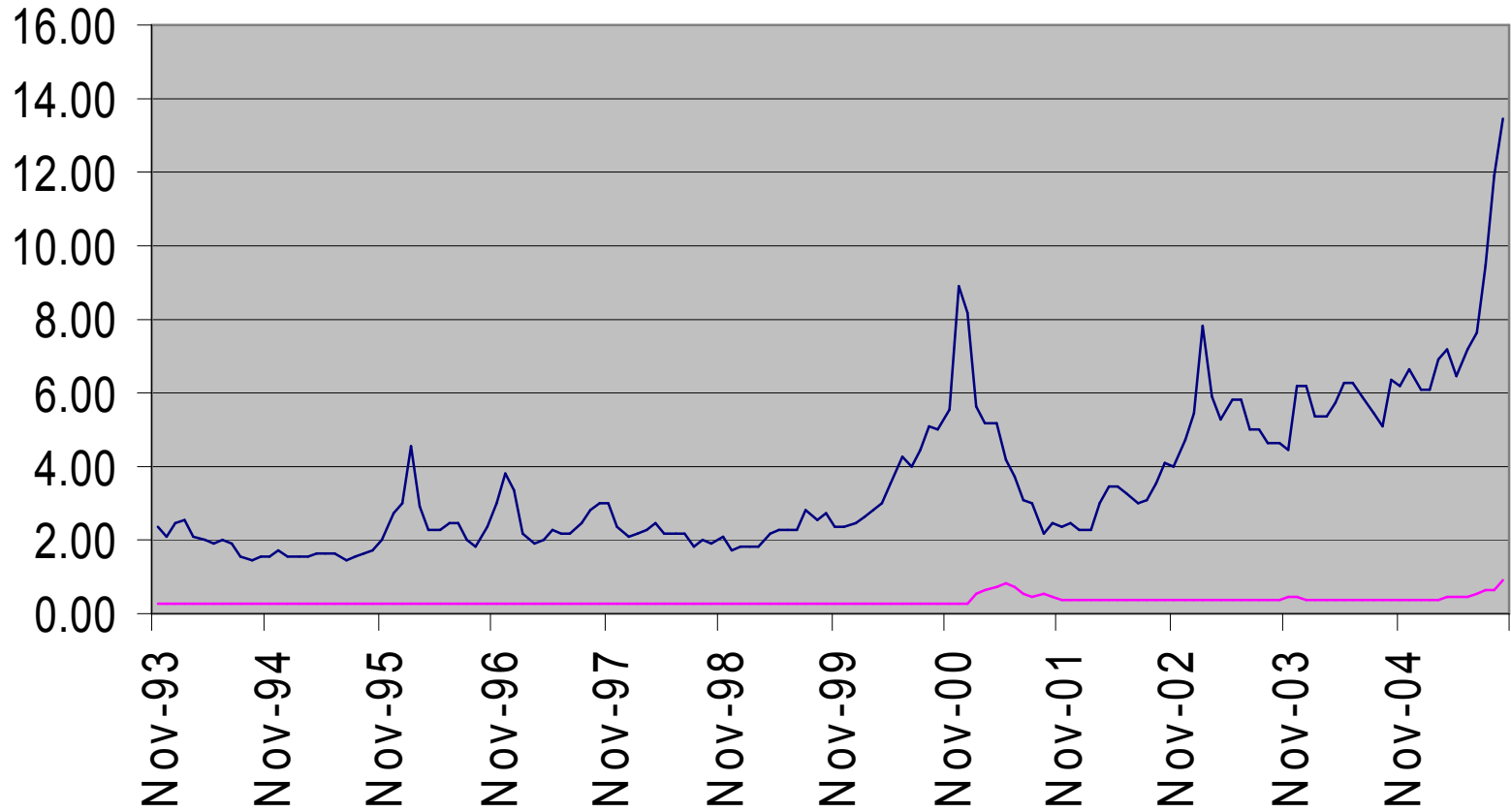
- Liability limitation (under the Paris Treaty and Finnish law)
- Interest rate for € 1.95B (more than 60% of fixed price contract): 2.6% or lower (suggests subsidies)  
(<http://www.energyintelligenceforeurope.dk/Documents/Fouquet20050923.pdf>)
- Government lending
  - Lead of banking consortium was Bayerische Landesbank, the Bavarian state bank
- Export credit agency (subsidies)
  - France (COFACE): €610 million
  - Sweden (SEK): €100 million
- France charged by EU, alleging subsidizing the Olkiluoto-3 sale contrary to EU anti-dumping laws:  
([http://eur-ex.europa.eu/LexUriServ/site/en/oj/2007/c\\_023/c\\_02320070201en00110019.pdf](http://eur-ex.europa.eu/LexUriServ/site/en/oj/2007/c_023/c_02320070201en00110019.pdf))



# Official View: Natural Gas



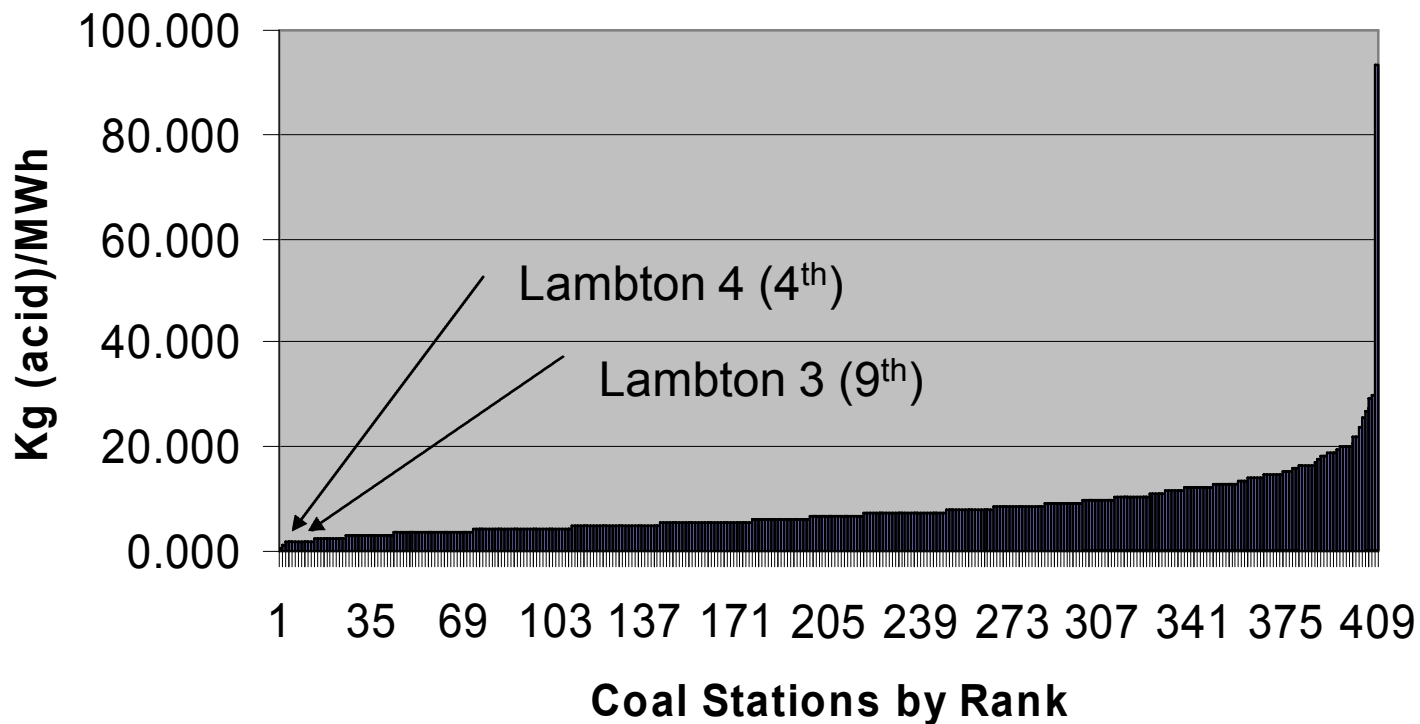
# 1993-2006 Energy cost of US coal price vs. gas (at source)



# How Clean Can Coal Be?

- Use technology to cut SOX emissions, rather than rely on mountain top removal
- Use scrubbers to virtually eliminate conventional pollutants
- Reduce CO<sub>2</sub> modestly now and plan for dramatic cuts

## Total Acid Gas Emissions of Coal Plants in NAFTA (Data: 2002 Commission for Environmental Cooperation)



# Cutting Coal's GHG Emissions

- Efficiency Gains
- Cogeneration
  - Industrial
  - Urban District Heating
- Biofuel Blending
- Carbon Capture and Storage



# Retrofit Scrubbers?

- High cost of gas makes scrubbers affordable
- Age and modest efficiency of existing coal units suggests concentrate on new

# Conclusion

- Coal is here to stay
- Sliding phase-out schedules perpetuates air pollution