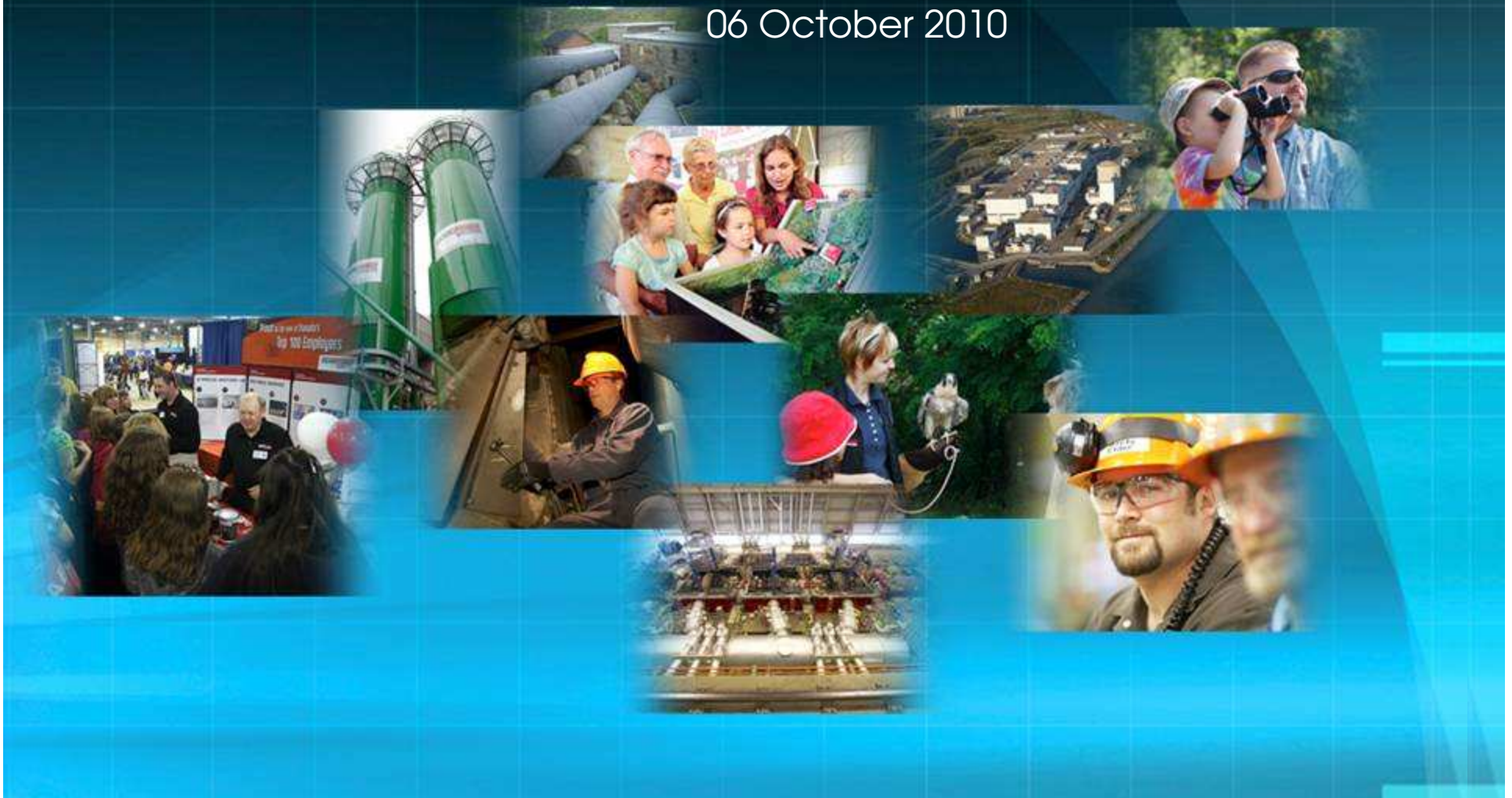


ONTARIO POWER GENERATION

AWMA-OS Annual Conference

06 October 2010

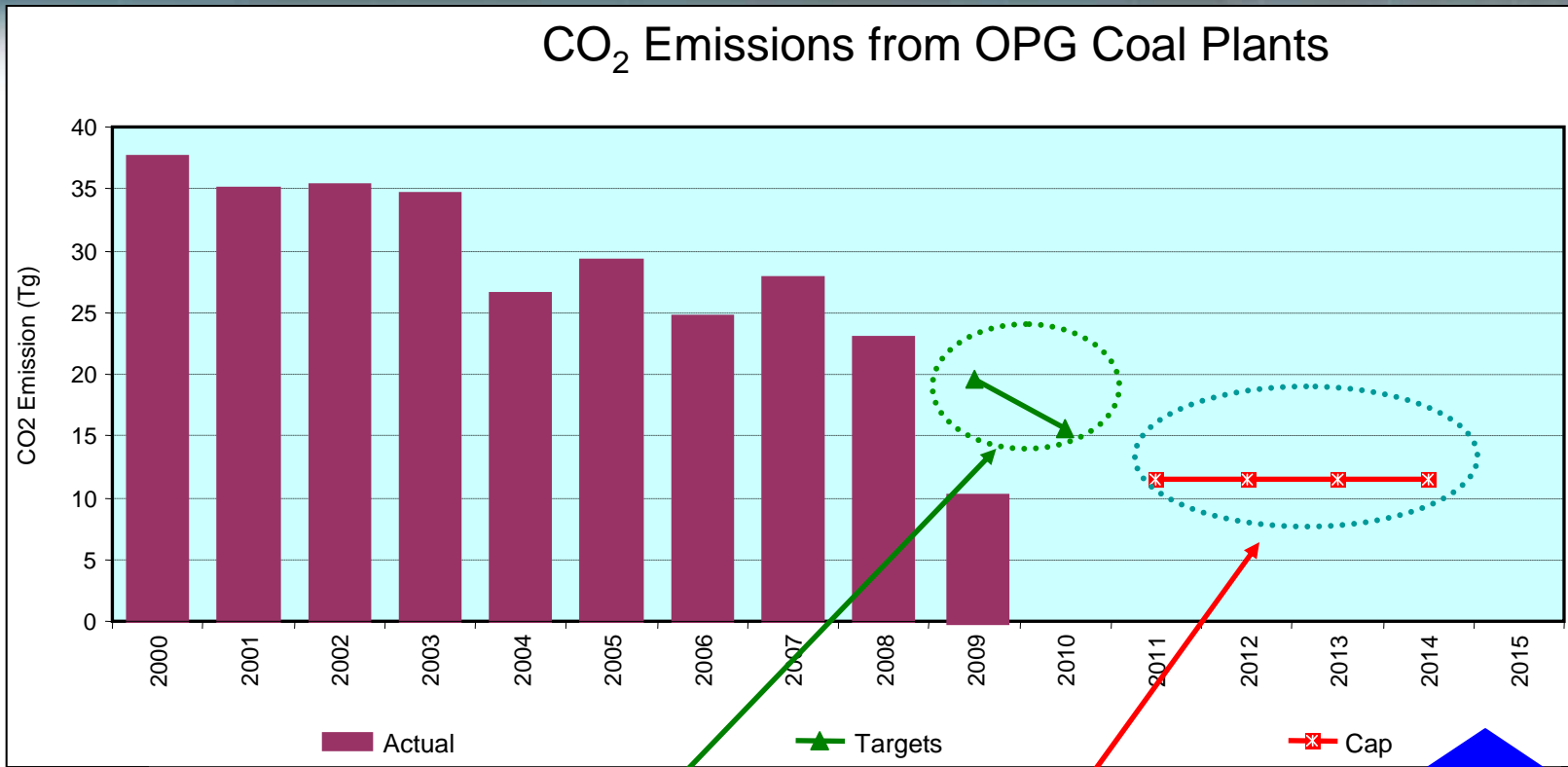




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CO₂ Emissions from OPG Coal Plants



Target based on Shareholder Declaration and Resolution

Target based on Shareholder Declaration and Resolution

Use of coal ends under Ontario Regulation O. Reg 496/07



OPG Repowering Program

OPG envisions repowering some coal units to burn biomass, gas, or co-fire biomass/gas because of the important role they play in the electricity market.

- Thermal Units provide capacity and energy needed to respond to rapid changes in demand and supply. This role will become increasingly important as the intermittent renewable energy portfolio expands.
- Thermal Units provide backup capacity and energy during nuclear refurbishment and new build.

“Ramp Rate” – thermal units provide rapid response to changes in demand.

- 5 to 7 MW/min/unit on coal

“Dispatches” – Thermal units respond to minute-to-minute changes in electricity system needs. For example, in June 2010:

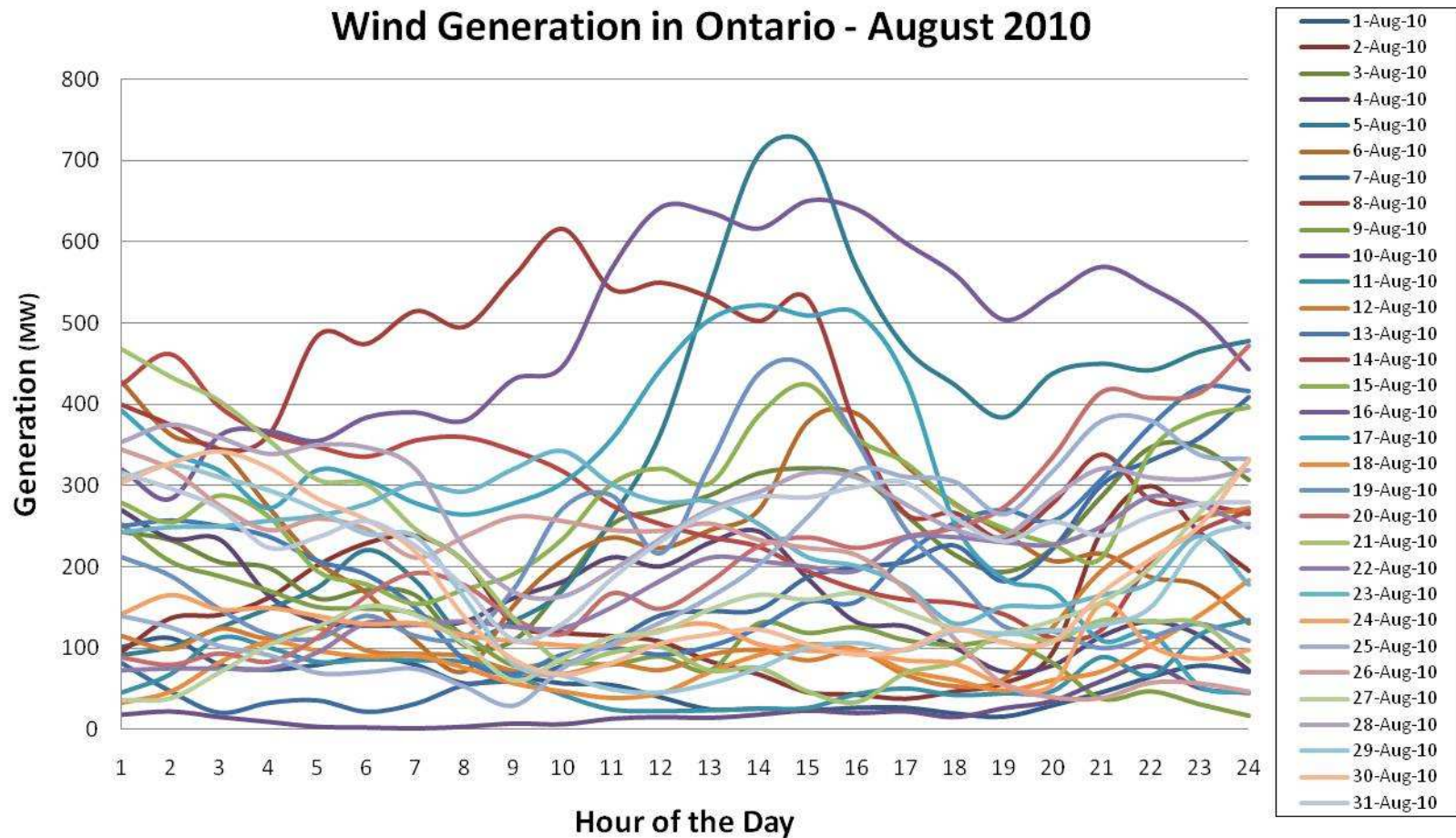
- Lambton received 3,455 dispatch instructions
- Nanticoke received 16,186 dispatch instructions

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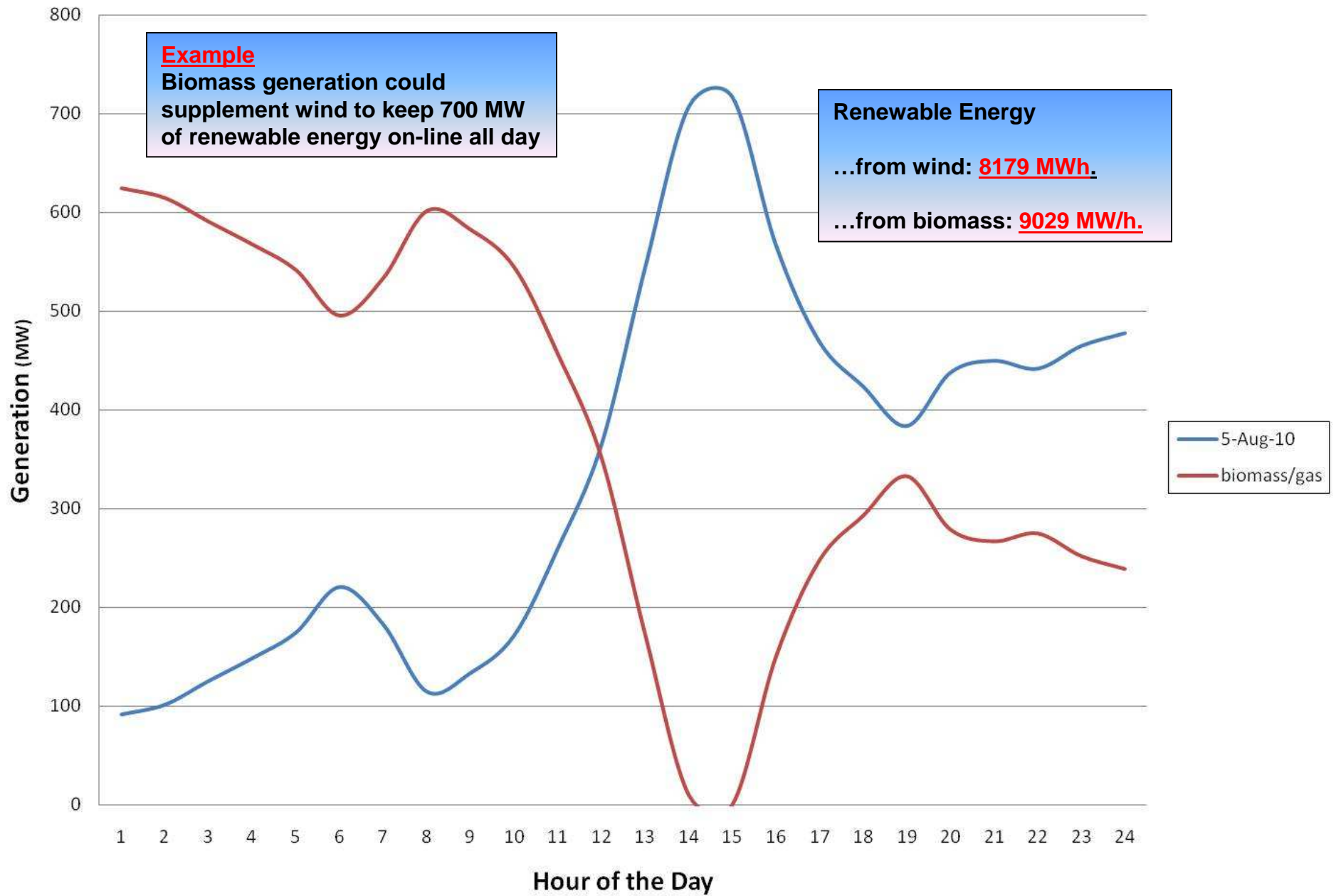


The ramp rate and flexibility provided by thermal units are important in enabling increased intermittent renewable generation while maintaining electricity system reliability and stability.

Wind Generation in Ontario - August 2010

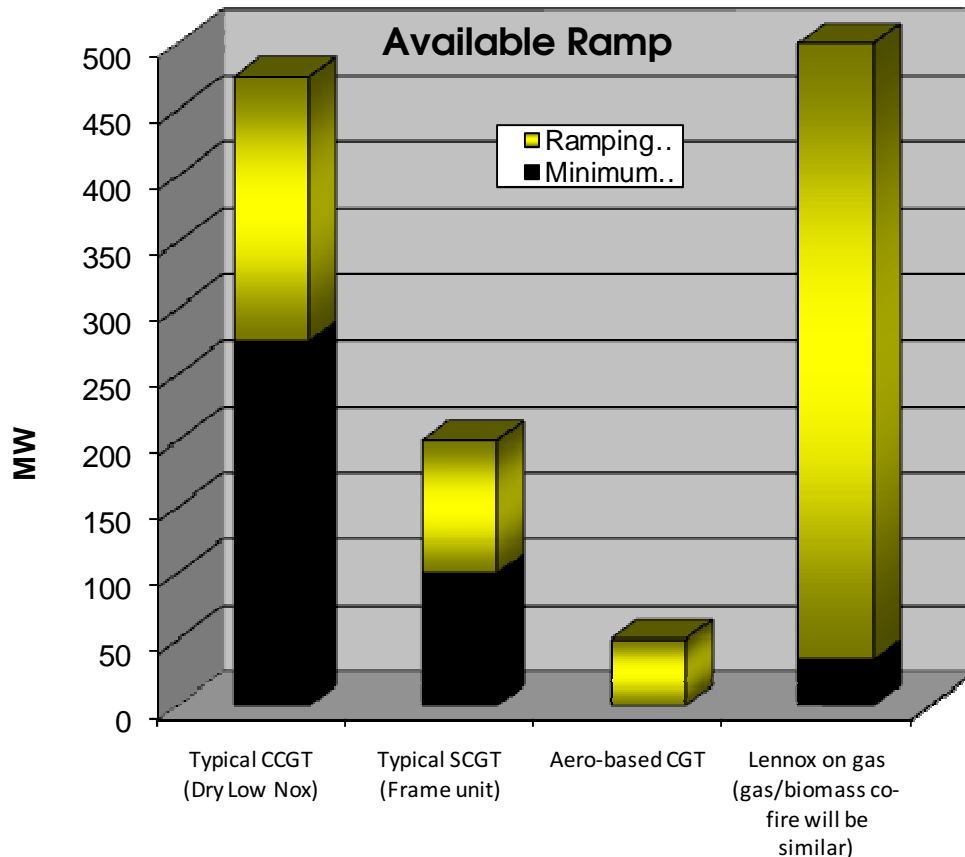


Wind Generation in Ontario - 05 August 2010





Converted Coal Units Provide Greater Flexibility Than Other Forms of Thermal Generation



One thermal unit operating at minimum load (50MW) provides 400 MW Ramp to the electricity system. CO₂ emissions from one thermal unit at 50 MW minimum load: **35 Mg/h.**

The same Ramp would require two CCGT both operating at 250 MW minimum load. CO₂ emissions from two CCGT each at 250 MW minimum load: **180 Mg/h.**

Available ramp is the difference between minimum production level and maximum production level of a generating unit

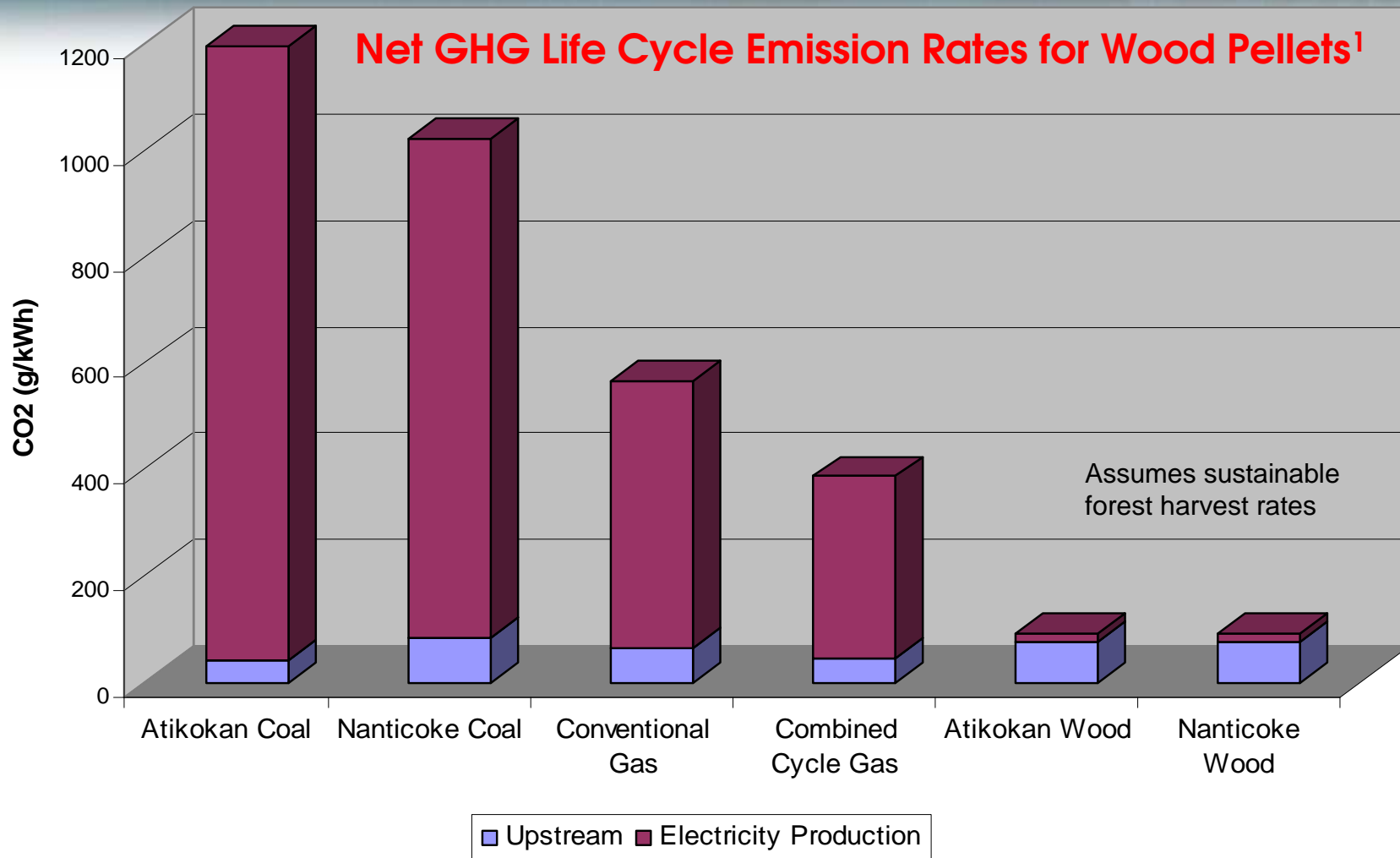
CCGT – combined cycle gas turbine (Portlands)
SCGT – simple cycle gas turbine (York Region)
Aero-based CGT – derived from an aircraft engine
Lennox – conventional boiler similar to coal units



Biomass: Ensuring Sustainability

OPG is taking four actions to ensure sustainability of our biomass fuel supply:

- **applying United Nations Framework Convention on Climate Change (UNFCCC) definition of renewable biomass**
- **ensuring there is a life-cycle analysis GHG benefit**
- **applying environmental criteria to fuel suppliers to promote suitable “upstream” practices in the supply chain**
- **Commissioning research to ensure decisions continue to be based on current science**



¹ Zhang, Yimin; Jon McKechnie; Denis Cormier; Robert Lyng; Warren Mabee; Akifumi Ogino; Heather L. MacLean. "Life Cycle Emissions and Cost of Producing Electricity from Coal, Natural Gas and Wood Pellets in Ontario, Canada", *Environ. Sci. Technol.* 2010, 44, 538-544



Sustainable Fuel Supply

- Wood pellet suppliers must have third-party chain of custody certification demonstrating that the wood fibre is sourced from well managed forests.



- OPG is working with OMAFRA and the Agriculture sector to develop appropriate verification of the sustainability of agri-biomass fuel supply.



Repowering Status

Atikokan GS

- OPA Directive
- Biomass Fuel Supply RFIP
- Engineering studies underway

Nanticoke, Lambton, Thunder Bay

- Nanticoke 3&4 and Lambton 1&2 units shut down October 01, 2010
- Analysis and engineering studies of biomass/gas repowering options of remaining units are underway.