

Wind Energy and Climate Change: Challenges and Opportunities in Canada

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Canadian Wind Energy Association
Association canadienne de l'énergie éolienne

Outline

- CanWEA
- Wind Energy and Climate Change
- Wind Energy is Making a Substantive Contribution to GHG Emissions Reduction
- Wind Energy is Poised to do Much More
- Challenges Remain - Actions Required to Address Those Challenges in Canada
- Why Wind Energy is a Key Component of any Climate Change Mitigation Strategy



Canadian Wind Energy Association

- More than 340 corporate members including:
 - Turbine manufacturers
 - Component suppliers
 - Wind project developers / owners / operators
 - Utilities
 - Service Providers
- CanWEA's role
 - Policy development and advocacy
 - Communications and outreach



Wind Energy and Climate Change

- Wind energy produces no GHG Emissions + rapid “payback” of life-cycle GHG emissions
- Wind energy reduces GHG emissions when:
 - it eliminates the need to build new GHG emitting generation
 - It prevents existing GHG emitting generation from coming on-line
- GHG emission reductions dependent on the grid electricity mix – regional / not national



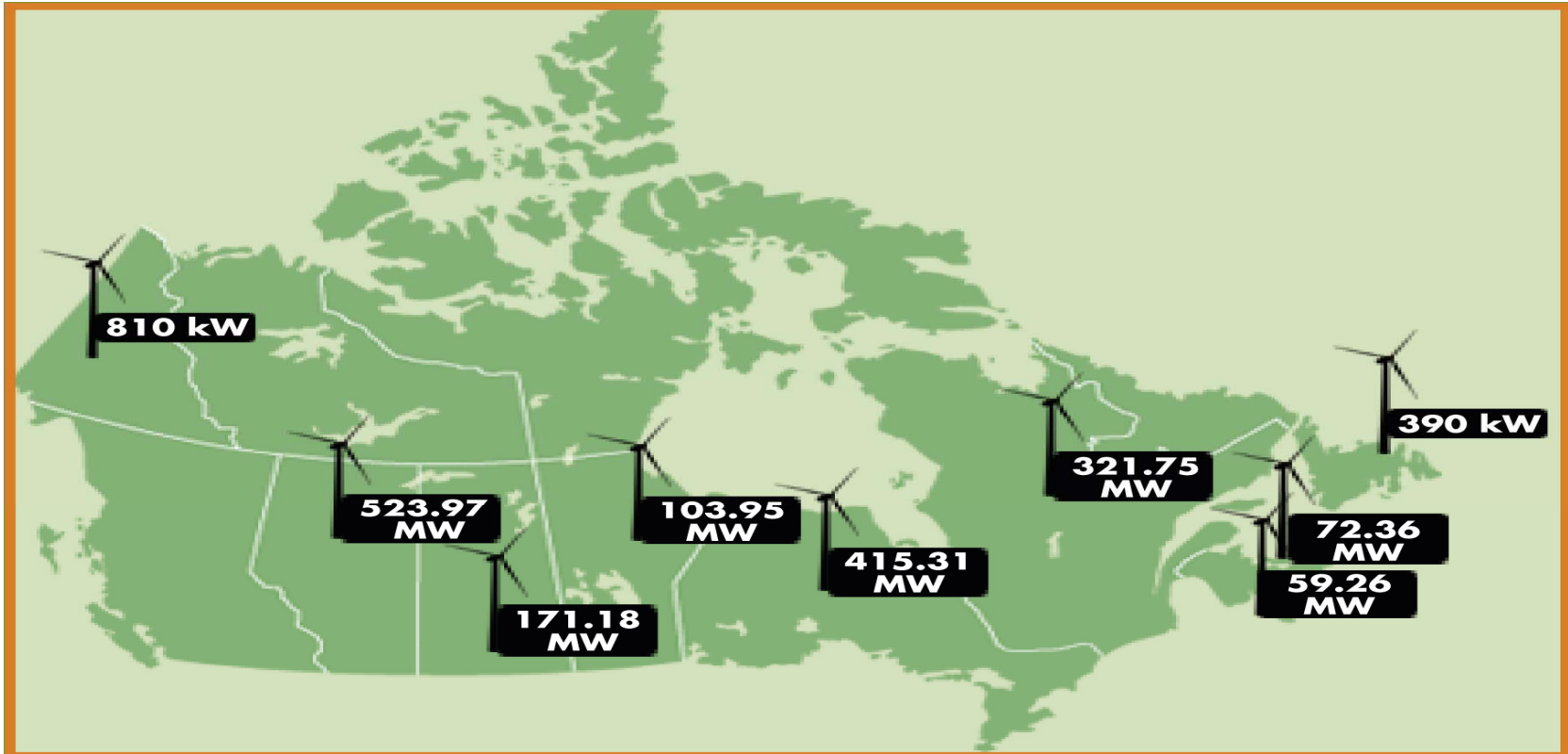
Status of Wind Energy - Globally

- Wind energy is the fastest growing source of new electricity generation in the world:
 - 1995: 4,800 MW of installed capacity
 - 2006: 74,000 MW of installed capacity
- Wind energy now provides:
 - electricity to meet the needs of 23 million homes
 - 91 million tonnes of annual GHG reductions
- In 2006, the global wind energy industry:
 - installed \$23 billion US in new equipment
 - directly employed more than 163,000 people



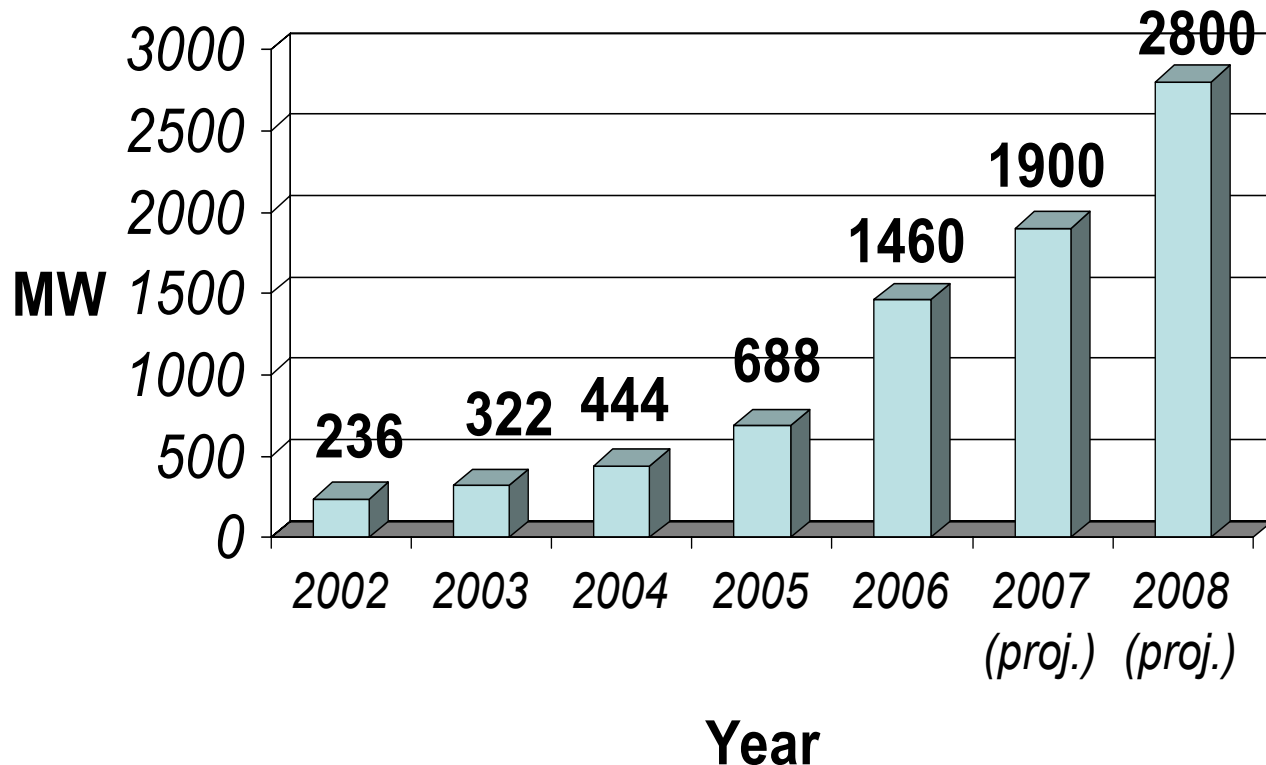
Wind Energy in Canada: Oct. 2007

1,670 MW of Installed Capacity



Wind Energy Growth in Canada

Installed Wind Capacity



Global Wind Energy Projections

- Global Wind Energy Council scenarios (Global Wind Energy Outlook 2006):
 - Reference Scenario
 - 113,000 MW by 2010, 231,000 MW by 2020 (2.7%)
 - Moderate Scenario
 - 137,000 MW by 2010, 560,000 MW by 2020 (6.6%)
 - Advanced Scenario
 - 154,000 MW by 2010, 1.1 million MW by 2020 (13%)
- Resulting GHG emission reductions
 - Reference – 339 million tonnes / year in 2020
 - Moderate – 825 million tonnes / year in 2020
 - Advanced – 1.6 billion tonnes / year in 2020



Prospects for Wind in Canada

- Provincial objectives represent a minimum of 12,000 MW by 2016 - e.g. Ontario (4,600 MW by 2020), Quebec (4,500 MW by 2016)
- 12,000 MW of wind energy in 2016 would:
 - service 3.6 million Canadian homes annually
 - meet 5% of Canada's total electricity demand
 - represent 35% of electricity produced from new facilities constructed in Canada (2005-2015)
 - represent a \$20+ billion investment (2005-2015)
 - directly employ 10,000+ people in 2015
 - reduce GHG emissions by 9 million tonnes / yr



Economic Challenges/Solutions in Canada

- After decades of declining costs, wind energy costs have recently increased:
 - supply / demand issues
 - commodity prices
 - integration costs
- Supply / demand issues likely to be resolved in 3 – 4 years
- Technology improvements will continue to create cost reductions
- Little doubt wind energy will become even more cost-competitive over time



Policy Challenges/Solutions in Canada

- Government support still required – need will decline when markets value wind energy's environmental attributes
- What is the future of Federal incentives for wind energy in Canada?
- What procurement mechanisms will be used by Provincial governments / utilities?
- When will Canada put in place structures to create a carbon dioxide price in the marketplace?



Technical Challenges / Solutions in Canada

- Transmission availability an issue for all generation – large investments required to:
 - Use existing transmission more efficiently
 - Facilitate access to, and integration of, wind energy with new transmission
 - Build new transmission in a timely manner
- Pursuing efficient wind energy integration
 - Greater use of tools like wind energy forecasting, power management, geographic distribution of facilities
 - Will new generation facilitate wind integration?



Communications Challenges / Solutions in Canada

- Wind energy has broad public support, but we need to increase public knowledge and understanding of wind energy
- We need to ensure that wind energy debate / discussion is based in solid information and peer-reviewed science
- We need excellent community / stakeholder relations and need to engage the silent majority of wind supporters



Why Wind Energy is a Key Component of Any Climate Change Strategy

- Wind energy produces multiple environmental benefits
- Wind energy is a major industrial development opportunity and produces real economic benefits for rural communities
- Wind energy has strong + broad public support and growing stakeholder (gov't / utility) support
- Wind energy technology has moved from “alternative” and “niche” into the mainstream

