Building the Renewable Energy Market

Connecting Producers to Buyers

October 28, 2004

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TransAlta's Wind Business

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Outline

- Company Background
- Wind Energy Market Background
- Market Context
- Market Barriers/Challenges
- Market Opportunities

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Background

- Builds, owns and operates wind power plants
- Independent division of TransAlta, Canada's largest unregulated independent power provider
- Major Activities
  - Exploration – wind prospecting
  - Development
  - Production & Operation
  - Product Marketing
- Major Products
  - Green Energy®
  - Green Energy® Tags

Current Wind Facilities

- 189 MW
- 220 wind turbines
- 375 GWh annually
- *enough for over 80,000 homes*

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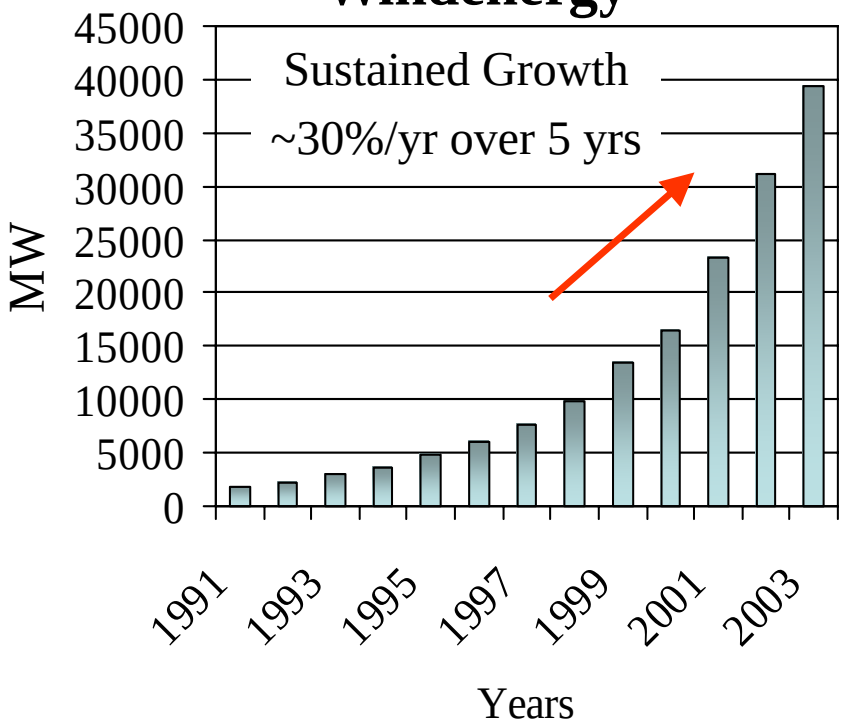
Wind is the fastest growing source of new electrical power

Worldwide Growth in Windenergy



Total Installed Jan 2004

- World-wide 39,434 MW
- Germany 14,609 MW
- USA 6,352 MW
- Spain 6,202 MW
- Denmark 3,115 MW
- India 2,120 MW
- Canada 326 MW

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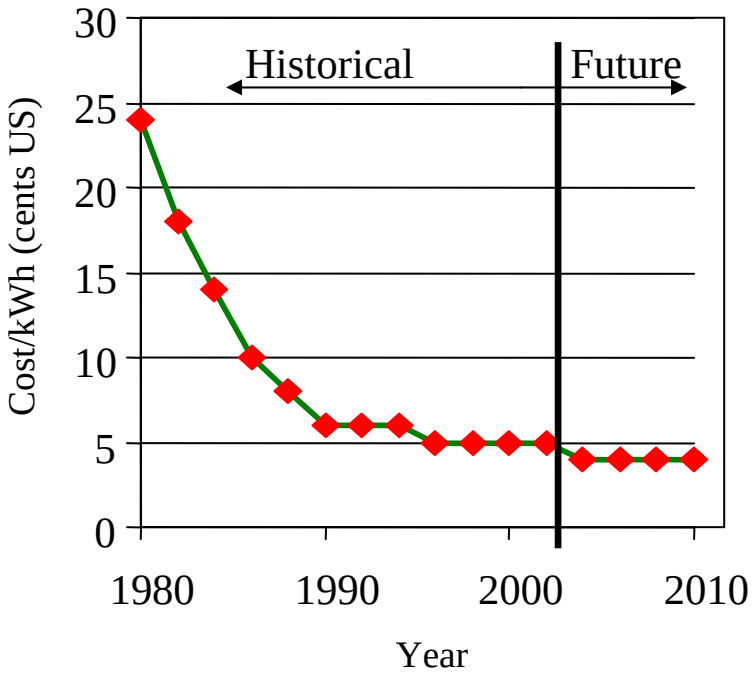
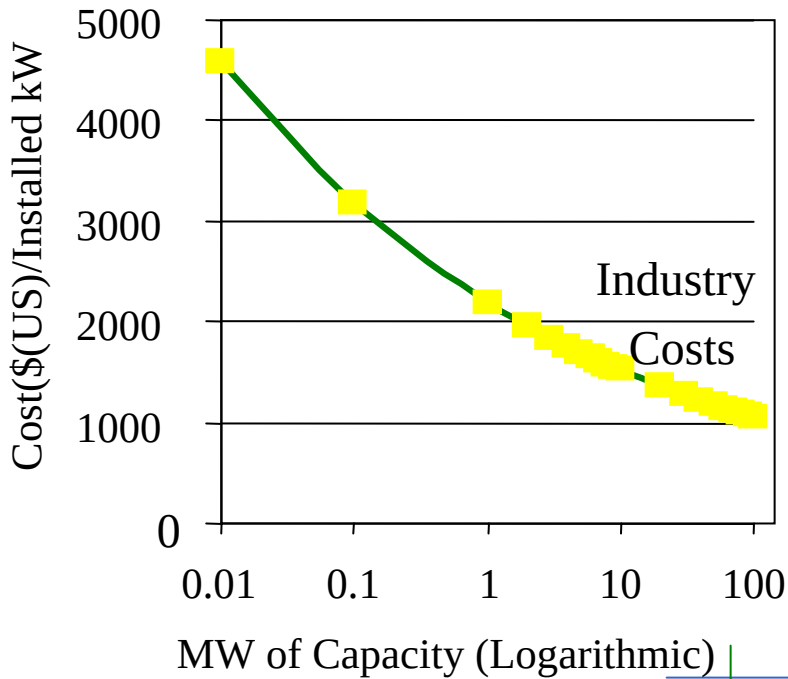
Cost continue to decline with new technology and scale

Historical & Projected Wind Energy Costs



Facility Size vs Installed Cost



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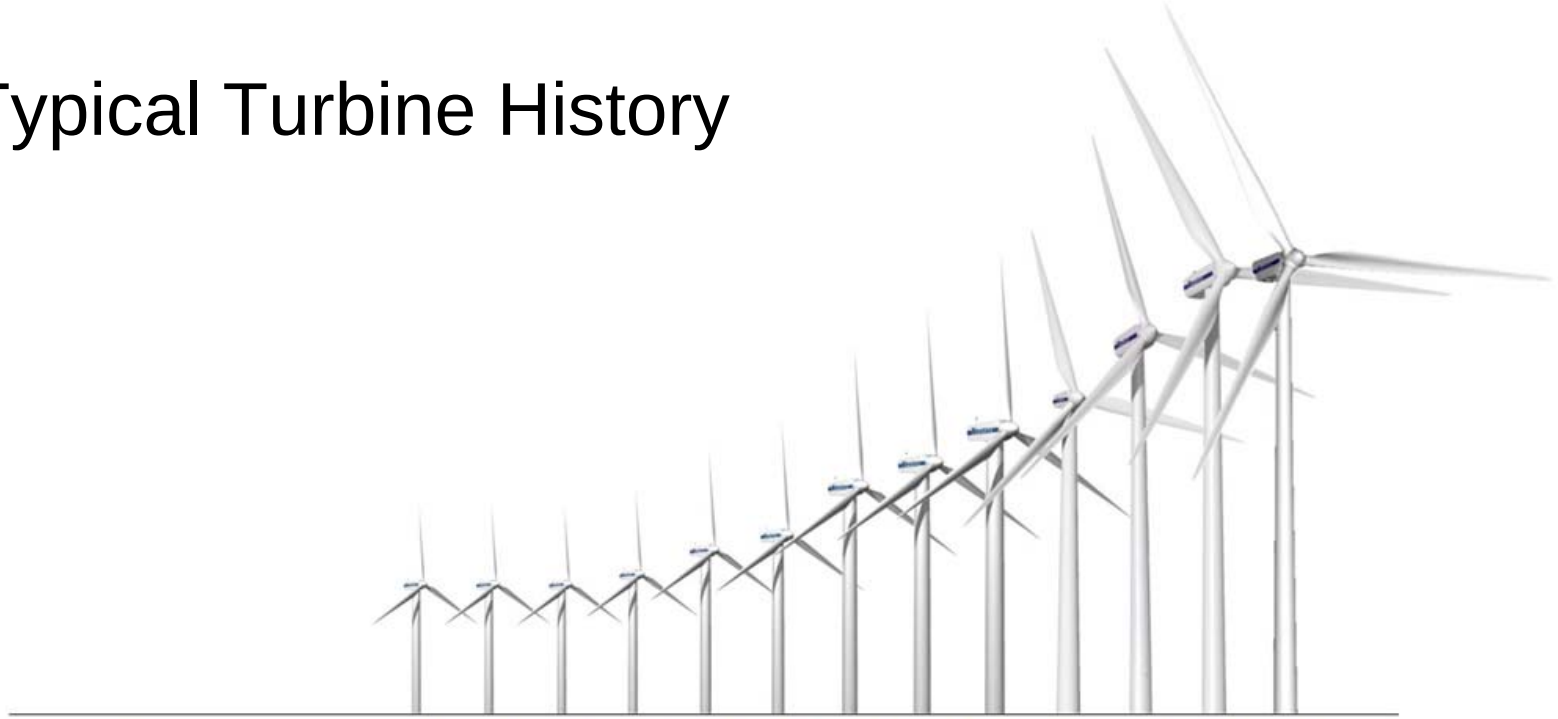
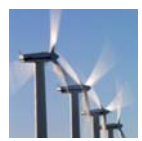
Turbine size and output has increased dramatically

Typical Turbine History



Product/Rotor diameter (m)	V15	V17	V19	V20	V25	V27	V39	V44	V47	V52	V66	V80	V90
Year of installation	1981	1984	1986	1987	1988	1989	1991	1995	1997	2000	1999	2000	2002
Capacity (kW)	55	75	90	100	200	225	500	600	660	850	1750	2000	3000
MWh/year	217	265	301	346	481	647	1304	1581	1947	2530	4705	6768	–



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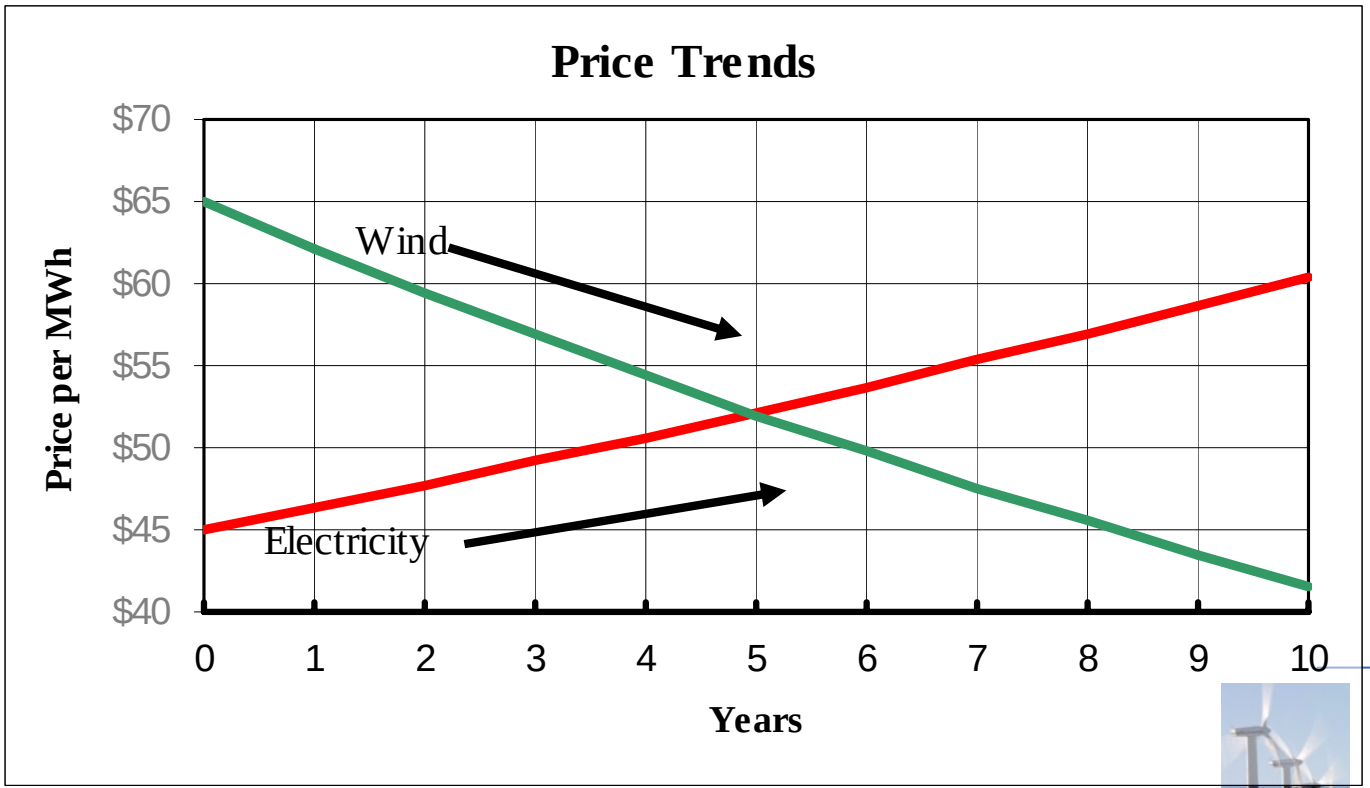
Price convergence is expected within 5 years due to gas costs

Expected Market Prices Over Time



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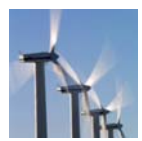
Market Context



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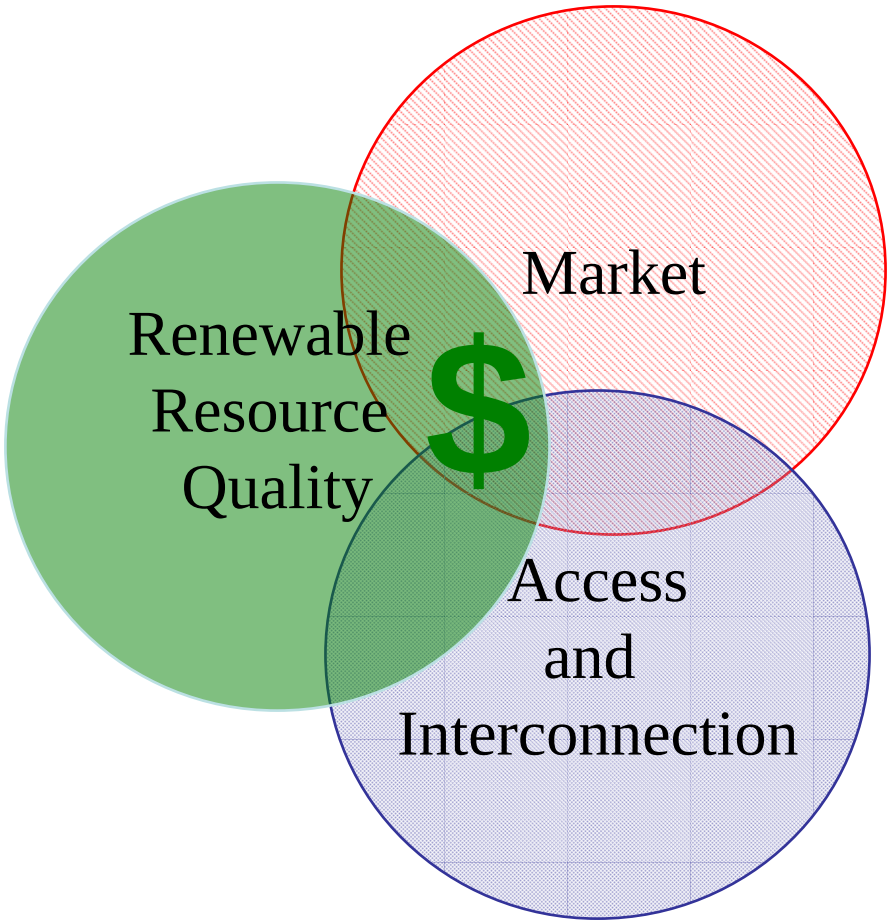
Development opportunity requires convergence of 3 factors



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Value of Renewable Investment to Producers

Top Reasons Renewables Makes Good Sense

- Green demand related to Capital Stock Turnover
  - Transition from fossil to renewable sources
- Suitable investment economics
- Incremental and controlled growth
- Fuel diversity – zero cost
- Low operating costs
- Capex and Ops. costs continue to drop
- Lower construction risk and less complex than thermal

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Wind is Technologically Ready

- Industry is on the cusp of being competitive
- Mature technology, now need to:
  - Achieve economies of scale
  - Overcome market acceptance issues
    - Transmission infrastructure
    - New entrant acceptance
    - Technology familiarity
    - Provincial responsibility – multiple jurisdictions
  - Deal with perverse signals in policy, markets
    - Kyoto and LFEs
    - Green power purchases by federal govt
    - CRCE and exclusion rules

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Market Challenges

Environmental & regulatory hurdles larger as industry grows

Regulatory

- Transmission – Free space used up
- Technical interconnection requirements getting tighter
  - VAR, voltage control, ride through, etc.
- Length of time to receive approval
- Overcoming ‘incumbent barriers’
- Access to customer and utilities

Environmental Perceptions

- Concerns based on unfamiliarity with new technology:
  - Birds and Bats
  - Sound
  - NIMBY
  - Aesthetics
  - Property values

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Policy Challenges

- Initiatives by Canadian Government have been positive
  - 200 MW in just over 2 years of WPPI (200% growth)
- Evolving role of renewables in Kyoto (eg, LFEs):
  - not treated the same as natural gas
  - penalized for having zero emissions
- United States needs consistent tax incentive to remove boom/bust cycle

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Market Opportunities

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Stimulating Demand…

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Green Power Marketing

- Green Pricing
  - Optional utility programs
  - Offers customers the options to support Green electricity investment
  - Premium on electricity bill pays for additional costs related to renewable energy
- Green Power Marketing
  - Competitive offer in deregulated market
- Green Tags
  - TRCs, TRECs, etc
  - Separation of energy and the green attributes
  - Generation and sale do not need to be within the same transmission grid

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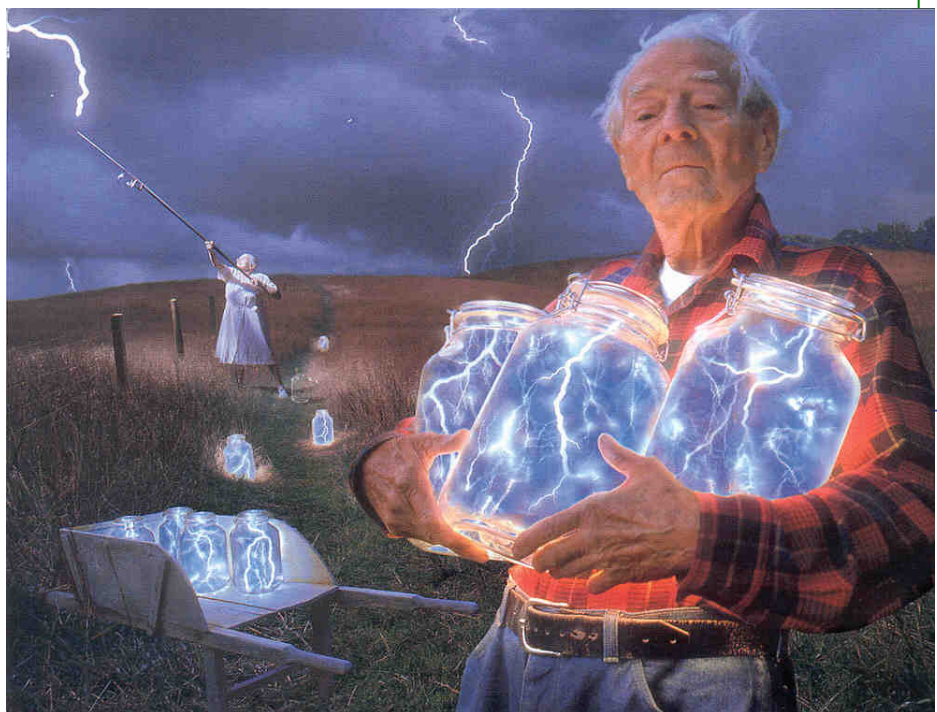
Customer Motivations

- Residential
  - Future Generations
  - Right thing to do
  - Tangible benefits
- Commercial
  - Hedge Fuel Cost Risk
  - Environmental sensitivity
  - Corporate Stewardship
  - Regulatory/Voluntary requirements
  - Employee morale
  - Enhance public image
  - Marketing Benefits



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Government Policy

- Renewable Portfolio Standards are Necessary
  - Fossil fuel generators do not pay for externalities
  - Public Goods – Renewable Energy benefits the public good
  - Transaction costs – Customer choice has higher transaction costs
  - Middle Man – Forces utilities/electricity suppliers to include a portion in their mix
  - Long term stable markets are required for investment in the capital intensive renewable energy sector

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Industry Opportunities

- Renewables will be a 'full player' in North America's electricity portfolio
- Will provide local rural economic investment, employment and contribute to those economies through taxes
- Will support domestic manufacturing resulting in reduced component costs, improved project economics and more competitive pricing
- Will play a vital role in reducing emissions
- Will allow all jurisdictions to produce renewable energy
- Will allow high value natural gas to be used elsewhere than electricity production

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