

WADE CANADA

ENERGY AND THE ENVIRONMENT

Canada's Decentralized Energy Industry

Presented by: Elizabeth Huculak
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WADE Canada Alliance for Decentralized Energy

WADE Canada is a registered, national, non-profit industry association that supports the growth and development of Canada's Decentralized Energy (DE) industry.

Our vision is a sustainable energy future where affordable, efficient, reliable and clean decentralized energy technologies are deployed in community driven markets and enabled by progressive policies and legislation.

The World of Future Energy

Alberta's Competitive Advantage

Innovation to Commercialization

Global Clean Energy Congress

Energy, Economy and Environment - Another Triple Bottom Line

Motivation for Change?

- Energy Demand
- Rising costs
- Energy Security
- Environmental impact
- Global Competitiveness
- Operational Efficiency
- Aging Infrastructure
- Economic Growth and job creation

"The solution to climate crisis is not far off in our future- it is in the buildings we inhabit, our civic infrastructure and the way we organize our lives" - President Bill Clinton

Decentralized Energy

- Integrated into buildings
- Connected to energy intensive processes and equipment
- Built to support district energy systems and micro-grids (thermal and/or electric output) for neighboring consumers or entire communities

Sources include:

- renewable energy, such as solar, geoechange, hydrokinetic turbines and community integrated wind turbines,
- waste heat recovery, from industrial process exhaust heat, cooling towers and smoke stacks,
- wastes such as wood waste, agricultural residues such as manure and straw, household wastes and sewage



Decentralized Energy (DE) is heating, cooling and/or electrical power that is produced, managed and stored at the point of consumption.



WORLD OF FUTURE ENERGY

The State of Global Energy

World Future Energy Summit – Abu Dhabi, January 2011

Strong Messaging from United Nations and International Leaders

- 80% of CO₂ is produced by energy generation
- Copenhagen and Cancun:
 - Commitment to 2 degree temperature increase
 - Technology development
 - Investment to support developing nations
- EU commitment to 60% renewables – Denmark 100%
- 2010 investment in renewables \$24.6 billion projected to increase to \$54.4 B by 2020
- 1.4 billion people globally do not have to access to electricity
- Electricity demand to increase by 30% by 2030
- Investment in new renewable grid capacity is estimated to be \$6 trillion US by 2035

In 2010, all G20 economies and also others have initiated or completed the development of economic growth plans that are strongly based on green growth
 -C Figueres, United Nations

Compelling Examples of Progress

Energy Efficiency

Empire State Building

Energy efficiency upgrades:

- 38% energy savings
- \$4.4 million savings annually
- GHG 105,000 tonnes over 15 years
- \$100 million investment
- payback in 3.1 years

*Built in 1931,
heritage office
building privately
owned and
operated*



Technology Integration

Masdar, UAE



Model carbon neutral city of 40,000 population

Masdar City
Masdar Carbon
Masdar Institute
Masdar Capital
Masdar Power

More Examples of Progress

Innovative Finance

- Policy and Scale Risk
- Capacity Building
- Regulatory – how to get \$ on the ground
- Carbon Finance
- How to attract \$
- Supporting new and scalable technology

Innovative Structures

- Solar bonds
- Tax credits
- Risk sharing
- Project pooling
- FIT with efficiency bonuses
- Benefit sharing based on risk share

Policy Advancements –IRENA

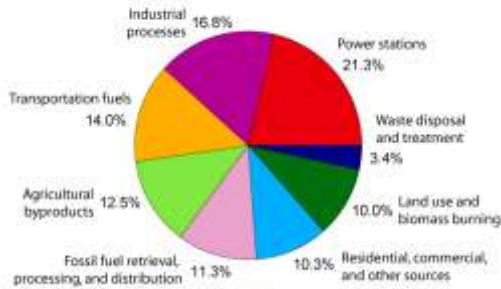
IRENA believes that renewable energy use must, and will increase dramatically in the coming years, because of its key role in:

- reducing greenhouse gas emissions and mitigating climate change
- alleviating energy poverty
- supporting sustainable development, and
- boosting economic growth
- enhancing energy security

➤ 149 country signatories

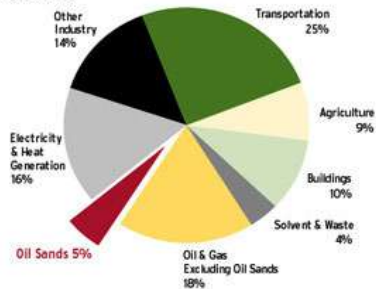
Global GHG Profile

Annual Greenhouse Gas Emissions by Sector



Source: Emission Database for Global Atmospheric Research version 3.2, fast track 2000 project

Canada's GHG Emissions by Sector



Source: Environment Canada

Canada and Alberta

Municipal Solid Waste

- 791 kg/capita in Canada
- Alberta is highest average at 1 tonne/capita

GHG Intensity in

- Canada is 200 g/kWh
- Quebec (20)
- Alberta (880)

GHG global contribution

- Canada 2%
- 7th highest intensity /GDP (2005)



2020 GHG Reduction targets:

Canada 17% (607 Mt)

Alberta 25% (50 Mt)

Electricity production

- Canada is 60% of hydro
- Quebec is 97% hydro
- Ontario is 53% nuclear
- Alberta is 41% coal



ALBERTA'S COMPETITIVE ADVANTAGE

GHG Reduction Opportunity

Industrial

Commercial

Residential

Institutional

- Begins with Energy Efficiency/Conservation
 - Building retrofit
 - New standards of construction
 - Passive design
- Efficiency in generation and distribution
- Capitalize on waste as assets
 - Organic waste
 - Waste heat and cooling
- Integration and optimization

Energy as an Economic Driver

Energy investment as an economic stimulus and cost reduction

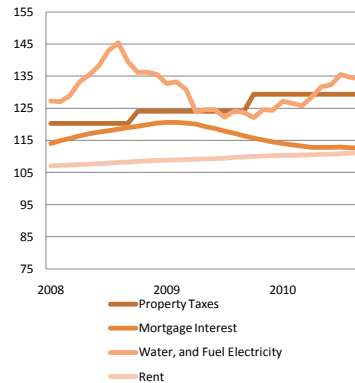
- Utility costs rising faster than other shelter costs

Energy costs impacting Property Taxes, Income Taxes and Land Development levies

- Rising costs of new infrastructure development
- Replacement of aging generation infrastructure
- Transportation burdens
- Expanded transmission network
- Operating costs for public facilities (hospitals, seniors housing educational facilities)

GHG reduction strategies – cost of carbon

Shelter Price Index - Canada



DE Benefits

- improved energy generation system efficiency,
- increased efficiency in industrial processes,
- avoided electricity wastage from transformer and power line losses,
- deferred construction costs for transmission and distribution upgrades,
- reduced emissions and healthcare costs from pollution and occupational hazards inherent in centralized fossil fuel power,
- increased efficiency and reduced waste from residential and commercial buildings.

Visualize It!

Progressive utility business models

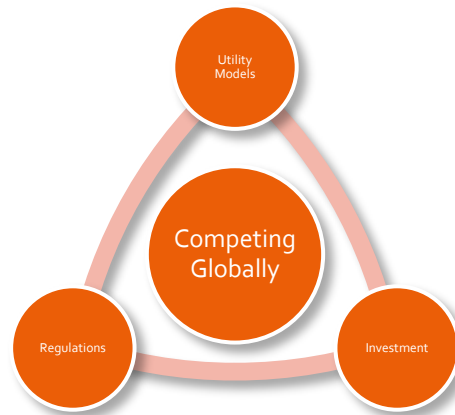
- Owning, operating or leasing on-site generation systems
- Improved controls and communications in metering and energy data management.

Investment

- Private – loans, equity, cash
- Public – grants, feed in tariffs, standard offers, emission funds.

Regulations

- Microgeneration Regulation
- Feed in Tariffs
- Green Energy Act
- Energy Supply Mix Regulation



Bridging the Gap

Generation capacity:

- Alberta new generation added since 1998 – 5,700 MW
- Proposed new generation –
 - 9,600 MW thermal
 - 9,500 MW renewables

Demand:

- Peak demand in 2009 10,236 MW
- Projected demand by 2031
 - New 11,500 MW
 - Replacement 2,000 MW

Current Alberta Mix

Generating Capacity (MW)	2009		2011		2011	
		MIX	Additions		Total	MIX
Coal	5,692	41.4%	560	8%	6,252	30.2%
Gas	5,189	37.8%	4,340	62%	9,529	46.0%
Hydro	900	6.6%	140	2%	1,040	5.0%
Wind	657	4.8%	1,400	20%	2,057	9.9%
Biomass	323	2.4%	140	2%	463	2.2%
Nuclear			70	1%	70	0.3%
Other alternative			280	4%	280	1.4%
Waste Heat	63	0.5%	70	1%	133	0.6%
Fuel Oil	10	0.1%	0		10	0.0%
Subtotal	12,834	93.4%	7,000		19,834	95.7%
<i>Interconnections</i>						
British Columbia	750	5.5%			750	3.6%
Saskatchewan	150	1.1%			150	0.7%
Subtotal	900	6.6%			900	4.3%
Grand Total	13,734	100.0%	7,000		20,734	100.0%

Attracting Business and Investments

WADE Canada is attracting international business to Alberta and is supporting the growth of local clean energy business both domestically and internationally.

Two primary initiatives:

- Innovation to Commercialization Program
- Global Clean Energy Congress

Innovation to Commercialization

- Program Overview

- a project enablement tool
- develop the independent prosperity of early
- bridging the gap between market opportunities and technology supply.
- facilitate the deployment of optimum technology solutions for project opportunities.
- matches project opportunities to funding sources



- Bringing the world's most progressive and advanced energy businesses to Calgary to showcase their clean energy technologies.
- Over 4,000 attendees will visit the exhibition plus 1000 Conference delegates and 200 exhibiting companies.
- World-class event to demonstrate the leading-edge technologies

Content

- Applications of Technology and innovation
- Emission Control and Carbon Capture
- Energy Preservation and conservation
- Supply & Demand
- Finance and Investment
- Environmental Performance
- Risk Management
- Research & Development
- Regulatory Policies

Target Audience

- Municipal Leaders and Management
- Project/Program Executives
- Construction Managers
- Purchasers and Supply Chain Managers
- Senior Technology Developers and Innovators
- Business Development Executives
- Risk Management Professionals
- Financial & Investment Executives
- Research and Development
- Government Leaders and Policy Makers



JOIN WADE CANADA
SUPPORT THE VOICE OF DECENTRALIZED ENERGY IN CANADA

We build the competitive advantage of our members by enabling DE project implementation, promoting opportunities for DE, bringing policy issues to the table, attracting capital and encouraging new entrants to the industry. As a member you get the standard membership benefits listed on our website plus you will be provided with opportunities to:

- Participate in DE projects
- Access to public and private capital for DE projects
- Access export markets through WADE Canada's international network of affiliates
- Targeted recruitment of skilled and qualified people
- Receive discounted rates for WADE Canada events and partner events

For a list of our members, rates and on-line membership application please visit us at:

www.wadecanada.ca