



Renewable and Alternative Energy - Alberta

National Renewable Energy Forum

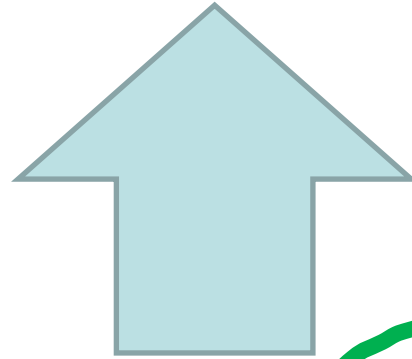
April 2 2013

Susan Carlisle

Director, Alternative Energy

What is Driving Alberta Today?

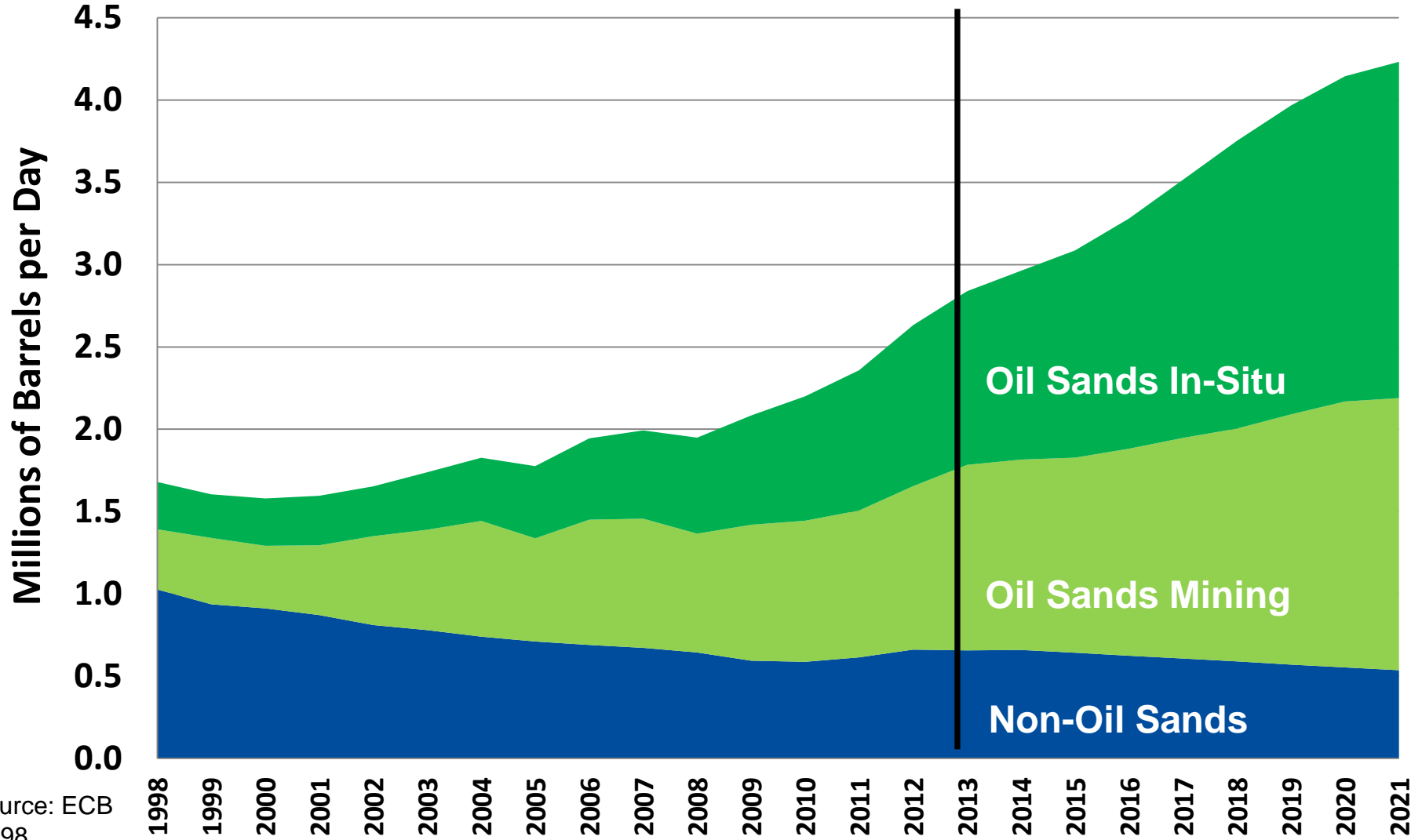
Market Access



Infrastructure

Social License

Alberta Oil Production

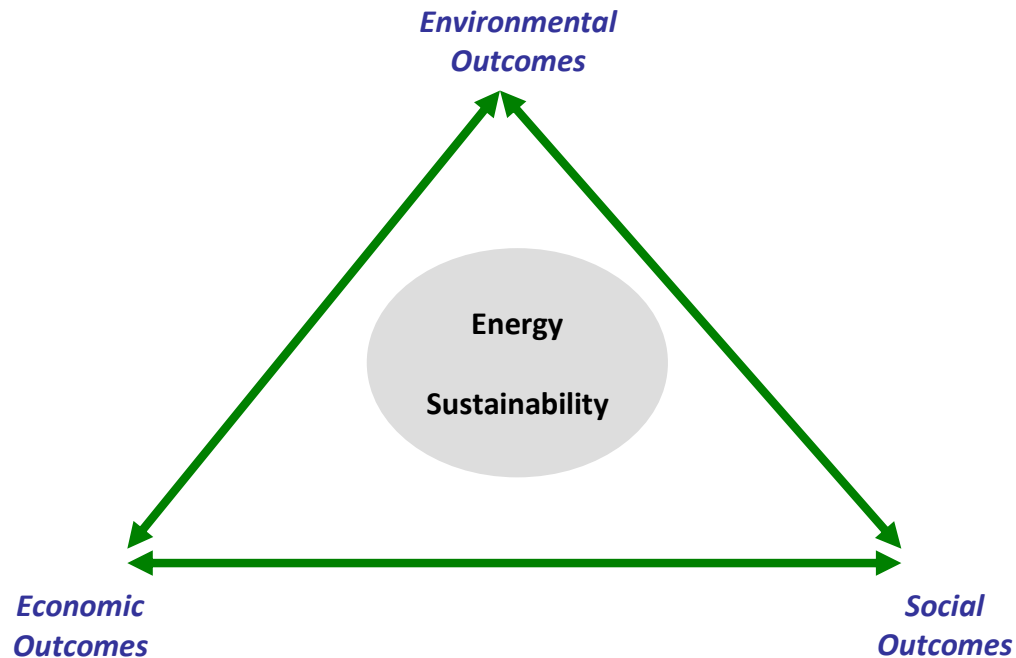


Source: ECB
ST98



Energy Sustainability

- Alberta's energy system should achieve a sustainable balance of environmental, social and economic outcomes

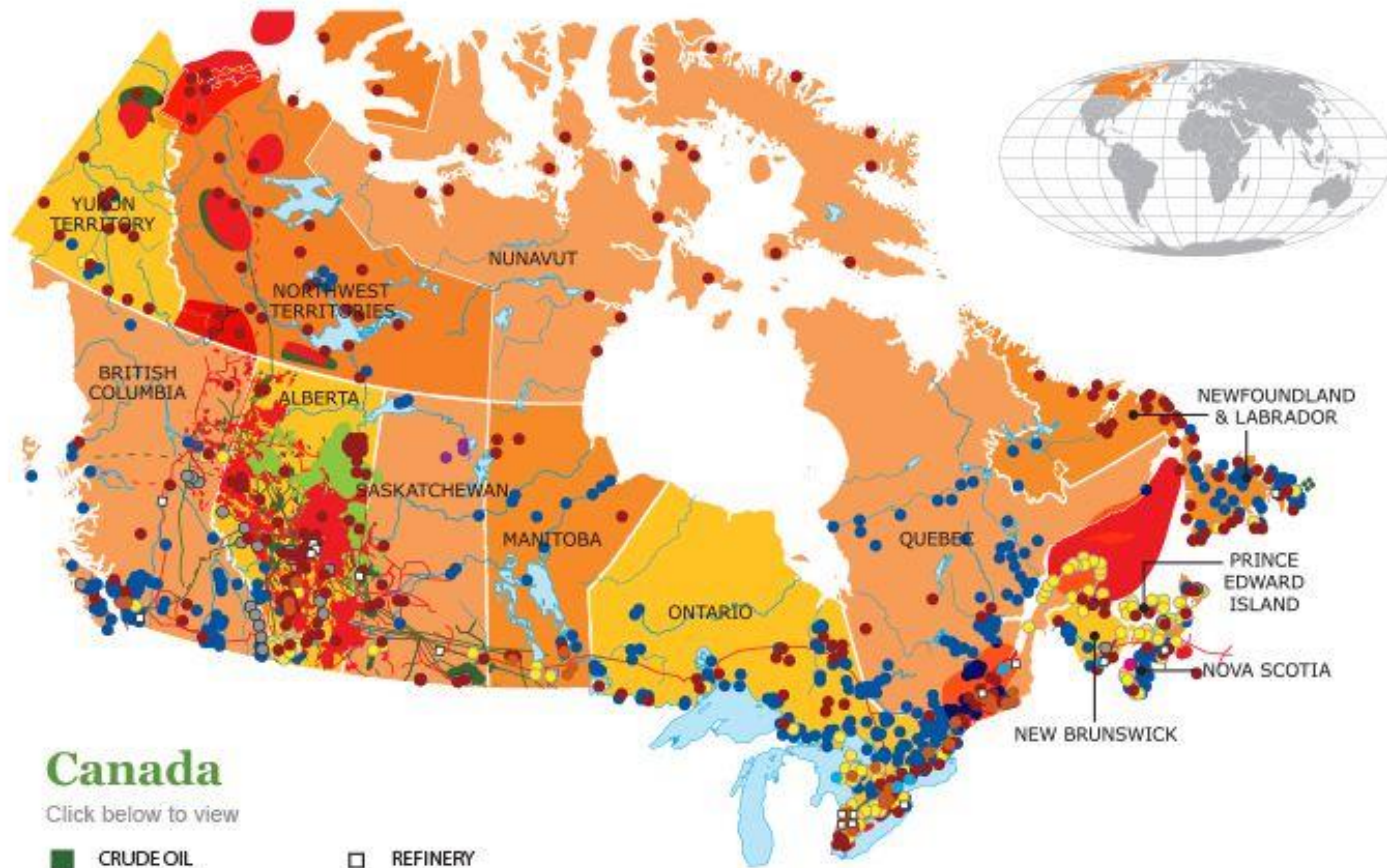


Key Strategies

- **The Canadian Energy Strategy**
- **The Alberta Climate Change Strategy**
- **The Provincial Energy Strategy**




Canadian Energy Strategy

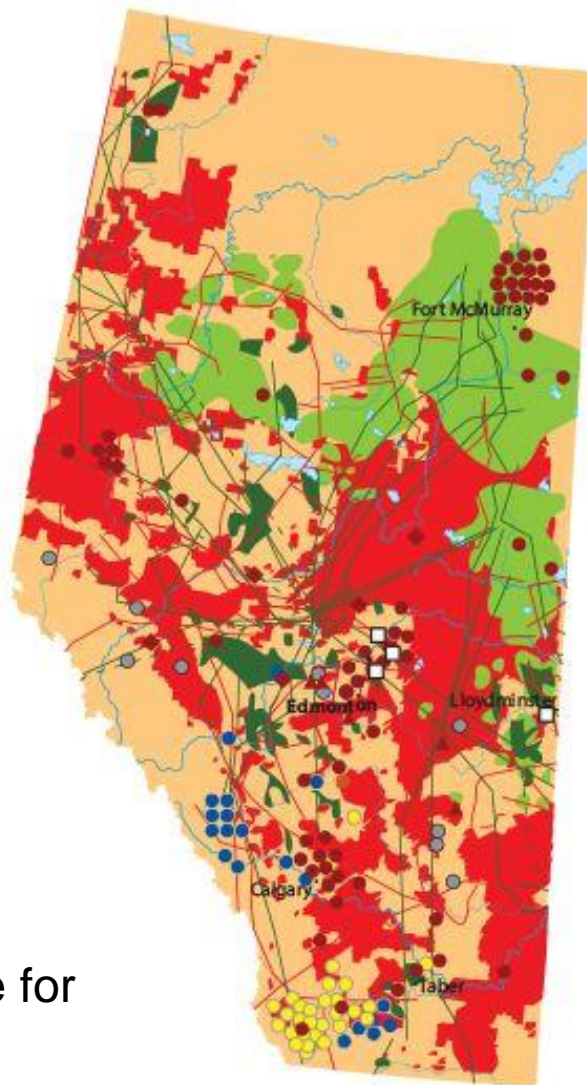


Canada

Click below to view

- | | | | |
|---|----------------------|---|---------------------------|
|  | CRUDE OIL |  | REFINERY |
|  | NATURAL GAS |  | HYDROELECTRIC PLANT |
|  | OIL SANDS |  | COAL MINE |
|  | NATURAL GAS PIPELINE |  | WIND FARM |
|  | CRUDE OIL PIPELINE |  | THERMAL ELECTRIC FACILITY |
|  | NUCLEAR |  | URANIUM MINES |

Source: Centre for Energy



Alberta

Click below to view

- CRUDE OIL
- NATURAL GAS
- OIL SANDS
- NATURAL GAS PIPELINE
- CRUDE OIL PIPELINE
- REFINERY
- HYDROELECTRIC PLANT
- COAL MINE
- WIND FARM
- THERMAL ELECTRIC FACILITY
- NUCLEAR
- BIOFUEL FACILITY
- CROSS-BORDER ENERGY

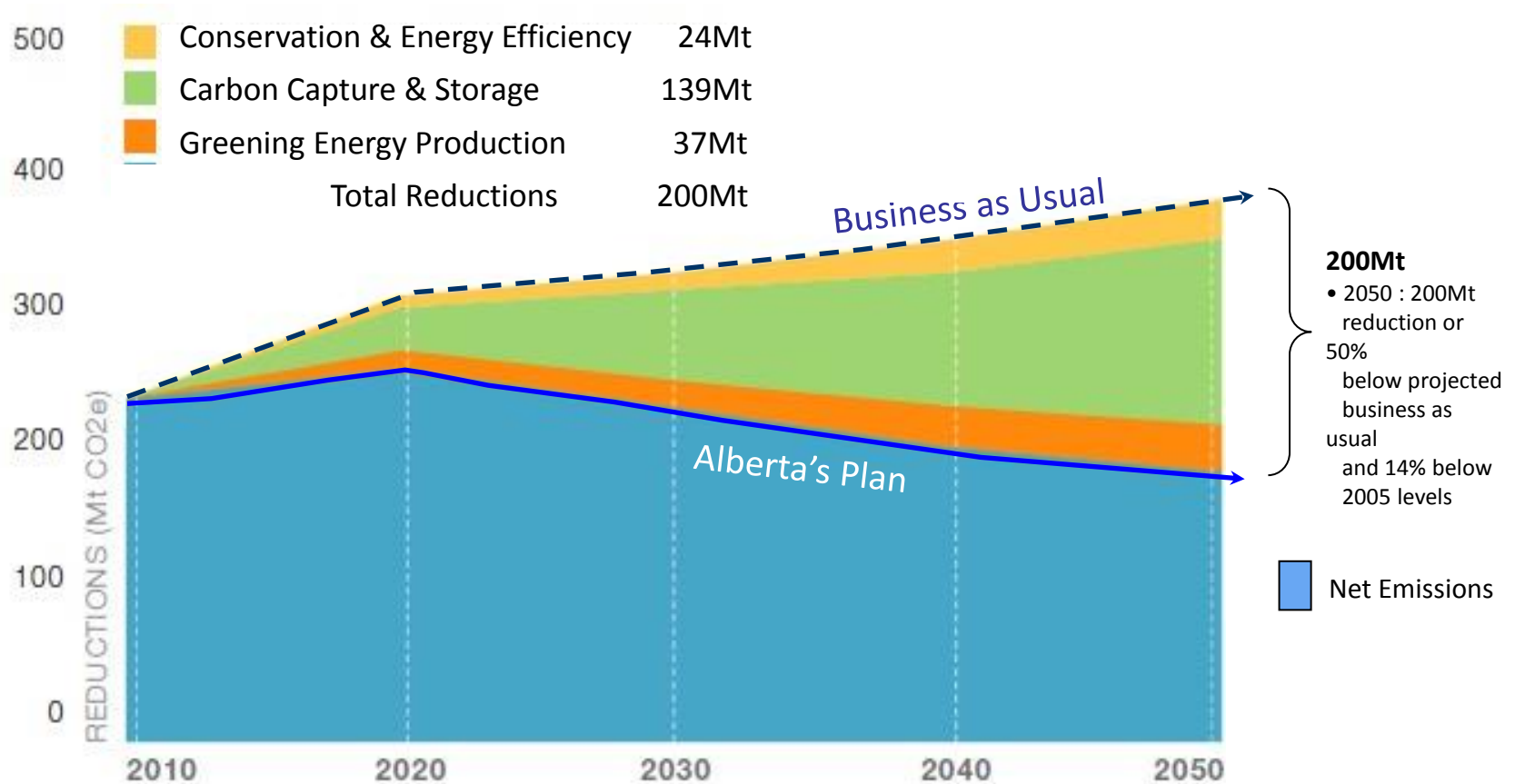


Source: Centre for Energy



Alberta Climate Change Strategy Renewal

Climate Change Strategy (2008)



Source: Alberta 2008 Climate Change Strategy

Climate Change Strategy Renewal Objectives

- Achieve GHG reductions while maintaining strong economic activity
- Determine effect of policy on market access
- Appropriate jurisdictional authority
- Ensure a fair distribution of climate policy costs
- Incent technological innovation for long-term reductions and transformational change
- Enable market instruments to bridge the gap between current and long-term reduction policies

Climate Change Renewal Timelines

2013	2014	
<ul style="list-style-type: none">• Progress Report• Formal Public Consultation	<ul style="list-style-type: none">• Strategy Renewal• Policy Framework	<ul style="list-style-type: none">• Renew Specified Gas Emitters Regulation

July 2015: Federal coal regulation comes into force

Alberta's Alternative and Renewable Energy Policy Framework



A&R Energy Policy Framework

Strategic Positioning and Inputs

**The Canadian Energy Strategy
– Council of Federations**
(in progress)

10 Main Topics including:
**#6 Renewable, Green and/or
Cleaner Energy**

Coal Regulations – Canada
(in force 2015)

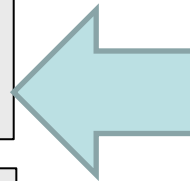
**Provincial Energy Strategy –
Alberta (2008 – Under Review)**

- **Clean energy development**
- Wise energy use
- Sustained economic prosperity

Alberta Climate Change Strategy
(2008 - Under review)

- CCS
- Energy efficiency & conservation
- **Greening energy production**

**Alternative and
Renewable Energy
Policy Framework**
(in progress)



A&R Energy Scope

End Use	Renewable Energy	Alternative Energy
	Wind, solar, geothermal, biomass, etc.	Lower emissions than conventional
Electricity	★	★
Transportation	★	★
Heat	★	★

A&R Energy Policy Framework Timelines

2013	2014	
<ul style="list-style-type: none">• Information Gathering• Draft Framework with Policy Options• Formal Public Consultation	<ul style="list-style-type: none">• Final Framework• Action Plan	<ul style="list-style-type: none">• Commence Implementation

Barriers and Opportunities

- Resource Size and Characteristics
- Technology
- Infrastructure
- Financial
- Markets
- Regulatory
- Labour and Skills
- Information and Awareness
- Social Acceptability

Build on Experience

Alberta's experience

- Specified Gas Emitters' Regulation/ Carbon Offsets (since 2008)
- Climate Change Emissions Management Corporation (since 2008)
- Alberta's Competitive Electricity Wholesale Market (since 1990's)
- Alberta Electric System Operator recognized internationally for integration of wind into the Alberta electricity market
- Micro-Generation Regulation (since 2009)
- Agriculture Growing Forward Programs (since 2008)
- Renewable Fuels Standard Regulation (since 2011)
- Bioenergy Grant Programs (2006 - 2016)
- Alberta Forest Products Road Map (2012)
- Research and development (e.g., Alberta Innovates)
- Outreach (e.g. Inside Education)

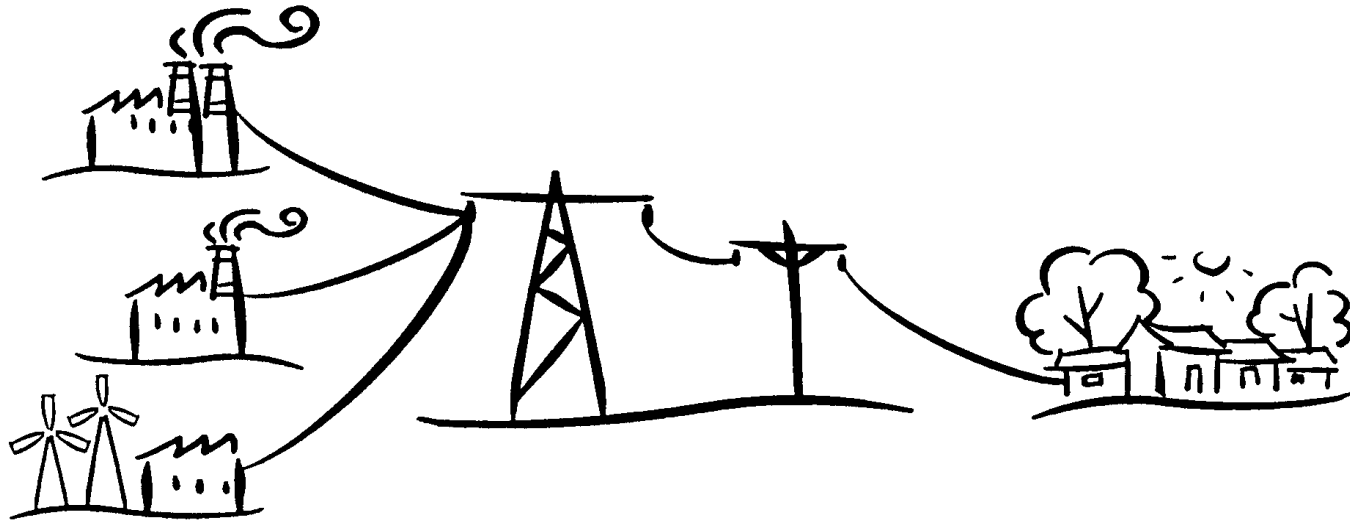


Experience in other jurisdictions

Alberta Electricity Market Overview



Current Market Structure



Generation

- Competitive / Market based
- Private Investment
- Energy Only Market Design

Transmission

- Fully Regulated
- Cost-of-Service Model
- One rate for Albertans

Distribution

- Fully Regulated
- Supports Retail Competition

Retail / Customer

- Partially Deregulated
- Competitive Contracts
- Regulated Rate Option for Small Consumers

Electricity Sector Governance Structure in Alberta

ALBERTA GOVERNMENT

Policies, Law, Regulations

AESO

Transmission Planning
System and Market Operations
Financial Settlement

ALBERTA UTILITIES COMMISSION

Regulator: Distribution,
Transmission and Regulated
Rate for small customers

MARKET SURVEILLANCE

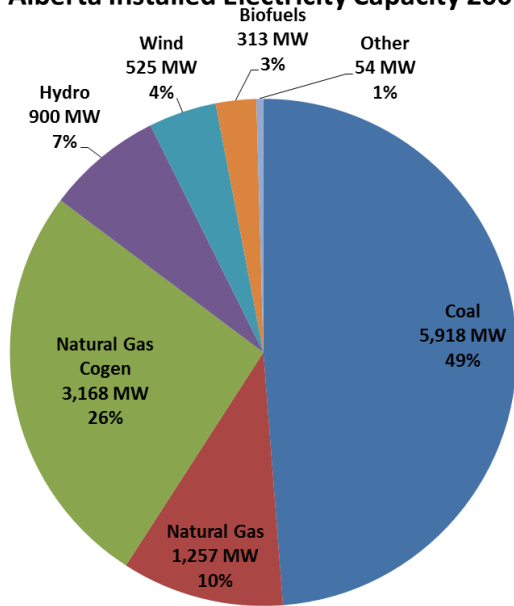
Compliance Surveillance
Enforcement of Reliability Standards

BALANCING POOL

Banker on behalf of customers

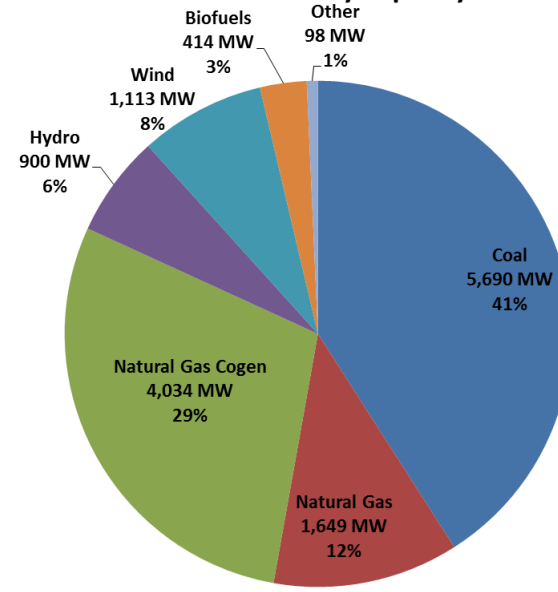
Alberta's Electric Generating Capacity

Alberta Installed Electricity Capacity 2007



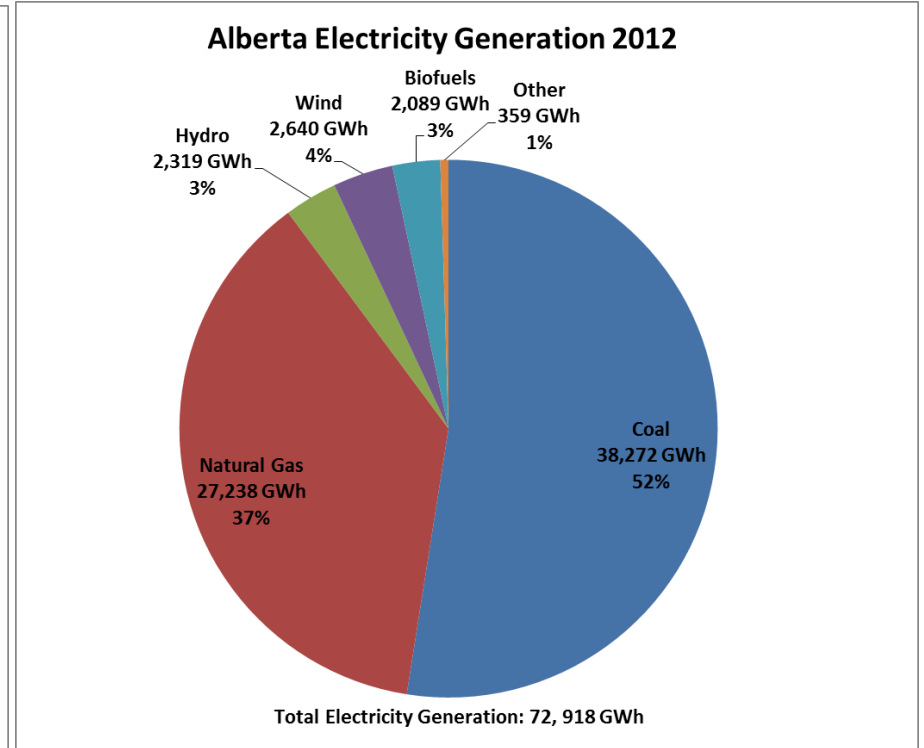
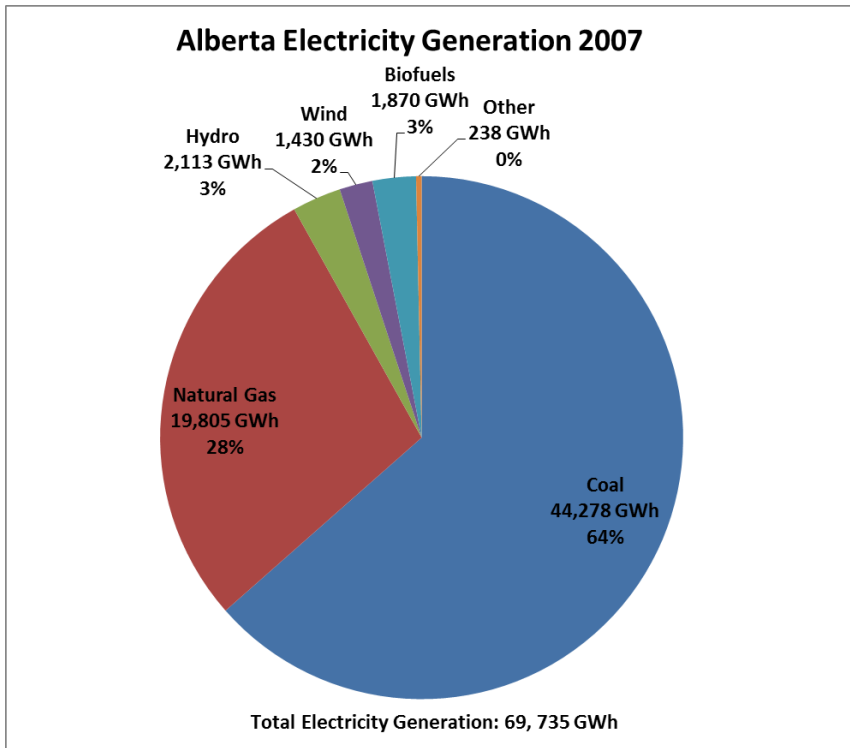
Total Electricity Capacity: 12,135 MW

Alberta Installed Electricity Capacity 2012



Total Electricity Capacity: 13,898 MW

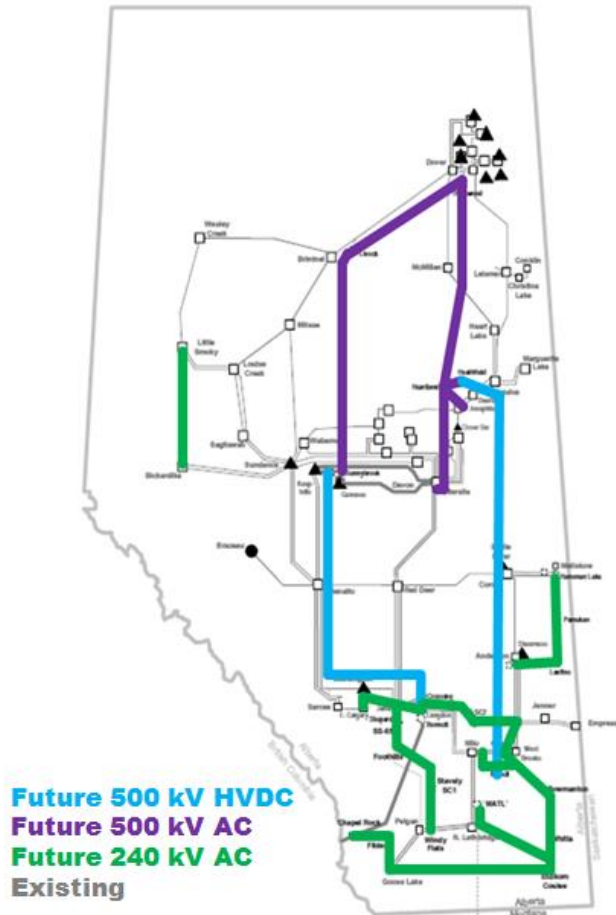
Alberta's Electricity Generation



Renewables in Alberta's Electricity Wholesale Market

- Generating capacity is privately developed and owned
- Generated electricity is sold into a competitive market
- Non-dispatchable renewables such as wind are guaranteed entry into the market whenever they can supply electricity
- Wind enters market at \$0/MWh and take the price set as a result of other generators' bids for a given time period
- Dispatchable renewables, such as biomass and hydro, bid into the system along with other generators
- Market can accommodate intermediary marketers wishing to contract with electricity generators

Renewables and Transmission



- Congestion is expensive
- Wind, solar and hydro located far from load
- Inadequate transmission to link available generation to load leads to higher electricity prices for consumers

Renewables and Transmission

- Transmission and distribution remain fully regulated in Alberta
- \$14 Billion to be spent on critical transmission infrastructure and other projects
- Every \$1 billion in transmission investment increases residential bills by approximately \$1/month
- Southern Alberta Transmission Reinforcement (SATR)
 - accommodates growth in wind in south
 - 3 stage project being built between 2011 and 2016
 - Estimated cost: \$3 billion
 - Capacity for 2,7000 MW wind upon completion

Renewables in the Retail/End Use Sector

- Micro-generation provides a low cost solution for end users to connect small (1 MW maximum) renewable generating capacity to the grid
- Retailers find innovative solutions within the retail market
Examples:
 - Enmax “Generate Choice Solar Program”
 - Enmax “WhisperGen” program for heating
 - Green energy retailers such as Bullfrog Power, Bow Valley Power, Enmax and Just Energy
 - Utility Consumer Advocate helps consumers make informed choices (www.ucahelps.alberta.ca)



Thank You!

April 2 2013

Susan Carlisle

Director, Alternative Energy

Susan.Carlisle@gov.ab.ca