

# Corporations & Society

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- How to address societal and environmental needs in industry?
  - Focus on energy, and the oil sands
- A brief introduction to the oil & gas industry
  - Environmental Perspectives: Hydrocarbons in 2050 & 2100
- “Sustainability”
  - Definition, Accountability
- Suncor’s response to evolving expectations
- Corporations, Government and Society
  - Climate Change & Corporate Response and Responsibility
- Questions and Stories

# We Create Energy for a Better World

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## Mission

We create energy for a better world

## Vision

To be trusted stewards...  
Guided by  
our values... economic  
prosperity, social  
wellbeing, healthy  
environment

## Values

Safety above all else  
Respect  
Do the right thing  
Raise the bar  
Commitments matter

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# Dedicated Employees, Responsible Development

Long-term strategy focuses on our economic, social and environmental performance.

- Safe and performance-driven work environment
- Minimizing our environmental footprint
- Contributing to well-being of the communities in which we operate
- Strengthen relationships and increase the participation of Aboriginal Peoples in energy development.

*“Leaders cause things to happen that otherwise wouldn’t, or stop things from happening that otherwise would.”*

- Mark Little, President, Upstream, Suncor

“Unfortunately, a good part of the population sees business people as disconnected. But a company is just a sum of individuals like you and I. We’re sisters, brothers, fathers, mothers, cousins. Sometimes we are sad, mad, sick. We should not be shy to put up that real face. People want to connect to human beings, not a bunch of alpha women and men.”

- Sophie Brochu, CEO of Gaz Métro



# Energy in the Modern Society

- Energy use is explicitly linked to quality of life
  - Variations within similar QoL caused by geography, climate
- Energy use will increase as world alleviates poverty
  - Reduction of energy poverty
- Energy demand dictates energy production
  - Energy will be delivered by the cheapest source
- All people have the same drivers
  - A better life for their children

U.S. energy consumption by energy source, 2015

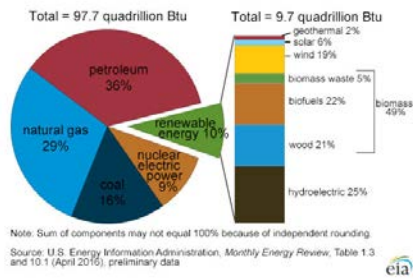


Figure 1. World marketed energy use by fuel type (quadrillion Btu)

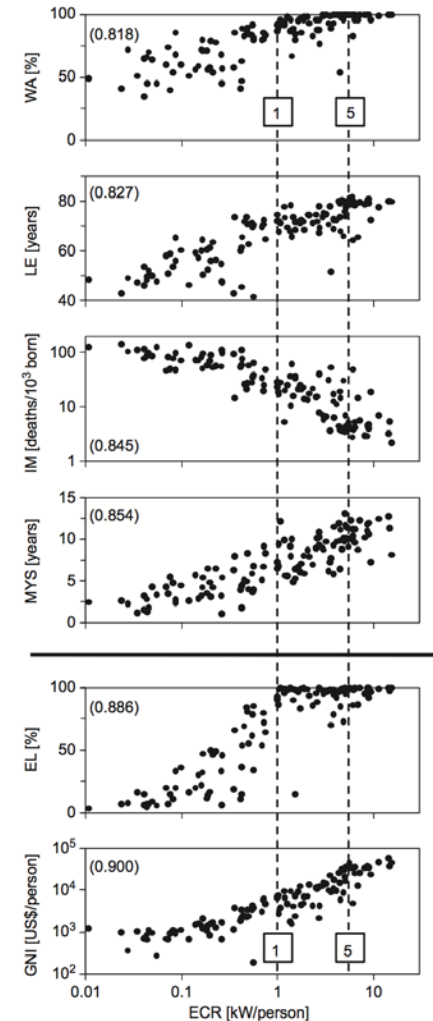
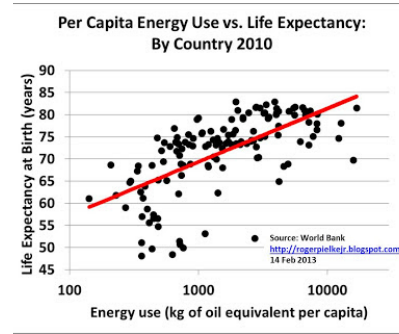
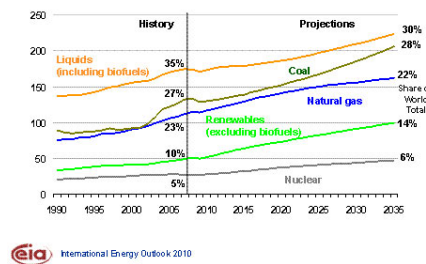


Fig. 1. Quality-of-life-related variables and energy consumption rate per capita ECR: Improved water access WA, life expectancy LE, infant mortality IM, mean years of schooling MYS, electrification level EL, and gross national income GNI. Correlation coefficient in parentheses (infant mortality and gross national income are considered in logarithmic scale). Note: Data for 118 countries with populations larger than four million in 2005 (data sources: Barro and Lee, 2010; DM, 2011; EIA, 2011; Elvidge et al., 2011; IEA, 2010; UN, 2011a, b; WB, 2011).

# The Oil Sands

- The Oil Sands were “discovered” by Alexander Mackenzie
- Canada has the 3rd largest oil reserves in the world
  - 173 B Barrels
  - 167 B is in the Oil Sands
- Canada is the 5<sup>th</sup> largest oil producer
  - 6<sup>th</sup> for natural gas
- Oil sands are a mixture of bitumen, sand, clay and water
  - Predominantly sand (McMurray, Clearwater)
  - Sometime Dolomite (Grosmont)

Bitumen will not flow like regular oil, to recover it:

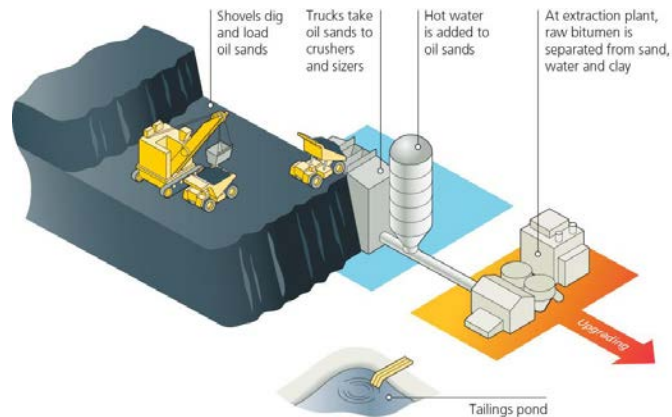
- If it's shallow (<100m) we can mine
  - Mining recovers almost all of the oil
- If it's deeper than 200m, we use thermal methods
  - Steam Assisted Gravity Drainage (SAGD)
  - Cyclic Steam Stimulation (CSS)
  - These recover up to 50% of the oil



Note: 1 km<sup>2</sup> = 1 square kilometre = 0.39 square miles

# Oil Production from the Oil Sands

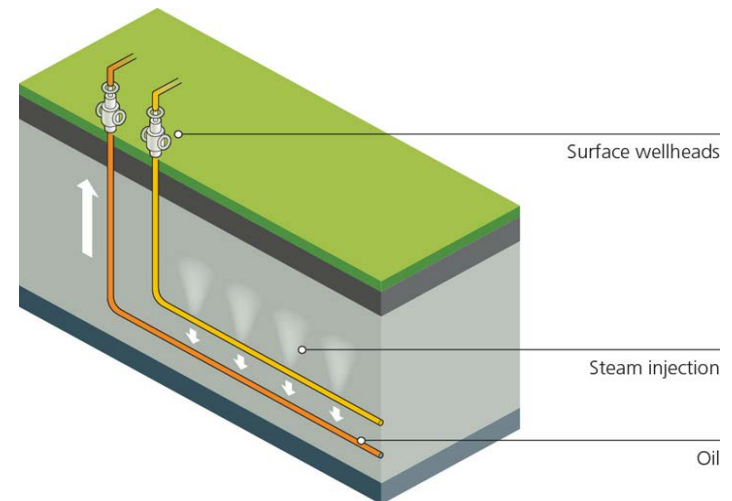
## Mining



- Suncor was the first company to mine oil sands (celebrating 50 years in 2017)
- About 1T of ore is required for 1B synthetic crude
- More than 85% of water is recycled
- 20% of resource is minable

## In Situ

- ~80% of oil sands are too deep to mine
- Need to lower viscosity bitumen through heat
- Steam Assisted Gravity Drainage
  - Invented by R. Butler at Imperial Oil
  - Several variants with solvents & surfactants
  - VAPEX, Nsolv, Cyclic Solvent Process
  - Electromagnetically Assisted Solvent Extraction (ESEIEH Pilot/EASE)
  - Suncor is one of the largest SAGD operators





# Suncor and renewable energy

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- Suncor will be among the providers of renewable energy as it becomes commercially available.
- Suncor is a Canadian pioneer in wind power. We and our partners are involved in six operational operating wind power projects in Alberta, Saskatchewan & Ontario. These facilities have a generating capacity of 287 megawatts (MW), enough to power about 100,000 Canadian homes.
- Suncor operates Canada's largest ethanol facility – the St. Clair Ethanol Plant in the Sarnia-Lambton region of Ontario.



# How Do We Evolve to the Energy System of 2050?

- Looking beyond the energy needs of today to understand what is required for the future.
- In 2050 we will be using hydrocarbons for four things:
  - Lubricants, Petrochemicals, Long Distance Transport, Agriculture
- Energy requirements of all kinds will be set by demand
  - Suncor has been an advocate for an economy-wide carbon price that encourages reductions across the entire economy since 2009
- The upstream goal is to lower production intensity as a reduction in demand is required to lower volume
  - Significant opportunities exist in the oil & gas industries to lower GHG intensity by >50%
  - Oil Sands today account for 0.13 % of global emissions
- “Ultimately...the problem isn't with the barrels, it's with the emissions”<sup>1</sup>

U.S. energy consumption by energy source, 2015

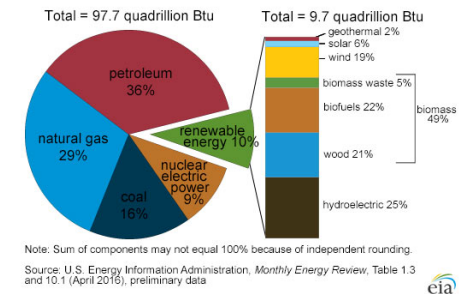
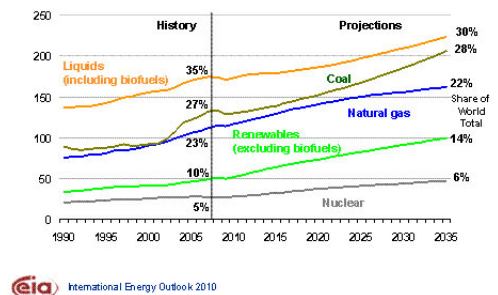


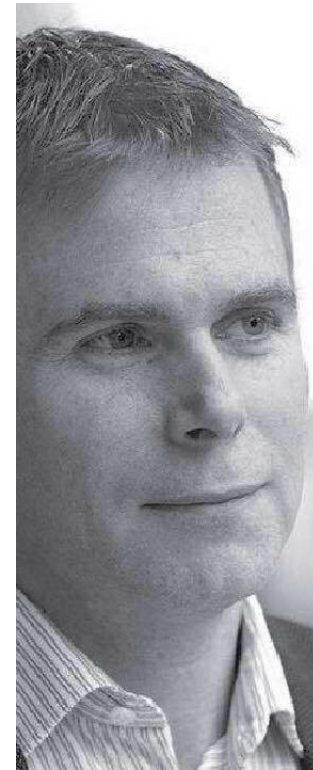
Figure 1. World marketed energy use by fuel type (quadrillion Btu)





# Significant opportunities to exist in the oil industry to lower GHG intensity

- With Suncor's support for carbon taxes comes the requirement for business response
- We need to be competitive on both price and production impacts; public policy must create competitive conditions for companies
- Canada has a role to play internationally, exporting cleaner resources and innovation
- Governments have a role to play in developing policy to accelerate and de-risk innovation
- "There are two ditches to this road":
  - One is we proceed too slowly:
    - Increase the risk of climate change impacts
    - Increase the risk of economic upheaval
  - The other is we proceed too quickly:
    - Increase the social costs of the transformation
    - Export industry (& GHG production) to other jurisdictions with no resulting GHG reduction



“UNTIL THE  
**REST OF THE WORLD HAS  
POLICIES** THAT IMPOSE  
**SIMILAR COST, YOU'RE NOT**  
ACTUALLY **REDUCING**  
**EMISSIONS** TO THE EXTENT  
YOU THINK. YOU'RE  
**JUST DISPLACING** THE  
**EMISSIONS** AND THE  
**ECONOMIC ACTIVITY** TO  
OTHER JURISDICTIONS.”

Andrew Leach  
Alberta Climate Change Panel

[www.thaglobeandmail.com](http://www.thaglobeandmail.com)

JWN Media

- De-industrialization
- Lose social license to continue to reduce footprint

# Think Globally, Act Locally

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- We share in the global challenge to tackle climate change by reducing emissions while providing energy the world needs. We will measure our progress by:
  - reducing the total emission intensity of the production of our oil and petroleum products by 30% by 2030
- We're harnessing technology and innovation to deliver products with lower intensity and costs:
  - Solvent (& solvent assisted) extraction methods in pilot today lower GHG by >50%
    - Electromagnetically Assisted Solvent Extraction, Heated Solvent, Steam Solvent
  - New mine extraction methods may lower mine footprint and GHG by ~ 25%
  - New crude compositions and conversion technologies to reduce refining GHGs
  - Expand electrical co-generation – lowest GHG thermal technology available
  - Reclamation processes can absorb material amounts of CO<sub>2</sub>
  - Continue to develop renewables - fuels and electricity
- Suncor will export both its oil and technologies to lower worldwide GHG production
  - Canada has an active energy innovation sector lowering emissions
  - Most producing jurisdictions do not have equivalent environmental regulations

# The Energy System 2050

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- Sustainability is economic, environmental and social
  - At its core, sustainability is about an organization's ability to understand, respond and adapt to a changing external environment and in doing so remain relevant, and generate value, regardless of which version of the future unfolds
- Suncor is working to strengthen our relationships and increase the participation of Aboriginal Peoples in energy development.
- In 2050 we will still be using hydrocarbons for four things:
  - Lubricants, Petrochemicals, Long Distance Transport, Agriculture
  - Significant opportunities exist in the oil & gas industries to lower GHG intensity by >50%
- The world needs at least 50% more food to feed 9 billion people by 2050<sup>3</sup>
- 1.2 Billion people today do not have access to electricity<sup>2</sup>
- Decarbonization of most electrical generation and urban transport seems reasonable but carries risk
  - Artificial pace could squander resources with no environmental benefit
    - Ontario's Auditor General reports Ontarian's paid an extra \$37 Billion for hydro from 2006 to 2014 <sup>1</sup>
- All industries will be impacted by energy policies within and between jurisdictions
  - Oil will be used, where will it be produced?
  - Electric vehicles will be used in Canada, where will they be made?
- What we have learned
  - Human activity is causing climate change, and not all of it
  - Corporations are a key component of reaching our societal expectations

# Reading List

Title and Author	Subject
The Discipline of Innovation. Peter Drucker. HBR: May-June 1985	The best single essay on sources of innovation I've read
Gunfire at Sea: A Case Study in Innovation. Elting Morison. Men, Machines & Modern Times (MIT Press), 1966	Implementation and barriers to innovation
Out of the Crisis. W,Ed. Deming	The original thinker on the quality movement and industrial renaissance
Systems of Survival. Jane Jacobs. Dark Age Ahead. The Nature of Economies	Outstanding expositions on the "proper" roles of government and commerce, and the futures of economics and society.
Overcoming Organizational Defenses. Chris Agyris	An examination of the issues which impede innovation and learning in large organizations
Creating a Customer Centered Culture. Robin Lawton	Understanding internal and external customer requirements
Fourth Generation Management. Brian Joiner	Industrial Engineering and Production Classic
Energy Transitions: History, Requirements, Prospects. Energy Myths and Realities. Vaclav Smil	Bill Gates' favourite writer on energy and economy
The Age of Unreason. Charles Handy	Exceptional writer on Business and Society
The Idea Factory. Jon Gertner	A great story about Bell Labs, who created the modern world
The Great Degeneration. Niall Ferguson	A cautionary tale on commerce in the OECD in the 21 <sup>st</sup> Century
Can we Control Carbon Dioxide? William Nordhaus, 1975	The original paper on 2 degrees
Where Good Ideas Come From. Stephen Johnson	A wonderful review of innovation & processes