Tracking the Transition of the Energy Sector
With Summary Views on Portfolio Divestment of Oil & Gas
Discussion Slides for the University of Victoria
November 2019
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Tracking the Transition
World Energy Demand by Primary Source
Annual; 2000 to 2018

Source: BP Statistical Review
Growth in Renewable Energy is Exponential

Source: BP Statistical Review

World Renewables Consumption

Source: BP Statistical Review
World Energy Demand By Primary Source
Annual; 1970 to 2018

Exajoules

0 100 200 300 400 500 600


Renewables
Hydro
Nuclear
Natural Gas
Oil
Coal

…but this fraction is still very small.

Source: BP Statistical Review
Market Share of Renewables, Oil and Gas
As a percentage of the total of all primary energy sources

Source: BP Statistical Review
Global GHG Emissions Growth
Annual; 2000 to 2018

Source: BP Statistical Review

- China
- Canada
- USA
- India
- Europe
- Rest of World

Tonnes of CO2 (Blns)


Rise of China
Financial Crisis
Economic recovery
Cheap energy era

Source: BP Statistical Review
Sources of Global GHG Emissions, 2017 and 2040

This is how much emissions must shrink by 2040

Source: IEA Sustainable Development Scenario (World Energy Outlook 2018)
World Investment in Renewable Energy

Annual; 2000 to 2018

Source: IEA
Cumulative Investment in Renewable Energy
Annual Global Capital Expenditures; 2000 to 2018

Typical Paris Agreement Transition Scenario
Annual; 1970 to 2040

Typical Paris Agreement Transition Scenario
Annual; 1970 to 2040

$4.1 Trillion Spent
(2000 to 2018)

Typical Paris Agreement Transition Scenario
Annual; 1970 to 2040

$4.1 Trillion Spent
(2000 to 2018)

Who Will Supply the Future? Who Should?
Annual; 1970 to 2040

$4.1 Trillion Spent
(2000 to 2018)

Who will supply this?


ARC Energy Research Institute
Scenarios for Future Oil Demand
2015 - 2040

Oil Production by Volume and Perceived Corruption

Corruption (Colour) and Size of Oil Production (Black Spots)

Source: Corruption map from Transparency International (2016); Oil volumes by BP Statistical Review 2018
Progressive Oil & Gas is Responding to Climate Change

Suncor's Sustainability Goals
Our greenhouse gas (GHG) emissions goal: harness technology and innovation to reduce our emission intensity by 30% by 2030

Chief aims for Occidental Petroleum to be ‘carbon neutral’
Shale producer pins hopes on enhanced oil recovery using captured greenhouse gases
Ultimately, she wants Occidental to be “carbon neutral”: capturing greenhouse gases equivalent to all the emissions arising from its operations, its supply chain and the use of the oil and gas that it produces.

Shell Vows to Halve Carbon Footprint by 2050 to Achieve Paris Goals
“The oil and gas industry is reducing its emissions fast”

“Who cares? You will be irrelevant in 10 years”
People are Buying Bigger and Bigger Guzzlers
Two-Axle, four-tire trucks, pickups, SUVs, vans less than 8,500 lbs

Source: US Bureau of Economic Analysis (BEA)
Estimated Well-to-Combustion Emissions
US Refined Average Crude Oil (2014)

Source: ARC Energy Research Institute, using input data from US Department of Energy National Energy Technology Laboratory
Is it really a binary choice?
(the goal is to reduce emissions ASAP)
Not All Oil Production Emissions are the Same!
GHG Intensities of Various Oil Production Sources Around the World

- US Average represents the weighted average production emissions of all crude oils that were consumed in US refineries in 2014; All plays assume wide Boundary Oil Production GHG Emissions Intensity; KgCO$_2$/B

A wide 8:1 ‘dynamic range’ in GHG intensity

US Average*

Worst

Best
The Growing ESG Movement is Important
ESG reporting will identify progressive companies across all energy systems

We focus investors, companies and cities on taking urgent action to build a truly sustainable economy by measuring and understanding their environmental impact

Top investment groups push for action on climate risks
BlackRock and others demand disclosure at US energy companies, analysis shows