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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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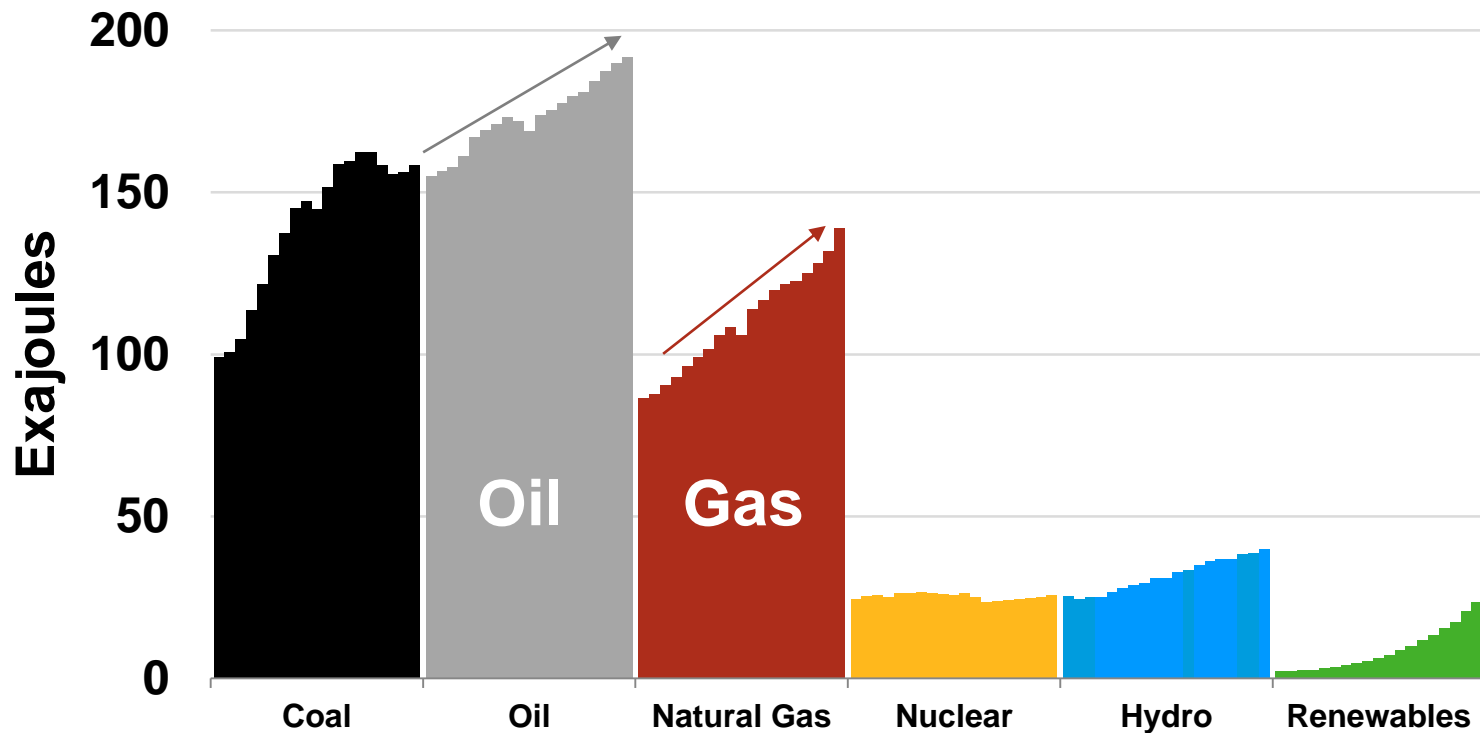


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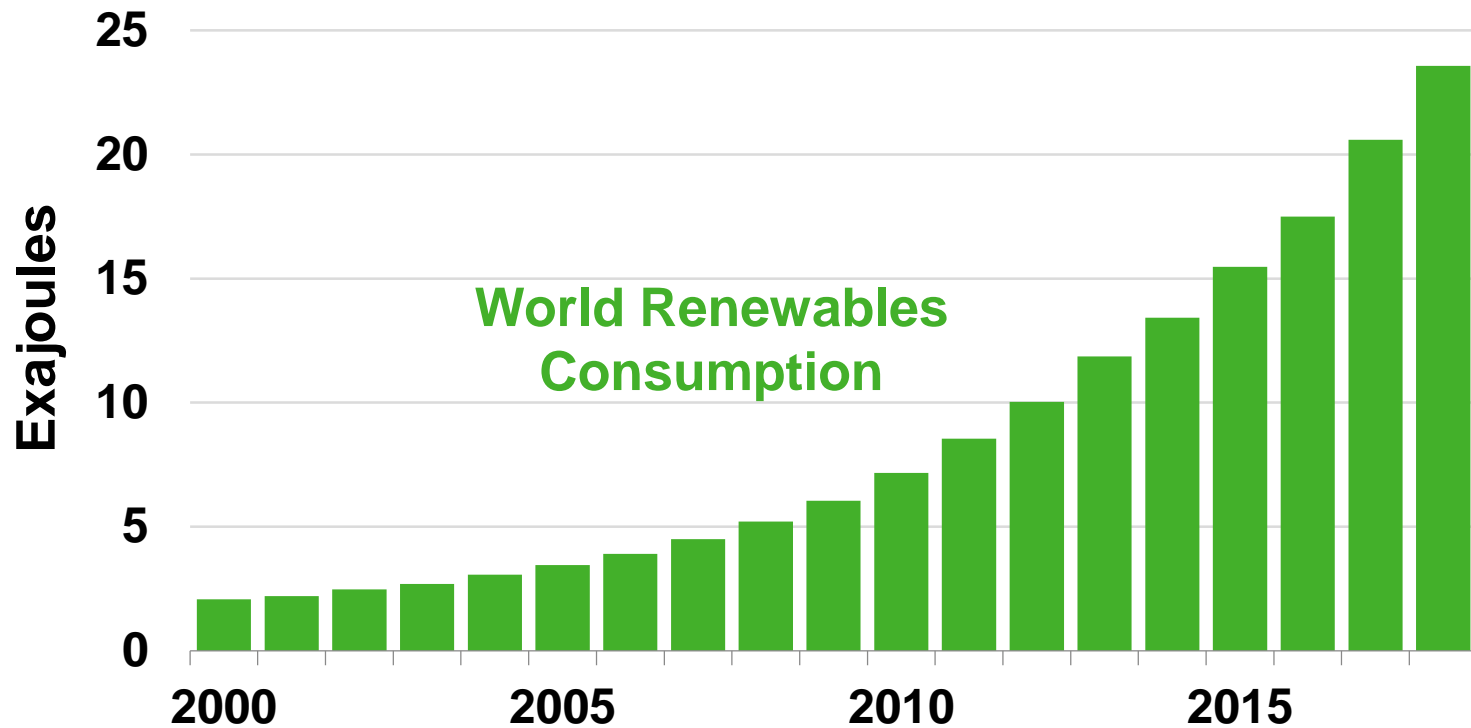
Tracking the Transition

World Energy Demand by Primary Source

Annual; 2000 to 2018

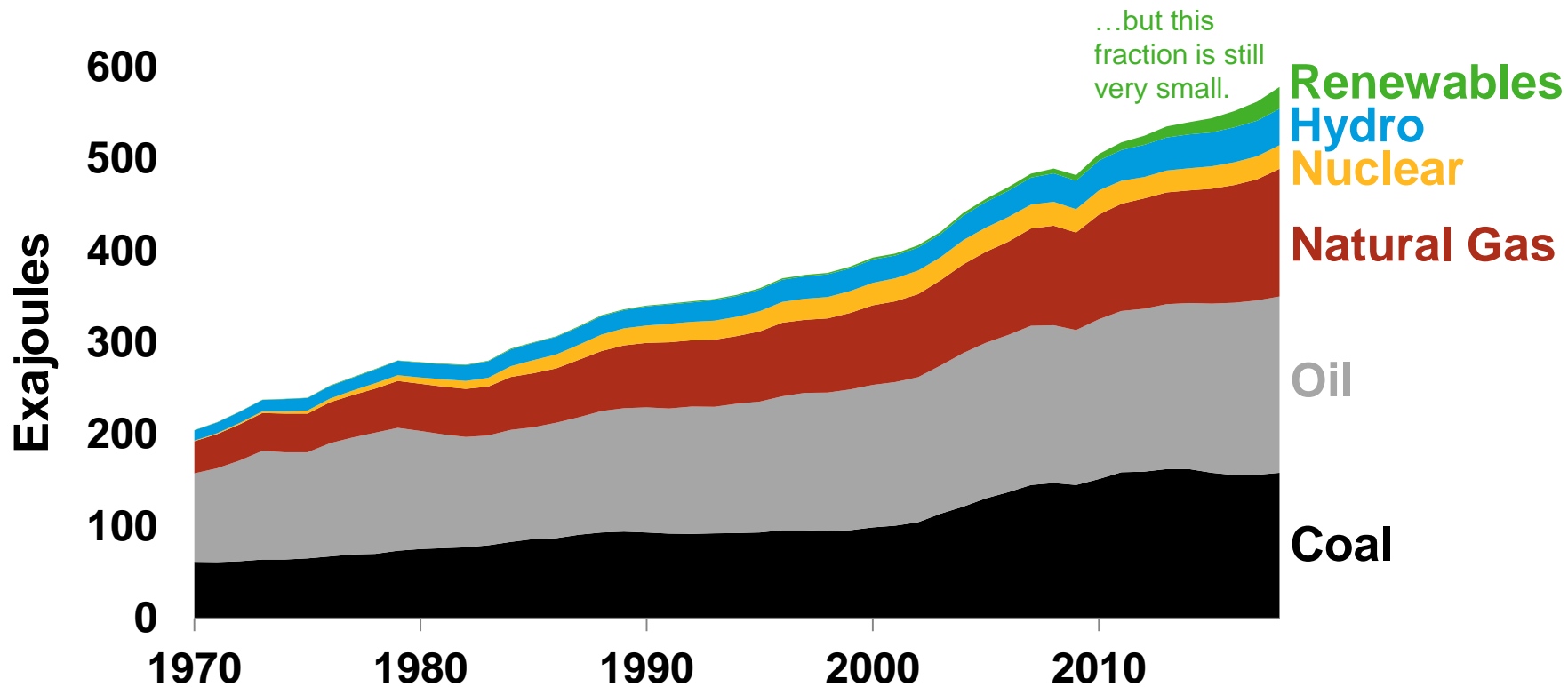


Growth in Renewable Energy is Exponential



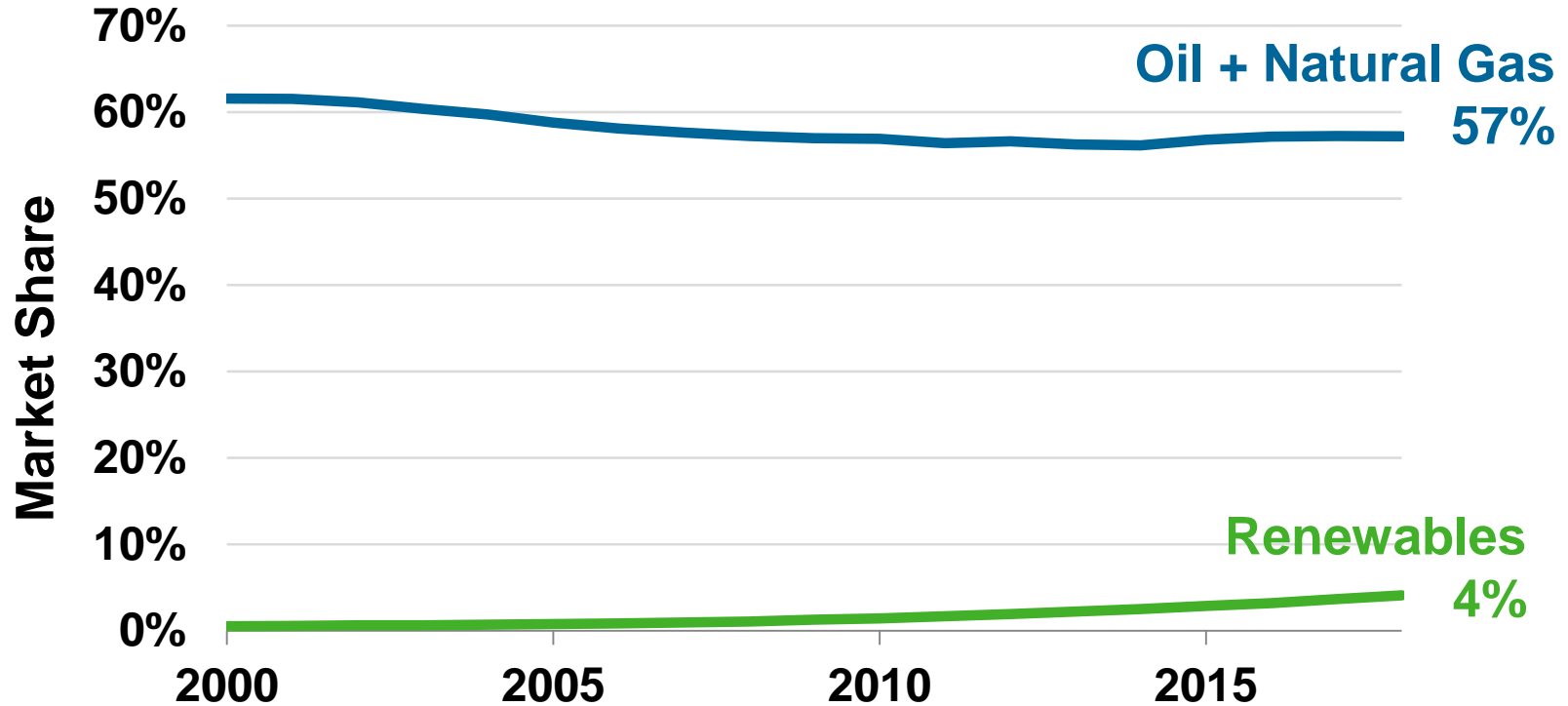
World Energy Demand By Primary Source

Annual; 1970 to 2018



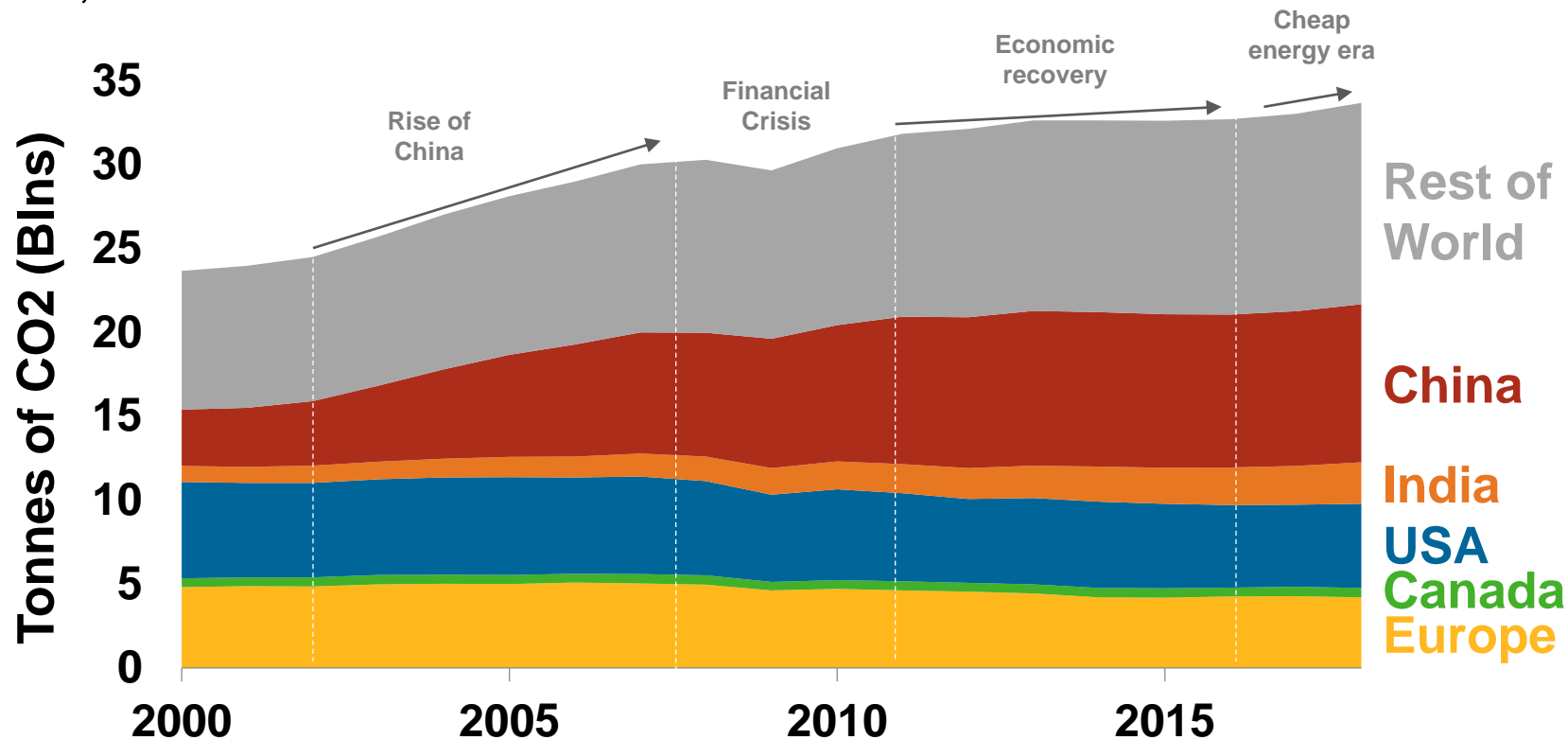
Market Share of Renewables, Oil and Gas

As a percentage of the total of all primary energy sources

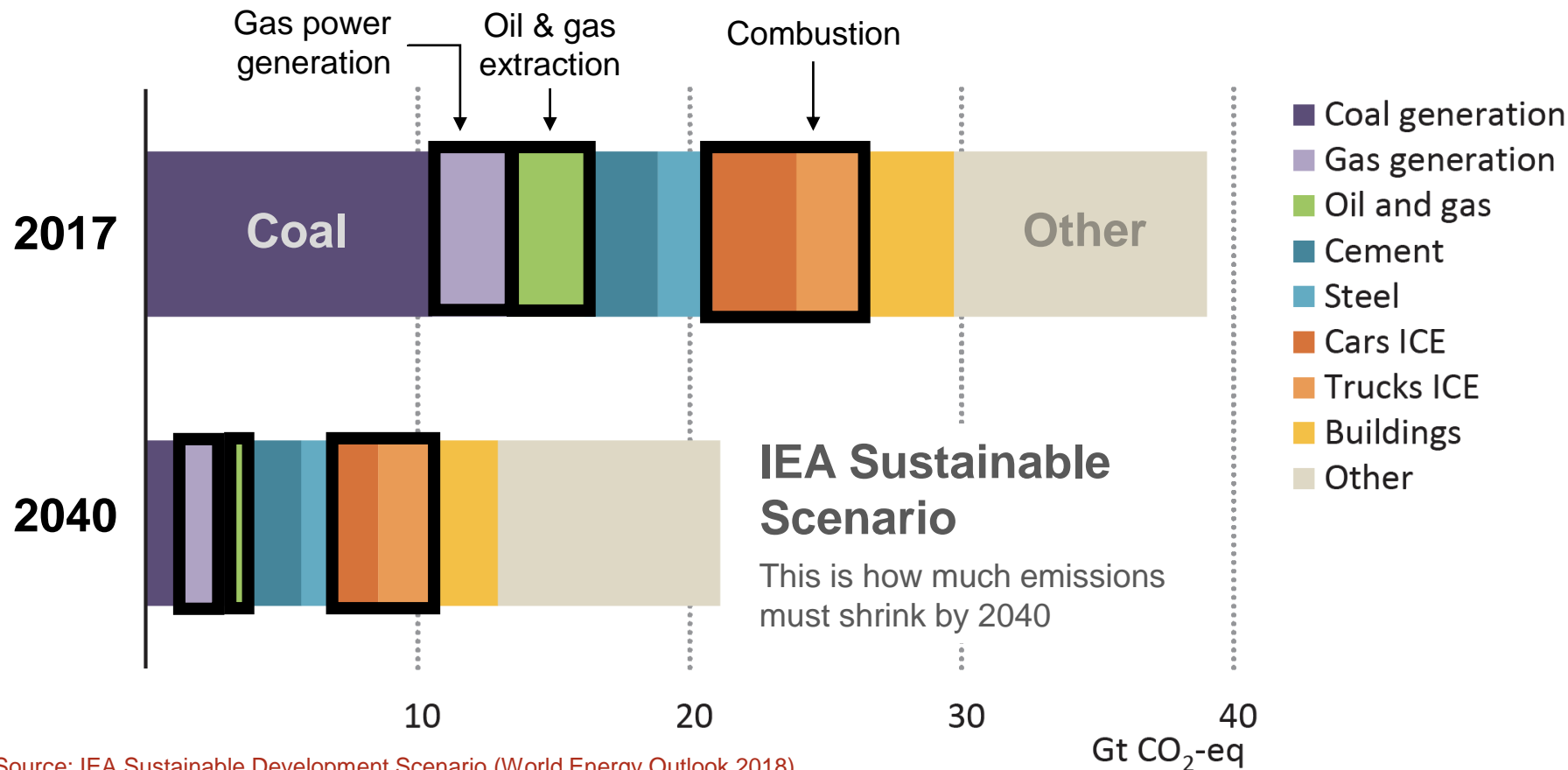


Global GHG Emissions Growth

Annual; 2000 to 2018

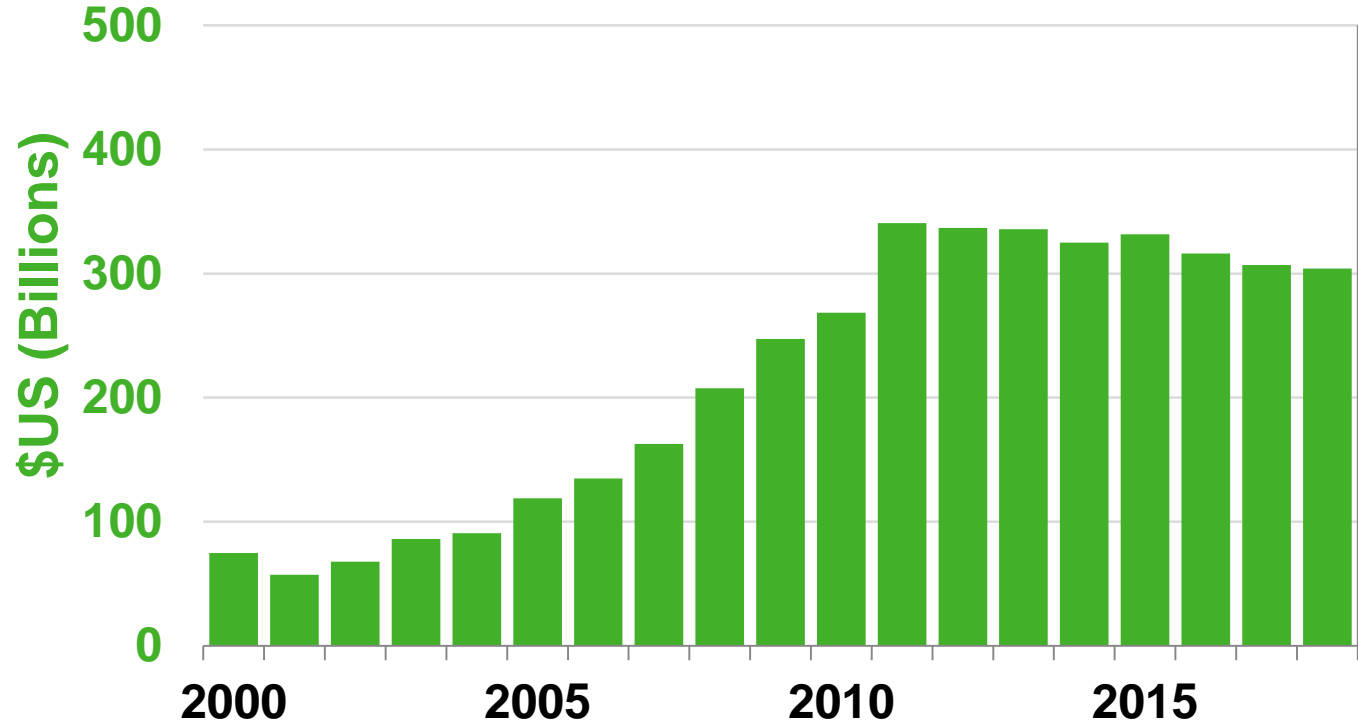


Sources of Global GHG Emissions, 2017 and 2040



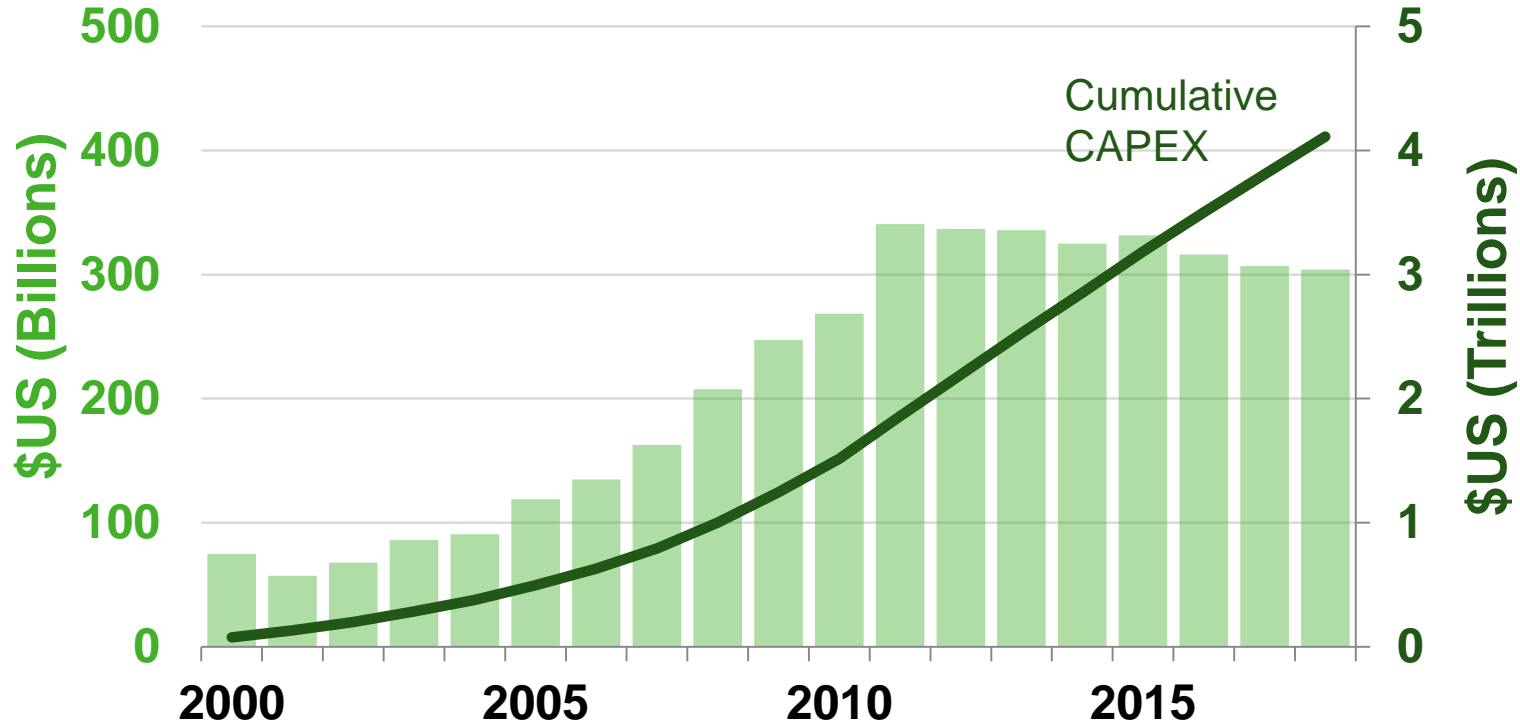
World Investment in Renewable Energy

Annual; 2000 to 2018



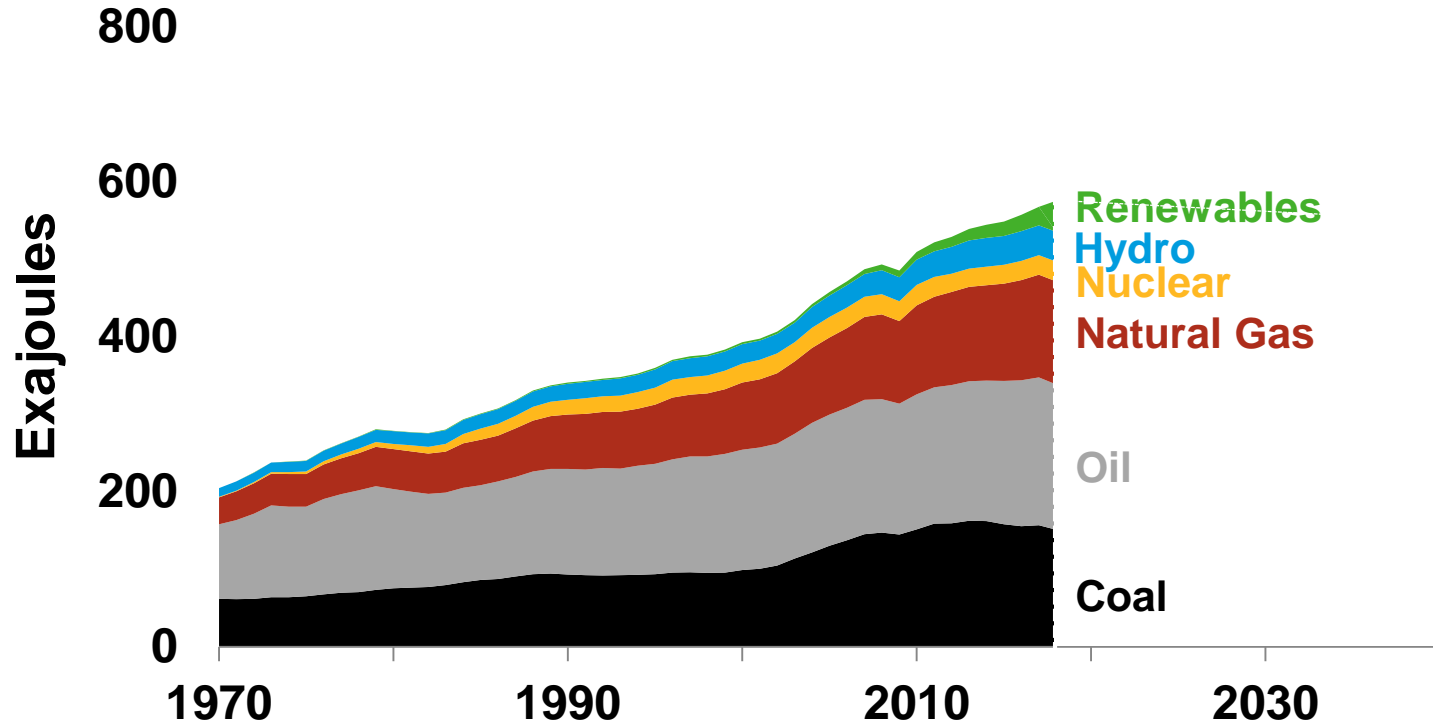
Cumulative Investment in Renewable Energy

Annual Global Capital Expenditures; 2000 to 2018



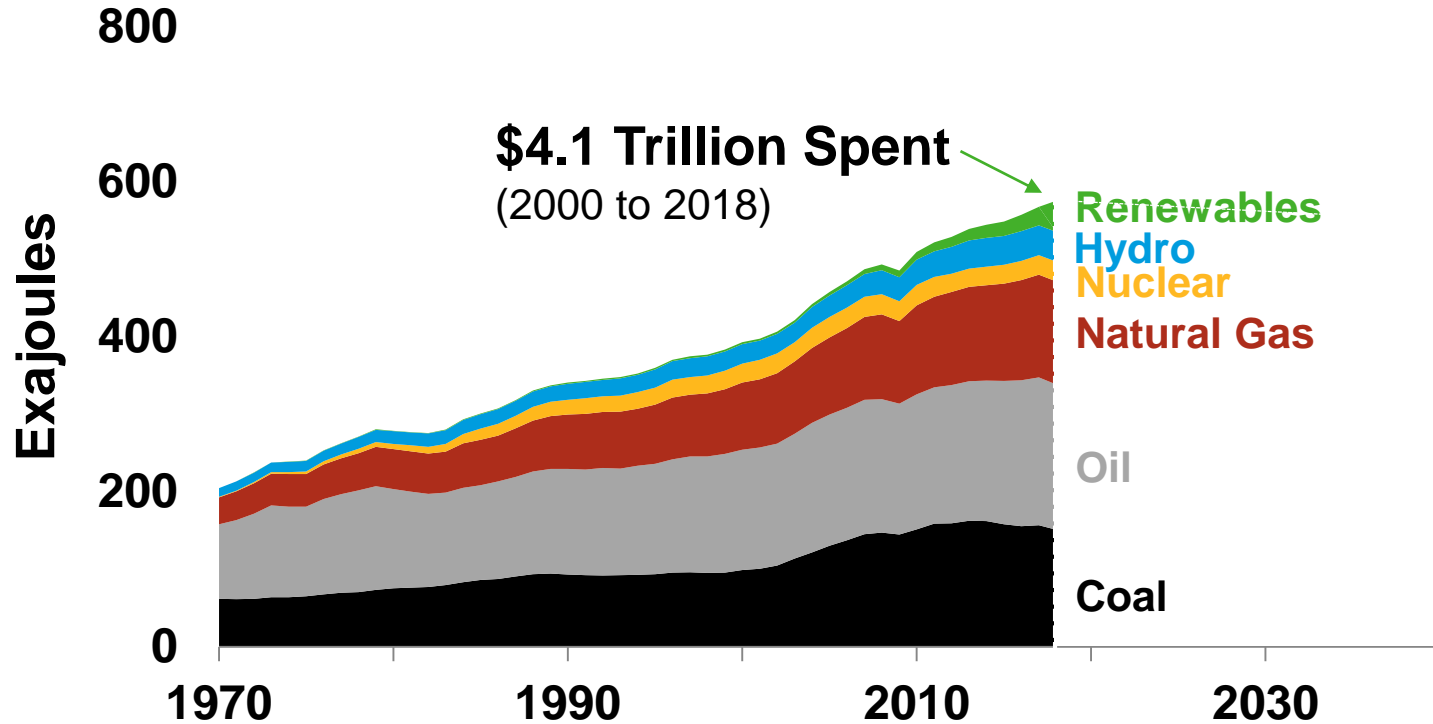
Typical Paris Agreement Transition Scenario

Annual; 1970 to 2040



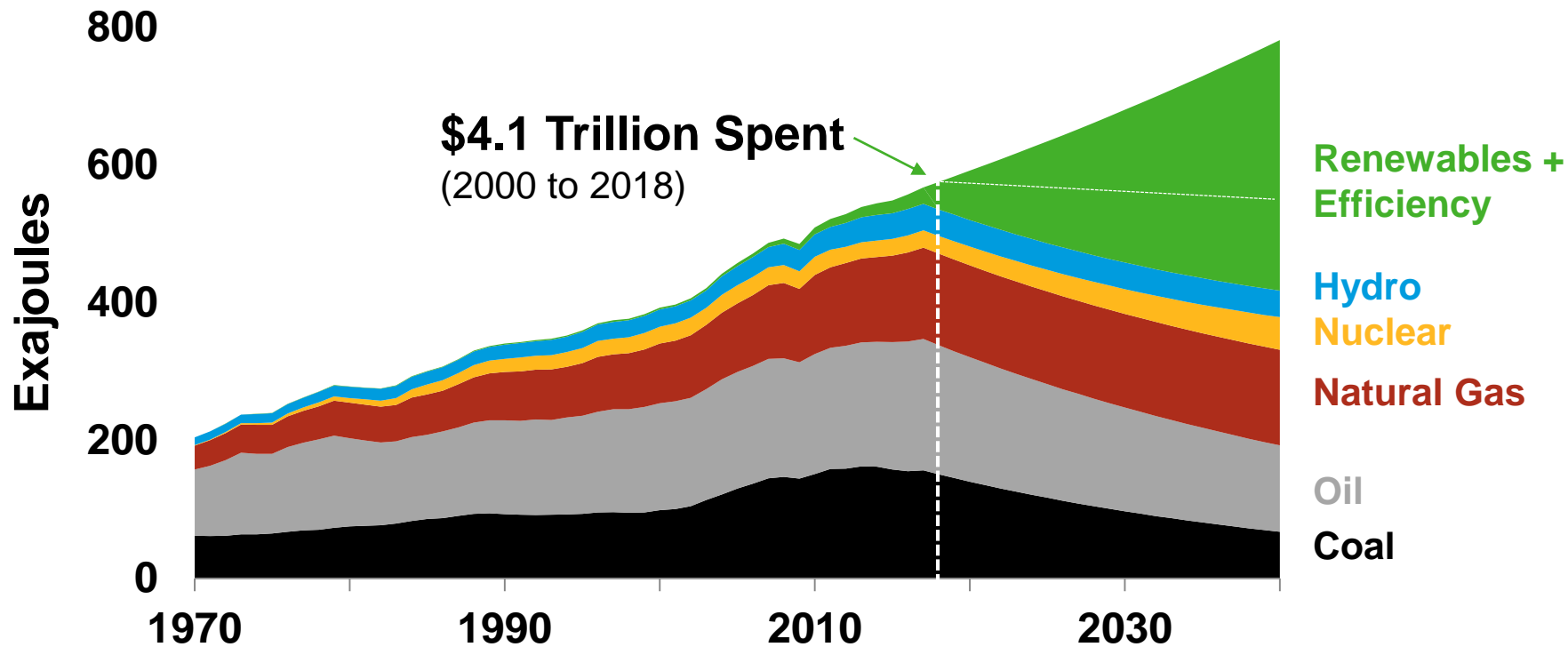
Typical Paris Agreement Transition Scenario

Annual; 1970 to 2040



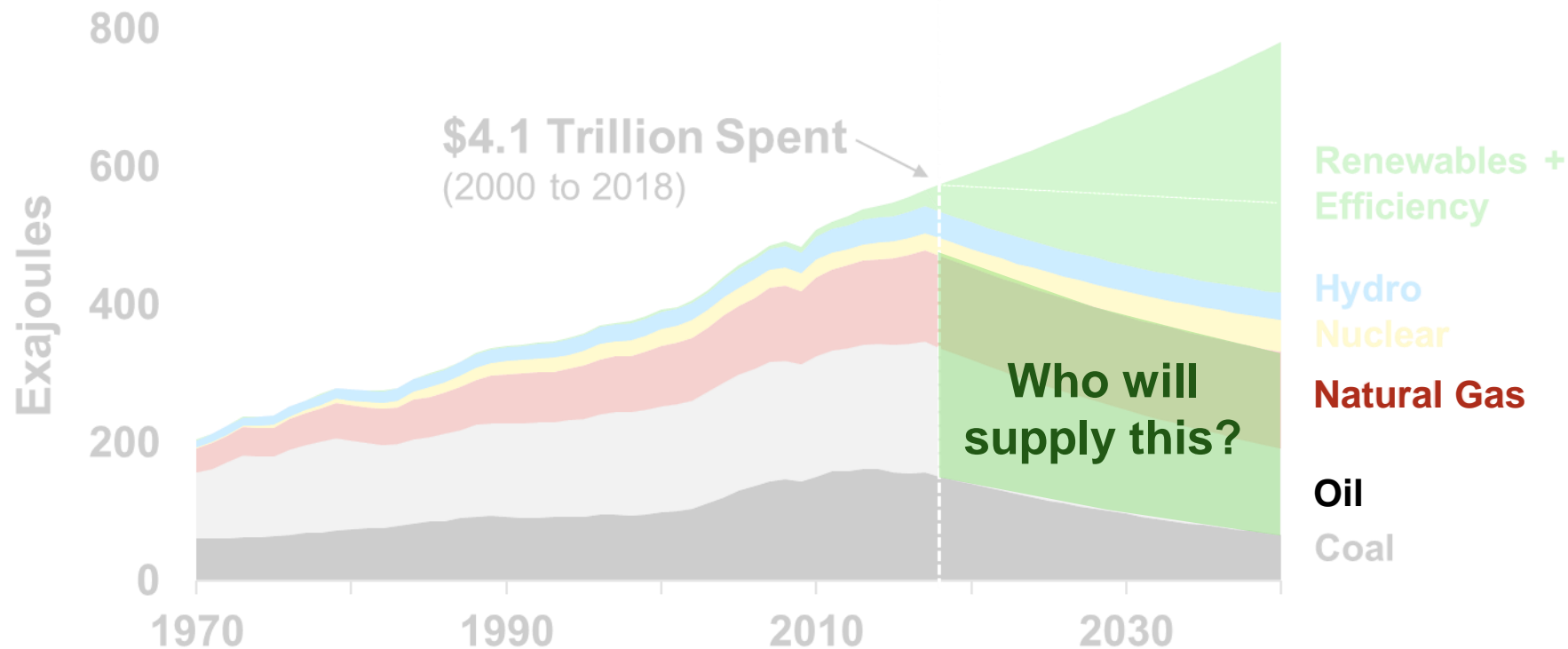
Typical Paris Agreement Transition Scenario

Annual; 1970 to 2040



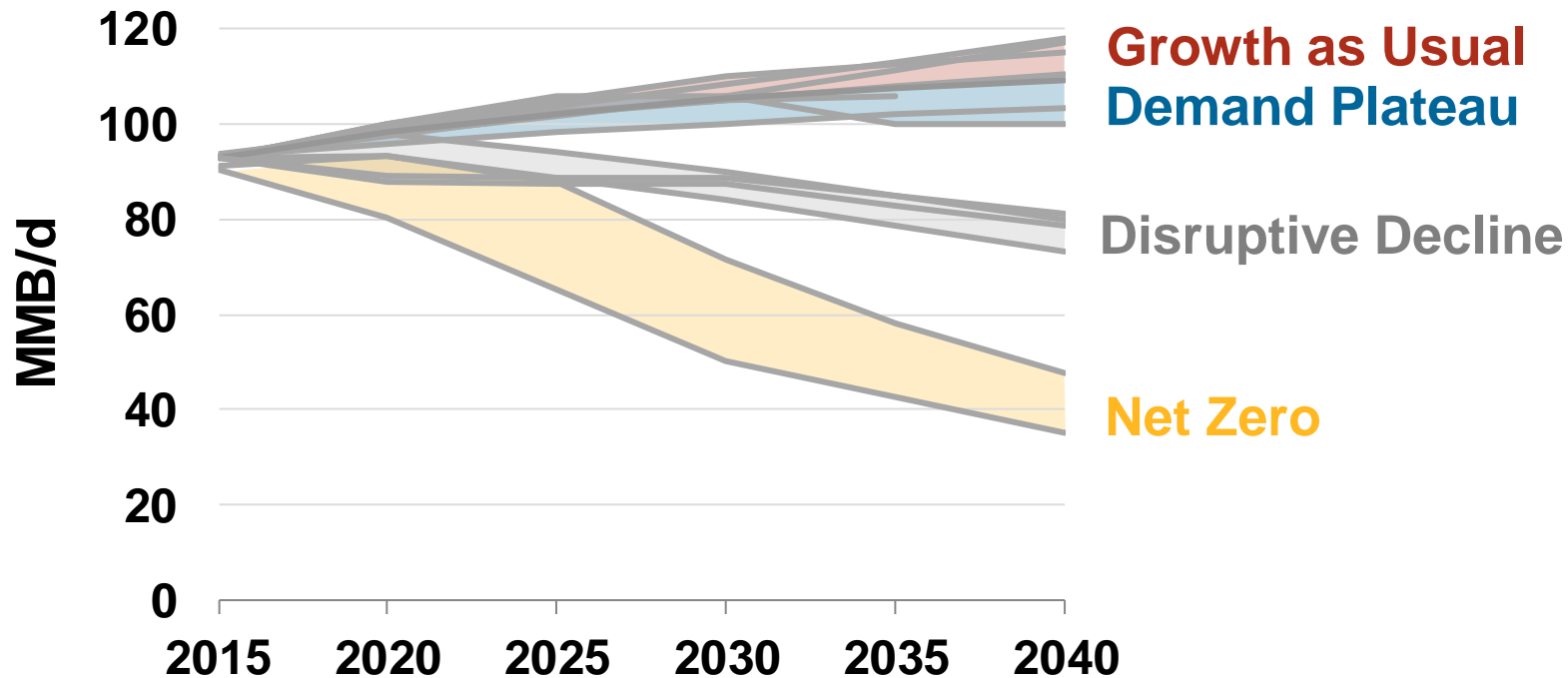
Who Will Supply the Future? Who Should?

Annual; 1970 to 2040



Scenarios for Future Oil Demand

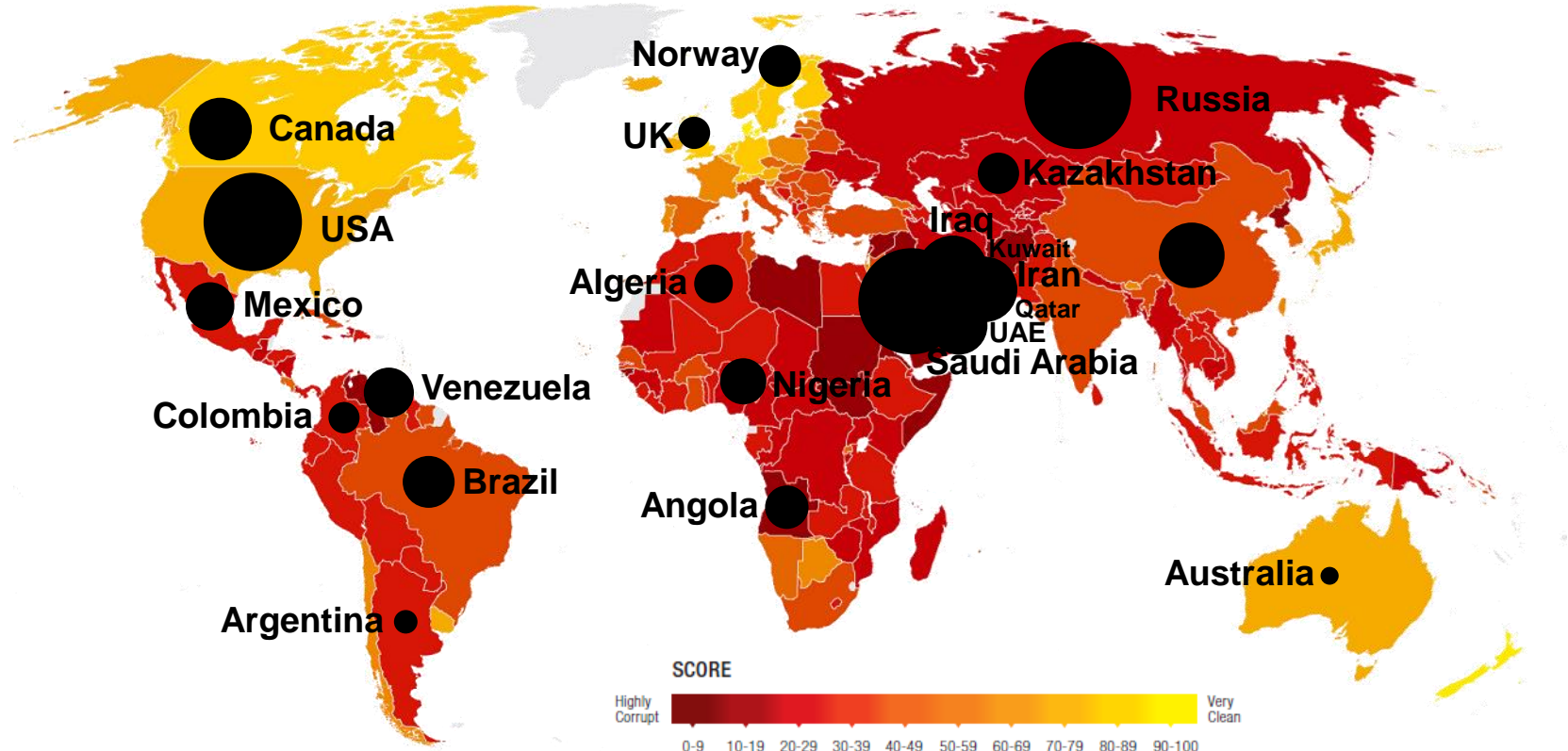
2015 - 2040



Source: IEA Current Policies (2016), Statoil Rivalry (2016), EIA Reference Case (2016), Exxon Mobil (2017), OPEC Reference Case (2016), BP Base Case (2017), Statoil Reform (2016), IEA 450 (2016), Statoil Renewal (2016), Greenpeace Energy [R]evolution (2015)

Oil Production by Volume and Perceived Corruption

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



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.

Capturing Technological Improvements in Oil Sands Operations Pathway to the Future



Note: Total emissions intensity includes: production and upgrading, transportation, refining, transportation of refined product and combustion. CNQ Oil Sands operations includes: Oil Sands Mining and Upgrading and Thermal Crude Oil.
Source: Internal company reports and ARC Energy Research Institute 2017 Report



PATHWAY TO CONTINUE TO REDUCE GHG EMISSIONS

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Shell Vows to Halve Carbon Footprint by 2050 to Achieve Paris Goals

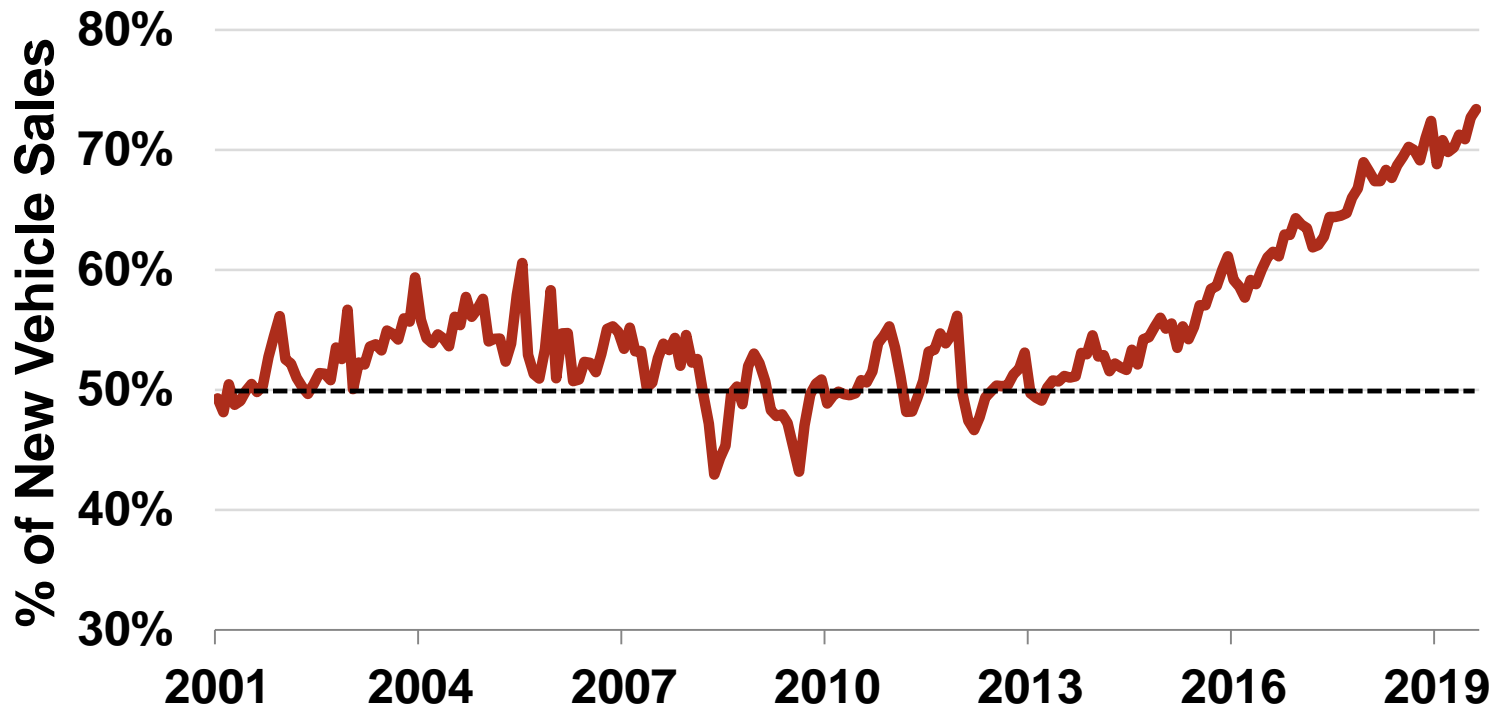
A man with a beard and a woman are sitting at a wooden table outdoors. The man is pointing at a laptop screen that displays a bar chart. The woman is looking at the screen. There are two speech bubbles overlaid on the image. The background is a blurred outdoor setting with trees and a building.

“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

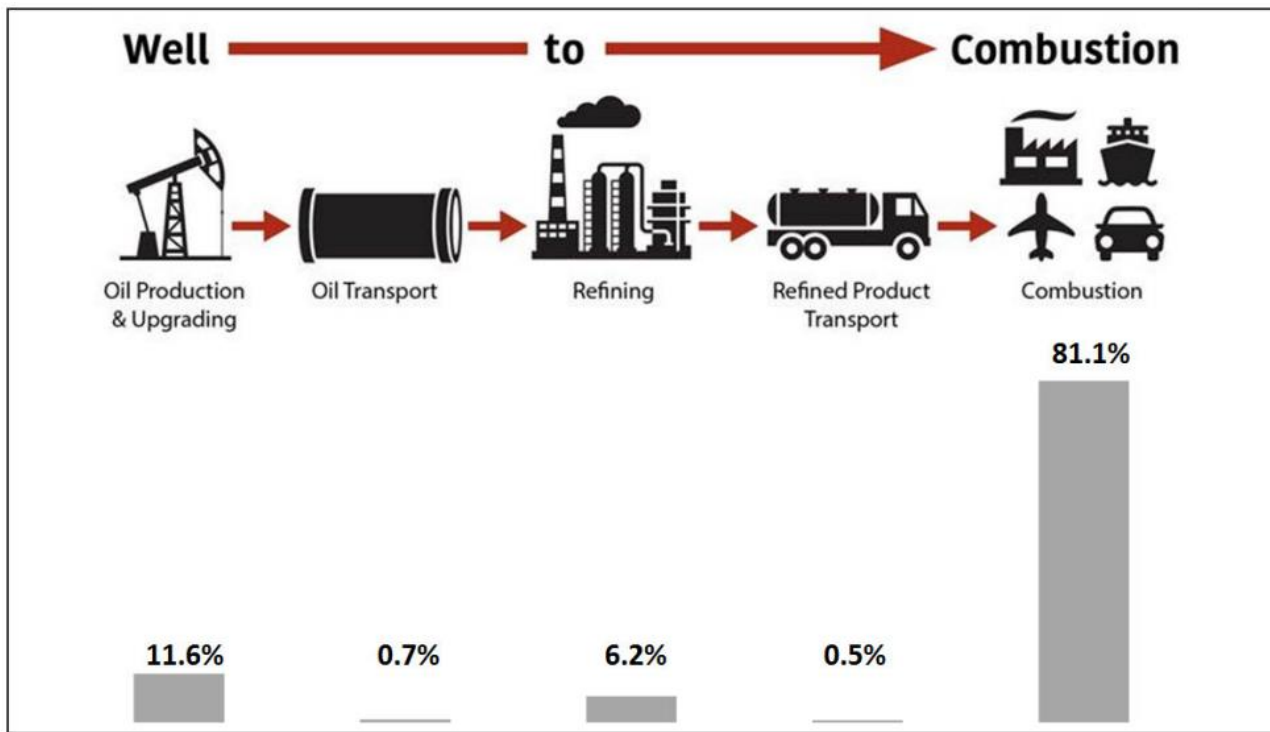




US Light Trucks

Estimated Well-to-Combustion Emissions

US Refined Average Crude Oil (2014)



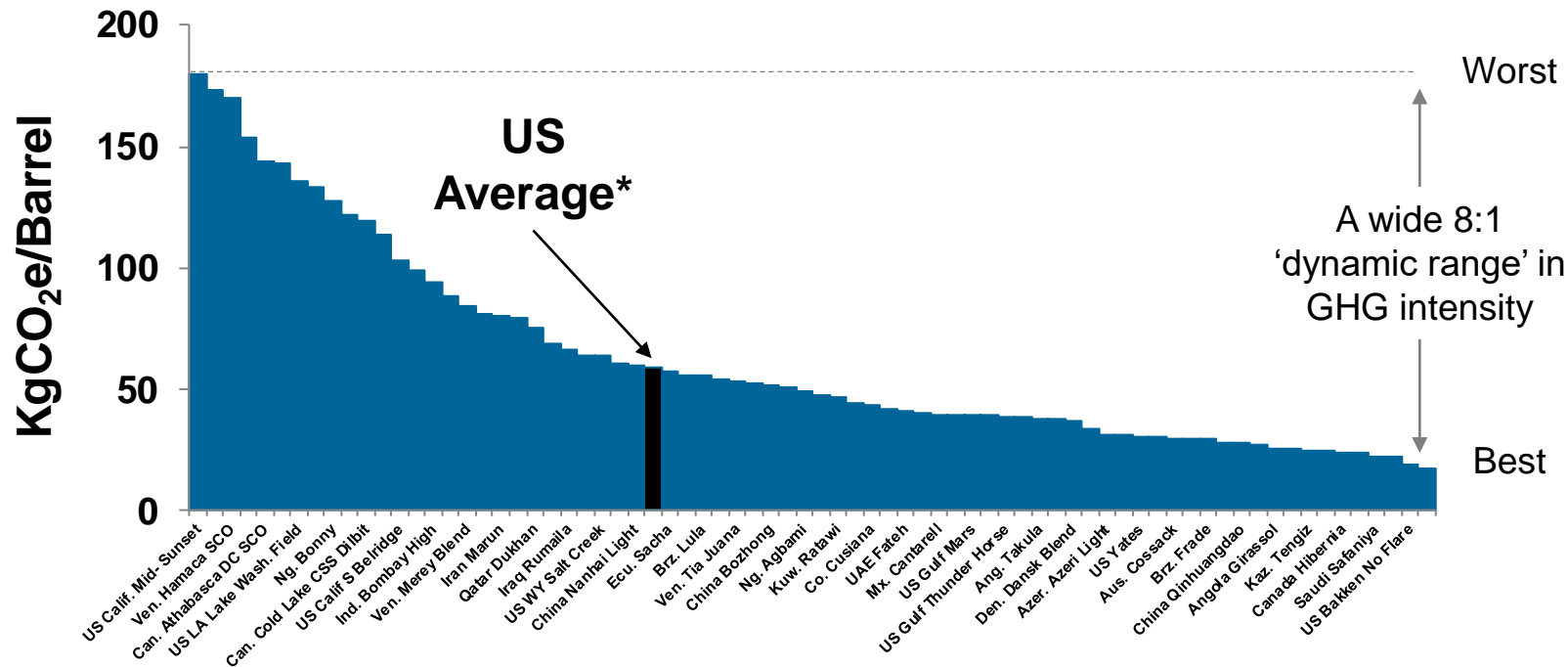
Is it really a binary choice?

(the goal is to reduce emissions ASAP)



Not All Oil Production Emissions are the Same!

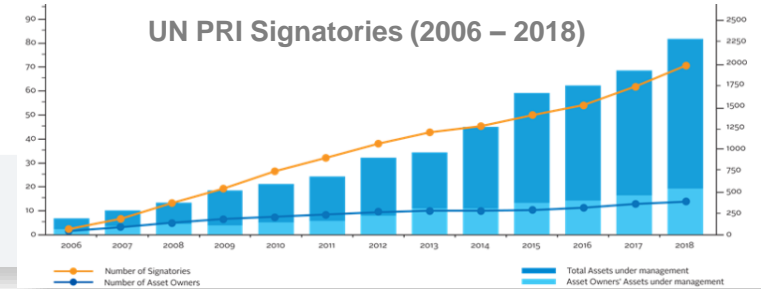
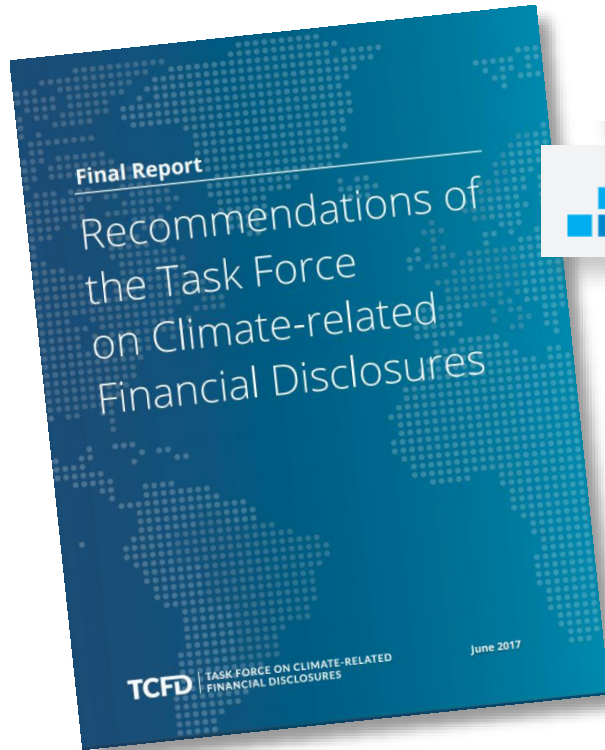
GHG Intensities of Various Oil Production Sources Around the World



- 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; KgCO₂e/B
Source: ARC Report: "Crude Oil Investing in a Carbon Constrained World (2017 Update)"

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