

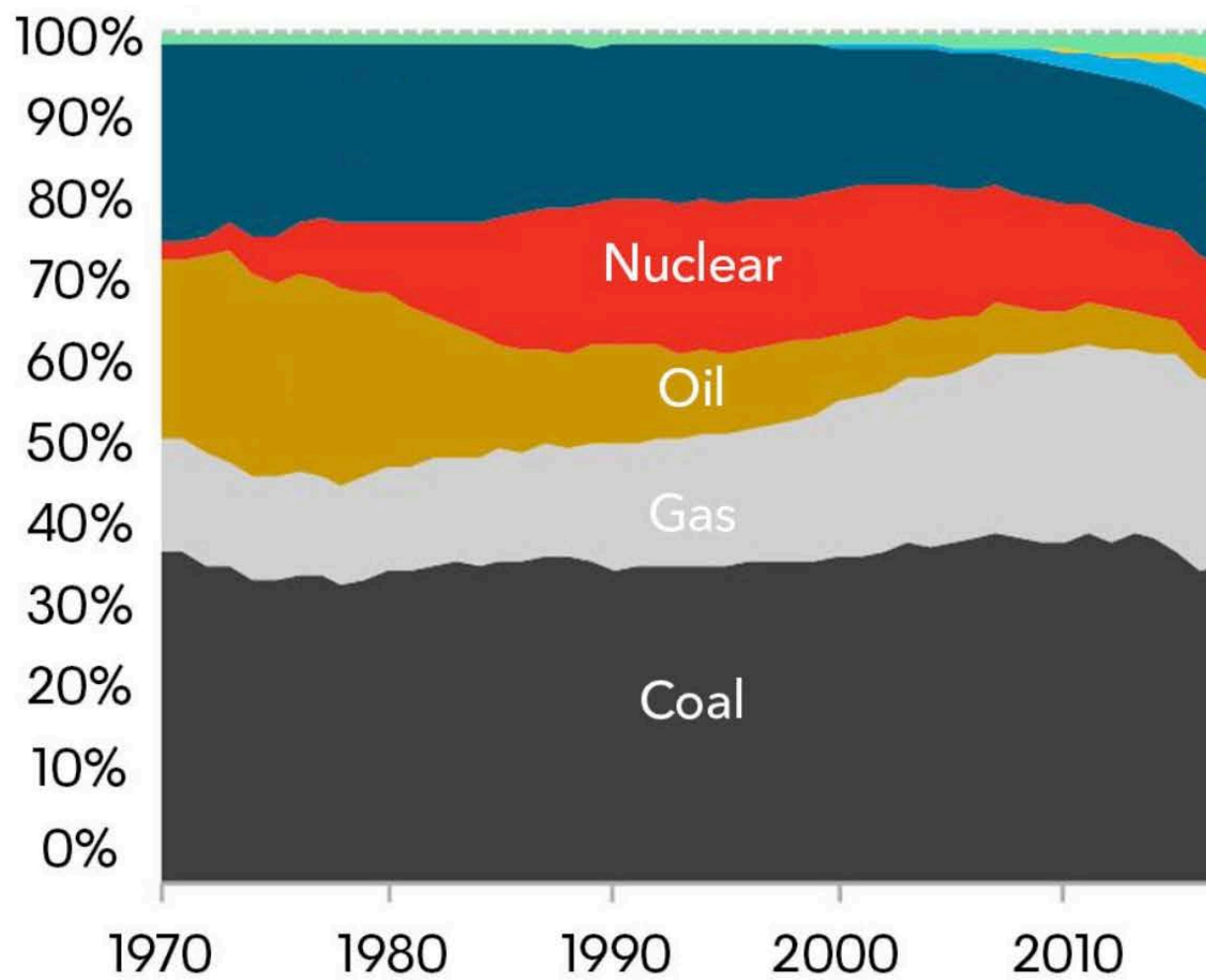
The 21st Century Energy Transition

Bruce Usher, Professor of Practice

Elizabeth B. Strickler '86 and Mark T. Gallogly '86 Faculty Director,
The Tamer Center for Social Enterprise, Columbia Business School

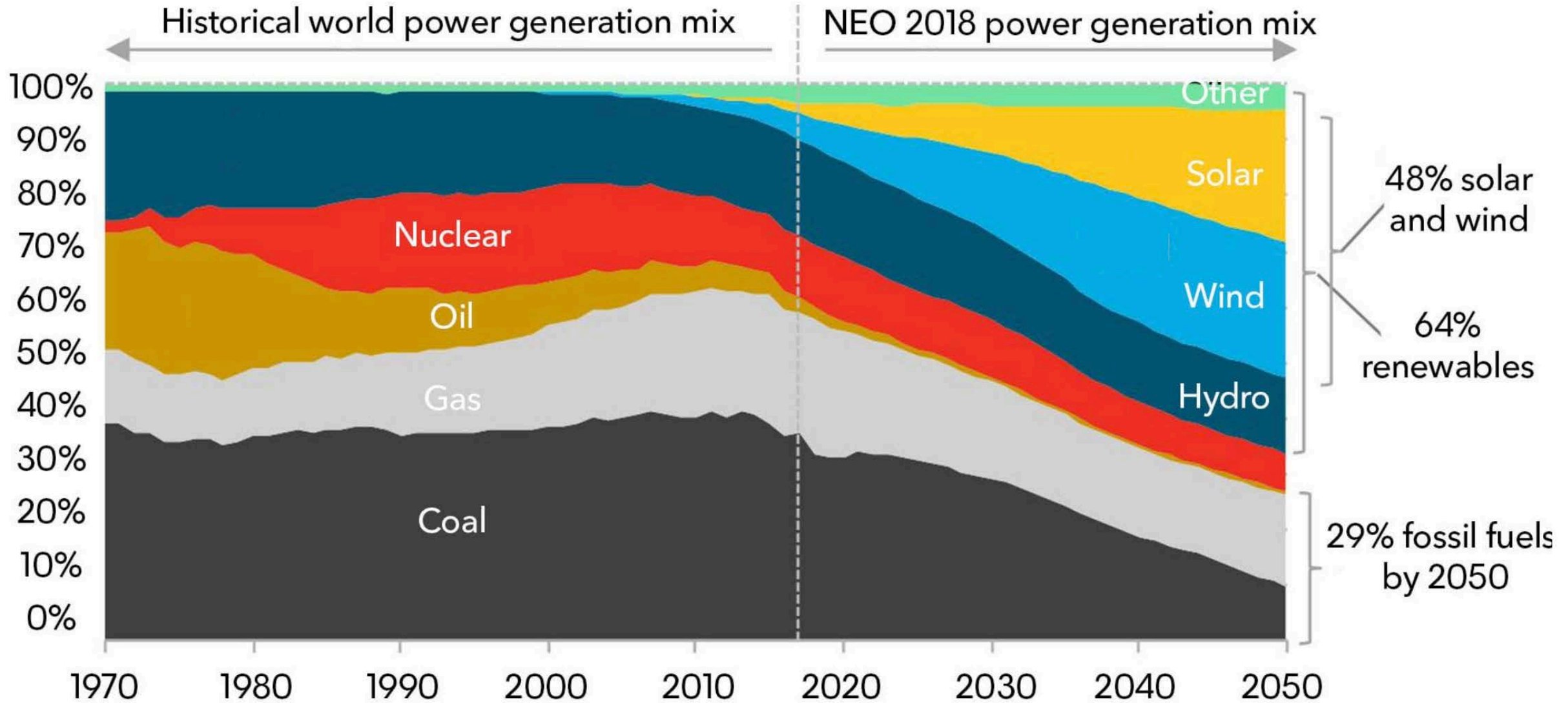
BlackRock, 10 May 2019

Historical World Power Generation Mix



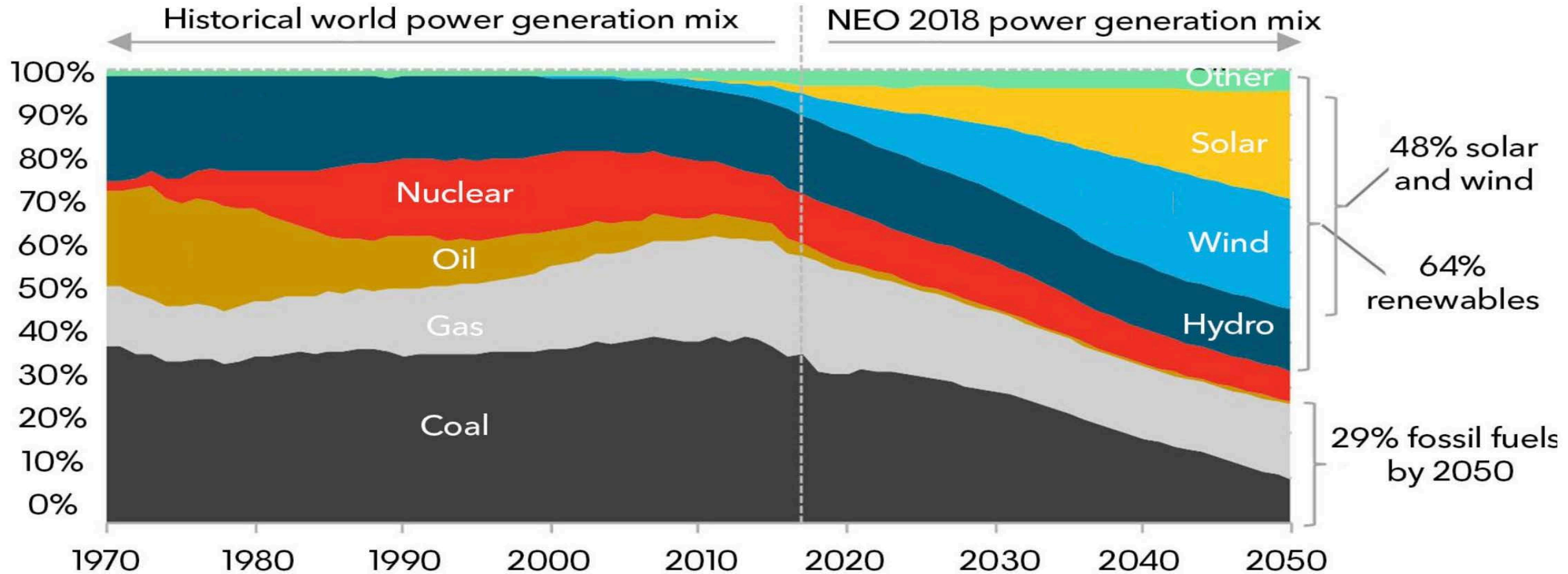
Source: Bloomberg NEF, IEA.

The 21st Century Energy Transition from Fossil Fuels to Renewables



Source: Bloomberg NEF, IEA.

The 21st Century Energy Transition from Fossil Fuels to Renewables



“The mix of fuels used in power generation is set to shift materially.” BP Energy Outlook

“The energy transition is unstoppable.” Ben van Beurden, CEO, Royal Dutch Shell

The 21st Century Energy Transition: Drivers of Change

Renewable Energy



The 21st Century Energy Transition: Drivers of Change

Energy Storage



The 21st Century Energy Transition: Drivers of Change

Electric Vehicles



The 21st Century Energy Transition: Drivers of Change

Renewable Energy



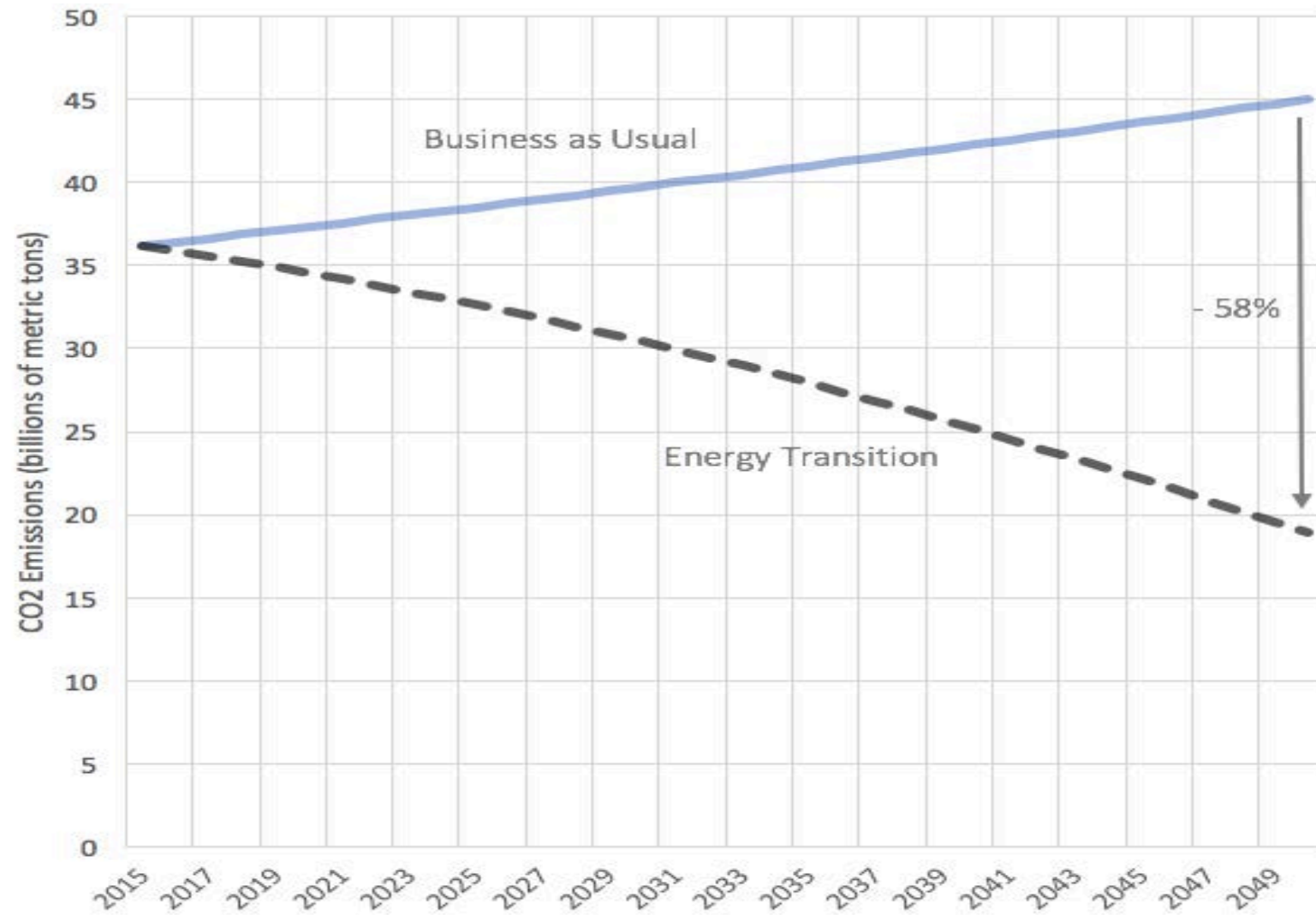
Energy Storage



Electric Vehicles

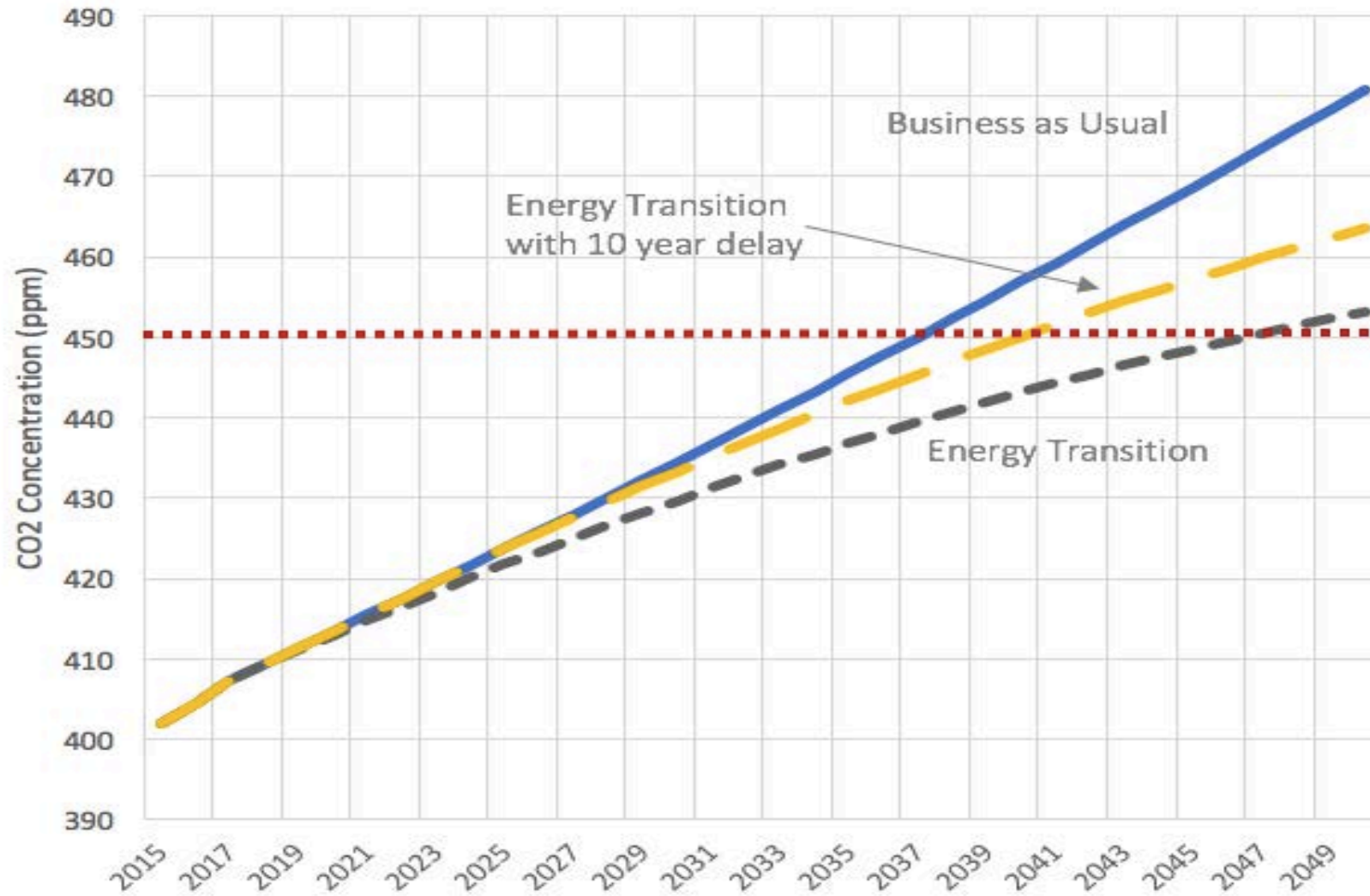


Annual CO₂ Emissions



Source: IRENA ReMap, Bruce Usher

CO₂ Concentration



Source: IRENA ReMap, Bruce Usher

Conference Agenda

Investments in the Renewable Energy Transition



David Giordano

Managing Director, Renewable Power Group
BlackRock Alternative Investors



Geoffrey Heal

Donald C. Waite III Professor of Social Enterprise
Columbia Business School

The Role of Storage in the Energy Transition



Alan West

Samuel Ruben-Peter G. Viele Professor of Electrochemistry; Professor of Chemical Engineering and of Earth and Environmental Engineering; Chair of Chemical Engineering
Columbia University

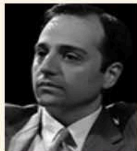
Coffee break

The Transition to Electric Vehicles



Jiong Ma

Senior Partner
Braemar Energy Ventures



R.A. Farrokhnia '04

Executive Director, Dean's Office
Adjunct Associate Professor of Business, Economics
Columbia Business School

The Impact of China's Climate Policy on the Energy Transition



David Sandalow

Inaugural Fellow
Center on Global Energy Policy, Columbia University's School of International and Public Affairs

Possible Climate Change Futures: Warming, Impacts, and Uncertainties



Kate Marvel

Associate Research Scientist
NASA GISS

Closing Remarks



Peter deMenocal

Thomas Alva Edison/Con Edison Professor of Earth and Environmental Sciences;
and Director, Center for Climate and Life
Lamont-Doherty Earth Observatory;
Dean of Science, Faculty of Arts and Sciences