



COLUMBIA LAW SCHOOL

SABIN CENTER FOR CLIMATE CHANGE LAW

Legal Pathways to Deep Decarbonization in the United States

Michael B. Gerrard

Andrew Sabin Professor of Professional Practice
Director, Sabin Center for Climate Change Law
Columbia Law School

John C. Dernbach

Commonwealth Professor of Environmental Law and Sustainability
Director, Environmental Law and Sustainability Center
Widener University Commonwealth Law School

- Deep Decarbonization Pathways Project
 - National blueprints for limiting warming to 2°C
 - Moving from incrementalism to transformation
 - Independent research teams from 16 countries
 - 3/4 of current CO₂ emissions
 - OECD, China, India, Brazil, South Africa, Mexico



SCIENCE

A Path for Climate Change, Beyond Paris

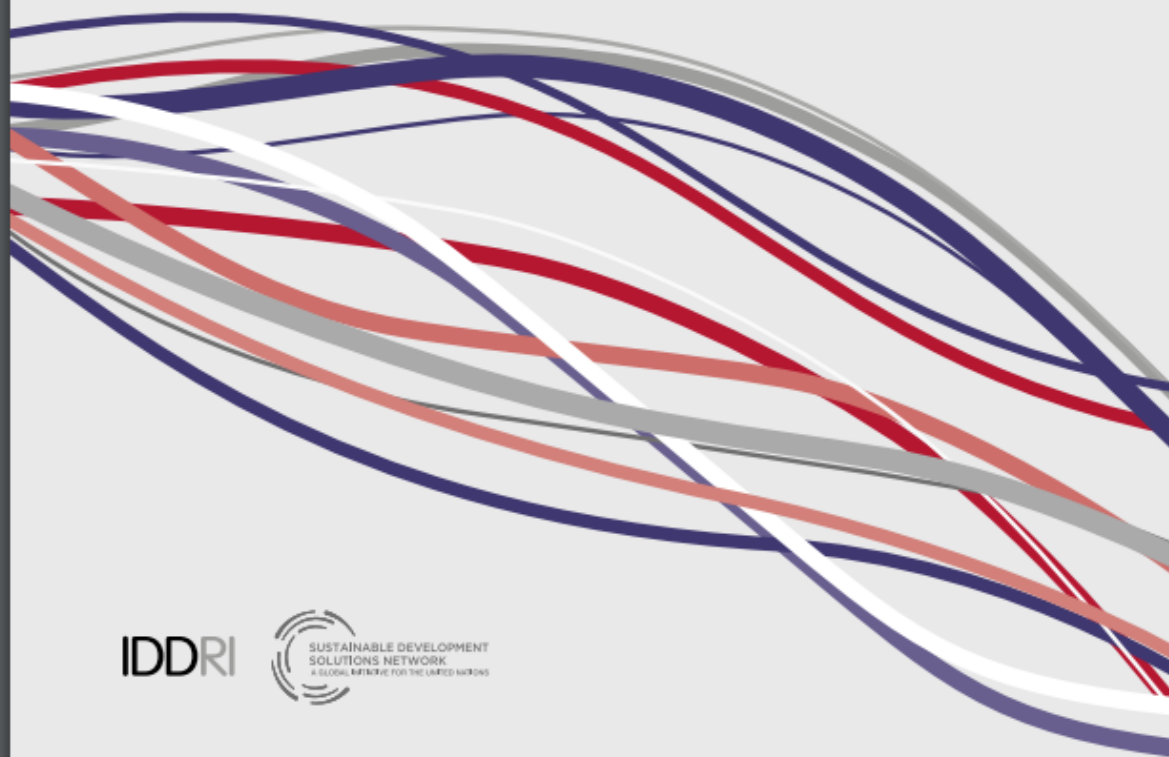
By JUSTIN GILLIS DEC. 1, 2015



UN issued with roadmap on how to avoid climate catastrophe

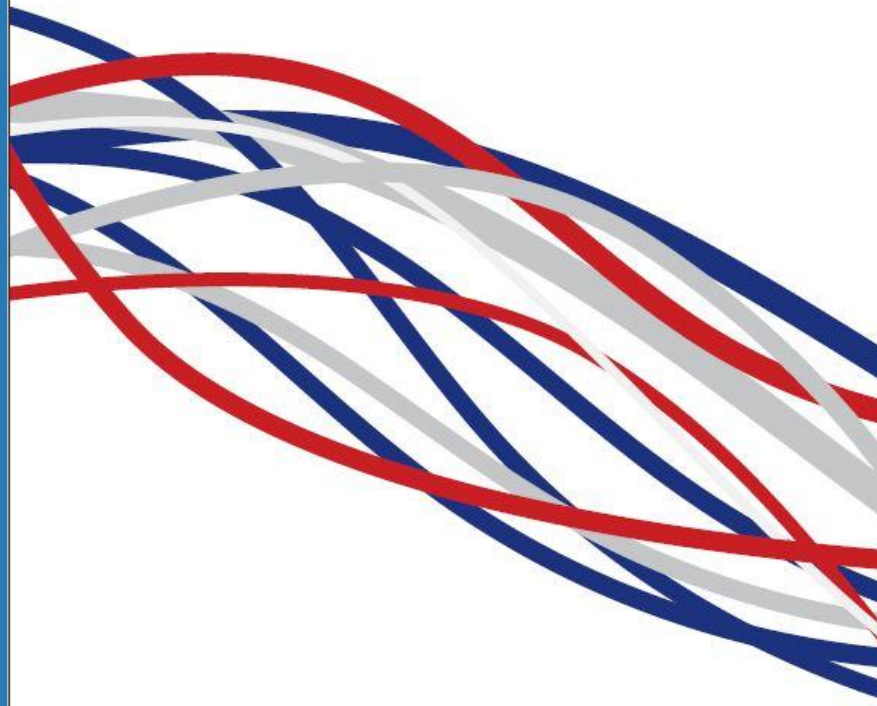
Report is the first of its kind to prescribe concrete actions that the biggest 15 economies must take to keep warming below 2C

pathways to
deep decarbonization
in the United States



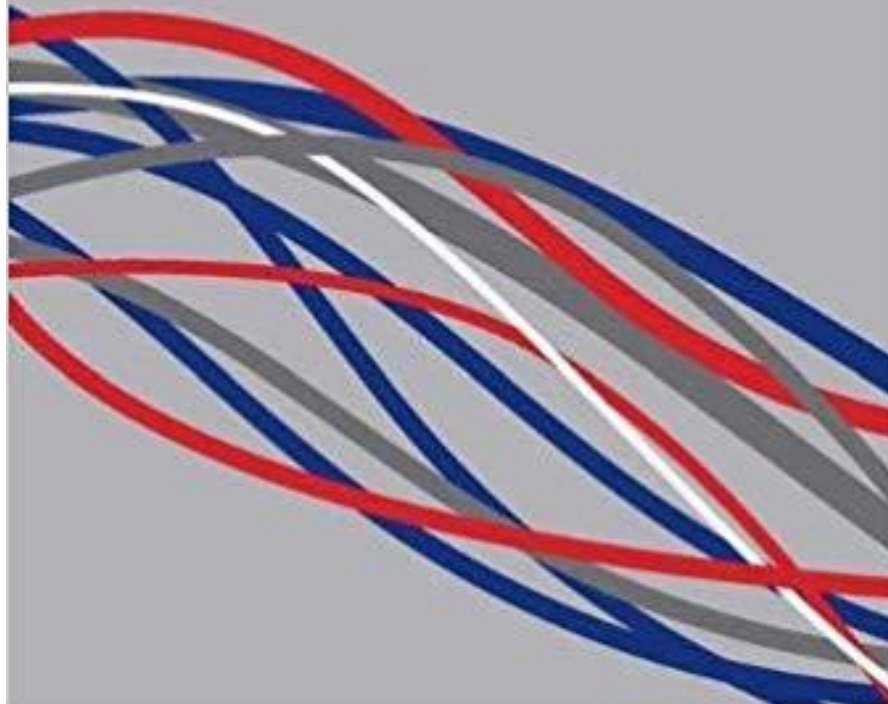
LEGAL PATHWAYS TO DEEP DECARBONIZATION IN THE UNITED STATES

MICHAEL B. GERRARD AND JOHN C. DERNBACH, EDITORS



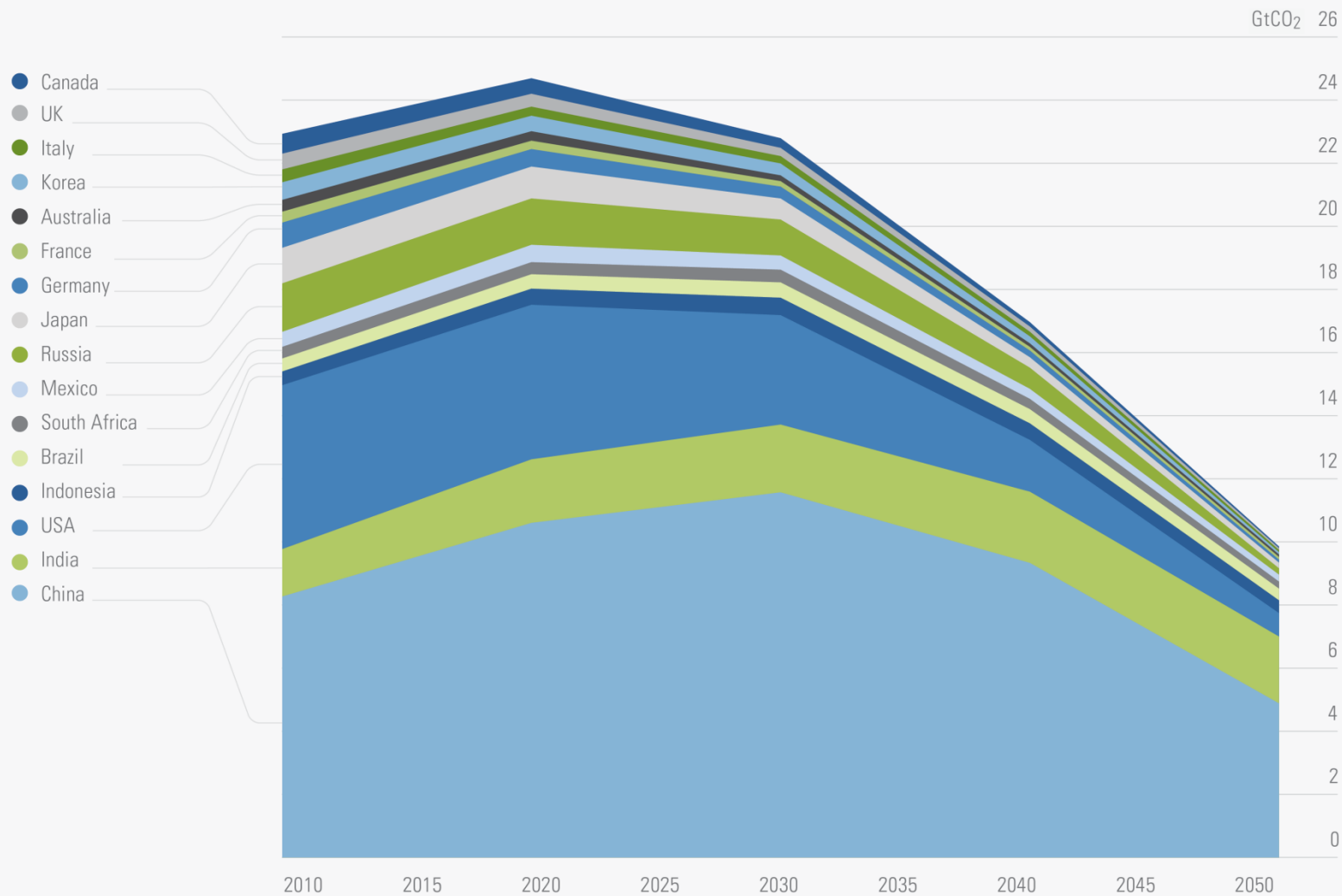
**LEGAL
PATHWAYS TO
DEEP DECARBONIZATION
IN THE UNITED STATES:
SUMMARY & KEY RECOMMENDATIONS**

MICHAEL B. GERRARD AND JOHN C. DERNBACH,
EDITORS

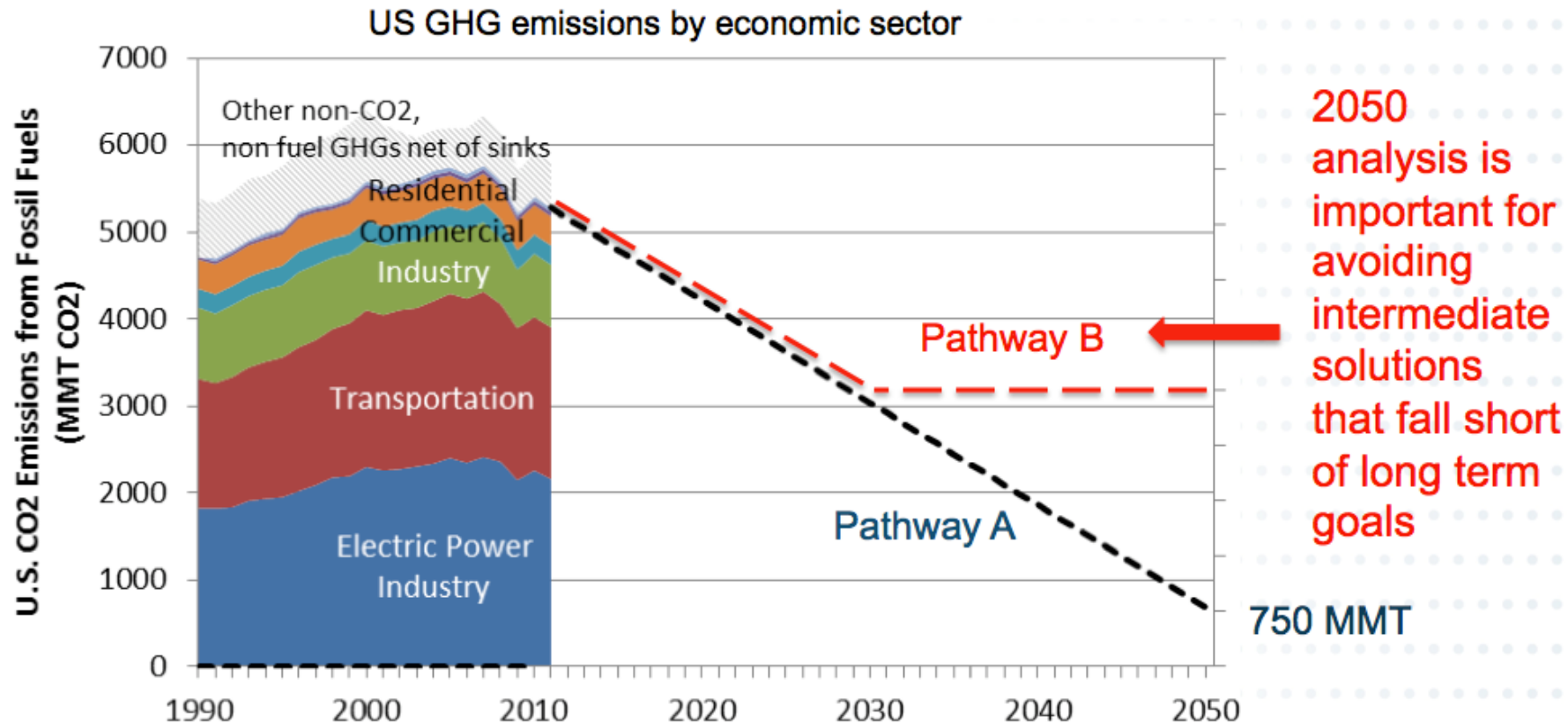


DDPP Aggregate Emissions

Figure 1. Emissions trajectories for energy CO₂, 2010-2050, showing most ambitious reduction scenarios for all DDPP countries. 2050 aggregate emissions are 57% below 2010 levels.

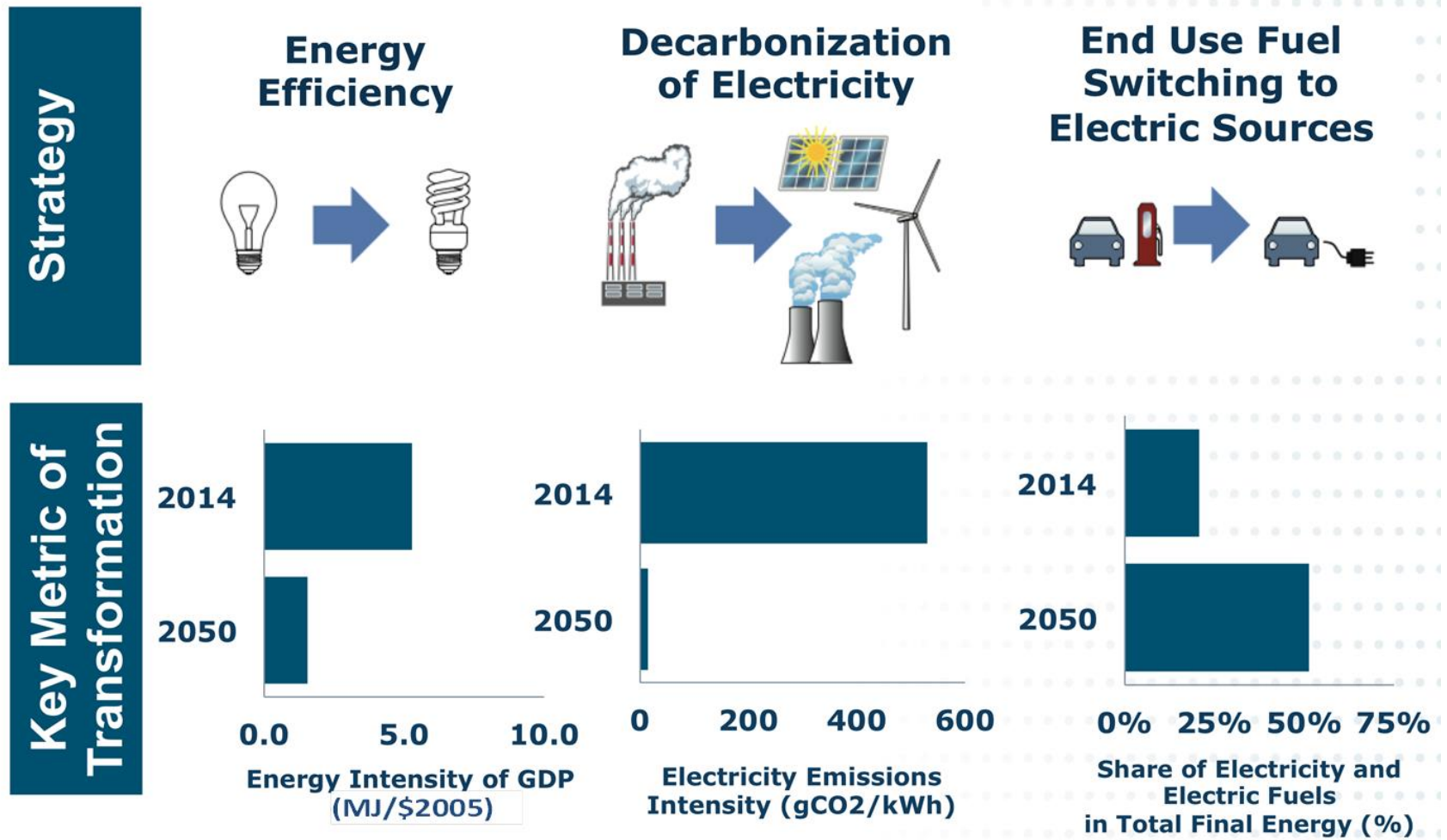


Avoiding emissions dead ends



Todd Stern: "It's all about the transformation."

Three Pillars of Deep Decarbonization



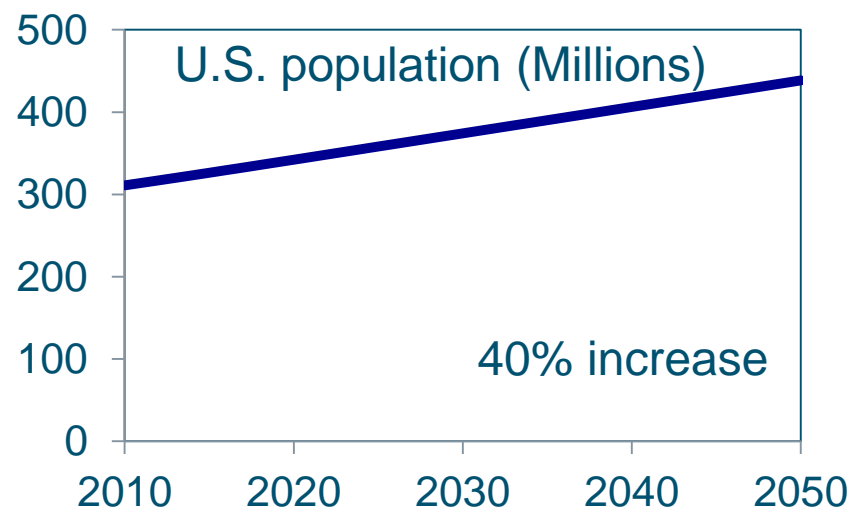
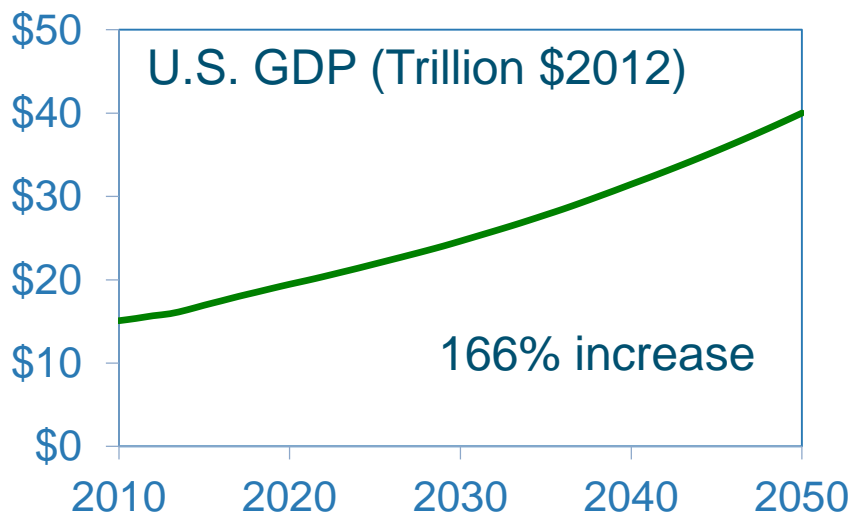
Pathways to Deep Decarbonization in the United States, Mixed case results

80% Reduction Goal by 2050 is Technically Feasible and Would Cost Only 1% of US GDP

- Almost complete decarbonization of electricity by 2050
- Double electricity generation through massive program of renewables construction
- More than double the efficiency with which energy is used
- Switching most end uses that require liquid fuels to electricity, especially passenger cars and space heating and cooling
- Requires deployment of roughly 300 million alternative fuel vehicles by 2050

Scenario Design Constraints

- Infrastructure inertia
- Electric reliability
- Same energy services as EIA forecast
- Technology is commercial or near-commercial
- Environmental limits (biomass, hydro)

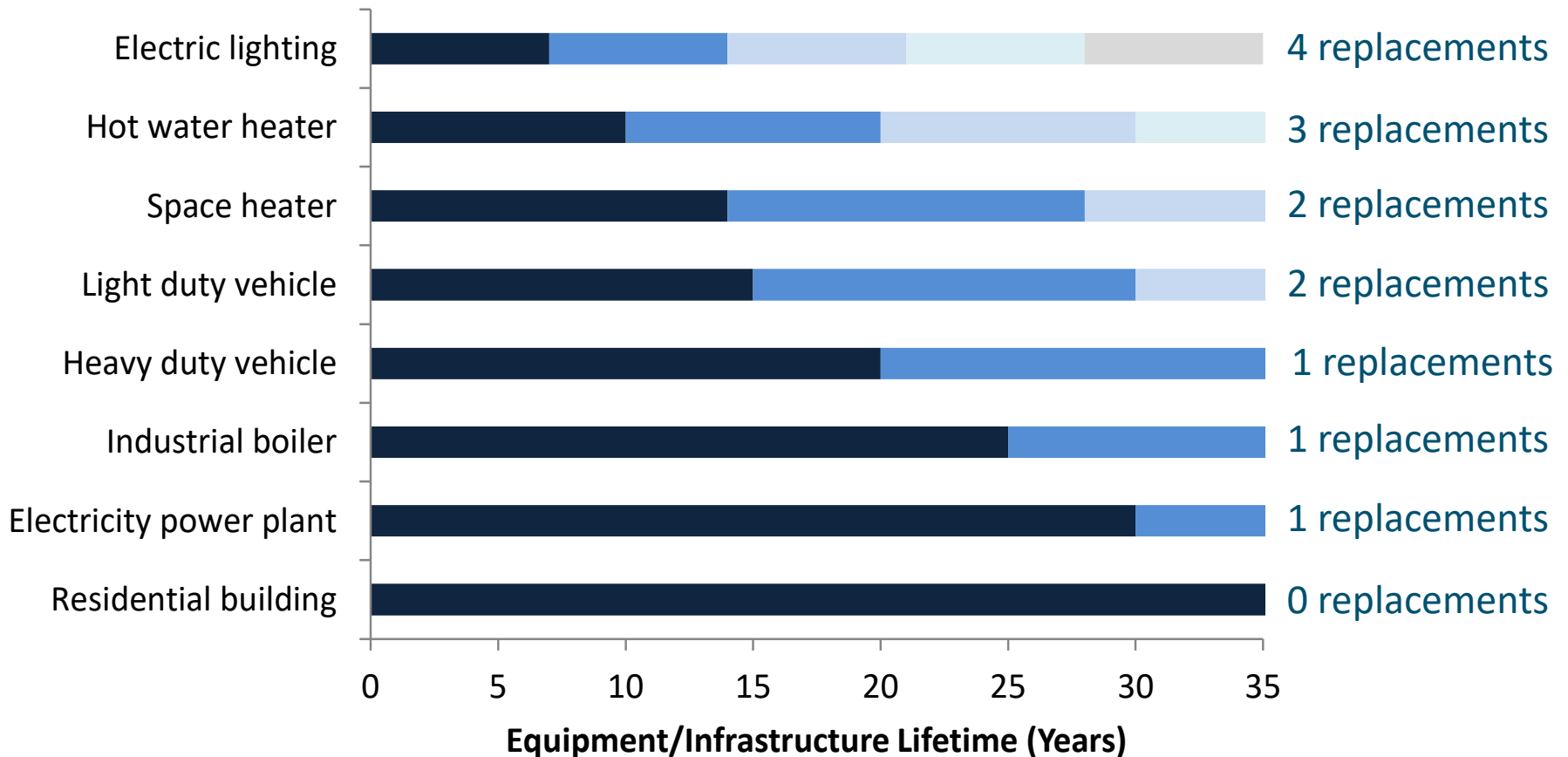


U.S. National Energy Modeling System and 2013 Annual Energy Outlook reference case

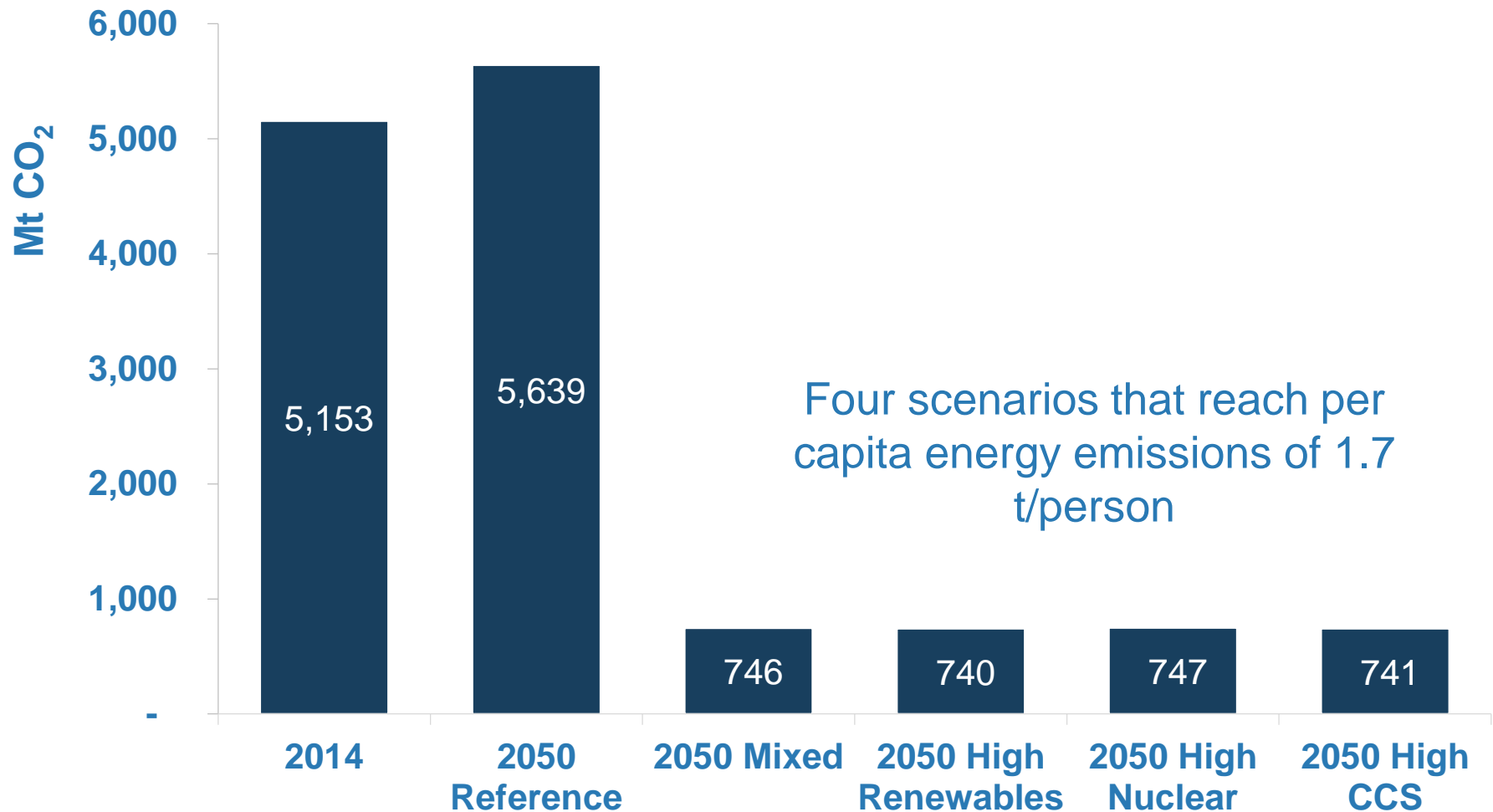
Early Retirement Not Required... But Timely Replacement Is

- A car purchased today, is likely to be replaced at most 2 times before 2050.
A residential building constructed today, is likely to still be standing in 2050.

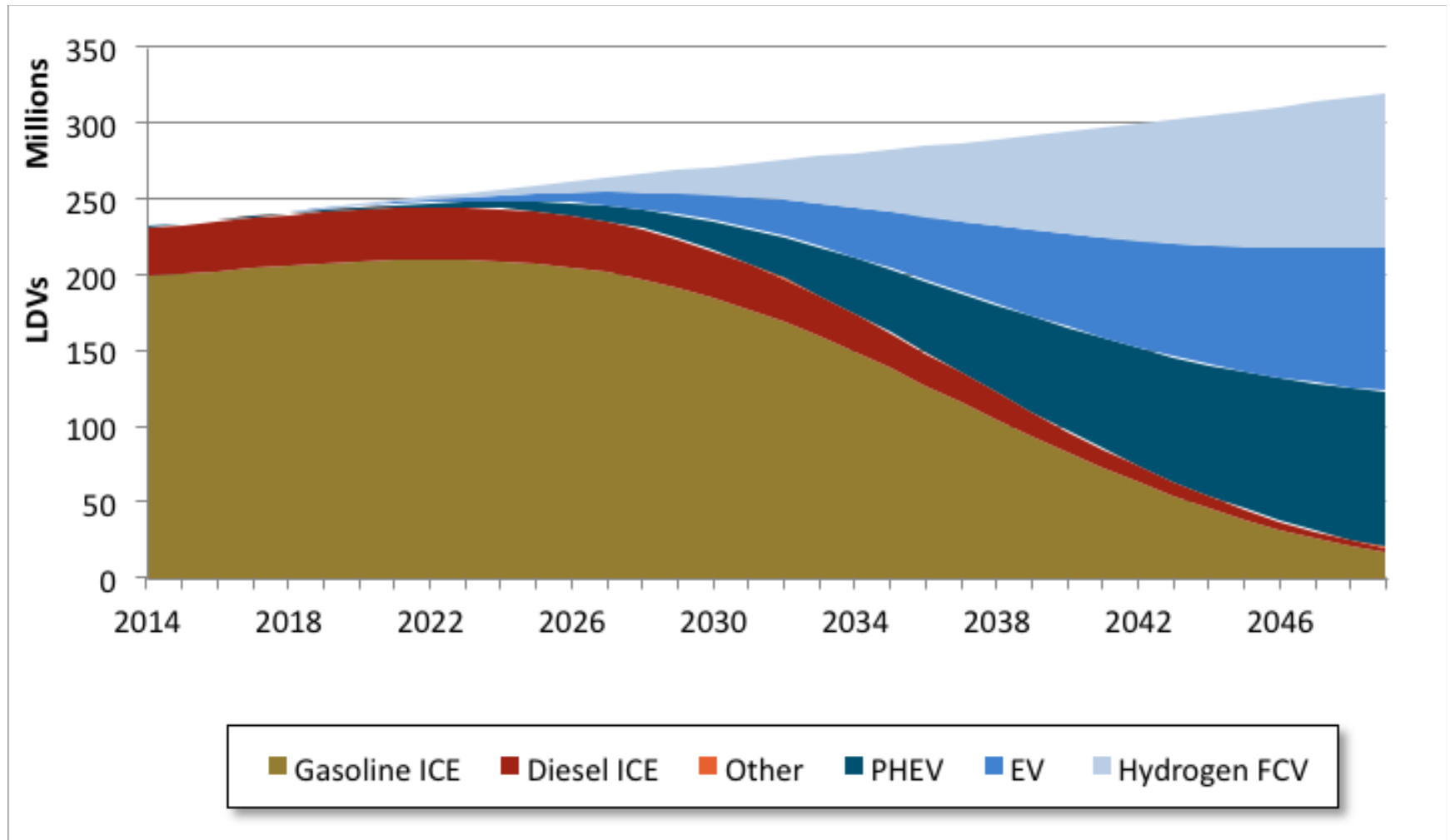
2015 → 2030 → 2050



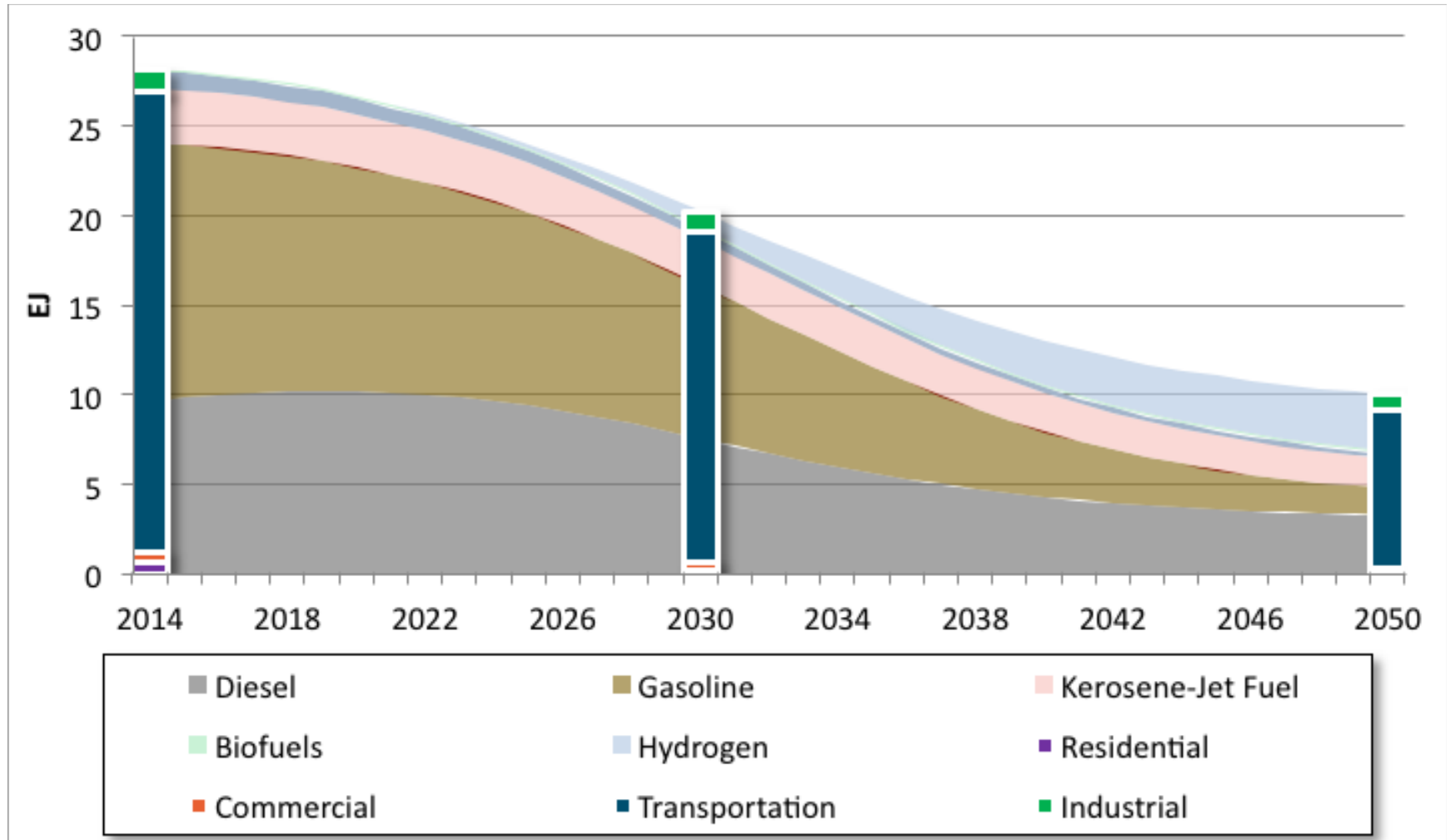
Multiple Feasible Technology Pathways Exist



Light Duty Vehicle Stock, Mixed Case



Liquid Fuel Supply & Demand, Mixed Case



Electricity Supply and Demand, Mixed Case

