Deep Decarbonization: A U.S. Perspective

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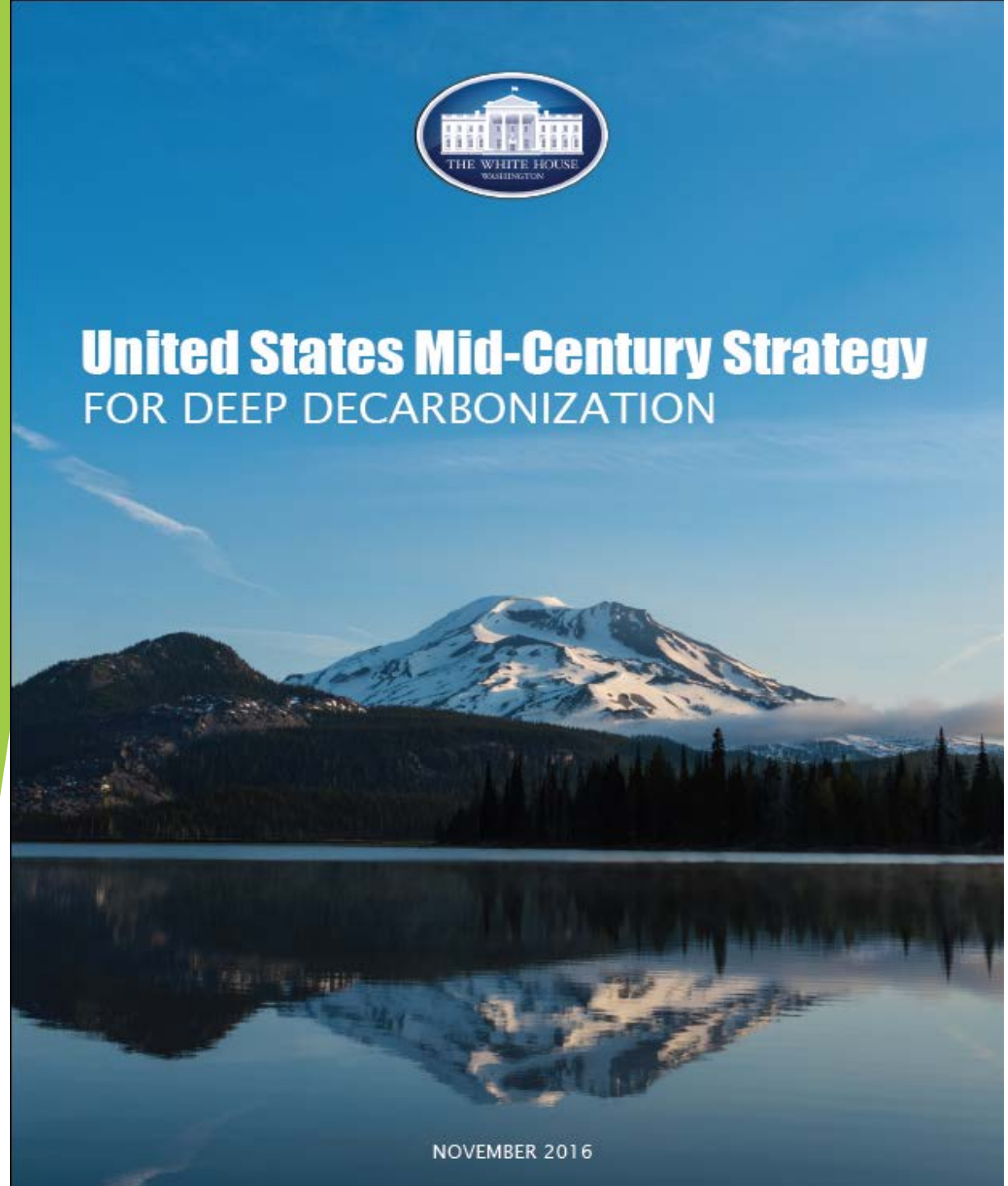
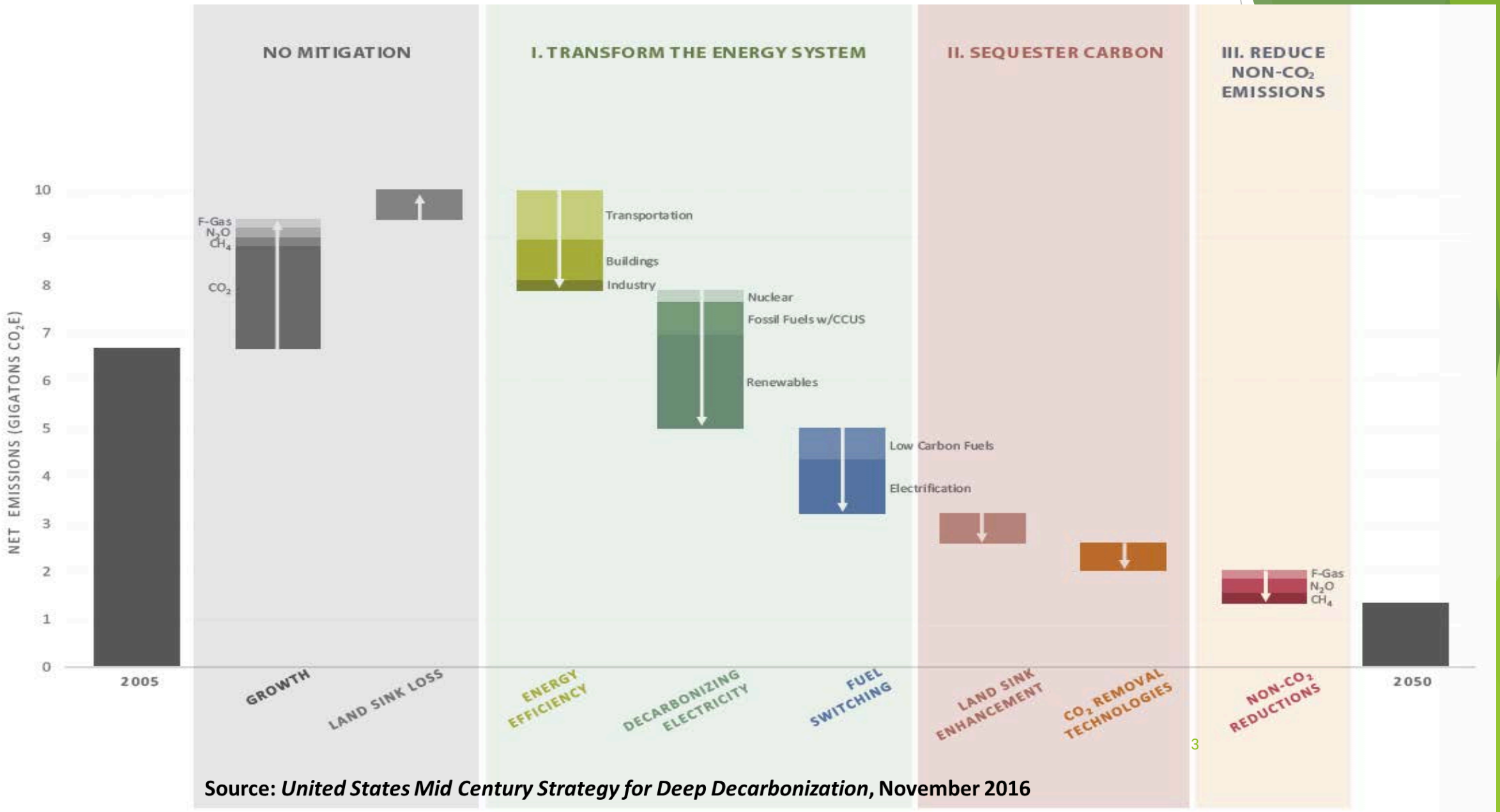


Not on White House website anymore.

Can find it on UN website.

http://unfccc.int/files/focus/long-term_strategies/application/pdf/us_mid_century_strategy.pdf

U.S. Mid Century Strategy



Source: ***United States Mid Century Strategy for Deep Decarbonization*****, November 2016**

Key takeaways

- Deep decarbonization of the U.S. economy is a heavy lift, but it's doable
- 2050 is not that far away – 32 years; U.S. auto fleet turns over every 15 years; power plants last 50 years or more; buildings and other infrastructure can last 100 years or more
- The pace of needed change is quite rapid by historical standards
- The power sector is the easiest sector to decarbonize, but it's not easy
- The U.S. transportation sector is the hardest sector to decarbonize, but it can be done
- We really need a portfolio of technologies to optimize costs and hedge our bets
- We need mutually reinforcing RD&D (e.g., Mission Innovation) and deployment policies, including a carbon price
- We cannot afford to wait; we need that interplay of technology innovation, public policy, market forces, and behavioral change to start now and play out over time, before it's too late
  - Recent history of natural gas, renewables and nuclear power illustrates this dynamic
- The land sink and carbon-negative technologies are really important
- Non-CO2 gases are really important

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Additional Slides

Background and Context

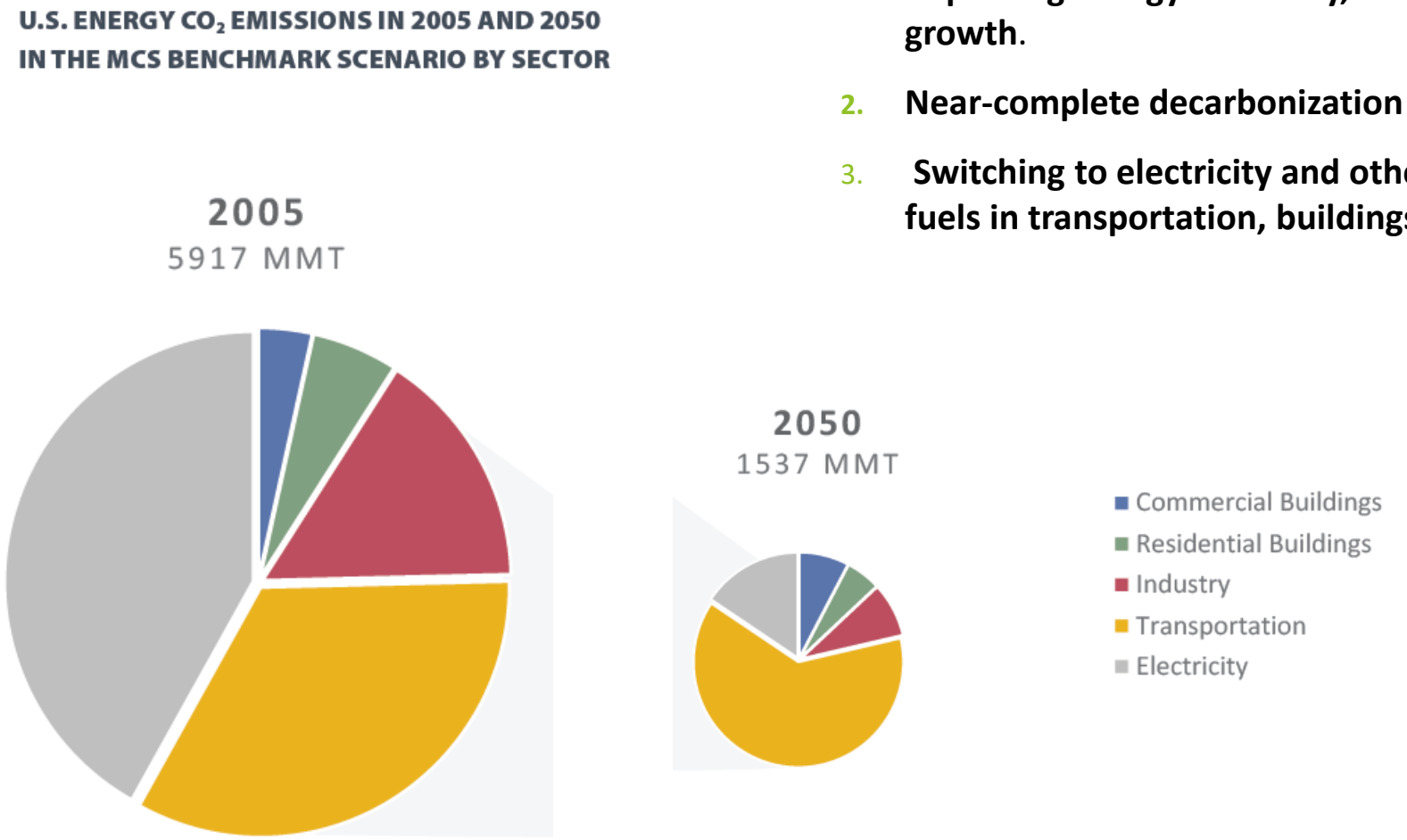
- Paris agreement:
  - Long-term global goal of remaining well below 2°C of warming; with best efforts to achieve 1.5°C
  - Bottom-up approach: Country Nationally Determined Contributions (NDC) targets for 2025/2030
    - **Each country determines, plans and regularly reports its own contribution it should make in order to mitigate global warming.**
    - **The contributions should be reported every five years and are to be registered by the UNFCCC. Each further contribution should be more ambitious than the previous one, known as the principle of 'progression'.**
  - Invited Parties to submit mid-century low-greenhouse gas (GHG) strategies by 2020.

The U.S. submitted its mid-century strategy 4 years early

- As a result of the North American Climate, Clean Energy, and Environment Partnership Action Plan, Canada, Mexico and U.S. released their mid-century strategies at COP22 in Marrakech November 2016
- 4 years early
- Wanted to be role models; potentially provide technical assistance
- Germany released theirs at COP22 as well
- France and Benin released theirs soon after
- Every country's plan is different

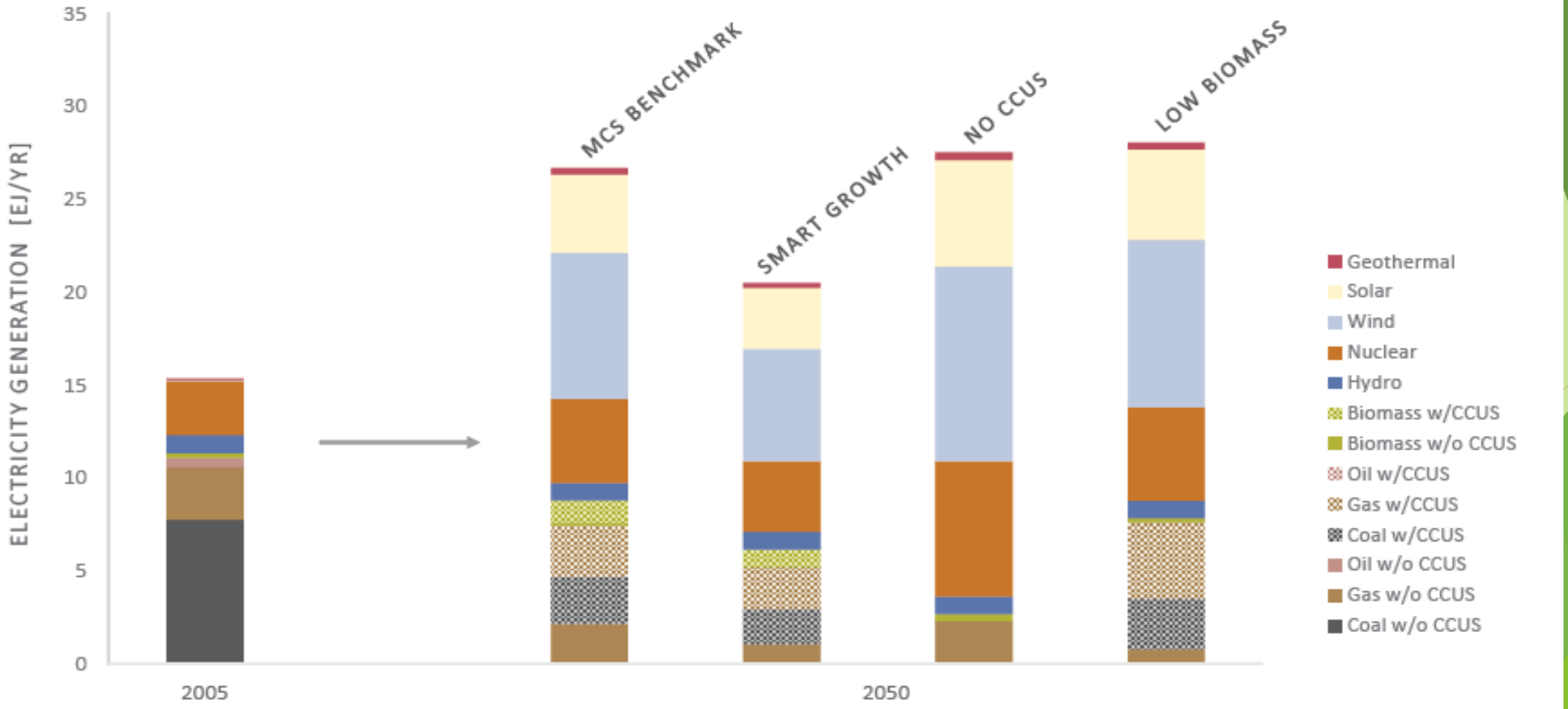
MCS Vision for a Low-Carbon U.S. Energy System in 2050

1. **Improving energy efficiency, including smart growth.**
2. **Near-complete decarbonization of electricity.**
3. **Switching to electricity and other low-carbon fuels in transportation, buildings, and industry.**



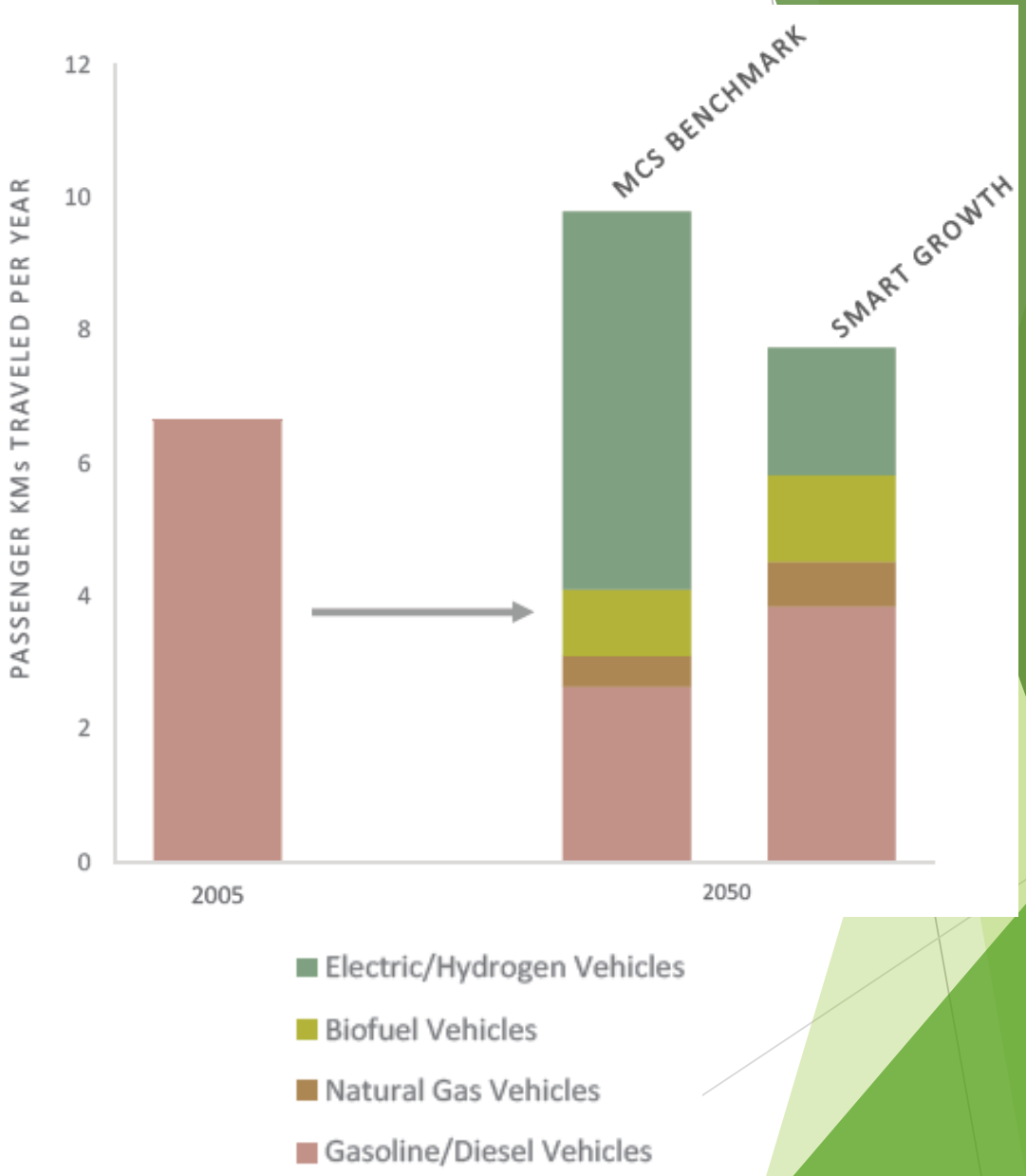
Electricity Strategy

- Near-complete decarbonization, driven by deployment of renewable energy (primarily wind and solar), nuclear energy, and fossil-fuels and bioenergy with CCS
- A major expansion of generation resources supports both economic growth and the electrification of other sectors



Transportation Strategy, USMCS

- Continue to increase fuel efficiency standards at same pace
- Developing low-carbon transportation fuels and vehicles, including electric vehicles, fuel cell electric vehicles and biomass-fueled vehicles
- Reducing vehicle miles traveled through smart growth and other strategies



The 4-legged stool driving transportation fuel use and emissions

- Low oil prices are a challenge
- Most historical progress has been on vehicle efficiency; vehicle standards are critical
- Other legs more difficult
- What's new is electrification and information technology (IT)
- IT could go either way with VMT
- IT should help with system efficiency