

U.S. DEPARTMENT OF
ENERGY

Office of
**ENERGY EFFICIENCY &
RENEWABLE ENERGY**

CLIMATE ENERGY AND ENVIRONMENT POLICY COMMITTEE (CEEPC)

MARK SMITH

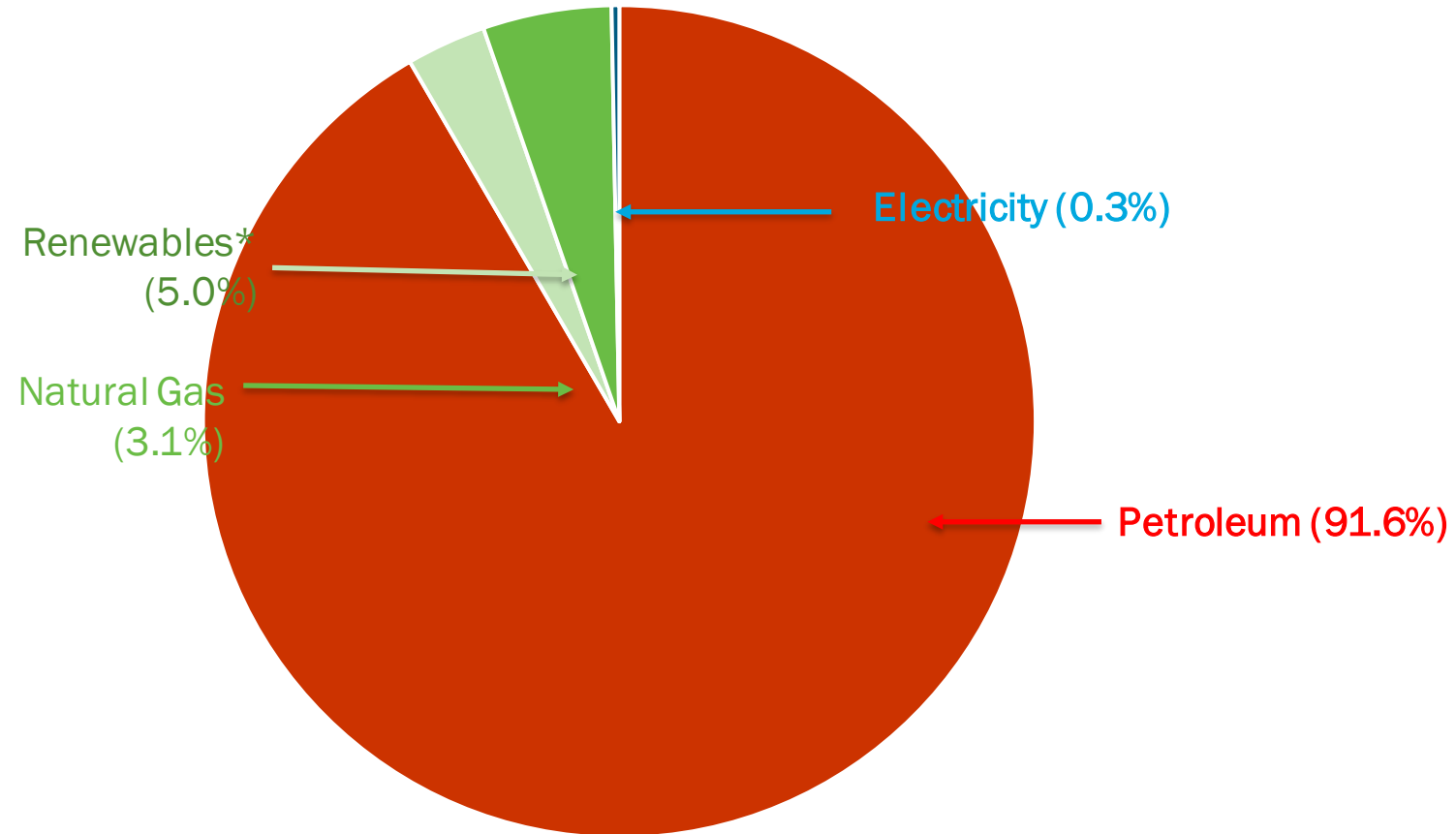
U.S. Department of Energy
Program Manager, Vehicle Technologies Office

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Transportation Energy Consumption (2019)

Petroleum Dominates Transportation Fuel Use

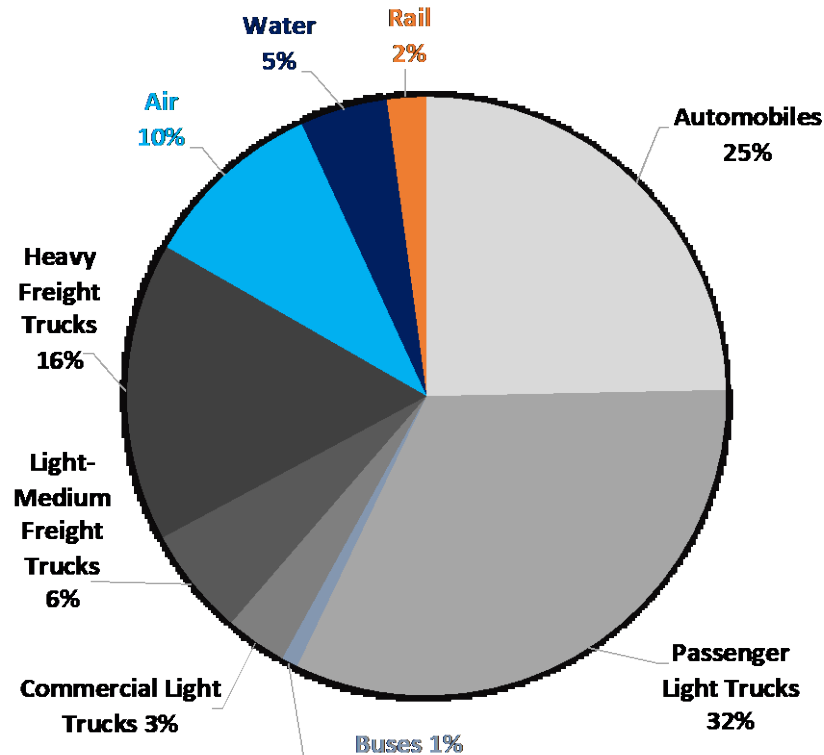


Source: Transportation Energy Data Book, edition 37 (January 2019), Table 2.03
* "Renewables" include hydro-electric, geothermal, wind, solar, and bio-mass energy.



Mission: Decarbonize transportation across all modes

2019 U.S. Transportation Energy Use (26.8 Quads)



Source: EIA AEO

- Net-zero by 2050 requires dramatic energy efficiency and emissions improvements in vehicle and the overall transportation system
- 100% clean electricity and dramatic technology cost reductions enable deep transportation decarbonization
- On-Road Vehicles (Light, Medium, Heavy) account for 83% of energy use, and can be electrified leveraging cheap and abundant clean electricity
- Long Haul freight movement and Air, Marine, Rail likely require Hydrogen and Biofuels

Vehicle Technologies Office (VTO)



ON-ROAD
Light-, Medium-, Heavy
Duty Vehicles



Batteries &
Electrification



Materials
Technology



Mobility
Systems



Demonstration and Deployment



Air, Marine, Rail



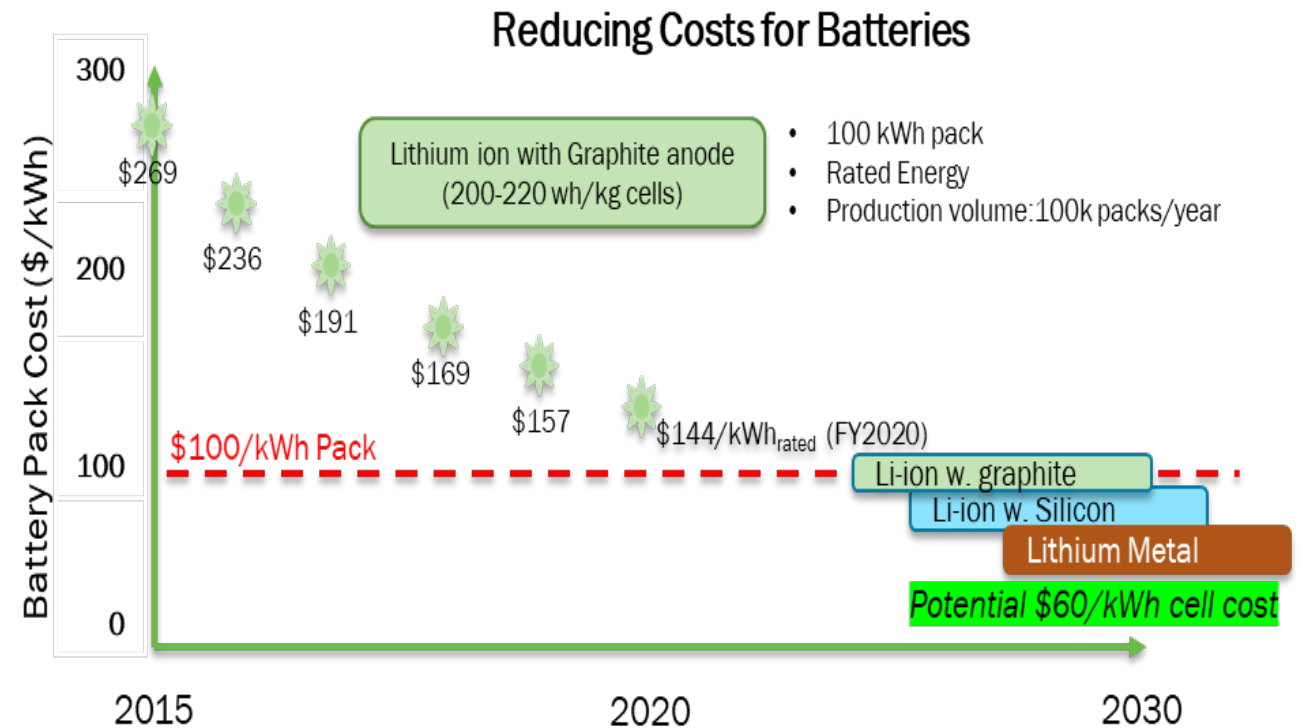
Some R&D for On/Off-
Road MD/HD Vehicles

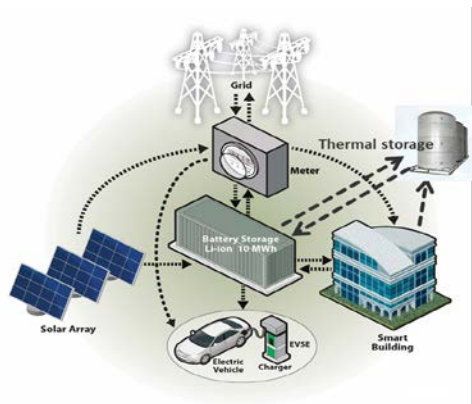
Electric Vehicle Battery R&D

BY 2025, reduce the cost of EV battery packs to less than \$100/kWh, and increase range to 300 miles, and decrease charge time to 15 minutes or less.

Developing multiple pathways to reduce costs and reduce material needs

- Next generation lithium ion
 - higher capacity Cathodes (*no cobalt/no nickel*)
 - silicon-based anodes (*no or low graphite*)
- Lithium metal batteries including solid-state & lithium-sulfur (*no cobalt/no nickel, no graphite*)
- Establish profitable lithium battery recycling ecosystem





- ❑ Significantly expand EV community partner demonstration activities
- ❑ Demonstrate innovative charging/ infrastructure technology for various types of EV owners. Improve equitable access to the benefits of electrified transportation,
- ❑ Support Administration's goal to deploy 500,000 charging stations across the Nation.
- ❑ Demonstrate innovations to enhance community resilience (especially underserved communities) to physical hazards using distributed solar, energy storage, EVs, and other DERs (joint EERE-OE effort).
- ❑ Support education and workforce training.



THANK YOU

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