



Sustainable

TRANSPORTATION

U.S. DEPARTMENT OF
ENERGY | Energy Efficiency &
Renewable Energy

Are Electric Vehicles Really Cleaner?

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Program Manager/Engineer

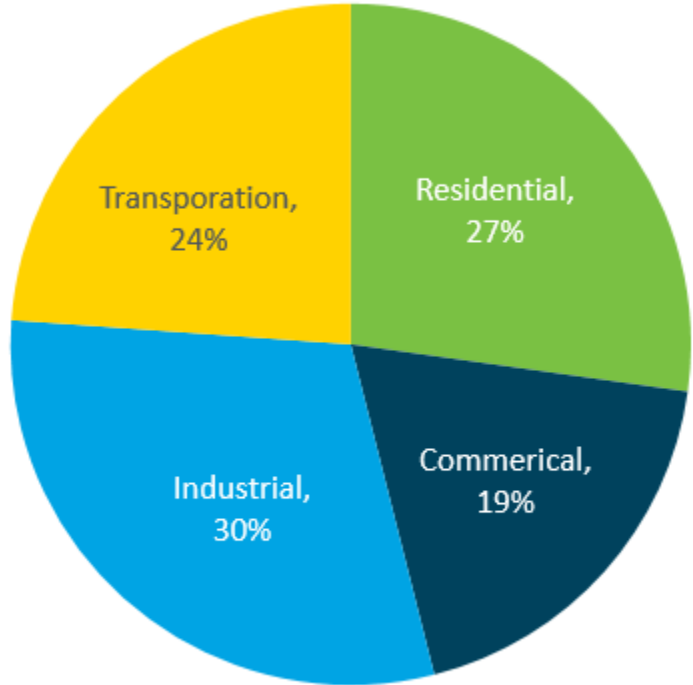
Vehicle Technologies Office

Presented for Clean Cities Coalition Webinar

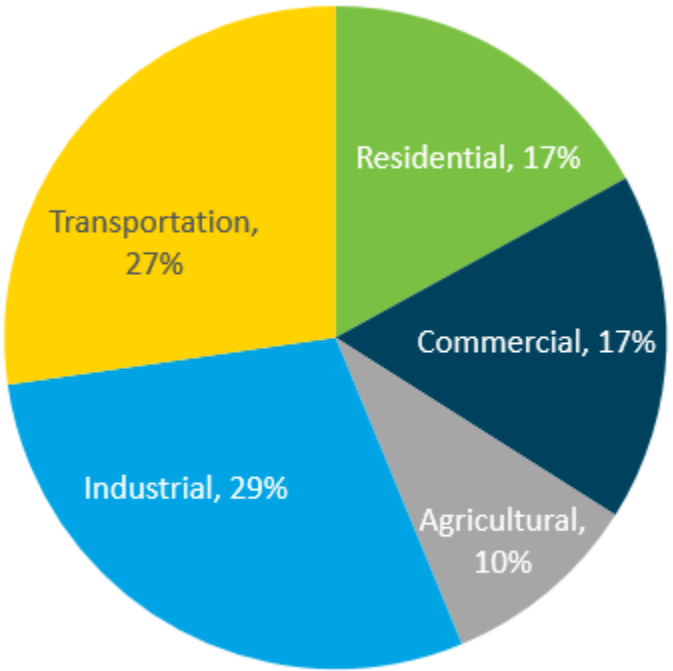
June 14, 2016

Why do we care about transportation?

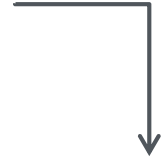
2013 Energy Consumption of US



2013 GHG Emissions of US



For an electric vehicle

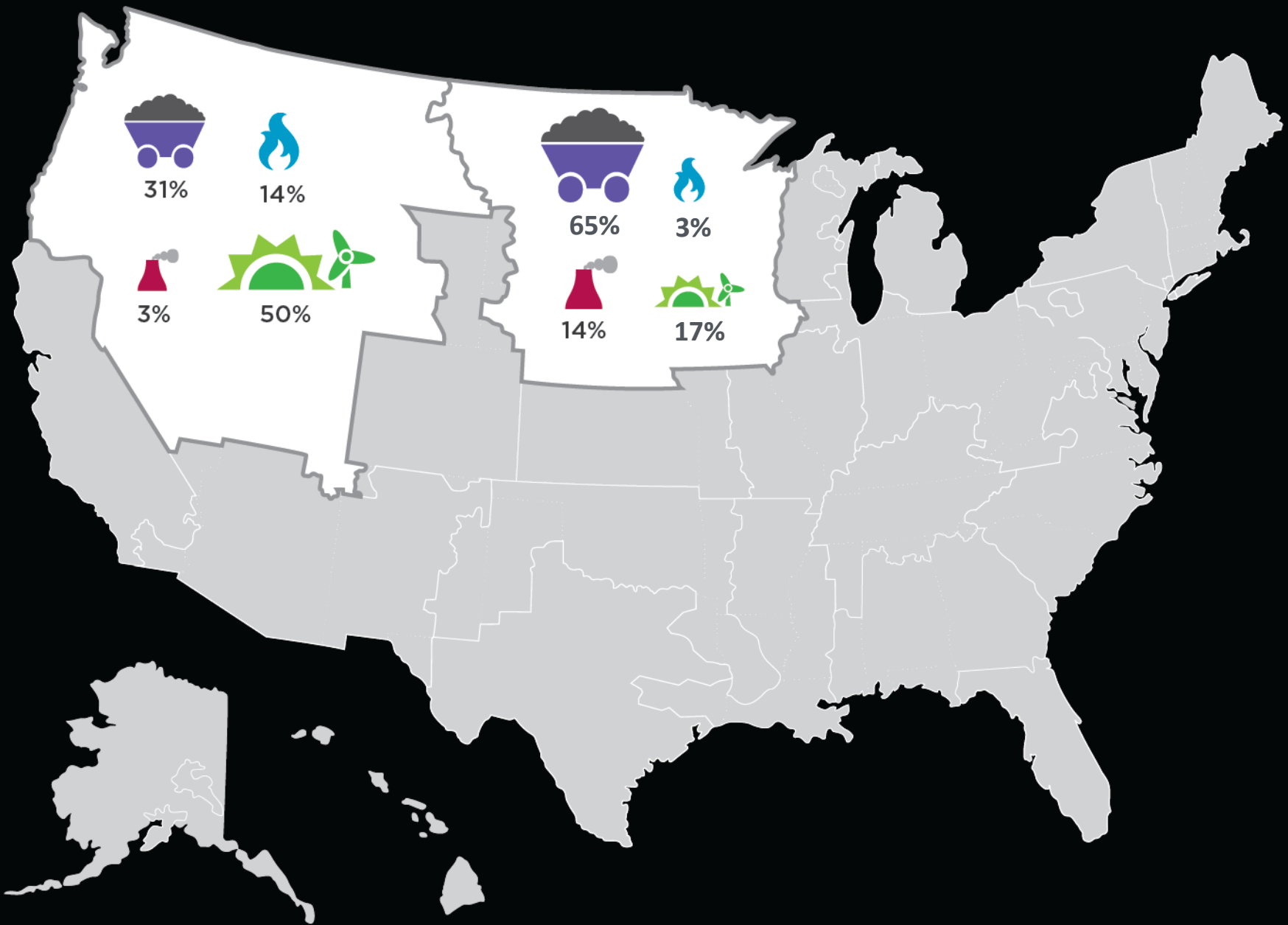


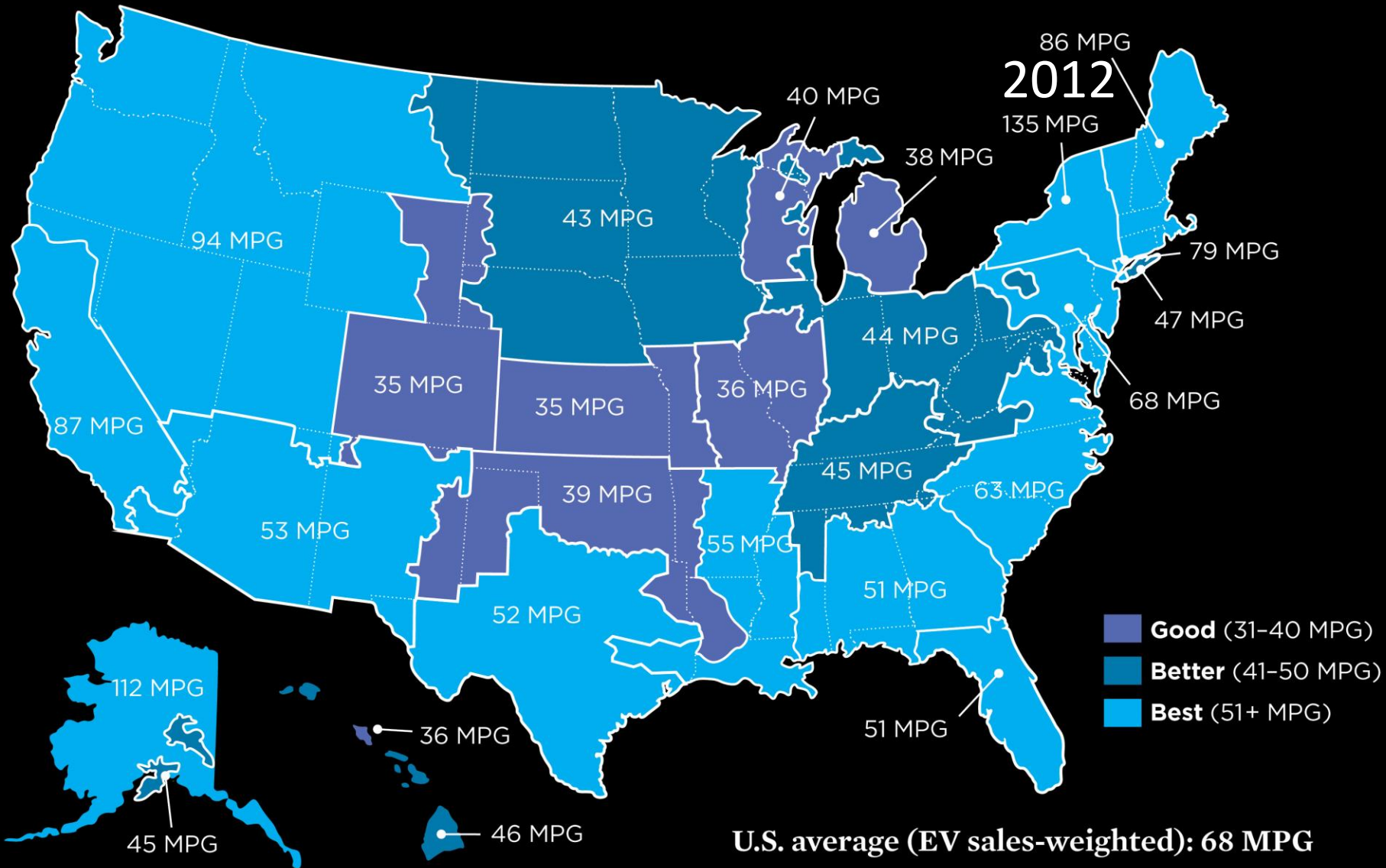
Well-to-wheels



For a conventional vehicle

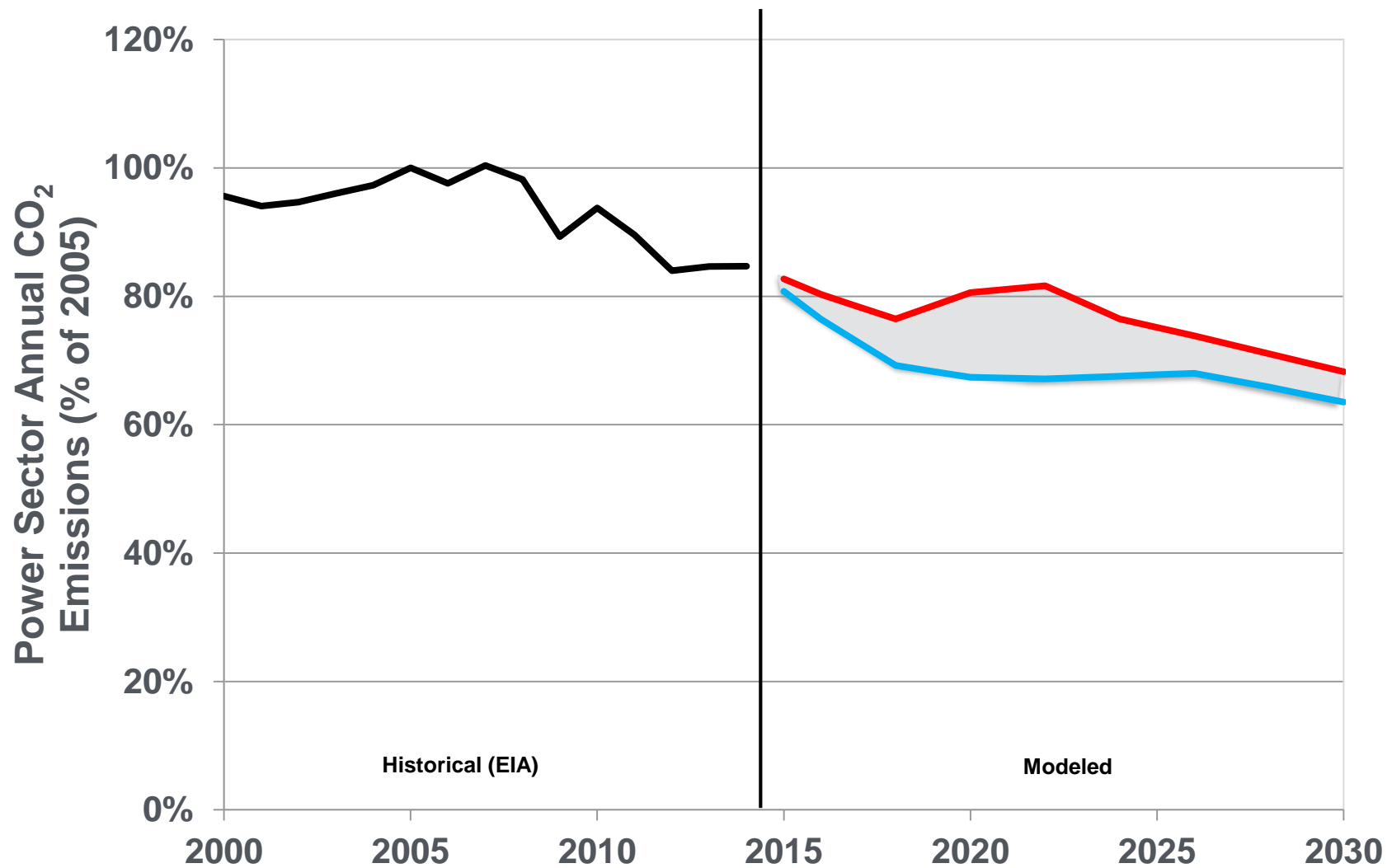




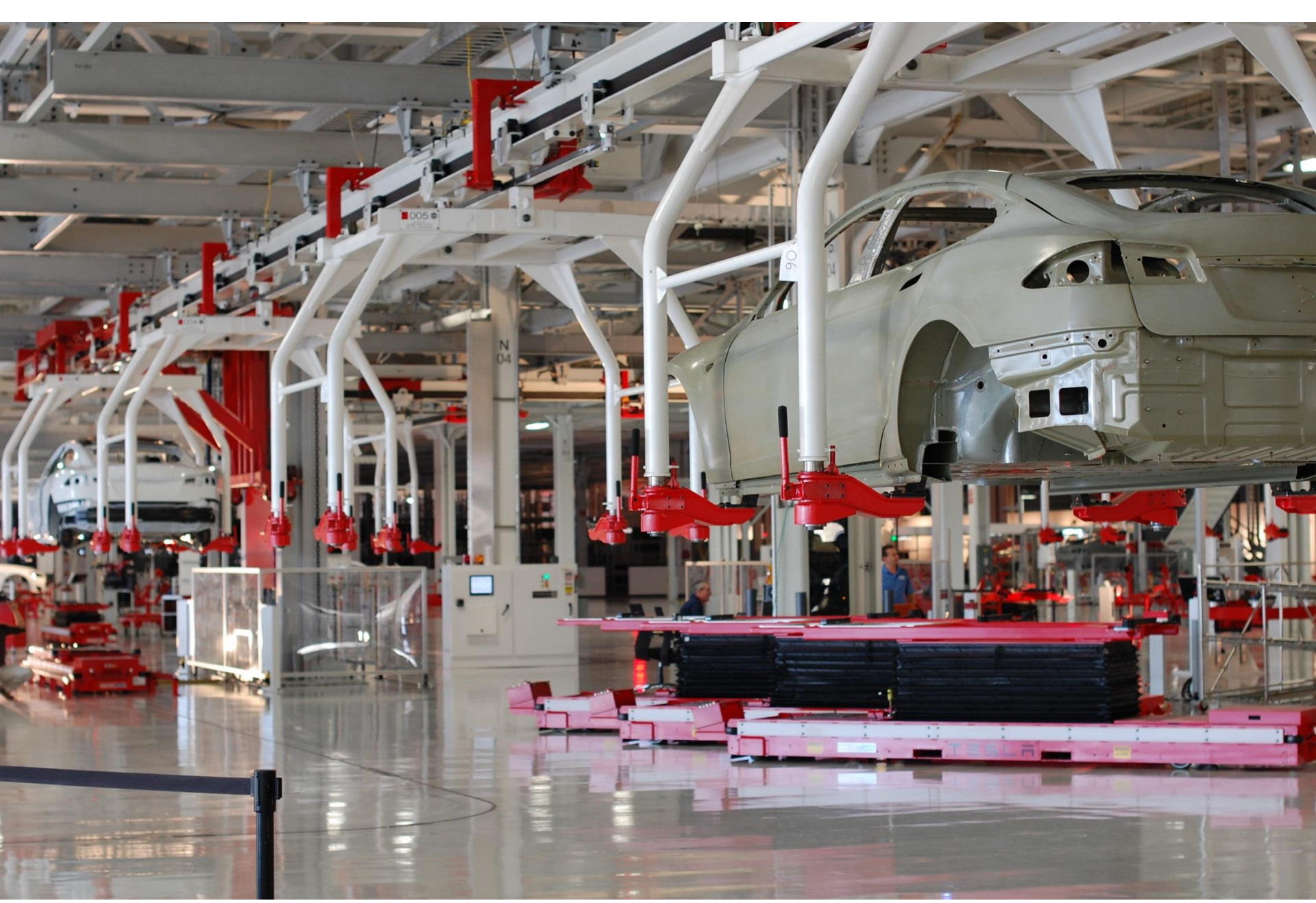


Source: EPA 2015 (eGRID data year 2012)

Electricity Emissions are Expected to Decrease Further



Source: NREL Technical Report, February 2016







Life Cycle Assessment of EV

Manufacturing

Use

Total LCA



**Disposal or
Recycling**

Battery Electric Cars

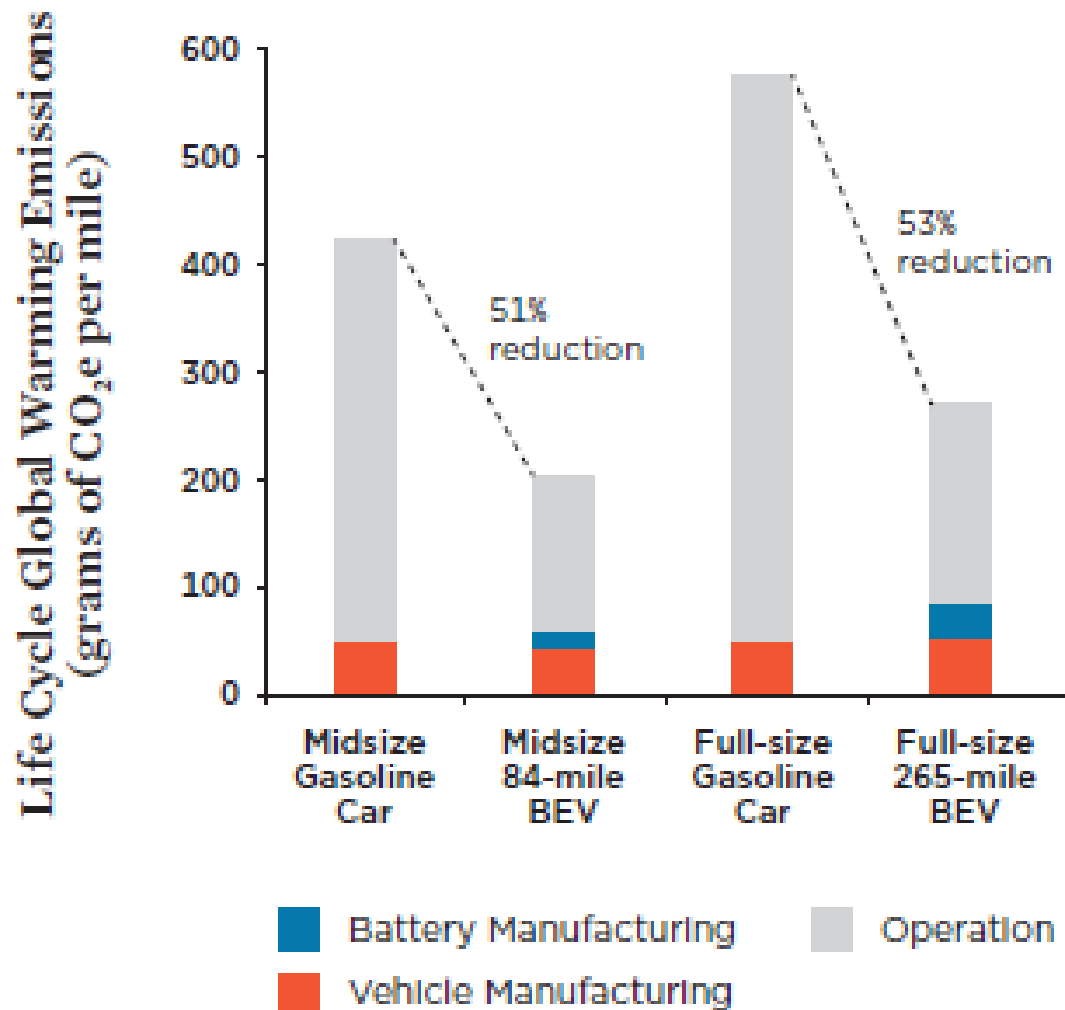


2015 Nissan LEAF
84-mile range
24 kWh battery
0.3 kWh/mile

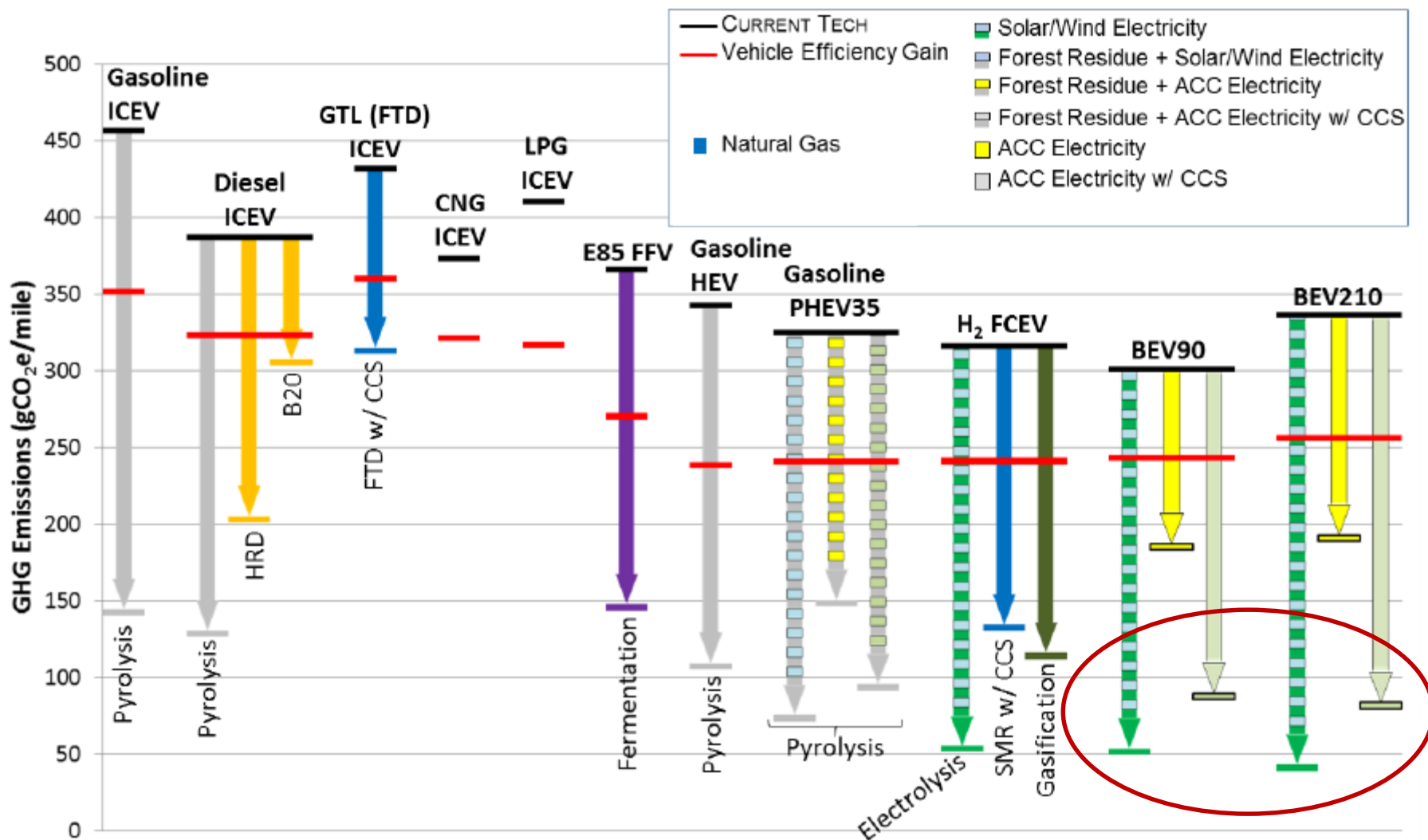


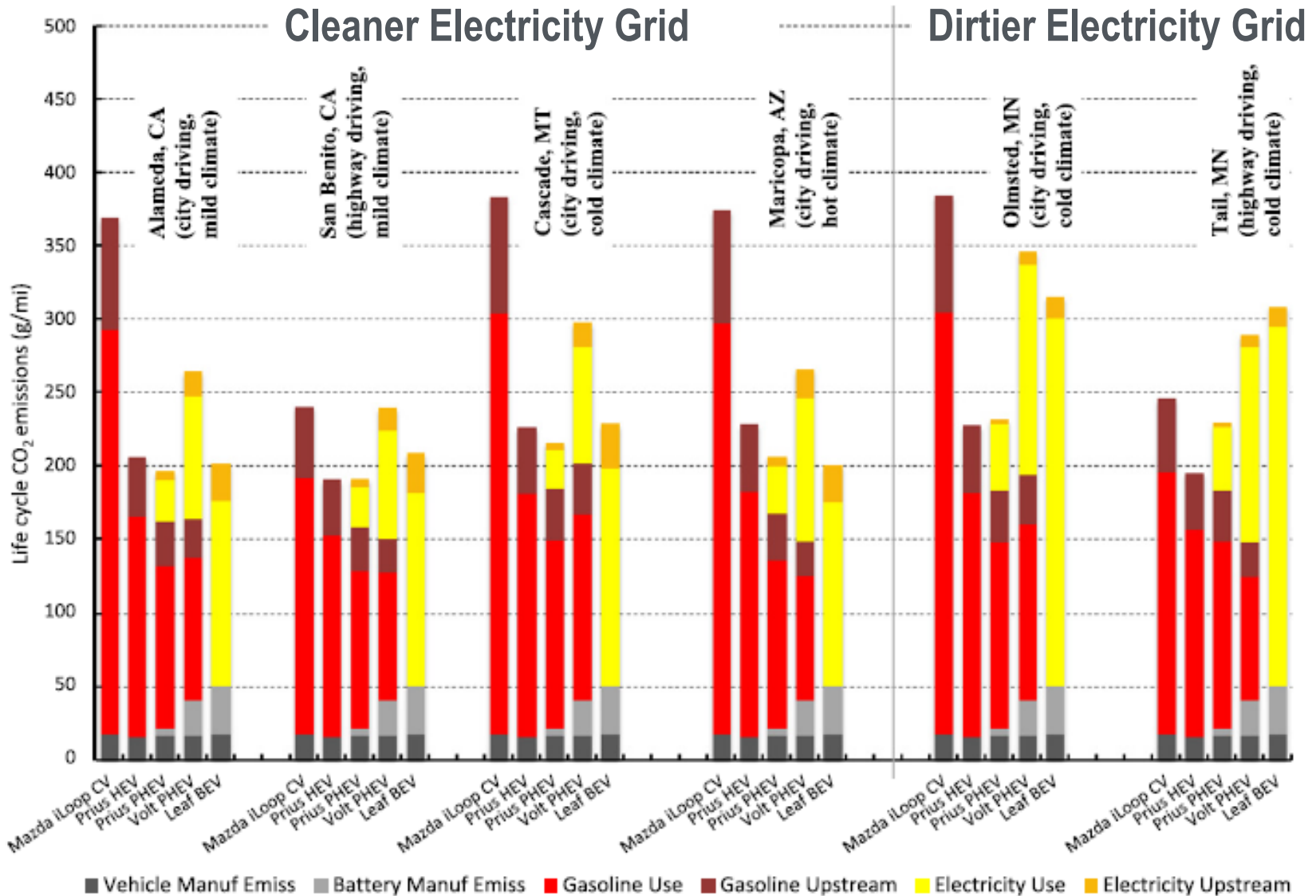
2015 Tesla Model S
265-mile range
85 kWh battery
0.38 kWh/mile

Lifecycle Assessment Results (UCS, 2016)



Fuel Source Matters





Major differences and important factors

- Lifetime of the vehicle
 - Usually around 12-15 years
- Electricity grid mix
 - Varies by region
 - Completely powered by coal still results in 29 MPG equivalent for average EV efficiency
- Vehicles for comparison
 - Gasoline vs. Hybrid vs. Plug-in EVs
- Driving behavior and temperature
 - City vs. Highway driving
 - Cold vs. Mild temperatures



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Thank you!

For additional information on this presentation, please contact:

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