Future Vehicles and the Future Interstate

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TOPICS

Electric vehicles
Highly automated vehicles
MODERN ELECTRIC VEHICLES

Range: Up to 335 miles
Primary energy source: Home charging

Trips longer than the vehicle's range require charging on the road
SUPERCHARGING

DC fast charging (120kW): up to 170 miles range in 30 minutes
SCALABILITY OF
ON-THE-ROAD CHARGING

Energy consumption
Charging spaces
ENERGY CONSIDERATIONS

Daily vehicle traffic

Vehicle energy usage per mile

Fraction of energy obtained from on-the-road charging

Example Calculations

Assume:
- 30,000 vehicles per day
- 300 Watt-hours per mile
- 1/3 of energy from on-the-road charging

3 MWh per roadway mile per day
**CHARGE SPACE CONSIDERATIONS**

Average charge rate

Distance between charging stations

Average vs. peak usage

Example Calculations

Assume:

- 3 MWh per roadway mile per day (from previous slide)
- Average 100 kW charge rate
- Charging stations 50 miles apart
- 63 charging spaces in use 24 hours per day
CHARGE SPACE CONSIDERATIONS
Example Calculations

Assume:
- 3 MWh per roadway mile per day (from previous slide)
- Charging stations 50 miles apart
- 3.5 acres solar per GWh/yr

190 acres solar

AUTOMATED VEHICLES
AVs HAVE SIMILAR BENEFITS TO INTERSTATES

Safer | More Enjoyable | Improved Traffic Flow
How can interstates facilitate automated vehicles?

How can automated vehicles facilitate interstates?
INTERSTATES FOR AUTOMATED VEHICLES

Narrower lanes

Smaller clear zones – Existing clear zones can be converted to AV-only lanes

Fewer lanes needed to carry the same number of vehicles

Do not need to be as straight
INTERSTATES FOR AUTOMATED VEHICLES

- Less Expensive to Construct
- Reduced Environmental Impact
- Can Access New Routes