

# Electric Vehicle Charging Solutions Central Tri-State Tollway (I-294) Corridor



September 27, 201

# CURRENT CHARGING SOLUTION

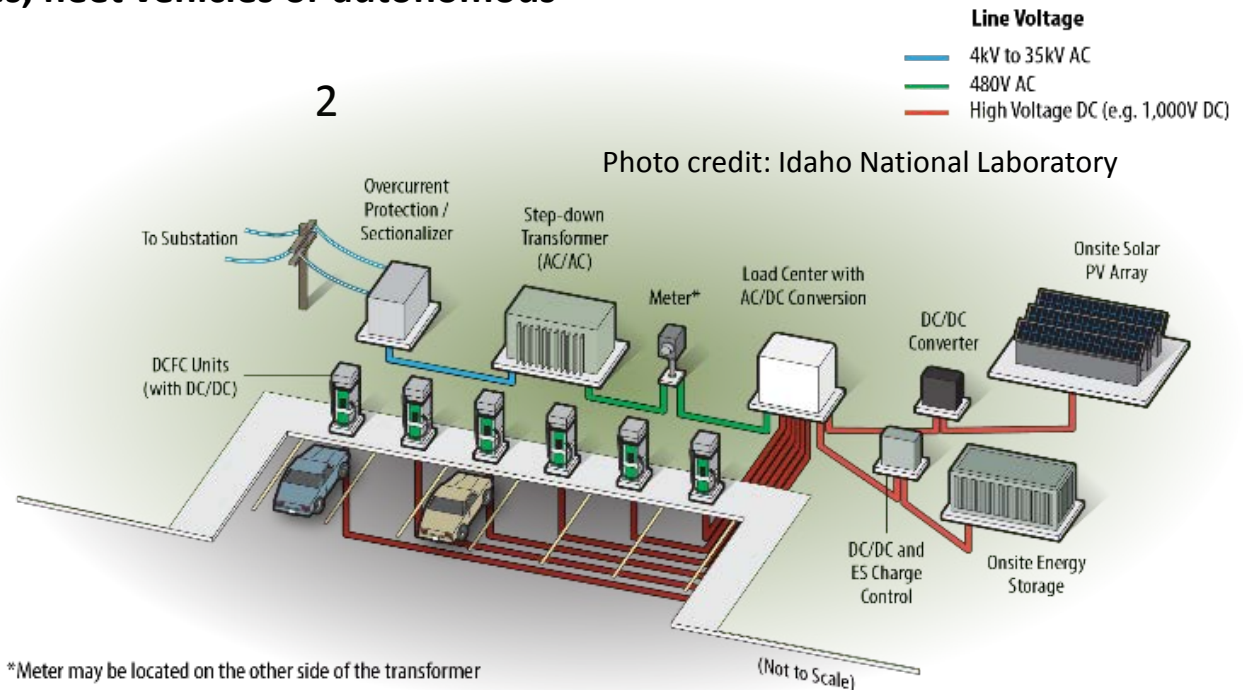
Conventional paradigm

Target: 15 minute charge

Costly infrastructure and demand charges

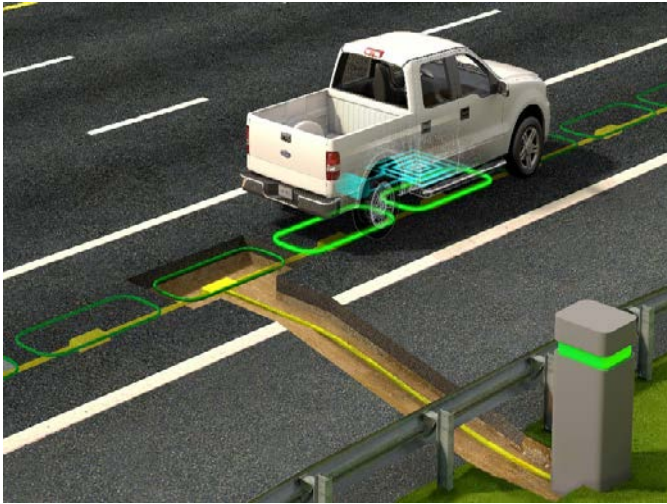
Rapid battery degradation with repeated fast charge

Not as suitable for larger vehicles, fleet vehicles or autonomous vehicles



# SMART POWERED LANES

## POWER AS YOU GO



### What are Smart Powered Lanes?

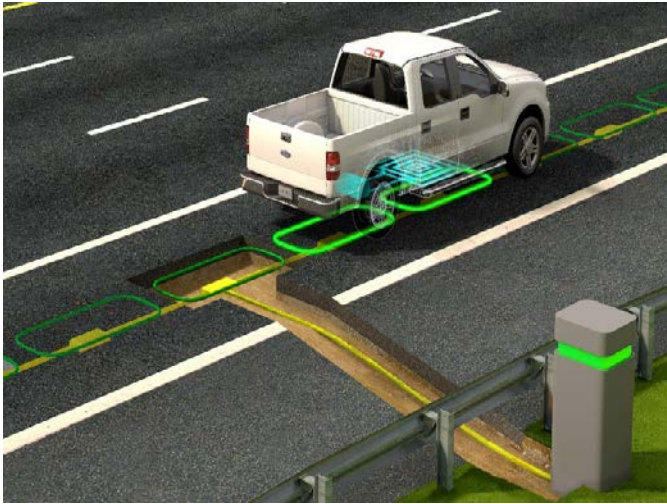
- Inductive charging technology buried under the pavement
- Power is transferred to using a receiver on the bottom of the vehicle frame
- Wirelessly charge a vehicles while driving in-motion at full speed





# SMART POWERED LANES

## POWER AS YOU GO



### Concept

- Roadway embedded coils energize sequentially as vehicles pass over the pads
- Receiving coils on the vehicle deliver power to the drivetrain and charge the battery
- Reduces battery size on EVs and allows hybrid EVs to operate with zero emissions

### Technical targets

- Continuous power to the vehicle at highway speeds
- Target 90%+ average efficiency, grid to battery

### Grid impact

- Continuous and controllable load by averaging over long roadway sections of coils
- Local load for wind and solar power

### Safety and compatibility

- Meet ICNIRP standards for safety
- Compatible with light to heavy duty vehicles

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### DRIVING TOWARD CHANGE



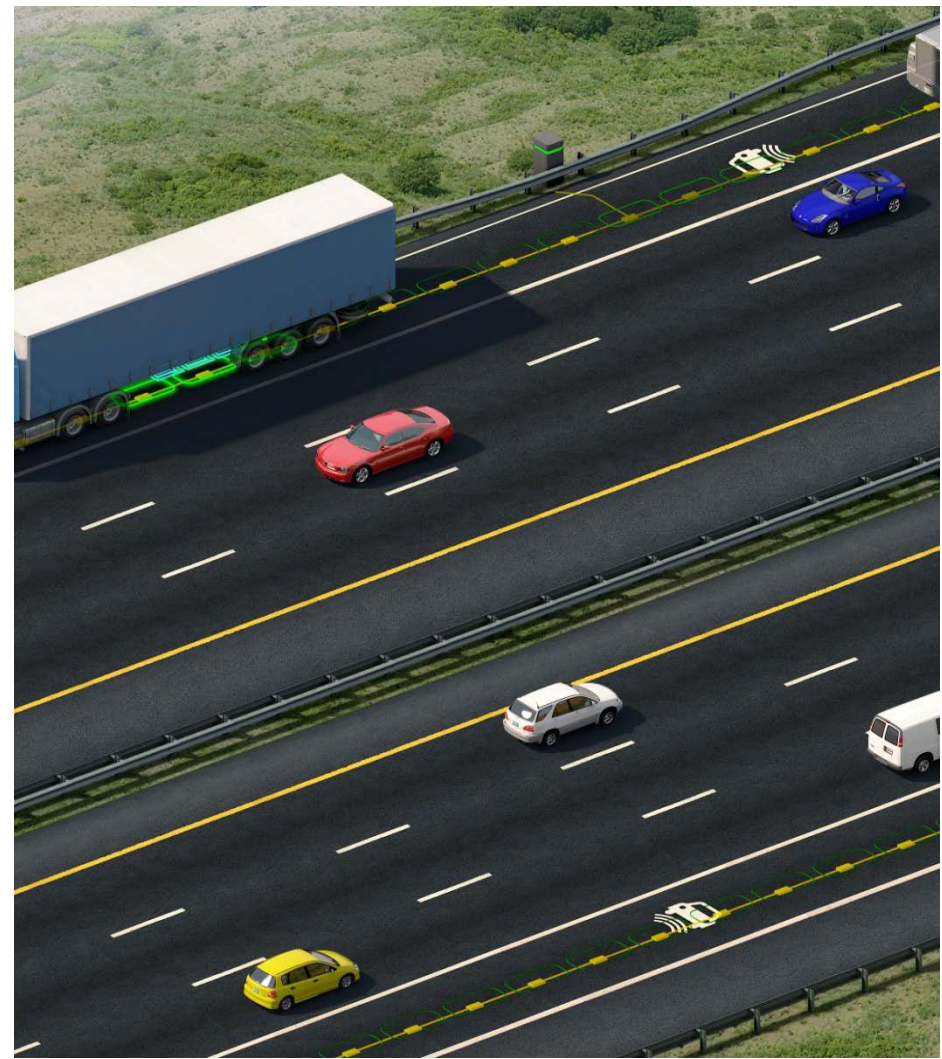
01 Energy storage shifted from battery to roadway



02 More consistent charging along a route



03 Lowers cost of electric vehicles with smaller batteries



# SMART POWERED LANES

## POWER AS YOU GO



### PASSENGER VEHICLES

- Highest current adoption
- Substantial range and Technology advancements
- Range constrained by battery



### TRUCKS

- Large focus for fleet conversion
- Technology development growing
- Freight capacity constrained by battery



### FREIGHT TRUCKS

- Least developed technology
- Growing adoption
- Constrained by battery and operational efficiency

# SMART POWERED LANES

## POWER AS YOU GO

### KEY BENEFITS

Better fleet efficiency with electric vehicles that don't need to stop to charge

Lower cost to electrify fleet vehicles



Cleaner vehicle fleets that are not reliant solely on fossil-based fuels

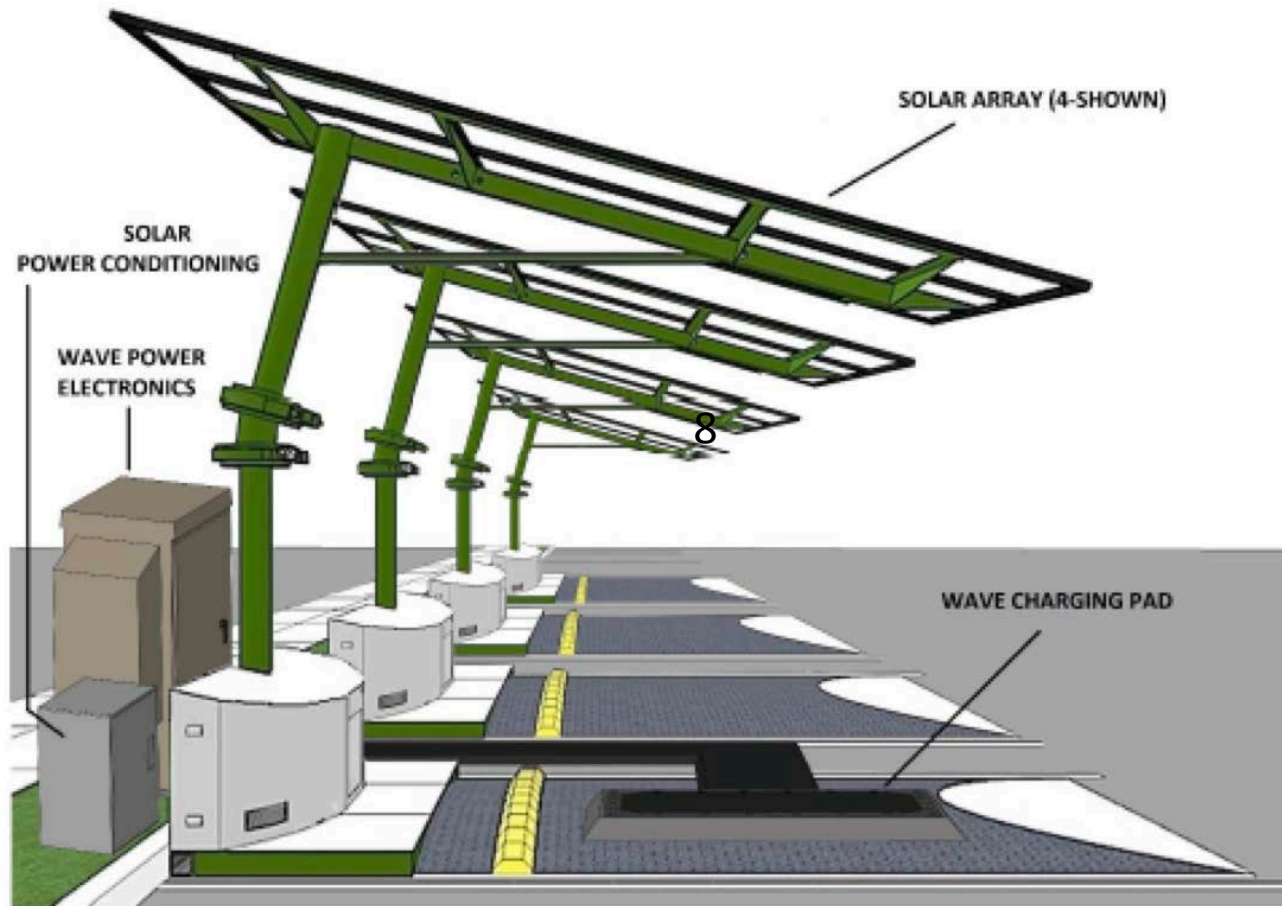
Reduce transportation operations costs



Minimal changes in operations, maintenance and required facilities



# STATIC WIRELESS CHARGING





# Shared Wireless Charging Infrastructure| Interoperability



## Interoperability

