Trending in a new direction
Electrified Transportation
Agenda

• Purpose in Electrified Transport
• What We Are Learning
• Accelerating Our Success
Purpose
Cleaner air – A clear purpose

Before

After
Our future: Clean, smart, efficient
The decarbonization process: Three powerful levers

Clean Buildings  
Trending with Impact  
For > 20 years

Clean Power  
Trending with Impact  
For > 10 years

Clean Transport  
Trending in a New Direction
EV market trend -
At the beginning of a multi decade conversion cycle

A multi-decade transition

Rather resilient to COVID, so far

But the USA Lag is Concerning

Bringing these trends together - Our Journey at Siemens

We are investing over $110 million in measures to reduce our carbon footprint

- 2.2 million tons CO₂ in 2014
- 1.7 million tons CO₂ in 2016
- 1.0 million tons CO₂ in 2020
- 0.0 million tons CO₂ in 2030

Do More of What Got Us to 50%

Drive energy-efficiency program
Increase energy efficiency in factories, employ sustainable technologies in new buildings

Expansive green energy purchase
Move toward a significantly cleaner power mix with a strong focus on renewable energy and highly efficient gas

And Change Our Business Further

Leverage distributed energy systems
Reduce energy costs and CO₂ emissions

Reduce fleet emissions
Utilize potential of low-emission cars in fleet, focus on electromobility across vehicle classes
What We are Learning
Six lessons to electrify clean transport now

1. Vehicle use – Watch the full spectrum
2. Electricity has different economics than gasoline
3. The land of 10,000 pilots
4. Charging infrastructure – Can’t plug-it-in
5. Service – A new mix of skills
6. Watch out for new digital traps that strand assets
Understanding the vehicle use – A key first step

- **eTruck**
  - (Freightliner, 2020)

- **Transit eBus**
  - (New Flyer, 2019)

- **Corporate fleets**
  - (transportationtodaynews/Shutterstock, 2019)

- **Electric vans**
  - (FIAT, 2020)

- **School eBus**
  - (Blue Bird, 2020)

- **Consumer**
  - (Mark Ralston / AFP - Getty Images, 2019)
# Vehicle use translates into a charging plan

<table>
<thead>
<tr>
<th>Battery Size</th>
<th>Home</th>
<th>Work</th>
<th>Station</th>
<th>Beyond 350 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;100 kWh</td>
<td>AC</td>
<td>30-50 kW DC</td>
<td>50-150 kW DC</td>
<td>150-350 kW DC</td>
</tr>
<tr>
<td>100-200 kWh</td>
<td>7.2-17 kW</td>
<td>50-150 kW DC</td>
<td>150-350 kW DC</td>
<td>250-350 kW DC</td>
</tr>
<tr>
<td>200 kWh+</td>
<td></td>
<td></td>
<td>30-50 kW DC</td>
<td>Beyond 350 kW</td>
</tr>
</tbody>
</table>

- **Home**: 30-50 kW DC, 7.2-17 kW
- **Work**: 50-150 kW DC, 50-150 kW DC
- **Station**: 50-150 kW DC, 150-350 kW DC, Beyond 350 kW
- **Beyond 350 kW**: 250-350 kW DC

(Mark Ralston / AFP - Getty Images, 2019)
### Vehicle use translates into a charging plan

<table>
<thead>
<tr>
<th>Dwell Time</th>
<th>50 – 150 kW DC</th>
<th>150 – 350 kW DC</th>
<th>Beyond 350 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;30min</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30min-3 hours</td>
<td>30 – 50 kW DC</td>
<td>50 – 150 kW DC</td>
<td>250 – 350 kW DC</td>
</tr>
<tr>
<td>&gt;3 hours</td>
<td>AC 7.2-17 kW</td>
<td>30 – 50 kW DC</td>
<td>150 – 350 kW DC</td>
</tr>
<tr>
<td></td>
<td>&lt;100kWh</td>
<td>100-200kWh</td>
<td>200kWh+</td>
</tr>
</tbody>
</table>

- **En-route**
- **Depot**

*Freightliner, 2020*
EV charging infrastructure: More than a gas station
Electricity is not equal to gasoline - Different opportunities & risks

Gasoline

- Priced Per Gallon
- Hedge risk
- Geo-political risk
- <20% local revenue

Electricity

- kWh – similar $/gallon
- kW – Max power used
- Fixed fee
- > 50% local revenue
The land of 10,000 pilots

...Critical as the US Attempts to "Resume a Leadership Role"
A Holistic View is a Common Theme to the Succeeding Programs
With a Profound Implication for the Future Service Industry

Building Infrastructure

Electrical Construction

Mobility & Transit

Automation & Networking
While Striving to End Proprietary IoT islands
Accelerating our success
The United States EV infrastructure continues to “significantly lag” other regions
Exciting trends accelerating our market

Last Mile Trucking Depots

Nationwide Charging Networks

Direct Utility Ownership Programs

Charge Ready
How It Works

Open Standard Ecosystems

OCPP Based
Multi-vendor
Access to data
Secure

(SCE, 2020)

(Electrify America, 2018)
Recommendations to support local success

1. Policies to support last mile electrification of goods
2. Collaboration with local utilities to find “right balance” of energy rates
3. Mandates around open standards for charging infrastructure
4. Programs that support “Plug-to-Grid” buildout & not just the charging station
5. Policies that support EV infrastructure in traditional building performance contracts
Clean up transportation…now
Creating environments that care
Questions?