Commercial Vehicle-Grid-Integration (VGI) Roadmap12, Portland, June 2019
How V2G Works

1. **Plug in your car** to any charger

2. **Charge battery** safely and efficiently in V2G Mode

3. **Make money** by providing power capacity and sending energy back and forth to regulate the Grid

4. **Or save costs** by using stored energy from EV batteries to reduce building energy peak consumption

5. **You’re ready to drive** with the charge you set for the day with advance trip planning using a mobile fleet management app
V2G Customer Profile: AFA JC DECAUX

- Leading supplier of urban equipment
- Fleet of 7 eNV200 in Copenhagen, DK
- 1 shift but fleet drives nights and day
- Customer puts a high value on running a green operation
- Requires green electrons (GoD)
- Revenues generated by Nuvve: $2000/car/year
Electric School Bus w/V2G & V2B Project

Site connection: 65kW
Two electric busses: 40kW
Total number of buses on site: 38
Potential connection: 760kW

Revenue opportunity:
- Frequency response
- Other grid wide services

Cost optimization:
- Demand charge management
- Time of Use optimization

Cost mitigation:
- Local generation
- Stationary storage
Profile: Bornholm Municipality

- Bornholm Municipality has 19 chargers in operation
- Island of 40,000 population; solar, wind, biomass energy mix
- Fleet is dispatched over 6 different locations
- Fleet Manager has a central operation control with Nuvve dashboard control
Fleet Solutions – Earning $ While Parked

Customer Example
• 10 EVs operated in single-shift 8am-5pm, M-F

Operation
• Started September 2016 with 160,000+ hours operations

Grid Services:
• Frequency Regulation in Ancillary Energy market

Revenue
• $2000 USD / car / year
General categories of barriers to V2G

1. **Regulatory status:** V2G is storage, not generation or load. Impacts metering, taxation, market access

2. **Interconnection:** Small generator standards are not designed for EVs

3. **Market Access/Market Design:** Markets were not designed for aggregated behind the meter kW scale resources
Backup slides
Nuvve – Vehicle-to-Grid (V2G)

- The world’s only platform enabling profitable deployment of EV fleets globally
  - 15 Patents around V2G
  - HQ in San Diego, California
  - Offices in Delaware, UK, Denmark, and France
  - 30+ Employees
  - 15 years experience in V2G projects
  - 2+ years of commercial operation in Europe
  - Projects deployed globally
  - Largest aggregation achieved: 13,000 EVs
Profile: Frederiksberg Forsyning

- Municipal owned Utility in Copenhagen area
- 10 eNV200 Nissan and V2G chargers
- Active on Energy markets since 2016
- Generate Revenues of 1860€ per car per year
- Driving 6am to 4pm weekdays
- Average yearly availability 17.5 Hours per day for V2G
Nuvve’s V2G Customers

- EV Fleets
- Light Trucks
- Heavy Duty
- Home
- Campus
- Multi-Unit dwellings
- Ride sharing
The EV Inflection Point is Here

2019: Ready for Inflection?

Units Sold

- BMW
- Chevrolet
- Chrysler
- Ford
- Honda
- Kia
- Mercedes
- Mitsubishi
- Nissan
- Tesla
- Toyota
- Volvo
- Other

Data shown quarterly. Includes plug-in hybrid electric vehicles, battery electric vehicles, and fuel cell vehicles.

Chart: Electrification Coalition/Paul Ruiz

* Source: SAFE analysis based on data from Hybridcars, InsideEVs, and automotive industry press releases.
* Created with Datavizrapper
Thank You