



# Electric Fueling for Fleets

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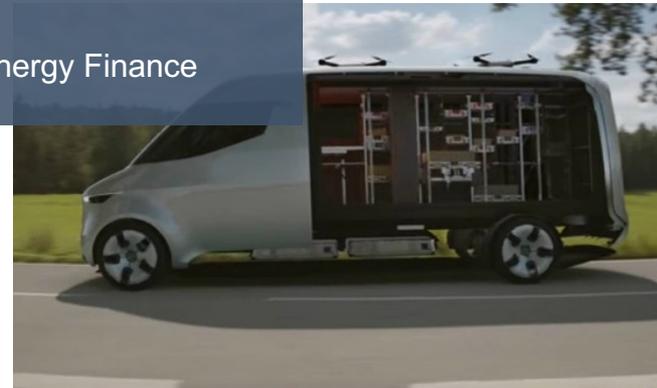
Illinois Commerce Commission

# The Future of Transportation Is Electric



By 2040, 55% of new car sales and 33% of the global car fleet will be electric.

—Electric Vehicle Outlook 2018, Bloomberg New Energy Finance



# The Future of Transportation Is Electric



ChargePoint is the ONLY company operating globally in every existing and emerging segment of electric vehicle (EV) charging

# ChargePoint Background

- + Founded in 2007
- + HQ in Campbell, CA; Offices in Scottsdale and Europe
- + 500 employees (35% in RD&E; 50 in Service/Support)
- + 8,000 Customers

**55,000+** Charging Spots | **40M+** Charges Delivered



- + **Aggressive investment in technology development**
  - Patents for networked EV charging
  - Standards leadership
  - Continuous innovation – Ultrafast charge network
  - Broad product range

# ChargePoint Fleet Solutions

- + 5,000+ fleet stations deployed
- + 150+ Fleets
- + Key Segments Served:
  - Public Sector Vehicles
  - Logistics/Delivery
  - Car Sharing
  - Transportation Network Companies
  - Public Transit
  - Vocational Vehicles/Off-Road



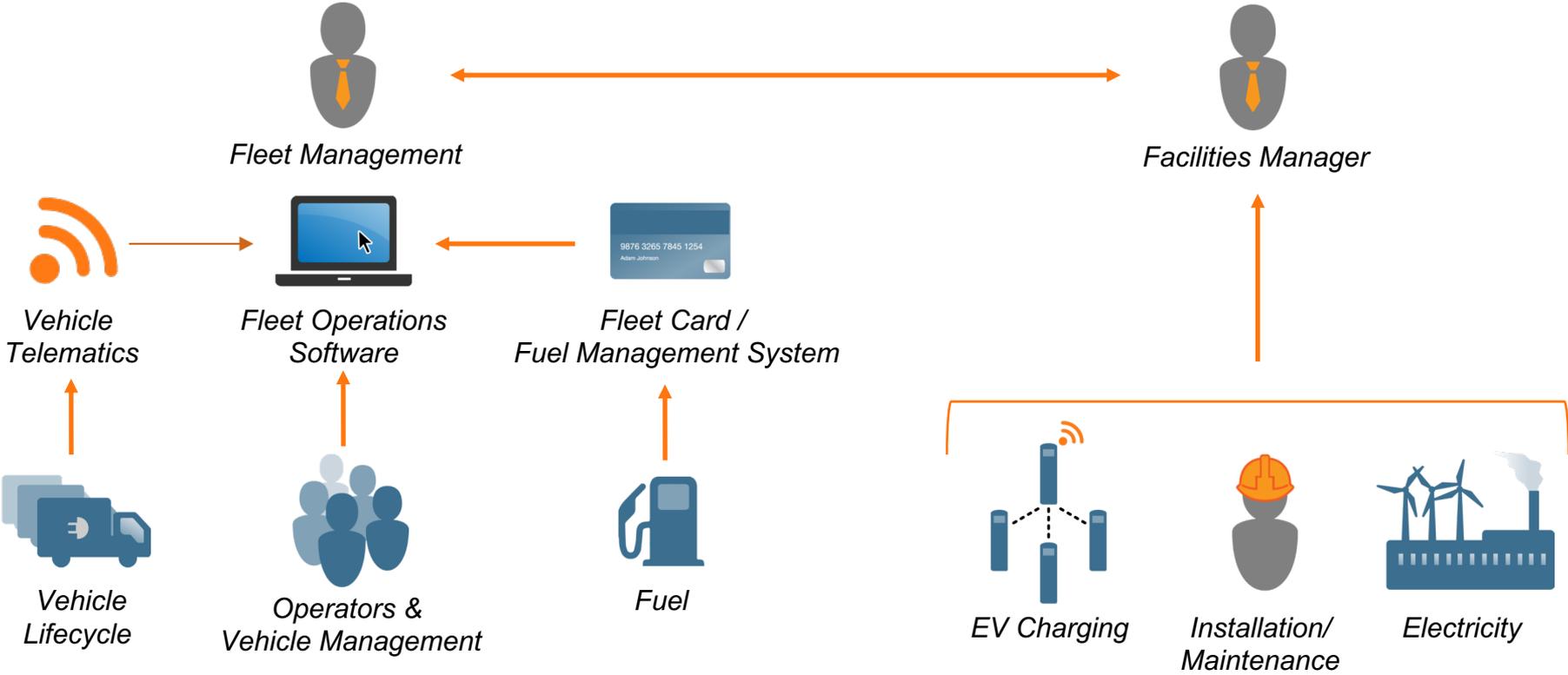
*ChargePoint proudly supports these fleet organizations*



# Defining Fleet Vehicles



# The Fleet Ecosystem – Stylized View



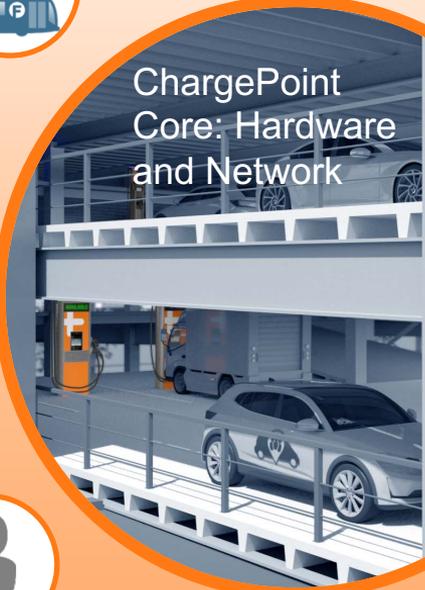
**3rd Party Route or Fleet Management Systems**



**Integration with Solar and Energy Storage**



**ChargePoint Core: Hardware and Network**



**Power Management**



**ChargePoint Network**



**Station Management & Reporting**



**Other Building Loads**



**Depot Energy Optimization**



**Utility Programs and Grid Services**

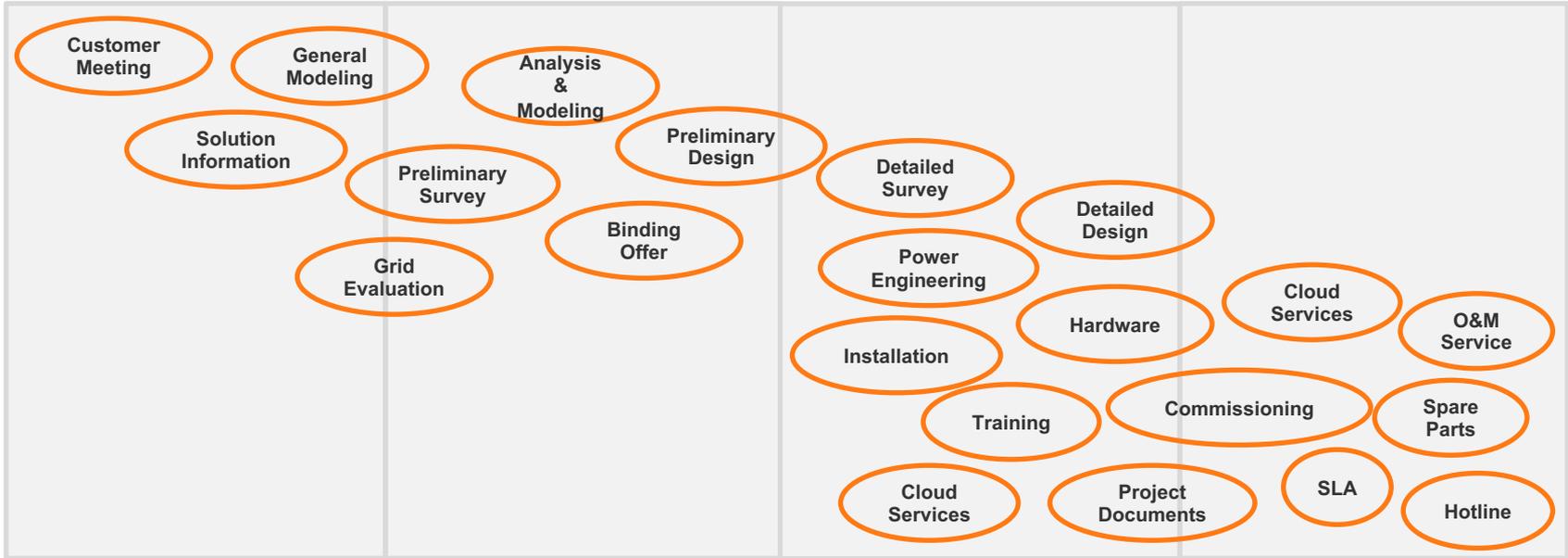


**Energy Solutions**



**Customer Use Case Consulting**

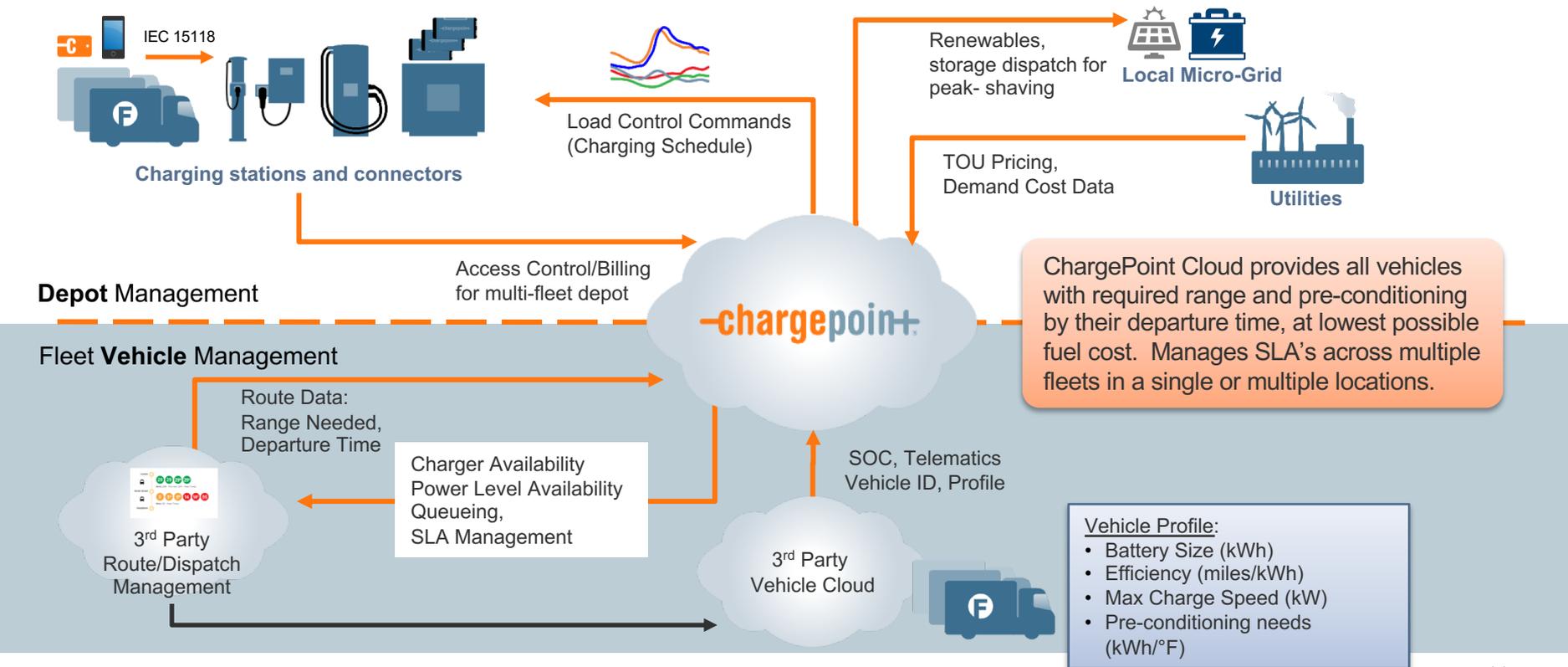
# Complete Charging Solution



# Charging Stations for Every Application

	Class 1-2 	Class 3-6 	Class 7-8 	HD Transit Bus/Coach 
<b>DC 4x 500A</b> 	Not Applicable		<b>&lt;0.5 Hours</b>	
			Over-the-road Semis/ Slip-seating	Long-Distance Coach (1.5MW @ 750V)
<b>DC 500A</b> 	<b>&lt;0.5 Hours</b>	<b>&lt;1 Hour</b>	<b>1+ Hours</b>	
	On-route fueling	On-route Fueling (up to 200kW @400V)	Operational Off-Peak Charging Off-road Equipment (Yard Tractors, Forklifts) (375kW @ 750V)	
<b>DC 200A</b> or	<b>0.5 Hours</b>	<b>1+ Hours</b>	<b>3+ Hours</b>	
	On-Route Fueling	Depot DC Charging (up to 62.5kW @ 400V)	Depot Slow Charging (up to 150kW @ 750V)	
<b>AC 32/50/80A</b> 	<b>5+ Hours</b>		Not Applicable	
	Public Sector Vehicle Pool Car Sharing	Urban/Regional Delivery School Bus/Vans/Shuttles		

# Energy Solutions: Custom Fueling System Design





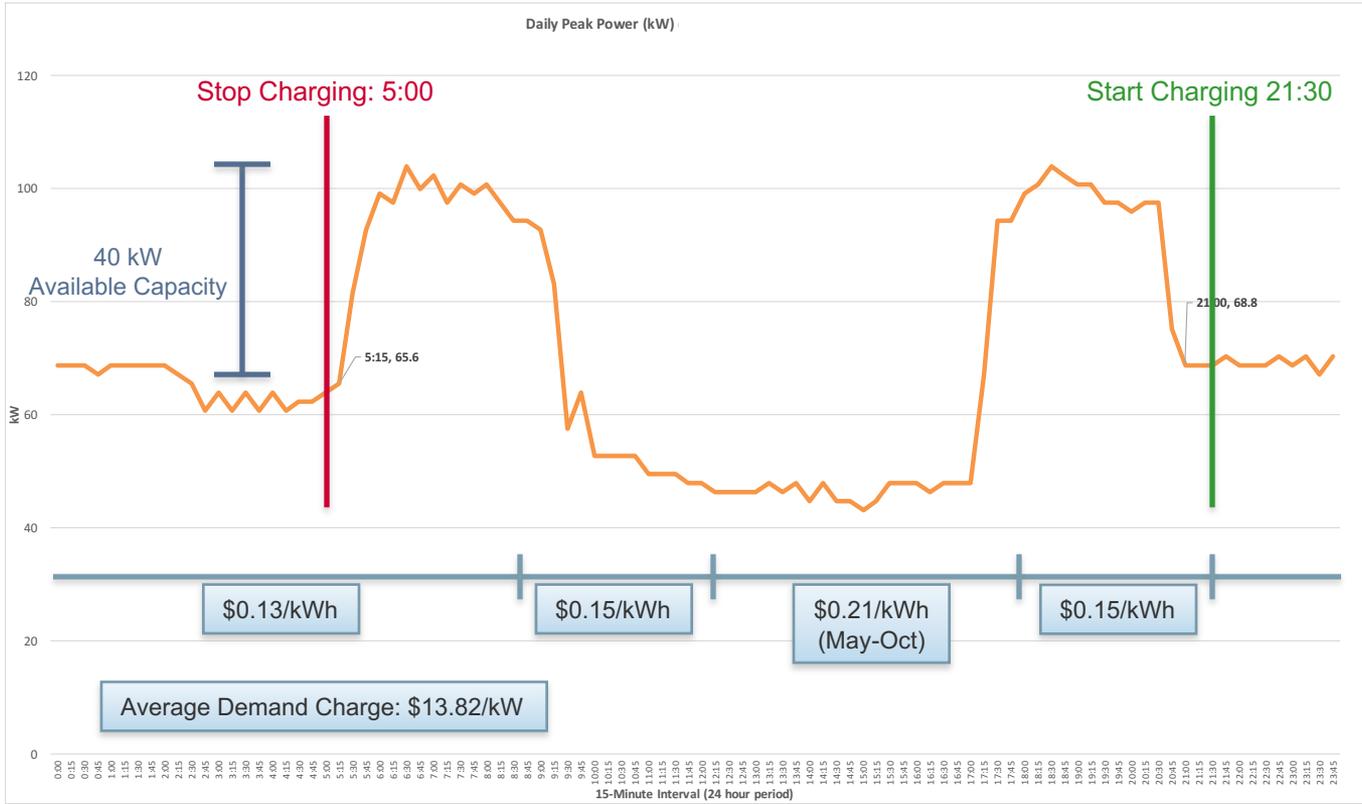
# Examples

# Preliminary Survey & Simulation/Modeling

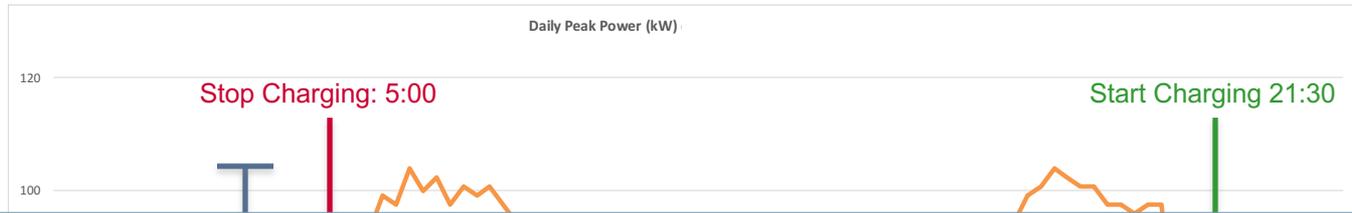
Route	Expected Bus Efficiency (kWh/mi)		Current Shift Length (hrs.)	Miles Driven per Shift	Energy Required per Shift (kWh)		Required Nameplate Battery Capacity (kWh)	Battery Commercially Available?
	Nominal	Strenuous			Nominal	Strenuous		
Cargo	1.8	2.8	12	142	256	398	478	✓
SRL	1.7	2.6	12	135	230	351	421	✓
Lot 8	2.1	3.5	12	74	155	259	311	✓
Lot 9	2.0	3.2	12	98	197	315	377	✓
JS-FC	1.7	2.6	12	268	456	697	837	✗
FC-CTA	1.7	2.6	12	203	344	527	632	✓
FC-L	1.7	2.6	12	182	309	473	567	✓
8-CTA	1.7	2.6	12	261	444	679	815	✗
9-CTA	1.7	2.6	12	221	376	575	690	✗
CTA	1.8	2.8	12	168	303	471	566	✓



# Power Management: Pilot Scale Example

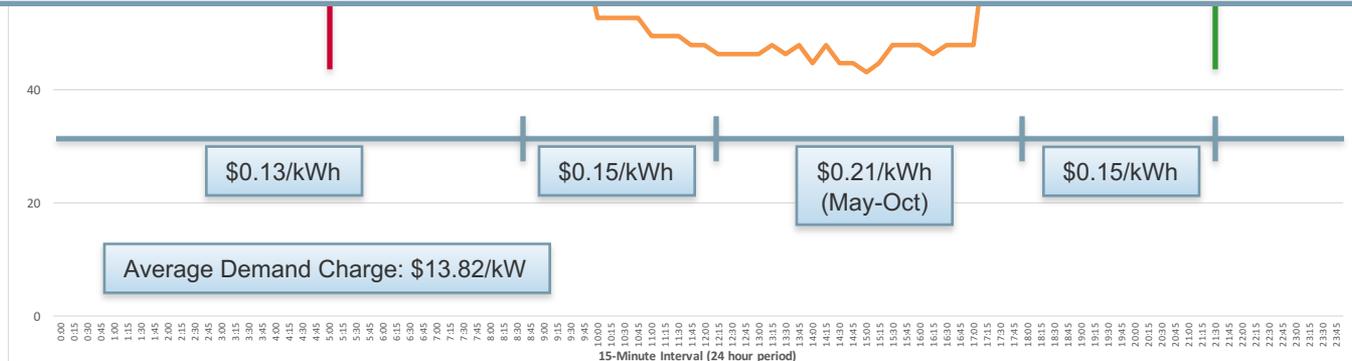


# Power Management: Pilot Scale Example



**Result: Charge 6 trucks with NO distribution upgrades at lowest electricity prices**

- Avoided distribution & panel upgrade: \$10,000
  - Avoided demand charges: \$556/month
  - Fuel savings: 50% vs. \$2.41/gallon



Thank You