Plug-in to Municipal Best Practices
Community EV Charging Station Workshop

Metropolitan Area Planning Council (MAPC)
Tuesday, May 8, 2018
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 AM</td>
<td>Welcome &amp; Poll Everywhere Activity</td>
</tr>
<tr>
<td>9:10 AM</td>
<td>EV Charging Station Selection &amp; Group Purchasing with MAPC – Megan Aki, MAPC</td>
</tr>
<tr>
<td>9:25 AM</td>
<td>Installation &amp; Maintenance Best Practices for EV Charging Stations – Justin Ries, ChargePoint</td>
</tr>
<tr>
<td>9:40 AM</td>
<td>EV Charging &amp; Car Share in Newton – Bill Ferguson, City of Newton</td>
</tr>
<tr>
<td>9:45 AM</td>
<td>Community Conversations on Lessons Learned &amp; Innovative Approaches</td>
</tr>
<tr>
<td>10:35 AM</td>
<td>Coffee break &amp; stretch</td>
</tr>
<tr>
<td>10:45 AM</td>
<td>VEH102 Vendor Presentations on Equipment &amp; Services with Q&amp;A</td>
</tr>
<tr>
<td>11:20 AM</td>
<td>Next Steps with MAPC</td>
</tr>
<tr>
<td>11:30 AM</td>
<td>Networking with Vendors &amp; Communities</td>
</tr>
</tbody>
</table>
Housekeeping
MAPC: ABOUT US

- Regional Planning Agency
- 101 cities and towns
- 90+ employees
- Wide range of planning expertise
Regional Energy Projects
- ESCO Procurement
- Regional Solar Initiative
- LED Streetlight Purchasing Program
- Community Electricity Aggregation
- Green Mobility Program
- Energy Resiliency

Climate and Energy Planning
- Connecting municipalities with incentives + plug-and-play programs
- Community energy and climate baselining, planning, and strategizing
- Outreach programming and education
- Net Zero Planning

Energy Technical Assistance
- Grant Writing
- Green Communities Designation
- Methane Leaks
- Solar Permitting and Zoning
- State and Local Policy
- Net Zero Guidance & Education
Accelerate the deployment of alternate fuel vehicles (AFVs) by reducing their incremental costs and building fleet capacity to plan procurements.

Propane, electric, and natural gas vehicles and infrastructure.
Text “MAPCMTG” to 22333 to join the poll activity

OR

Go to PollEv.com/mapcmtg in a mobile browser
EV Charging Station Selection & Group Purchasing with MAPC

Megan Aki, MAPC
ASSESS THE NEED

WHO needs to use the station?

HOW will they use the station?

WHERE will they be parked?
ASSESS THE NEED

City/town employees  Fleet operators  Residents  Visitors
ASSESS THE NEED

9-5 work hours

Re-charge midday

Overnight parking

Extend range for a trip
ASSESS THE NEED

- City/town hall lot
- DPW garage
- At home or workplace
- Service stations
SELECT A STATION

Level I

Level II

DC Fast Charging
SELECT A STATION

Level I

120V

6-10 hours for a charge

Overnight charging for vehicles that will travel under 40 miles during the day

Use cases: staff during work day, long term parking at commuter lots or vehicles parked overnight
SELECT A STATION

Level II

204-240V  1-3 hours for a charge

Most practical municipal applications, can add 10-25 miles of range in one hour of charging

Use cases: Commercial use or work vehicles that are heavily used and need a midday charge
SELECT A STATION

DC Fast Charging

480 V  30 minutes for a charge

Applications make most sense along highways at rest areas for a short duration charge that provides range for long distance travel.

Use cases: best for highway sites to enable longer vehicle trips.
SELECT A SITE

Proximity to Power
Mounting Type
ADA Compliance
Wayfinding & Visibility

PROCURE & INSTALL

1. Request 3 responses from vendors on COMMBUYS
2. Receive site assessment for install costs
3. Finalize statement of work and select best value vendor
4. Coordinate install with vendor
VEH102 VENDORS

Category 1
CHARGING STATIONS

Category 2
IDLE REDUCTION

Category 3
AFTERMARKET CONVERSIONS

VEH102: Statewide Contract for Advanced Vehicle Technology
2018 GROUP PURCHASING WITH MAPC

EV CHARGING STATIONS

AFTERMARKET CONVERSIONS
1. Hybrid electric conversions
2. Plug-in hybrid electric conversions
1. Level I and II stations
2. Coordinated site assessments
3. Installation
# VEH102: CATEGORY 1 VENDOR OFFERINGS

<table>
<thead>
<tr>
<th>VEH102 Vendor</th>
<th>Manufacturer</th>
<th>Volume discounts through VEH102</th>
<th>Level 1</th>
<th>Level 2</th>
<th>DCFC</th>
<th>Installation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ClipperCreek</td>
<td>ClipperCreek</td>
<td>3% (Level I)</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Coordination with third party contractors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-13% (Level II)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EVSE LLC</td>
<td>EVSE LLC</td>
<td>None</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Yes, through their installation partner (ABM)</td>
</tr>
<tr>
<td>Liquidsky Technologies Inc.</td>
<td>Liquidsky Technologies Inc.</td>
<td>5-27%</td>
<td>X</td>
<td>X</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Leviton</td>
<td>Leviton</td>
<td>5-15%</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Verdek</td>
<td>ChargePoint, Inc.</td>
<td>4-10% (Level II)</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-5% (DCFC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AeroVironment</td>
<td>2-5%</td>
<td></td>
<td></td>
<td>X</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Schneider Electric</td>
<td>30-35%</td>
<td></td>
<td></td>
<td>X</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Efacec</td>
<td>2-5%</td>
<td></td>
<td></td>
<td>X</td>
<td>Yes</td>
</tr>
<tr>
<td>Voltrek</td>
<td>ChargePoint, Inc.</td>
<td>11-18% (Level II)</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-5% (DCFC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AeroVironment</td>
<td>10-15 (Level I)</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40% (Level II)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>General Electric</td>
<td>10-24%</td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
</tbody>
</table>
TIMELINE

Community interest survey open

Collect specifications for SOW

Submit purchase orders & coordinate installs

Kick-Off Webinar 2/15

Workshop with VEH102 Vendors 5/8

Issue aggregate statement of work (SOW) TBD

Exact timing subject to change, per community purchasing needs
SPECIFICATIONS NEEDED

For each station:
- Level of Charge
- Voltage
- # of Ports
- Payment System
- Network Capable (Y/N)
- Desired Network Functions
- Mounting Type
- Cable Management
SPECIFICATIONS NEEDED

**For each station:**
- Approx. site address
- Existing site load capacity
- Distance from power source
- Cell signal availability (Y/N)
- Excavation needed (distance /surface type)
- Physical protections needed

**Workshop with VEH102 Vendors**
- 5/8

**Issue aggregate statement of work (SOW)**
- TBD
Installation & Maintenance Best Practices for EV Charging Stations

Justin Ries, ChargePoint
Driving Your EV Charging Project
The World’s Largest and Most Open EV Charging Network

Largest Community of EV drivers
+ 80% of new EV drivers join ChargePoint network every month
+ A driver plugs into our network every 2 seconds

Charging Everywhere
+ 55,000+ charging spots in US alone
+ 800+ ports added every month

We’re Established and Growing
+ Almost $300 million in funding
+ 74%+ share of commercial smart charging marketshare

We Are the Industry Leader
According to Time, Bloomberg, CNBC, Navigant Research
Design and Planning Considerations

1) Choose the Right Hardware/Software/Vendor
   • Charging Speeds & Station Types
     – Value of a Network
     – Ongoing Maintenance/Repairs

2) Site Assessment for Install Costs
   • Installation Options
   • Site Considerations

3) Future Expansion
   • Laying Conduit
   • Power Management
## Charging Speeds & Station Types

<table>
<thead>
<tr>
<th>EV Charging Options</th>
<th>Amperage</th>
<th>Voltage</th>
<th>Kilowatts</th>
<th>Typical Charging Time</th>
<th>Connector</th>
<th>Primary Use</th>
</tr>
</thead>
</table>
| **AC Level 1**                   | 12–16 amps     | 120 V   | 1.3–1.9 kW | 12–60 hours 2–5 miles RPH | J1772 connector    | • Backup charge  
• Some Home use                                      |
| **AC Level 2**                   | 6–80 amps      | 208 V or 240 V | Up to 19.2 kW | 2–4 hours 10–30 miles RPH | J1772 connector    | • Park and charge  
• Residential, commercial and public charging |
| **DC Fast Charge**               | 70–125 amps    | 208 V or 480 V | 24–150+ kW   | 15–45 minutes 100–250 miles RPH | SAE Combo, Tesla, ChaDeMo connector | • Commercial, public  
• Charging while traveling long distances (en-route) |
Commercial Level 2 Charging Station

+ **Speed**: Provides 20-25 RPH (miles of Range Per Hour).

+ **Clean Cord Technology**: Self-retracting, maintenance free, ultra-lightweight cord management system.

+ **Power Management Options**: Cut installation costs and double the number of parking spots served.

+ **Branding and Customization**: Promote your brand with an LCD screen and customizable signage.

+ **3G “Smart” Connectivity**: Allows for many driver experience enhancements as well as station owner flexibility controls.

+ **Consumer Friendly User Interface**: Available in multi languages (English, French, and Spanish), interactive animated user interface, and touch buttons for input (glove and ice operations).

+ **Compatibility**: 100% of EVs can charge with our Level 2 Chargers including Tesla
## Value of “Smart” Networked Stations

<table>
<thead>
<tr>
<th>Capability</th>
<th>Smart Charger</th>
<th>Dumb Charger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dispense Electricity</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Visible to Drivers</td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>* through mobile app, turn by turn directions, nearby amenities, real-time availability, 24/7/365 driver support</td>
<td>✔️</td>
<td>✗</td>
</tr>
<tr>
<td>Ability to Charge $ per Session</td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>* by kWh, time of use, or drivers</td>
<td>✔️</td>
<td>✗</td>
</tr>
<tr>
<td>Access Control</td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>* public/private, loyalty rewards</td>
<td>✔️</td>
<td>✗</td>
</tr>
<tr>
<td>Remote Access and Maintenance</td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>* proactive monitoring, rules/software updates, etc.</td>
<td>✔️</td>
<td>✗</td>
</tr>
<tr>
<td>Data Analytics</td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>* station usage, # of unique drivers, charging behavior, utilization, revenue, and costs</td>
<td>✔️</td>
<td>✗</td>
</tr>
<tr>
<td>Sustainability Reporting</td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>*GHG savings, fuel savings</td>
<td>✔️</td>
<td>✗</td>
</tr>
</tbody>
</table>
Visibility & Reporting: Dashboard

Station Status
- # of Ports: 56,643

Real Time Power
- 11.5 MW
- 364 MW

Unique Drivers
- In thousands
- Oct: 100
- Nov: 90
- Dec: 80
- Jan: 70
- Feb: 60
- Mar: 50

Sessions
- In millions
- Sessions: 1.0

Average Session Length
- Last 30 Days
- 5h 17m
- 2h 12m Charging
- 3h 5m Idle

Financials
- In thousands
- Session Fees
- Utility Cost

Environment
- Lifetime
  - Here's how EV charging has helped:
  - You've avoided 120,409,228 lb of greenhouse gas emissions
  - That's like planting 4,295,685 trees and letting them grow for 10 years
Ongoing Maintenance: ChargePoint ‘Assure’ Coverage

Industry leading parts and on-site labor warranty that covers repair and/or replacement of defective stations included at no extra cost

**Key Benefits:**

- **Proactive Monitoring…** we view remotely to ensure proper functionality
  - ChargePoint often knows about a problem before the host and will contact the host for proactive repairs
  - Proactive support and reliability with virtually no administrative efforts or unexpected costs annually

- **Includes all Parts and On-Site Labor to repair or replace product defects**
  - One business day on-site response or one business day from parts delivery. ChargePoint assumes all triage and repair coordination responsibilities
  - Coverage in all 50 US states + Canada

- **Monthly and quarterly reporting/analytics emailed to station owners**
- **98% Annual Uptime Guarantee**
- **Can be purchased for up to 5 years, up-front or annual billing available**
Station Installation Options

A. Use Your Preferred Electrician for the Entire Project (make-ready & installation)
   - We provide training @ www.chargepointuniversity.com

B. Use Your Preferred Electrician to Provide Make-Ready Work (picture on next slide)
   - We will send our electrician for final station hookup & provisioning

C. Use ChargePoint’s Preferred Electrician to Complete Entire Project
   - We will help coordinate & schedule a site assessment
Examples of Make-Ready Sites

Wall Mount

Bollard Mount
Site Assessment: Considerations

Aspects to Consider

• Proximity to power source
• Cell signal
• Potential trenching
• Lighting and security
• Visibility and signage
• Future Expansion
  – Extra Conduit for Future Stations
  – Power Management (more on next slide)
Future Expansion Cost Considerations

**Without Panel Sharing**

+ Each station requires a fully dedicated 40 amp circuit at all times, no matter how many vehicles plugged in
+ Expensive service upgrade required in order to accommodate more than a small handful of stations

**With Panel Sharing**

+ Panel Share works by setting a cap on the aggregate power of all stations, or groups of stations
+ Vehicles draw full power when few are plugged in
+ Power is intelligently shared when many vehicles are plugged in
+ Capital Cost Savings: avoid service upgrades
+ Electricity Bill savings: demand charge avoidance

Expensive service upgrade

Use Existing service
Let’s continue the discussion. Questions?

Justin Ries, LEED AP
Account Executive, New England
direct: 904.613.9363
Justin.Ries@chargepoint.com
ChargePoint
EV Charging & Car Share in Newton

Bill Ferguson, City of Newton
Community Conversations on Lessons Learned & Innovative Approaches

Matt Bradley
Boston

Bill Ferguson
Newton

Susan McPhee
Waltham, Woburn, & Winchester
Split into three groups of 8-10.

Each group will have a MAPC Facilitator and Community Leader.

Small group discussion for 45 minutes.

Report back on 1-2 lessons learned and 1-2 outstanding questions.
Coffee break!
VEH102 Vendor Presentations on Equipment & Services
GREEN TECHNOLOGIES
FOR TODAY’S FUELING
PRIORITIES

www.verdek.com
GREEN TECHNOLOGIES

- EV CHARGING
- ELECTRIC VEHICLES
- CNG VEHICLES/POWER GENERATION
- CNG/LNG PROCESSING
- BIOGAS TREATMENT
- SALES, FINANCING, INSTALLATIONS, AFTER SALES SERVICE
EV CHARGING SOLUTIONS - LEVEL 2

- CHARGEPOINT (CELL NETWORKED)
- AEROVIRONMENT (CELL NETWORKED AND NON)
- JUICEBOX (WIFI NETWORKED AND NON)

POWER RATING

7.2 KW

7.2-10KW
# EV Charging Solutions - Level 2 Key Feature

<table>
<thead>
<tr>
<th>Network</th>
<th>Payment</th>
<th>Power (KW)</th>
<th>Notes</th>
</tr>
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<tbody>
<tr>
<td>ChargePoint</td>
<td>Cellular</td>
<td>3.6(*)/7.2</td>
<td>Power Share</td>
</tr>
<tr>
<td>AeroVironment</td>
<td>None/Cellular(*)</td>
<td>3.6/7.2</td>
<td>Cell Avail. In June18</td>
</tr>
<tr>
<td>EmotorWerks</td>
<td>Wifi - Ethernet</td>
<td>7.2/10</td>
<td>Avail. In Future Release</td>
</tr>
</tbody>
</table>
EV CHARGING SOLUTIONS - LEVEL 3

- CHARGEPOINT (CHARGEPOINT PLATFORM)
- EFACEC (CHARGEPOINT AND OCPP PLATFORM)

POWER RATING
- 20-25 KW
- 50-150 KW
- 150-350 KW
<table>
<thead>
<tr>
<th>NETWORK</th>
<th>PAYMENT</th>
<th>POWER (KW)</th>
<th>PLATFORM</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHARGEPOINT</td>
<td>CELLULAR</td>
<td>YES</td>
<td>25-50-62.5</td>
</tr>
<tr>
<td>EFACEC</td>
<td>CELLULAR</td>
<td>YES</td>
<td>25--50-EVs 40-90-150 Buses</td>
</tr>
</tbody>
</table>
EV CHARGING SOLUTIONS
INSTALLATION GUIDELINES - OPTION 1 - WIRE-READY

- Use 1 40 Amp Breaker per port
- Run wires to final location
- Leave at least 3’ stub

- Verdek does
  - Final installation
  - Provisioning
  - Training
EV CHARGING SOLUTIONS - INSTALLATION GUIDELINES - OPTION 2 - TURNKEY

- SITE SURVEY
- PERMITTING
- INSTALLATION
- PROVISIONING
- TRAINING

- Bore from building column
- 24" Deep Bore
- Pull Boxes
- 120V outlet for police camera tower
- EV Charger Pedestals
EV CHARGING SOLUTIONS - AFTER SALES SERVICES AND MAINTENANCE

- Training of station users
- Submission of usage reports
- Daily monitoring of all installed stations
- Coordination with our local service team for any needed repair
About Voltrek

- Massachusetts Company
- Founded in 2010
- OSD Vendor Contract VEH 102
- WBE/DBE Certified
- Installed 900+ Charging Ports
- Leader in EVSE Project Management
Some of Our Clients
Our Services

**Phase 1- Strategic Planning**
- EVSE (charger) selection
- Site assessment for power availability & site design
- Engineering
- Best Practices: Usage policies, ADA accessibility
- Education

**Phase 2- Implementation**
- Installation/ Project management
- Programming
- Training
- Permitting

**Phase 3- Maintenance & Management**
- Monitoring (access, billing,
- Reporting
- Servicing
Partnered with Multiple Manufacturers
Features and Price Points

ChargePoint
- Networked
- Cable Management
- Power Share
- Billing enabled
- Largest network/integrated system
- Dual Cost Range: $6,200-$7,200

EVBOX
- Upgradable/Network Capable
- Optional Cable Management
- Power Share
- Billing enabled w/ network
- Multiple Network Options
- Dual Cost Range: $4,000-5,200

AEROVIRONMENT
- Multiple Model lines offering different features
- Non networked Model
- Dual Cost range: $1,300-$3,400
Our Work – Typical L2 Install

Teradyne Company, MA

MIT Cambridge, MA
Our Work – Typical L2 Install

Above:
Lenox Hotel, Boston, MA
Our Work- ADA Fast Charger Install

Natick, MA- I 90 Service Plaza
Contact Information

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Andover, Ma 01810
978-378-0910
info@voltrek.com
www.voltrek.com
Q&A

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Guy Mannino
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(203) 421-6477

Kathleen Connors, CEO
kathleen@voltrek.com
(978) 378-0910
Next Steps & Related Opportunities

**EV Charging Station Specifications Template**
Send to MAPC no later than **June 30, 2018**

**VW Settlement Request for Information** – responses due **May 18, 2018**
Let MAPC know if you would like to be a part of our response by **May 14, 2018**

**Eversource Make-Ready Investment**
More information to follow

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maki@mapc.org