Metropolitan Washington Council of Governments

EV Planning and Process Group

Infrastructure Deployment Guidelines

October 18, 2011

THE EV Project

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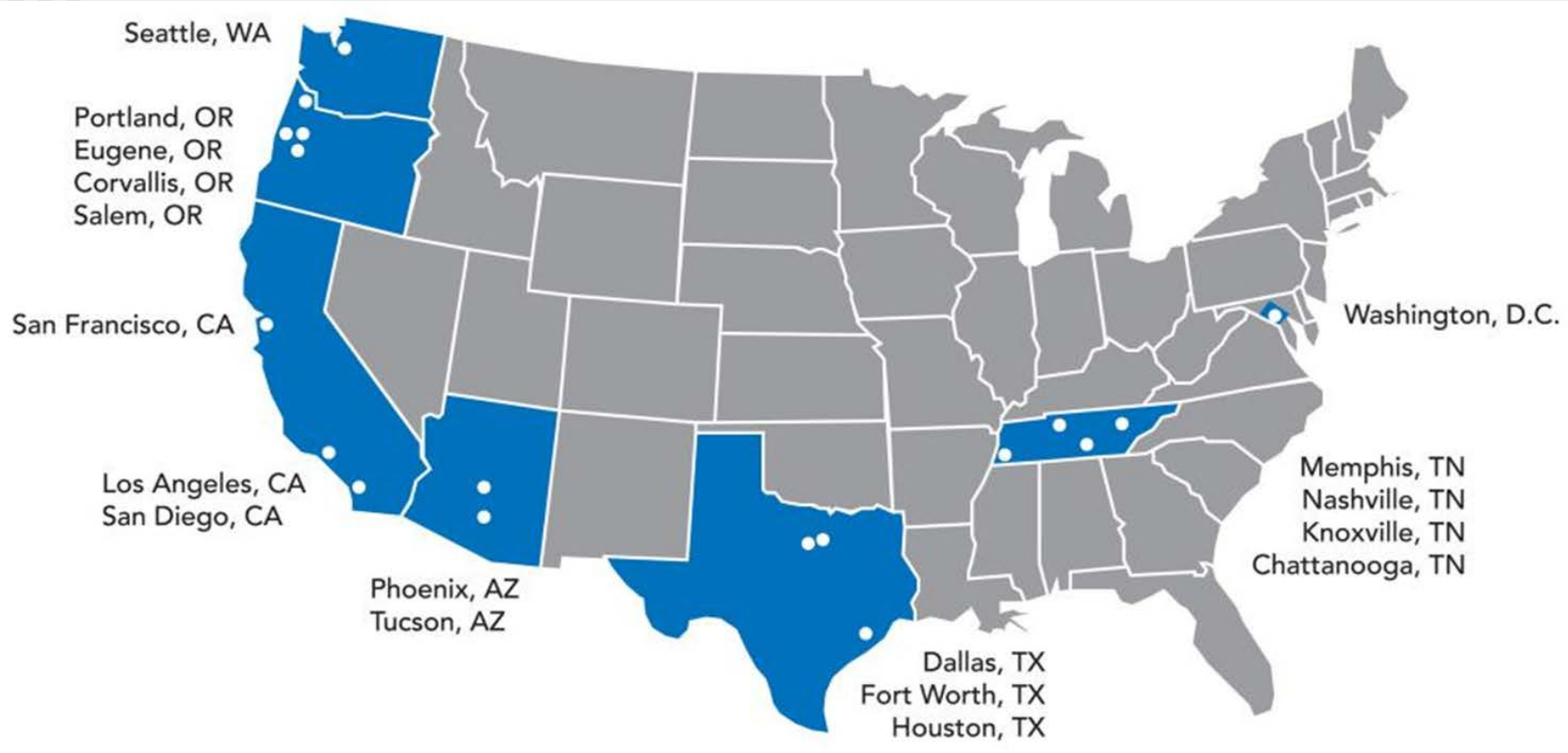
The EV Project

- **$230 million project**
  - **$115 million grant from US Dept. of Energy**
  - **$115 million match**
- **Purpose: To plan, build, study, and evaluate mature electric vehicle charging infrastructure in six states plus the District of Columbia**
- **Product: Lessons learned**

The EV Project

- Develop mature charge infrastructure “laboratories”,
- Collect and analyze data characterizing vehicle and infrastructure utilization,
- Demonstrate measures to minimize impacts of charging on the grid,
- Conduct trials of payment systems,
- Develop a sustainable business model for non-residential charging infrastructure, and
- Document and disseminate the results of the Project.

The EV Project



8300 Residential EVSE (Nissan Leaf and Chevrolet Volt)
5000 Publicly Available AC Level 2 EVSE
225 Dual Port DC Level 2 EVSE

THE EV Project

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The EV Project - Planning

- Organize stakeholders
- Plan Develop
  - Deployment Guidelines
  - Ten-Year Infrastructure Plan
  - EV Project Deployment Plan

    (EV Micro-Climate Plan)

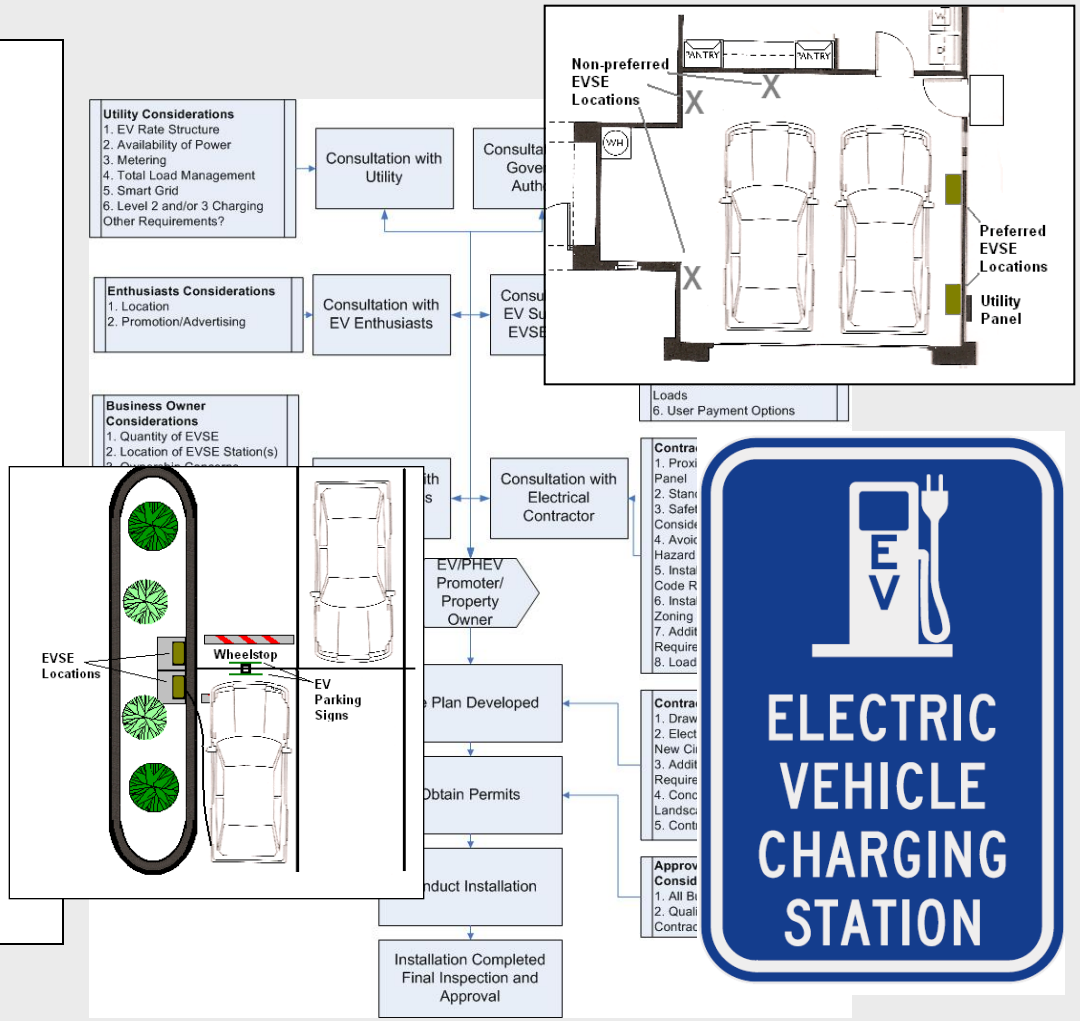
Deployment Guidelines

Electric Vehicle
Charging Infrastructure
Deployment Guidelines
for
the Oregon I-5 Metro Areas of
Portland, Salem, Corvallis and Eugene

April 2010
Final Version 3.1

ecotality

ELECTRIC TRANSPORTATION ENGINEERING CORPORATION



THE EV Project

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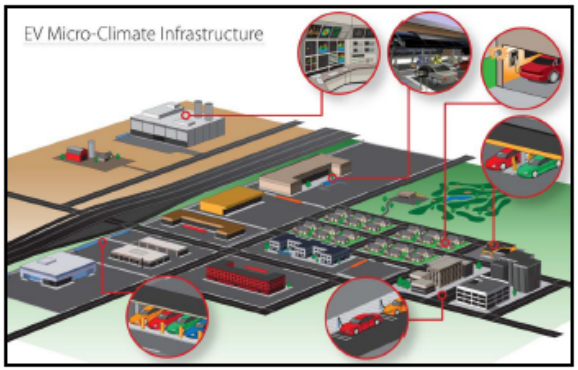
Long-Range Plan

Long-Range
EV Charging Infrastructure Plan
for
Arizona



November 2010

Version 4

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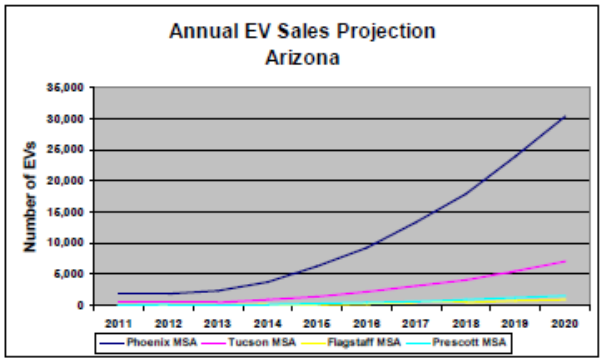


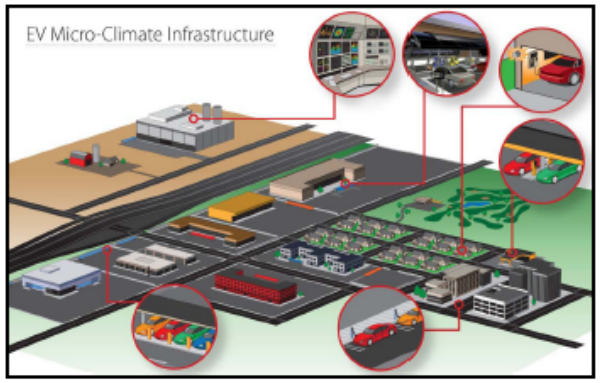
Figure 5-9: Annual EV Sales Projections - Arizona

Table 5-4 Cumulative EV Sales Projection Arizona

Cum. Sales	Phoenix MSA	Tucson MSA	Flagstaff MSA	Prescott MSA	Total
2011	1,870	440	0	0	2,310
2012	3,730	870	60	100	4,760
2013	6,070	1,410	130	210	7,820
2014	9,840	2,280	240	400	12,760
2015	16,180	3,750	440	730	21,100
2016	25,370	5,880	720	1,200	33,170
2017	38,690	8,960	1,120	1,870	50,640
2018	56,570	13,100	1,670	2,780	74,120
2019	80,380	18,610	2,390	3,990	105,370
2020	110,630	25,610	3,320	5,530	145,090

EV Micro-Climate Plan

EV Micro-Climate™ Plan
for
Northwestern Oregon



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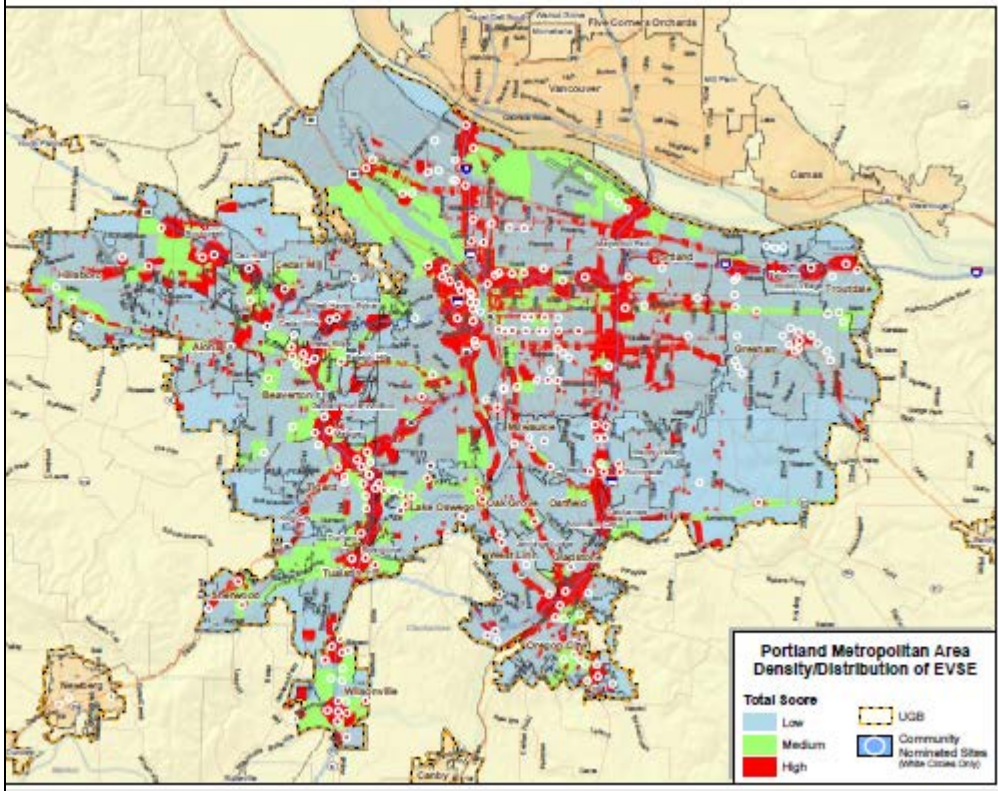

THE EV Project

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Publicly Available Level 2 EVSE

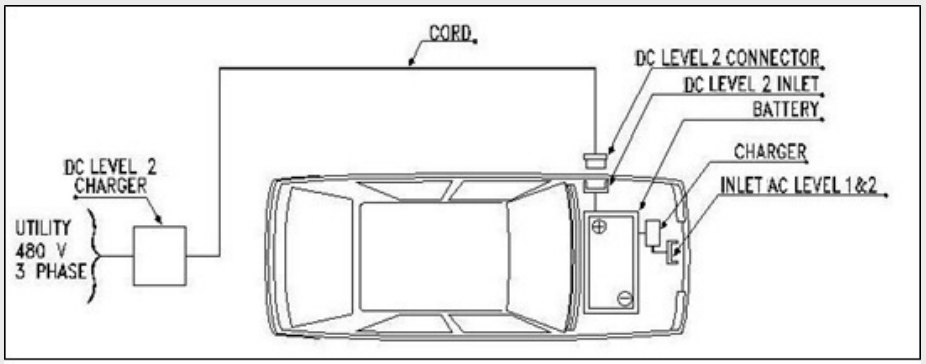
- **Where should they be installed?**
  - Micro-Climate™ process
  - Where people shop
  - Where people play
  - Where people gather
  - Target is 1 – 3 hours
- **Expand effective operating range of the EV**
  - Allows for unscheduled trips
  - Enhance “Range Confidence”
- **Businesses want to install EVSE**
  - Draws EV customers—they stay longer
  - Advertising Advantages
  - Revenue Collection Systems

DC Fast Charger Deployment

- **Where do they go?**
  - **Where energy is needed fast**
    - Near highways or cross-town roads
    - Highway corridors between towns
    - Busy fleet locations
    - Near Multi-Family Dwellings
  - **Where people stay a short time**
    - Gasoline stations
    - Rest stops
    - Convenience Stores
    - 10 – 15 minute charge
  - **What will it do?**
    - Fast energy return—50% fill in 30 minutes

EVSE Infrastructure Deployment Guidelines

Topics to cover before placing EVSE in public locations



1) EV Technology

- Agree on terms and categories

2) Charging Requirements

- AC/DC Level 1, 2,3

3) Charging Scenarios

- Planning Flowcharts

4) Additional Charging considerations

- Signage, ADA, Lighting, Point of Sale, Ownership,

5) Codes and Standards

- NEC, SAE, UL, Regulatory Agencies

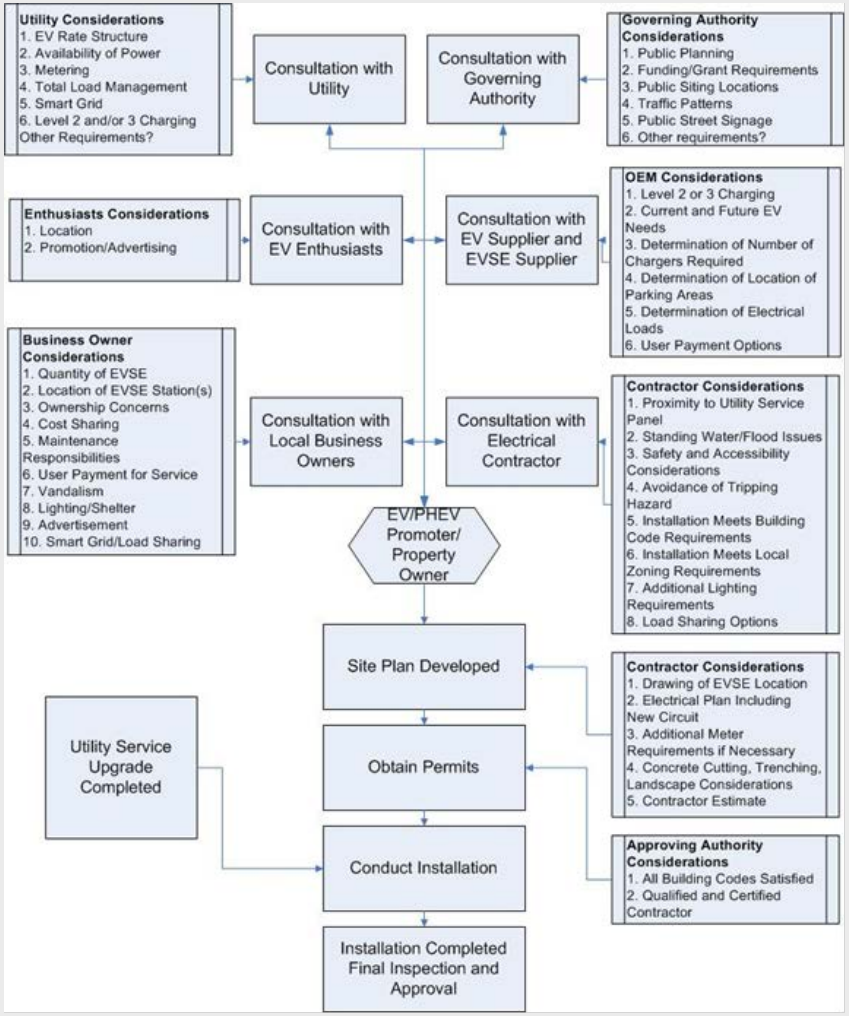
6) Utility Integration

7) Cost Estimating

EVSE Infrastructure Charging Scenarios

3) Charging Scenarios

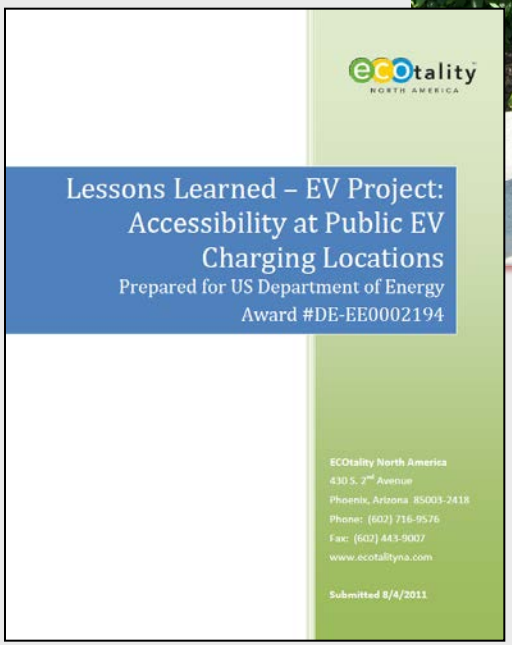
- Residential – Single Family
- Multi-Family
- Fleet
- Publicly Available



EVSE Infrastructure Additional Considerations

4) Additional Charging considerations

- Signage
- Lighting and Shelter
- Disability Requirements
- Safety
- Flood Zones
- Point of Sale Options
- Data Collection
- Vandalism
- Station Ownership
- Maintenance



EVSE Infrastructure Deployment Guidelines

5) Codes and Standards

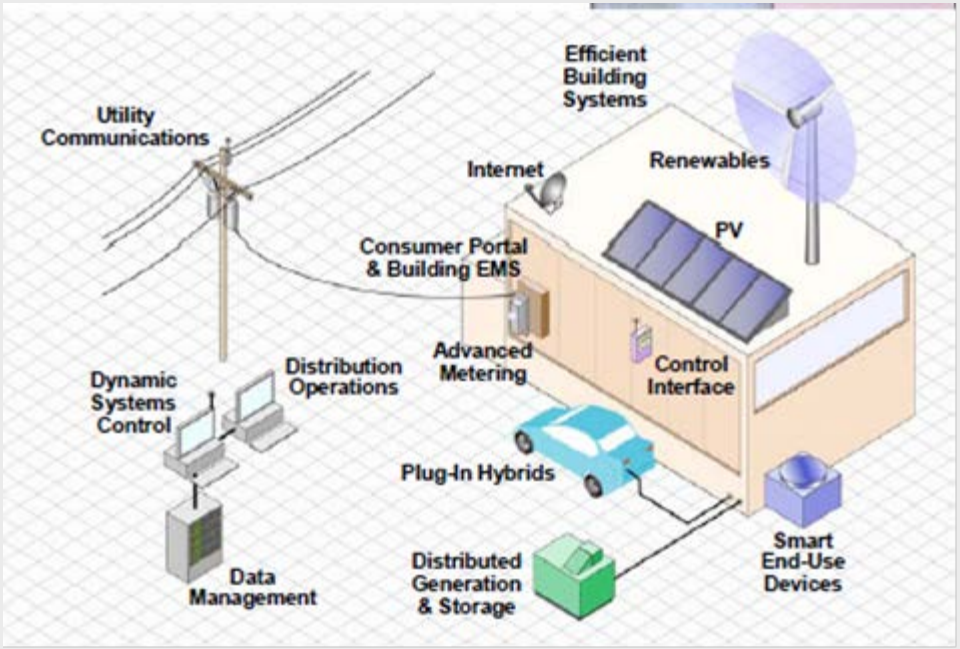
- NEC, SAE, UL, Regulatory Agencies

6) Utility Integration

- Smart Grid, Time of Use, Dual Meters, Demand Response, Vehicle-to-Grid, Clustering

7) Cost Estimating

Publicly Available Charge Station - Level 2 (Qty 2)			
Description	**Quantity**	**Cost Each**	**Total**
Labor (hrs)			
Consultation with Property Owner/Tenant	4	$ 95.00	$ 380.00
Initial Site Visit	2	$ 95.00	$ 190.00
Engineering Drawings	16	$ 90.00	$ 1,440.00
Permit Application / Acquisition	2	$ 95.00	$ 190.00
Installation	24	$ 95.00	$ 2,280.00
Approval	2	$ 95.00	$ 190.00
Labor Sub-Total			$ 4,670.00
Materials			
Distribution Sub-Panel (100Amp)	1	$ 250.00	$ 250.00
EVSE - 40Amp	2	$ 2,500.00	$ 5,000.00
40amp Breaker	2	$ 35.00	$ 70.00
#12 THHN Wire	400	$ 0.30	$ 120.00
Conduit - 3/4 EMT	100	$ 3.00	$ 300.00
40Amp Fused Disconnect	2	$ 115.00	$ 230.00
Ground Signage & Striping (painted)	2	$ 125.00	$ 250.00
Signage (Post Mount)	2	$ 250.00	$ 500.00
Miscellaneous	2	$ 60.00	$ 120.00
Material Sub-Total			$ 6,840.00
Trenching & Repair	100	$ 45.00	$ 4,500.00
Permit	1	$ 85.00	$ 85.00
		Total	**$ 16,095.00**



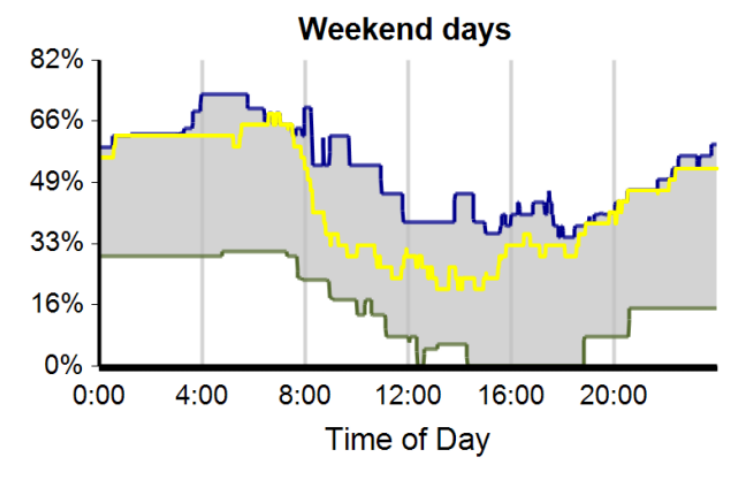
Data Collection & Reporting

Vehicle Data

EV

Nissan GDC
GM OnStar

INL



Percent of EVSE with Vehicle Connected

EVSE Data

EVSE

ECOtality Data
Center

INL

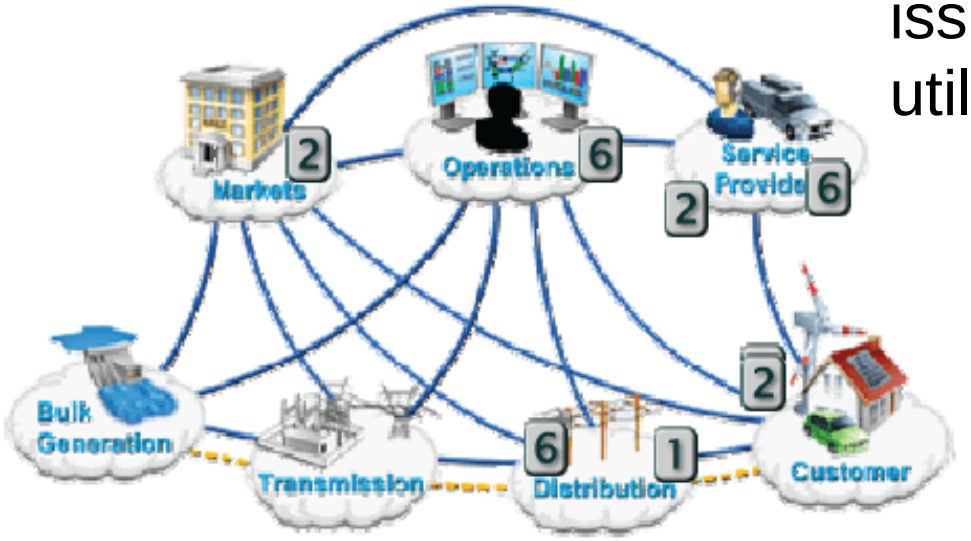
MATCH

- EV Project Participant
- EV Project Participant
- Non EV Project Participant

- Non EV Project EVSE
- EV Project EVSE
- EV Project EVSE

Utility Interface Discussions

1. **Local Grid Reliability -** clustering, etc.
2. **Peak Shaving Strategies** - Time of Use and Demand Response
3. **Regulatory Activities for EVSE Penetration**
4. **Carbon Mitigation and Revenue Strategies**
5. **Public Perceptions and Jobs**
6. **Grid Support Services**
7. **Informed Customer Relations - including real time pricing**

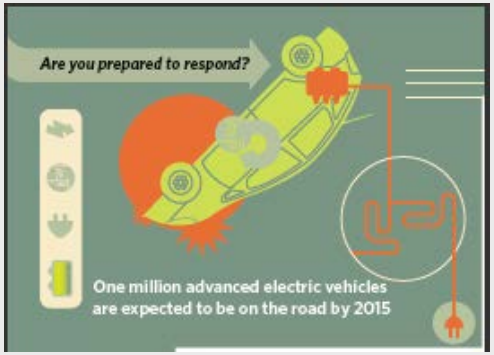


FUSE (Forum for Utility Stakeholders in EV Project) – bi-weekly conference call discussing issues common to utilities

EV Project – Lessons Learned

Lessons Learned Topics:

- EV Parking Signs
- Accessibility
- First Responder Training
- Micro-Climate Planning Process
- Infrastructure Guidelines
- Permitting Process
- Utility Rates/Rate Design
- Peak Demand Charges
- Commercial/Municipal Agreements
- Advertising



Thank You

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