



Portland General Electric

**CHAdEMO Meeting
NNA Farmington, MI
January 14, 2011**

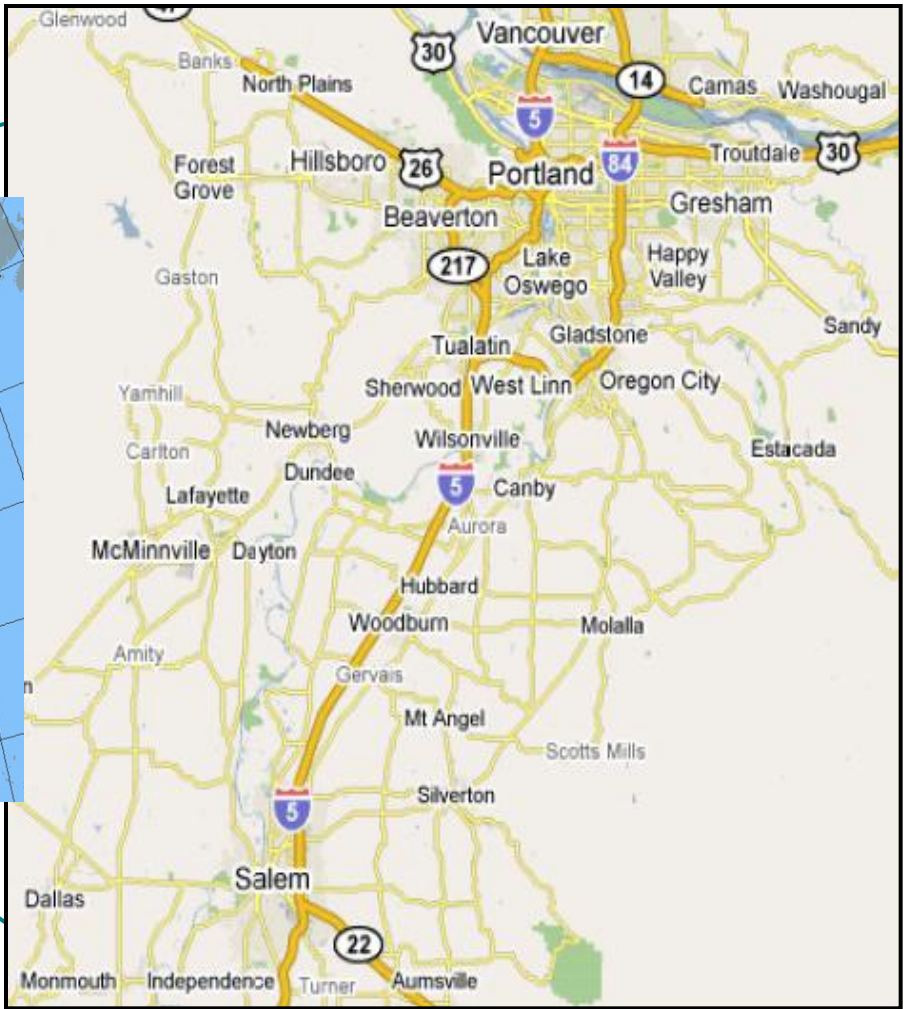


Portland General Electric at a Glance

- **Portland, Oregon headquarters**
- **Service territory population 1.6 million, 43% of state's population**
- **815,870 retail customer accounts**
- **52 cities served – Portland and Salem the largest**
- **4,000-square-mile service area**
- **26,000 miles of T&D lines**
- **2,459 MW of generation**
- **Summer peak load of 3,950 MW (2009)**
- **Winter peak load of 4,073 MW (1998)**
- **Annual demand of 2,348 MWa (weather adjusted)**
- **2,708 employees**



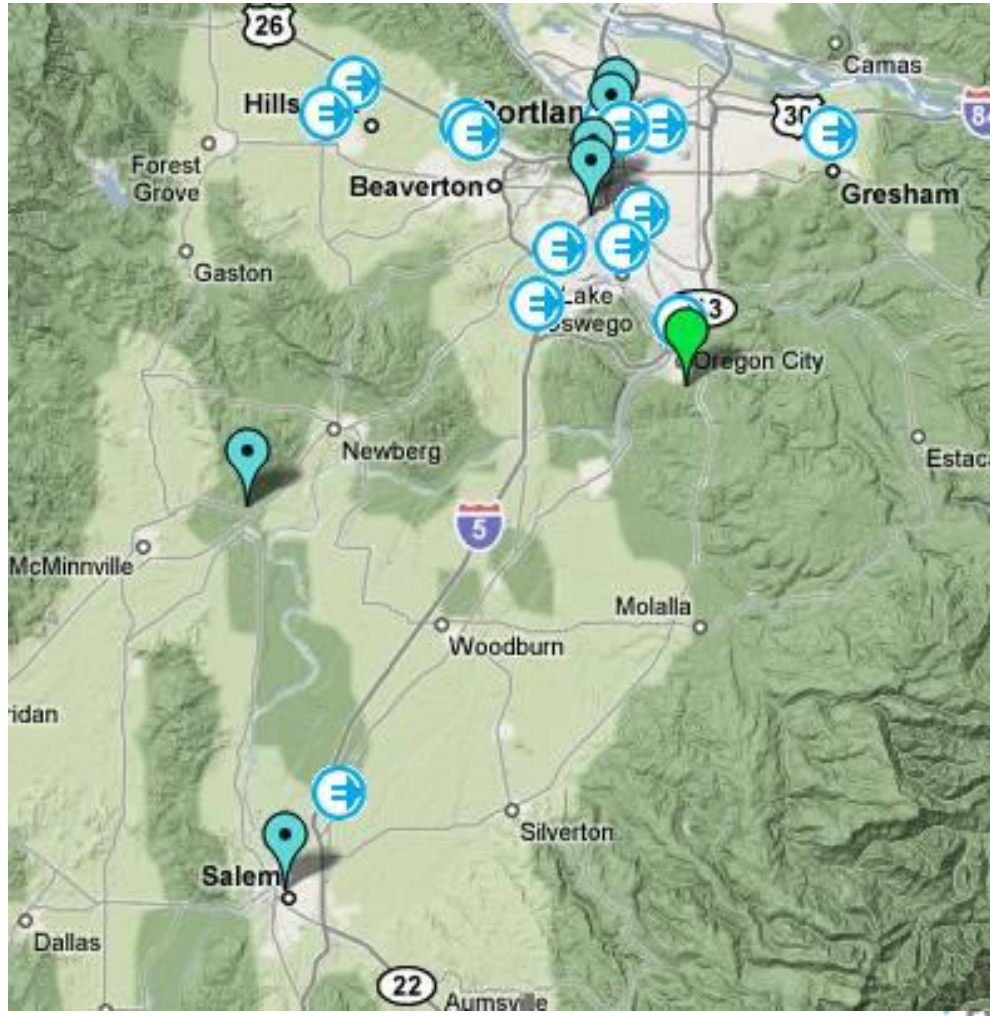
Our Service Area



Growing Charging Station Network

Over 50 public charging stations installed in Oregon

- Majority are sub-metered to capture usage and trends data
- 60% upgraded to J1772 standards.
- Portland General Electric owned stations and 40% of the others are powered by 100% PGE renewable energy
- North America's only publicly available DC Quick Charger



Charging Infrastructure Expectations 2011/12

- Residential- 1000+ Level 2
 - 800+ chargers (The EV Project)
 - 200 chargers from EV sales by other OEMs or outside EV Project
- Business/Public (1400+)
 - Retail and Public Locations (1000+ The EV Project)
 - Larger Employers based on EV sales to consumers (100+)
 - Other Locations outside of the USDOE grant (200+)
 - Delivery Trucks and off-road uses(100+)
- Quick Charging stations (80)
 - Roughly 50 spots using USDOE grant funds
 - 30 others using supplemental funding



Common Logo Available to Identify EV Chargers



The Quick Charger Journey to Oregon

- This quick charger was manufactured by Takasago Seisakusho headquartered in Tokyo, Japan. Takasago is a wholly-owned subsidiary of NEC.
- Mr. Keiichi Takahashi is the President of Takasago, former President of NEC Oregon.
- Governor's reception in Tokyo in November 2008 PGE and Takasago collaborate on interest to bring their chargers to US market.
- PGE and Takasago meet in Tokyo in 2009 and discuss proposal to bring Quick Charger to Oregon
- MOU signed in Portland, Oregon June 2010



Charlie Allcock and Mr. Takahashi



The Quick Charger Journey to Oregon Continues

Ms. Ueda and Mr. Sakurai, NEC and Carol Dillin and Charlie Allcock, PGE



- DC Quick Charger arrived in Portland July 12, 2010
- Technical personnel from Takasago, NEC Japan and NEC America joined the PGE Team to successfully install the unit completed July 13, 2010.
- Installed in the parking garage of PGE HQ in Portland, Oregon
- Certified by Interek of Beaverton, Oregon and began inspection July 13, 2010
- Received inspection and approval August 2, 2010



America's First Public Use Quick-Charge Station

August 5, 2010 - NEC and PGE announced the successful installation of the first DC quick charger in North America for public use with electric vehicles at the World Trade Center in Portland, Oregon. The all electric Nissan LEAF was the first vehicle plugged in and fully charged.



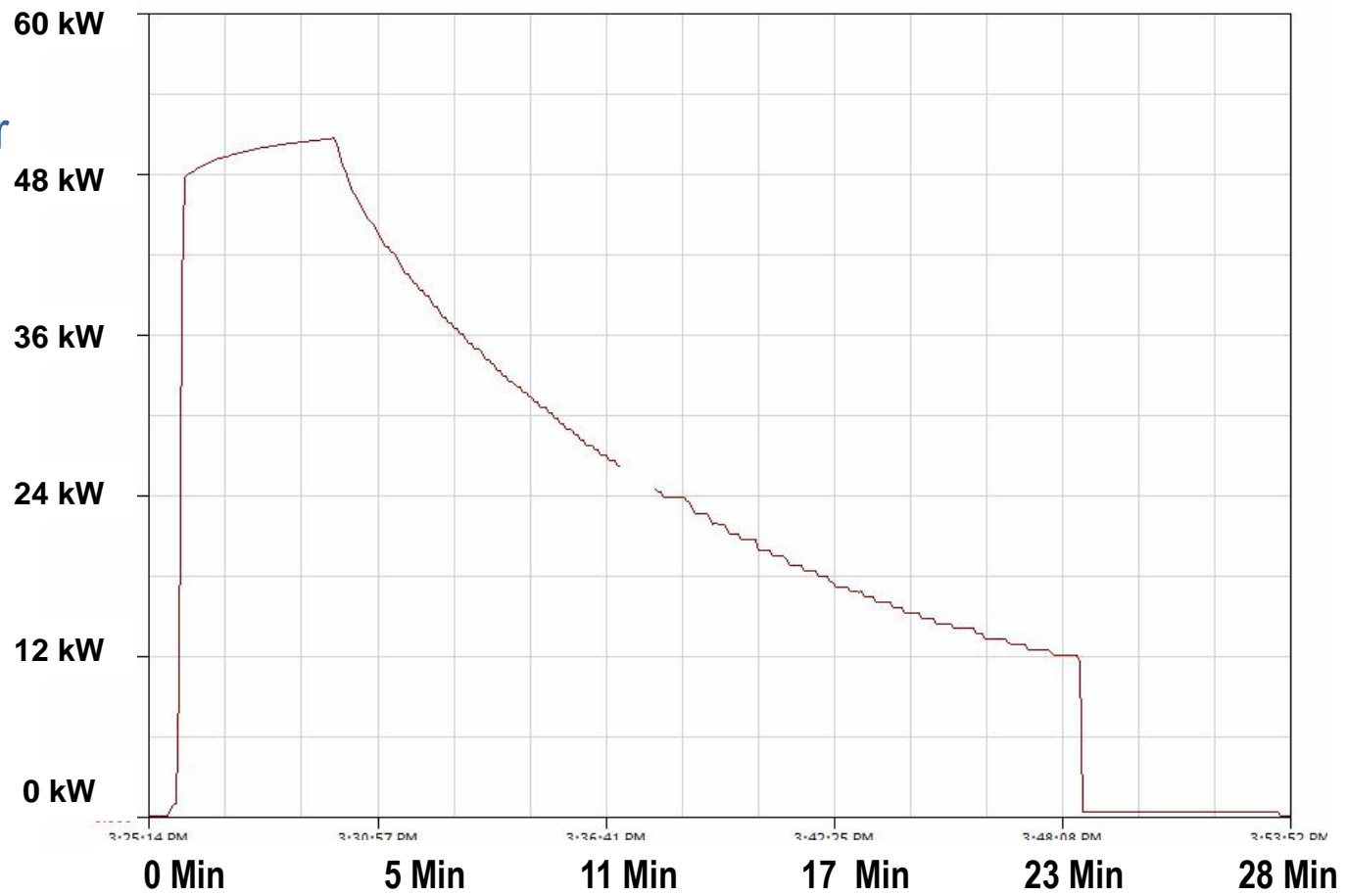
Oregon Governor Ted Kulongoski plugs into the Nissan LEAF



Charging Profiles - DC Quick Charge Testing

NEC/Takasago DC Quick Charger with Mitsubishi iMiEV 16kWh battery

- 50 kW peak
- Roughly 5 miles per minute of charge in the first 10 minutes of charge
- 6 kWh delivered in the first 10 min; 5 kWh in the remaining 13 minutes



Power Quality Report

- Review performance of the Mitsubishi i-MiEV using the NEC/Takasago DC Quick Charger
- Results:
 - Typical 20 Min charge time from 20-80%
 - After 10-15 min charging rate slows down
 - 10 min charge time adds roughly 4.5 miles/min of charging
 - No significant impact to building power
- Conclusion:
 - Best Opportunity – Ability to charge more quickly than anticipated and reduce “range-anxiety” fears.
 - Challenges – Charger connector and socket provides a few challenges to users.
 - Not Tested – Temperature affect on the charging rate.



Building the Northern Section of the I-5 Green Highway



I-5 West Coast Green Highway

- 600 miles long
- 10+ million population
- Similar demographic & sustainability values
- Allow residents of one metro area to travel to other metro areas using EVs
- High level of interaction & collaboration already exists
- RFP issued by Oregon and Washington DOT due January 24, 2011
- Construction to be completed by Fall 2010



Contact Info

Charlie Allcock

Director, Economic Development

121 SW Salmon St, 3WTCBR06

Portland, OR 97204

USA

Phone: 503-464-7694

E-mail: charlie.allcock@pgn.com

Website: www.portlandgeneral.com

