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Coulomb Technologies

Fueling The Electric Transportation Industry

California Energy Commission Presentation October 12, 2009
Richard Lowenthal



Company Overview



A Leading Supplier of Networked EV Infrastructure Products and Services

■ Company:

- Founded in 2007 to develop Networked Electric Vehicle Charging Stations through convergence of networking, grid, and electric vehicle technologies
- Led by Networking Technology Executives from Cisco, 3Com, Lucent, Echelon

■ Technology:

- Products are networked charging stations and network-based applications, including billing, station management, smart grid integration, and fleet management
- Shipped first ChargePoint Networked Charging Stations in December 2008, ChargePoint Network opened to public in San Jose in January 2009



Coulomb's Business



- **We sell charging stations**
 - Level I and Level II stations with global standards
 - Public charging stations for curbside, parking lots and schools
 - Commercial charging stations for workplaces, apartments, and condominiums
 - Home charging stations for garages and car ports
 - Future DC charging

- **We provide applications for operating large scale vehicle charging infrastructure**
 - Billing System to cover energy costs, maintenance costs, and capital
 - Advanced Metering Infrastructure interface
 - Smart Grid integration tools including demand response and utility incentive pricing programs
 - Fleet management
 - Charge management
 - Analysis of energy use, greenhouse gas savings
 - Remote Station Management – for high uptime and low support costs
 - Driver Charging Assistance
 - Find available stations, with real time status
 - Notify me when my car's charged, and needs charge.
 - Optimize cost of charging
 - Request new stations



ChargePoint™ Networked Charging Stations & ChargePoint™ Applications



mychargepoint Welcome Bret Fox / Logout

Home | My Account | Profiles | Reports | FAQ | Contact Us

Map | Satellite | Hybrid

Summary

Vehicle Name:	Saturn Vue
Vehicle Status:	Charging
Hours Charged:	Peak: 20 Off Peak: 30
Hours Plugged In:	70

ChargePoint™ Network Welcome Bret Lee / Logout

Home | Alarm View | Network View | Provision | Reports | FAQ | Contact Us

Device GUID v	Issue Details	Alarm Time	Alarm Count	
DEVICE00030	Operational 2	2008-07-07 18:14:53	2	View
DEVICE00023	Data 1	2008-07-03 18:15:08	5	View

View Alarm

GUID: DEVICE00023

Location: [Blank]

Alarms: [Blank] [Data Alarm](#) [Clear Alarms](#)

ChargePoint™ Network Welcome Andy Drum / Logout

Load Management | Reports | FAQ | Contact Us

Map | Satellite | Hybrid

County: Santa Clara

Load: **Shedtable - 450 MW**
Actual - 500 MW

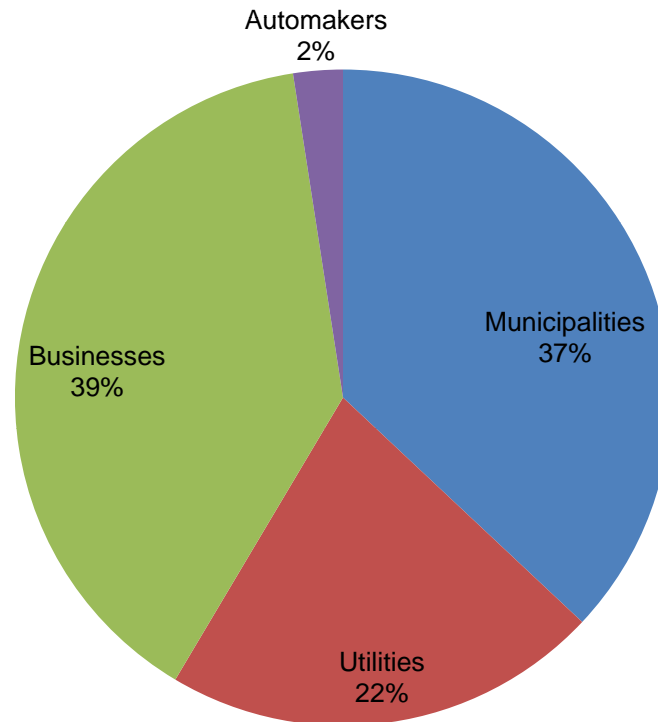
0 100 200 300 400 500 600 700 800 1000 MW

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Customer – Pipeline Overview



Today's Opportunities



RECENT AND PUBLIC CHARGING STATION DEPLOYMENT



•ChargePoint Networked Charging Stations Installed To-date

- San Francisco
- San Jose
- Campbell
- Sonoma county
- Walnut Creek
- Chico
- Hillsborough, Oregon
- Chicago, Ill
- Nashville Tenn
- Cary North Carolina
- Madison Wisconsin
- Baltimore Maryland
- Amsterdam, Netherlands
- Bochum Germany
- Prague, Czech Republic
- Diepenbeek, Belgium

And McDonalds, Apple, Starwood, ACE Parking, Hyatt, etc.



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EVSE DESIGN AND FEATURES



- Must support all PEVs from Scooters to Buses
- Must be compliant to UL standards
- Must have remote monitoring in order to keep high uptime
- Should allow for real time occupancy status by web or smartphone
- Anyone should be able to charge at any EVSE
- Should all have Demand Response, at least
- A station owner should have the option of billing for EVSE use

EVSE Costs



- Level II Stations cost from \$1,000 - \$4,000 depending on indoor/outdoor, shared/dedicated, inclusion of Level I or not
- Installation varies from \$500 to \$15,000!
- We use an average of \$5,000 for EVSE + installation for shared EVSE
- CEC may want to rebate less than the full amount
- Many times a city will have their Public Works department install
- Businesses sometimes do their own installations too
- Upgrade or supplements to existing stations have very low installation costs

Every City Should Have Stations



- Right now I can't use my MINI-E to go from San Jose to a meeting in San Francisco
- 500 cities times 5 stations times \$5,000 grant = \$12.5M
- Every one you fund puts three people to work for a day
- Cities and others often want to do their own install – this will stretch CEC money
- Most cars will charge at 3KW or 6KW, meaning if you charge for an hour your car will go 15 or 30 more miles – don't focus too much on highways
- Making sure all cities and communities welcome EV's will have a big impact on growing the EV market
- Many city dwellers have no home garage

We need PEV readiness programs



- Need \$1M grant for
 - Model ordinance for 1-day installation of EVSE (including permitting and inspection)
 - Model ordinance on rules that require EVSE wiring in all new garages
 - Model ordinance on allocation of public parking space and policies
 - E.g.: Free EV parking, EVSE at transit, curbside parking space

Growth



- We estimate that California will have 100,000 PEV's by 2012
- Each one needs two places to charge a day, one while you sleep, one while you work
- The home garage only counts for 25% of those
- We need 150,000 EVSE outside the home garage by 2012

CEC Role



- We need CEC help in the early days
- CEC could solve the chicken-and-egg problem. Provide stations initially to give momentum to the EV market, otherwise San Franciscans won't buy cars
- The CEC can also help dramatically by funding readiness programs
- But we also feel that once there are cars out there, infrastructure should be self-supporting i.e.:
 - Billing systems so that drivers pay for maintenance and electricity
 - Car buyers got their boost from CEC but now buy on their own because they're confident there will be places to charge
 - Utilities help with residential charging

CEC Funding Proposal



- \$1M for model resolution development grants
 - 1 day installation, garage wiring, public parking space allocation
- \$12.5M to ensure that every city has stations
- \$25M in matching grants for utilities, municipalities, or businesses who will pay for their own EVSE installations – 10,000 stations



Utility Role



- The utilities should play a large role
- For the residential market, EVSE should be “meters” and be rate-based
 - Taking the cost of EVSE and installation out of the car-buying experience would be a huge win for growing this industry
- Outside the single-family residence, things get more complicated and EVSE may remain a competitive market
 - Mobile consumers may encounter many utilities a day
 - Billing gets challenging, we need identification and authentication
- EVSE, cars, drivers, and utilities need to cooperate to include incentives, controls, and reporting for Smart Grid charging in all cases
- Integration with AMI is a must



THANK YOU



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