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PEV's Opportunities and Challenges

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Pepco Holdings, Inc.

Serving three states and Washington DC in the Mid-Atlantic US

Transmission & Distribution – 90% of Revenue

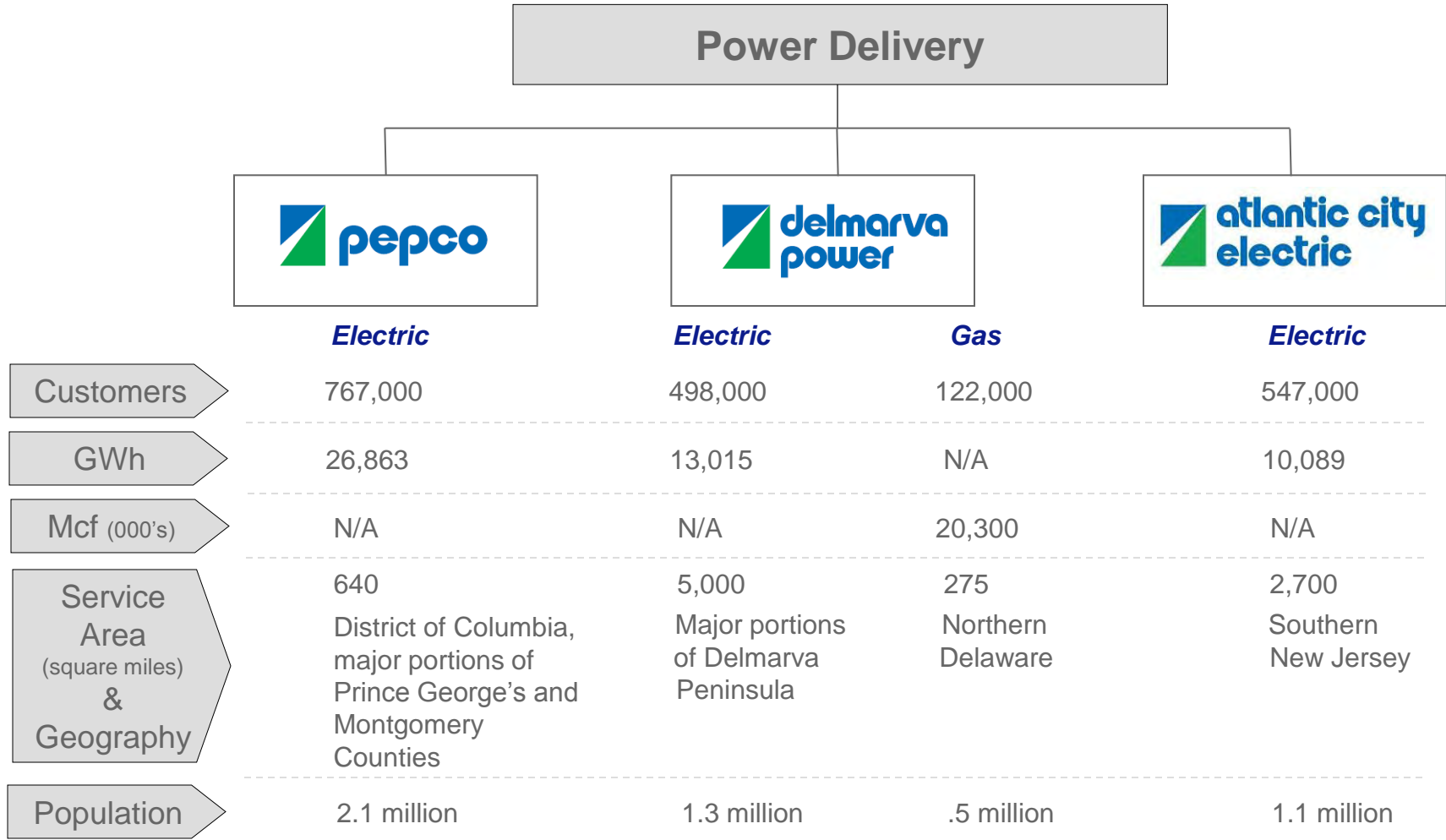


Competitive Energy / Other



Regulated transmission and distribution is PHI's core business.

PHI Business Overview



PHI History with Electric Vehicles

- Member of DOE Site Operator Program
 - Maintained a fleet of 6 all-electric conversion vehicles
- Founding Member of EV America
 - Developed first utility standards for electric vehicles
 - Later turned over to DOE
- GM PrEView Drive Program
 - 60 customer drivers for two weeks at a time
 - Installed over 75 Level 2 chargers
- Toyota RAV4 EV Program
- Ford Ranger EV Program



Plug-In Vehicles are coming....

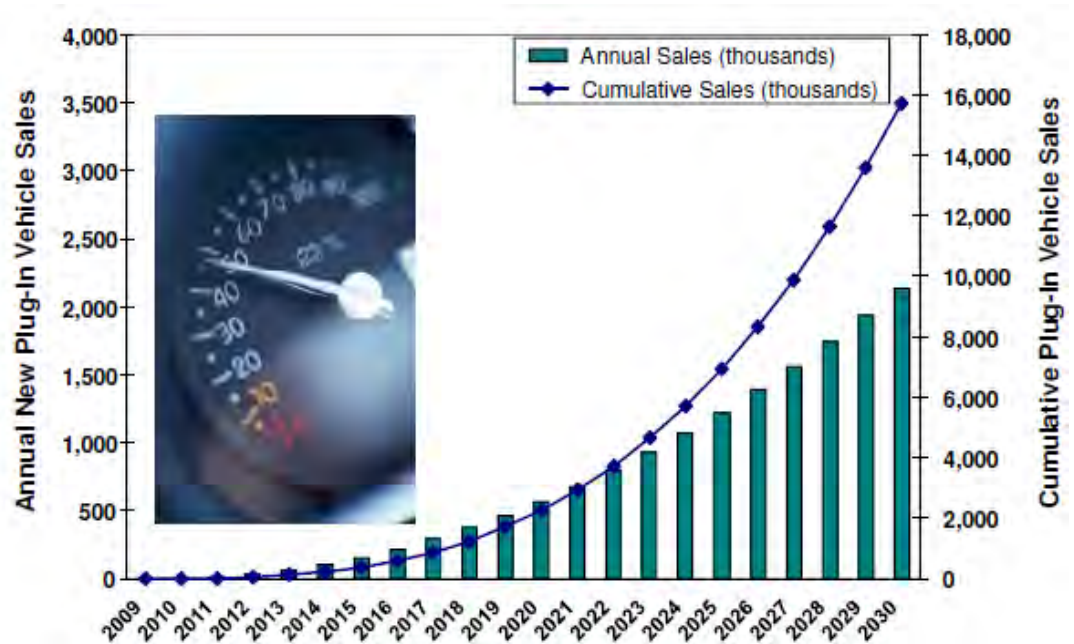
Here

- Penetration projections are inconsistent
- Initial Impacts to infrastructure will be due to clustering
- Significant penetration is still years away
- Washington, DC region is expected to be an early target market for several manufacturers

OEM Deployment in the Washington, DC Region

- | | |
|------------------------|------|
| • Ford Transit Connect | 2010 |
| • Chevy Volt | 2011 |
| • Nissan Leaf | 2011 |
| • Ford Focus | 2011 |
| • Ford PHEV | 2012 |
| • Fisker Nina PHEV | 2012 |
| • Tesla | 2012 |
| • BMW Megacity | 2013 |

EPRI National Projection for Plug-In Vehicle Penetration



Projections

In order to estimate demand for PEVs, population and number of vehicles per capita of the PHI service territories was used as a proxy for actual car sales.

Regional Demand Premiums

Hybrid Sales 2007-2009						
State	Sales	Percent of Total	Population	Average		
				Hybrids per Capita	Premium/Discount	
CA	199958	24.71%	36,962,000	12.30%	0.54%	1.15
VT	2994	0.37%	621,000	0.21%	0.48%	0.92
OR	17403	2.15%	3,687,000	1.23%	0.47%	0.88
WA	29676	3.67%	6,664,000	2.22%	0.45%	0.77
DC	2597	0.32%	599,617	0.20%	0.43%	0.72
CT	14503	1.79%	3,518,000	1.17%	0.41%	0.64
NH	5444	0.67%	1,325,000	0.44%	0.41%	0.63
VA	30397	3.76%	7,883,000	2.62%	0.39%	0.53
MD	20798	2.57%	5,699,000	1.90%	0.36%	0.45
CO	17598	2.17%	5,025,000	1.67%	0.35%	0.39
AZ	22148	2.74%	6,596,000	2.20%	0.34%	0.34
ME	4095	0.51%	1,318,000	0.44%	0.31%	0.24
HI	3926	0.49%	1,295,000	0.43%	0.30%	0.21
RI	3191	0.39%	1,053,000	0.35%	0.30%	0.20
NM	6063	0.75%	2,010,000	0.67%	0.30%	0.20
DE	2472	0.31%	885,122	0.29%	0.28%	0.11
NJ	23332	2.88%	8,708,000	2.90%	0.27%	0.07

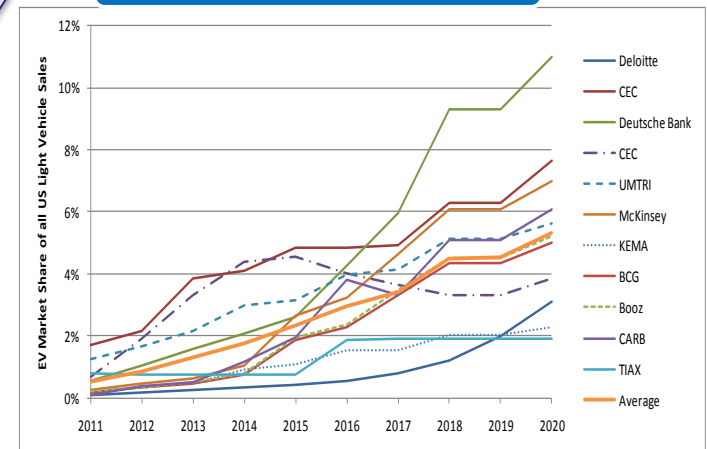
Total Expected Vehicles in Each Jurisdiction

Jurisdiction	Population	PHI Customers	Vehicles per Capita	Vehicles
Pepco MD	1,774,000	531,000	0.79	419,490
Pepco DC	209,880	256,000	0.35	89,600
Delmarva	840,856	498,000	0.95	473,100
ACE	1,629,231	547,000	0.69	377,430

From total vehicle count to plug-in vehicle count. Two data sources were used to derive PEV vehicle counts for each jurisdiction:

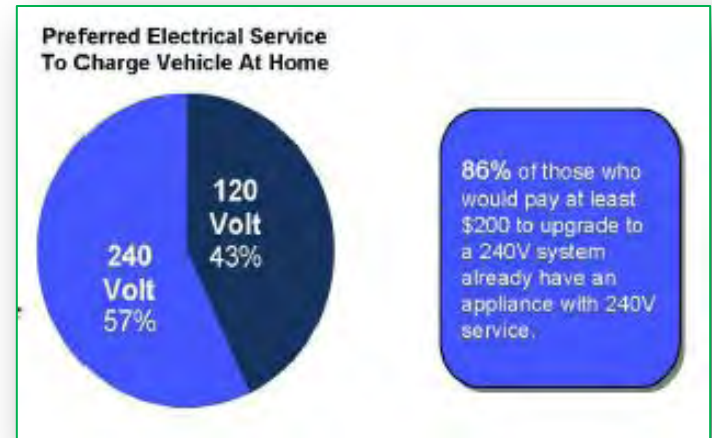
1. Aggregate PEV market share forecasts were used to determine a range of possibilities
2. The number of hybrid sales per state over the 2007-2009 time frame was used to determine the premium or discount that each PHI served state can expect when compared to the national average level of PEV market share

Market Share Forecast





Customers Prefer Level 2

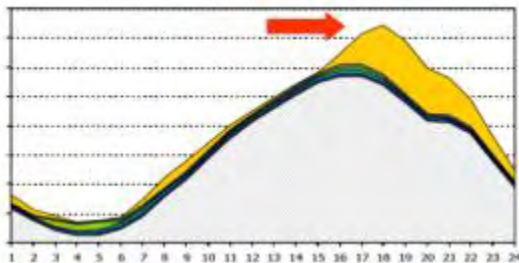
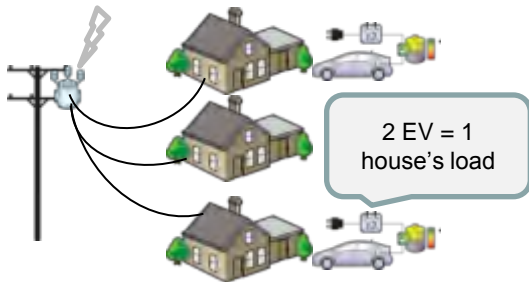
- Most vehicles come with a Level 1 charger (120V home outlet)
- Level 2 charging required for overnight charging of larger batteries
- Faster charging also allows higher efficiency, smaller battery
- **Customers surveyed preferred Level 2 chargers**
- Cost of installation is a potential issue
 - 75% of existing hybrid owners would pay at least \$200
 - PrEView Program showed \$1200 average installation cost
 - ***May require installation incentive.***



Characterizing Consumers' Interest in and Infrastructure Expectations for Electric Vehicles: Research Design and Survey Results, EPRI, May 2010

		Voltage / Current	Power	Chevy Volt (16 kWh)	Nissan Leaf (24 kWh)
Level 1		120V @ 12A	1.4 kW	11 hours	17 hours
Level 2		240V @ 14A	3.3 kW	4.8 hours	7.27 hours
		240V @ 32A	7.7KW	2 hour	3 hours
		240V @ 70A	16.8 kW	1/2 hour	1.5 hours

Unmanaged vehicle charging can create local clustering problems



Local Distribution System Impact

- EV load is equivalent to $\frac{1}{2}$ of full home load, so adding EVs may overload local transformers
- Older/historical houses and neighborhoods with higher concentrations of EVs may be a challenge (e.g., Washington, DC & Maryland Suburbs)

System Peak Load Increase

- Most drivers will return home and plug in between 4-8 PM, resulting in an increase to the normal afternoon peak
- Uncontrolled charging will create the need for additional Infrastructure and result in longer and higher peak demand
- Impact to EmPower Maryland goals

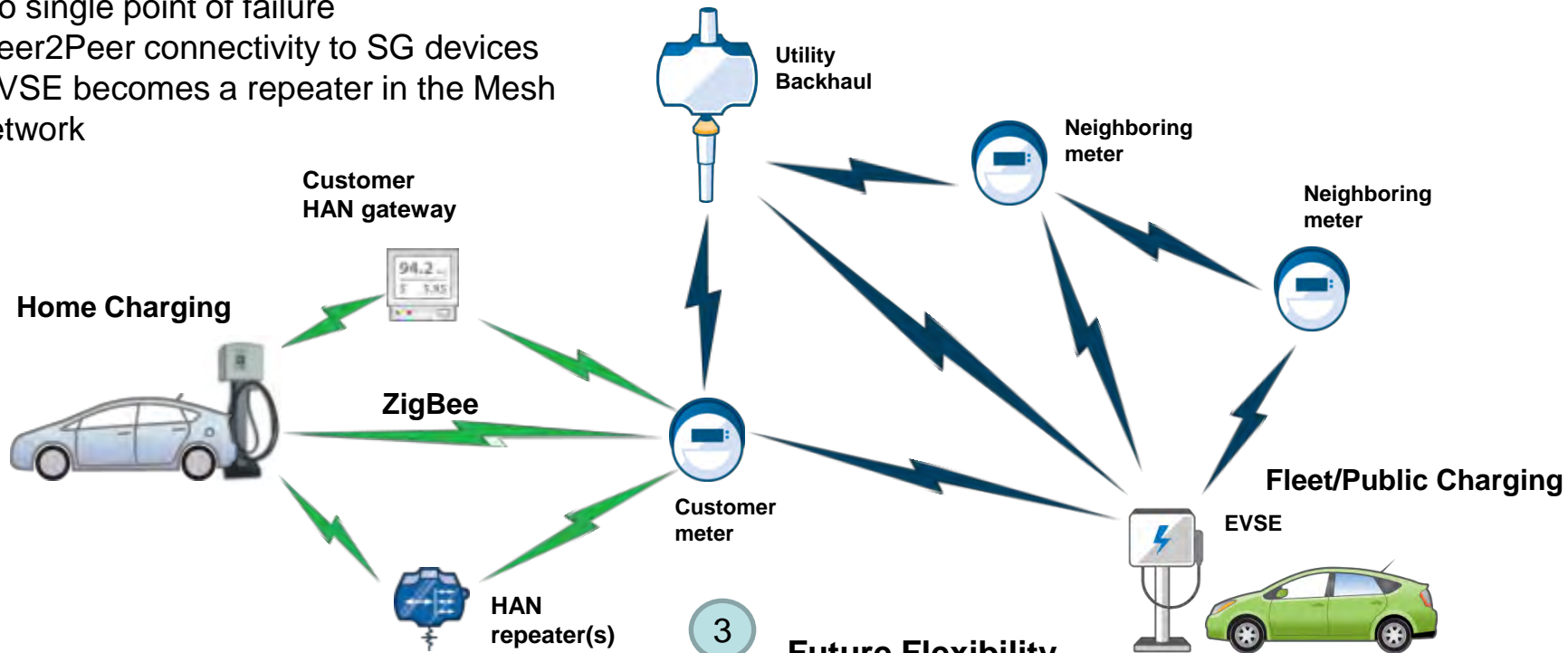
Operational Needs

- Metering EVSE as separate load for billing, Green House Gas (GHG) credits
- Back-office integration of EVSE for control, billing
- Remote diagnostics for lower maintenance costs
- ***Need to avoid the need for installing a second meter by certifying the metrology in the chargers***

Integrated to the “Smart Grid” Network

1 Robust, reliable communications

- Multiple connectivity paths
- No single point of failure
- Peer2Peer connectivity to SG devices
- EVSE becomes a repeater in the Mesh Network



2 Leverage Common Infrastructure

- Charger integrated with existing SG Communications network
- Utilizes existing SG Software Platform

3

Future Flexibility

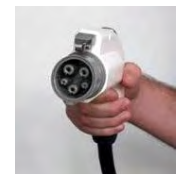
- Future-proofing with OTA upgrades

Together we can built a different future

- **That will decrease petroleum consumption and help our nation**
- **Improve environmental results & performance**
- **Remove obstacles**
 - Permits
 - Cost Recovery
 - Customer
- ***Will advocate for the residents/customers of the region***
- **Will provide incentive s to charge off peak**
 - Reliability Improvements
 - Defer electric system investment (if all possible)
- **That will create jobs in our region**
- **Will encourage collaboration among stake holders**

Moving Forward

- Continue Participation in EPRI & OEM's
- Will deploy 1 PHEV Bucket Truck in 2012
- PEV "Smart" Charging Communication network at:
 - Home applications
 - At work Applications
- Will continue to seek system planning data:
 - Jurisdictional motor vehicle registrations
 - OEM's
 - New Construction
- Actively support Regional Regulatory and Legislative efforts to prepare our customers and regional stake holders for PEV's



Contact Information

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Thank You !!!!!

Questions?

