EV Planning in SE Pennsylvania

MARAMA

Transportation & Air Quality Workshop

February 27, 2013

Rob Graff

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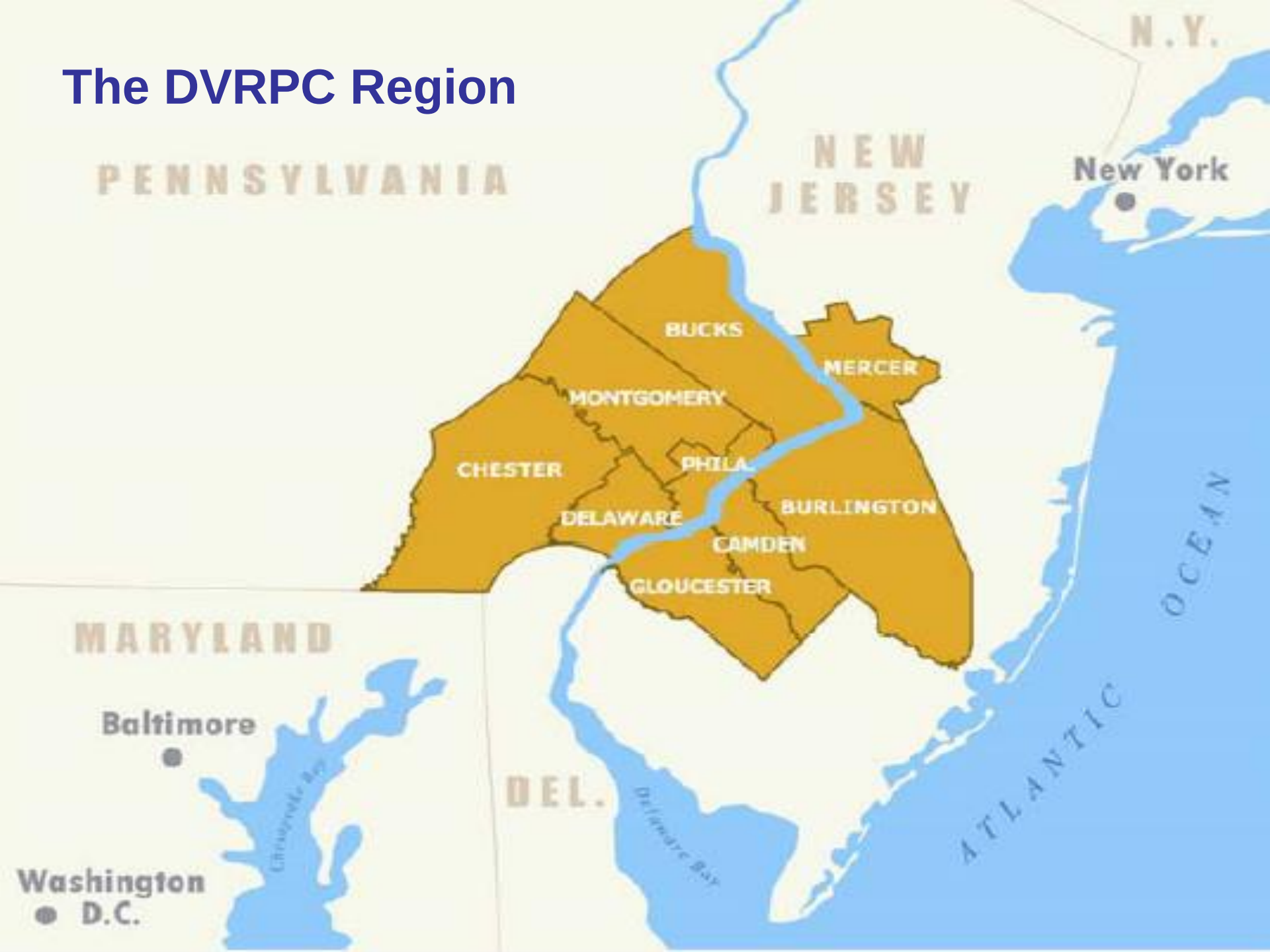
Delaware Valley Regional Planning Commission

The DVRPC Region



Delaware Valley Regional Planning Commission

- **MPO for Greater Philadelphia**
- **Region is bi-state, nine counties surrounding and including Philadelphia**
- **Planning areas**
  - Transportation Planning, Air Quality, Smart Growth Planning, Environmental Planning, Housing and Economic Development, Population and Employment forecasts, Long Range Planning
  - **Energy and Climate Change:**
    - Energy & GHG emissions inventory
    - Climate change adaptation planning
    - Prepare the region for new energy
    - **Electric Vehicle Readiness Plan**
    - Municipal energy management assistance

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DVRPC EV Activities

U.S. DOE-Funded Electric Vehicle Infrastructure Planning in the Five Counties of SE PA

- **Partners with DVRPC:**
  - PECO Energy
  - GPCC
  - City of Philadelphia
- **Completion date: April 15, 2013**

"Jump start" analysis, funded by PECO Energy

- **Analysis of Key Infrastructure Issues**

The EV Project – also DOE Funded

- **Serve on Steering Committee**
- **Provide information on our work**
- **We want to learn from their experience**

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Key regional-level question about EVs

How are they different from other cars?

What do local governments need to know?

Where will EV owners live?

Where, other than home, might they want to charge?

Where can EVs replace ICE vehicles?

How will EVs affect the electric distribution grid?

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Developing an "EV Ownership Potential" Score

Based on discussions with researchers in California, as well as with managers at Nissan and Chevrolet, we based EV ownership potential primarily on income and hybrid ownership.

Primary Factors		Secondary factors	
Income:	60%	Home Ownership	6%
Hybrids	25%	Dwelling Type	6%
		Education	3%

Data Sources:

- 2,225,595 passenger cars registered in 5 counties
- US Census – American Community Survey

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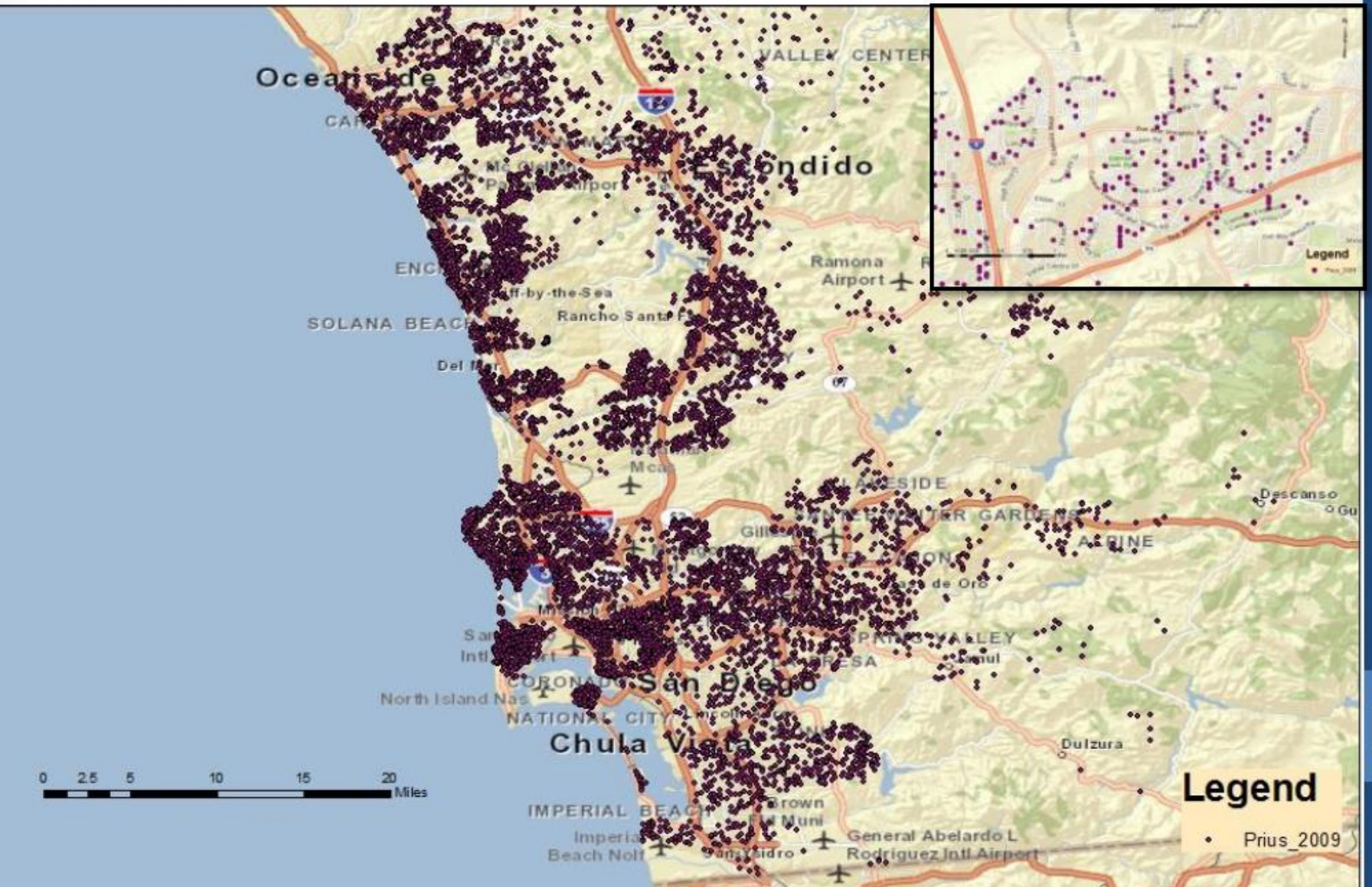
From: Plug-In Vehicles in the San-Diego Region: A Spatial Analysis of the Demand for Plug-In Vehicles, Gil Tal, et al., UC Davis PH&EVRC of ITS

Hybrid Ownership Distribution



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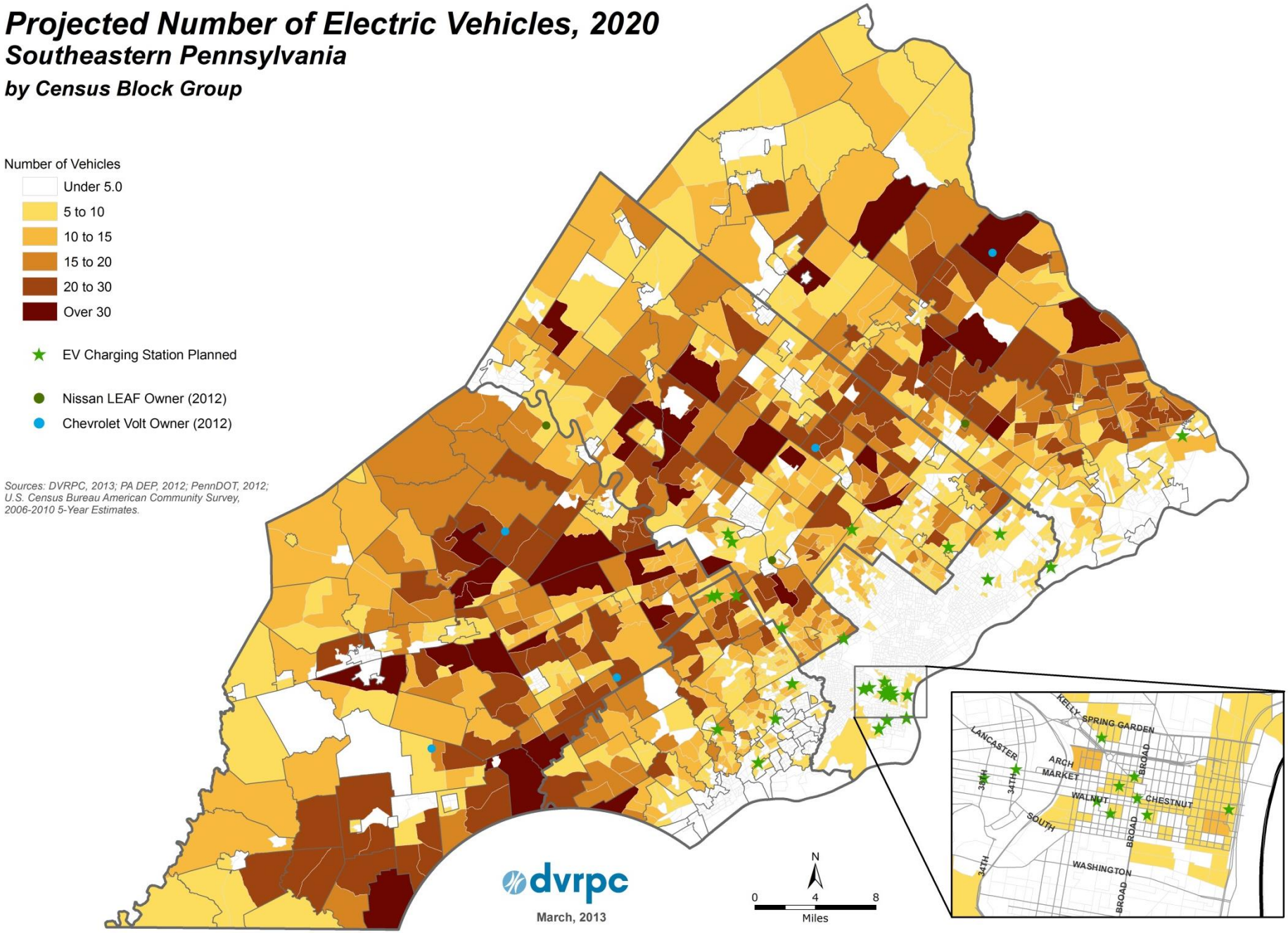
Plug-In Vehicle Distribution

Projected Number of Electric Vehicles, 2020

Southeastern Pennsylvania

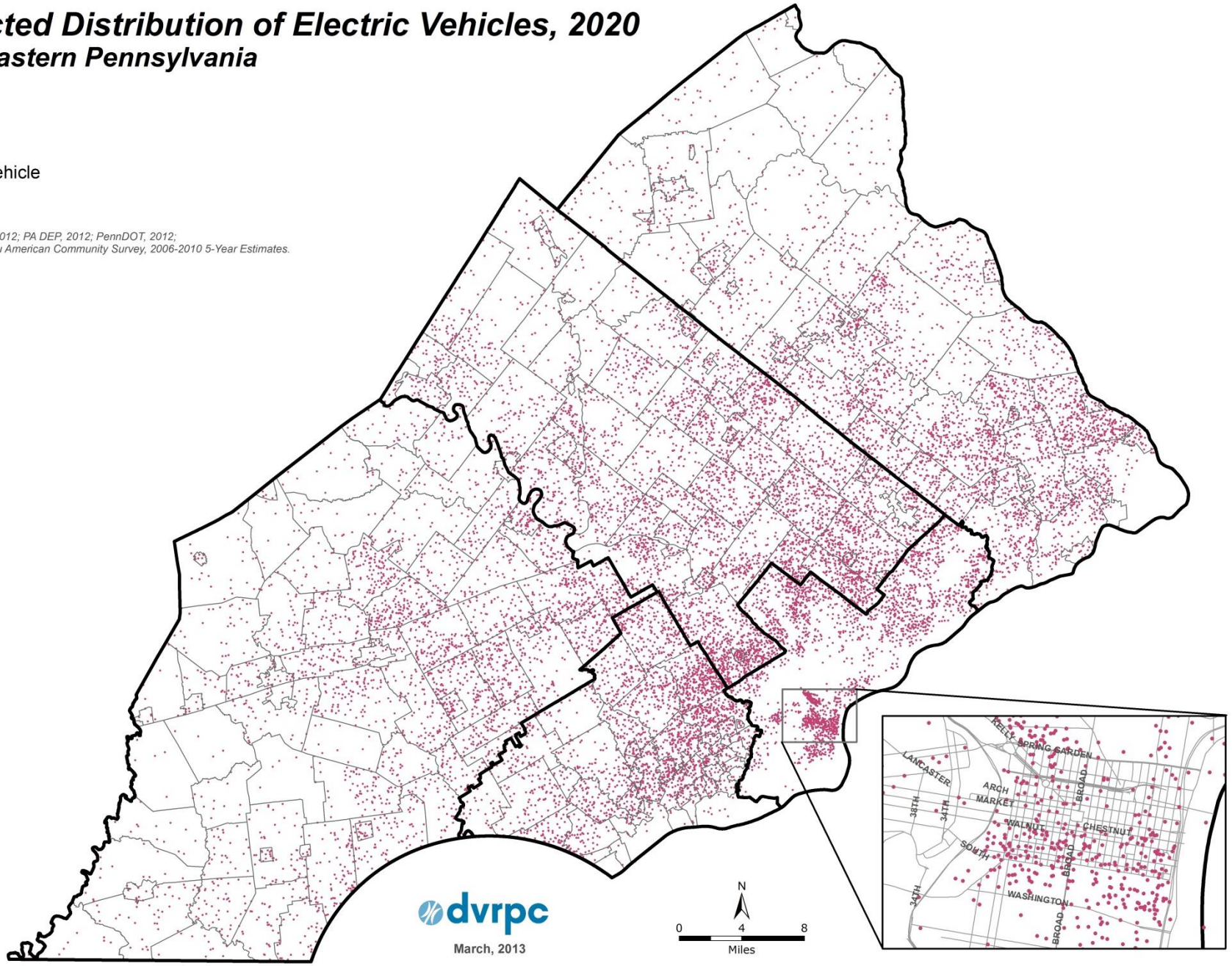
by Census Block Group



Projected Distribution of Electric Vehicles, 2020
Southeastern Pennsylvania

1 Dot = 1 Vehicle

Sources: DVRPC, 2012; PA DEP, 2012; PennDOT, 2012;
U.S. Census Bureau American Community Survey, 2006-2010 5-Year Estimates.



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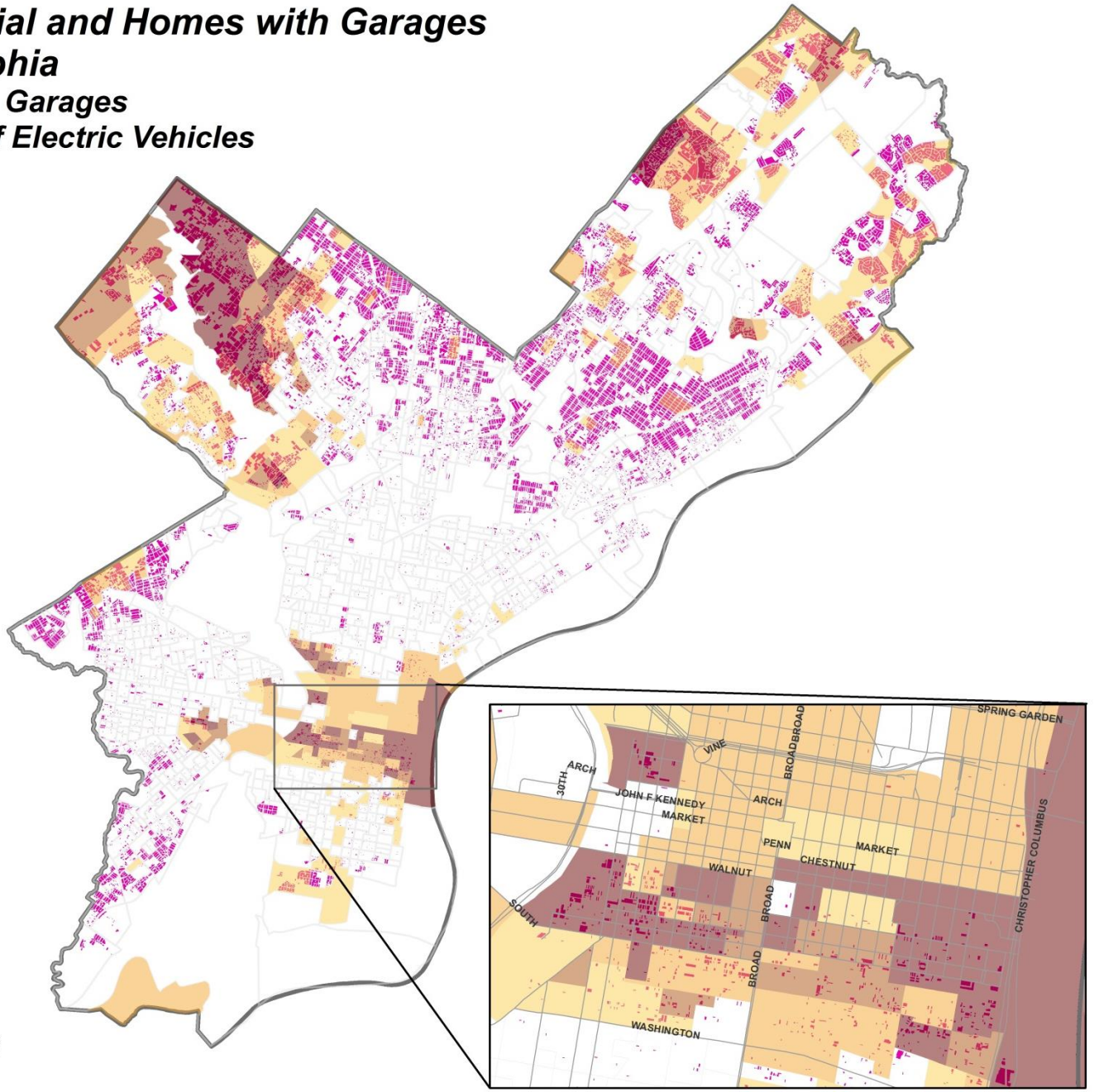
Electric Vehicle Potential and Homes with Garages in the City of Philadelphia

Homes in Philadelphia with Garages and Potential Percentage of Electric Vehicles

by Census Block Group



Sources: DVRPC, 2012; PA DEP, 2012; PennDOT, 2012; U.S. Census Bureau American Community Survey, 2006-2010 5-Year Estimates.

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Evaluation of “Away from Home” Charging

- Density of employment
- Roadways with greatest average daily travel
- High volume interchanges
- Major destinations

Data from various sources, including MPO GIS data

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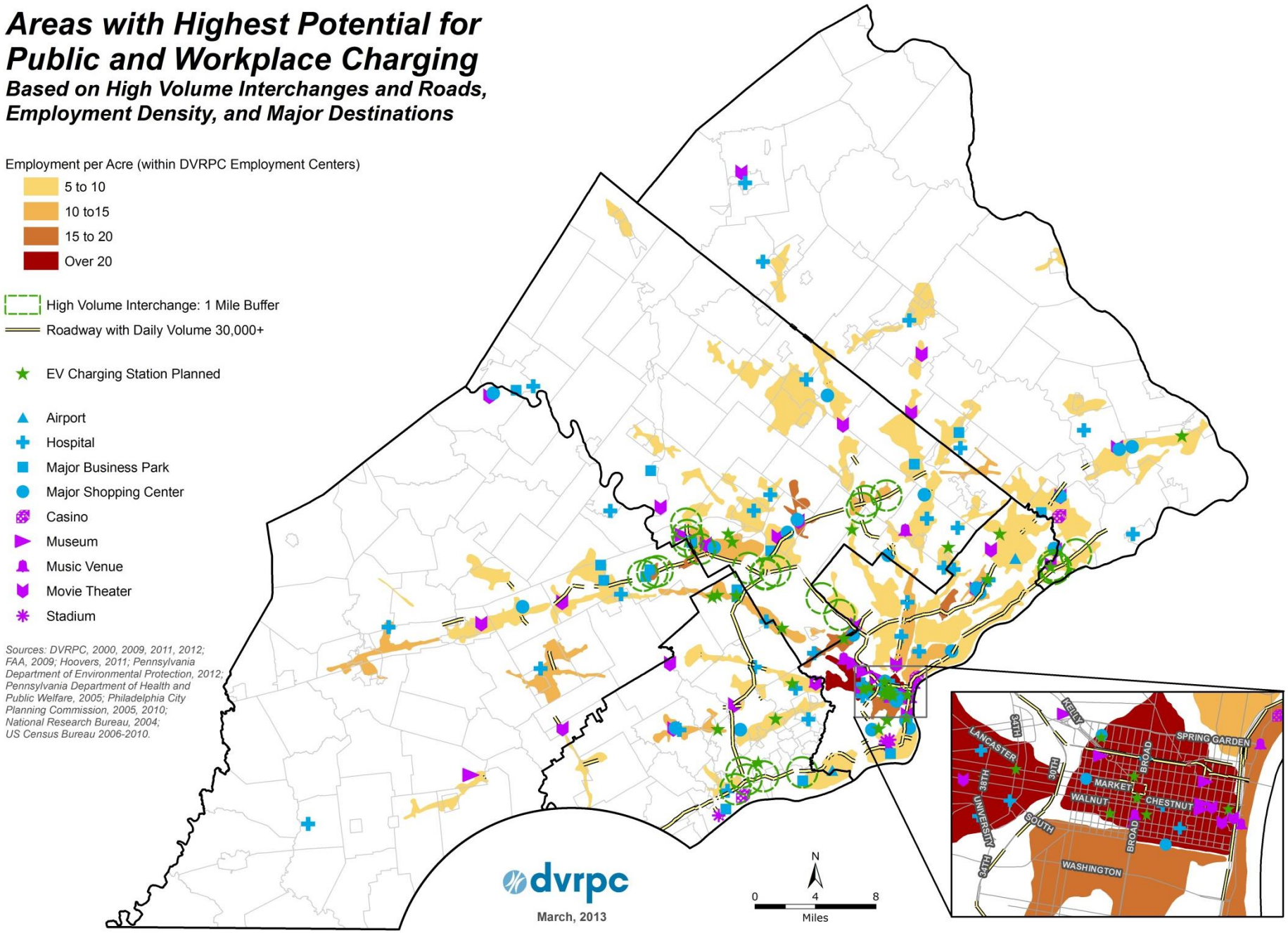
Areas with Highest Potential for Public and Workplace Charging

Based on High Volume Interchanges and Roads, Employment Density, and Major Destinations



Driving and parking habits

DVRPC Household Survey – 2588 vehicles in 5 counties

- **Based on a 24 hour diary and follow-up phone interview with households.**
- **From 2000 – New survey in the field right now**
- **Provides data on each trip taken for all modes.**

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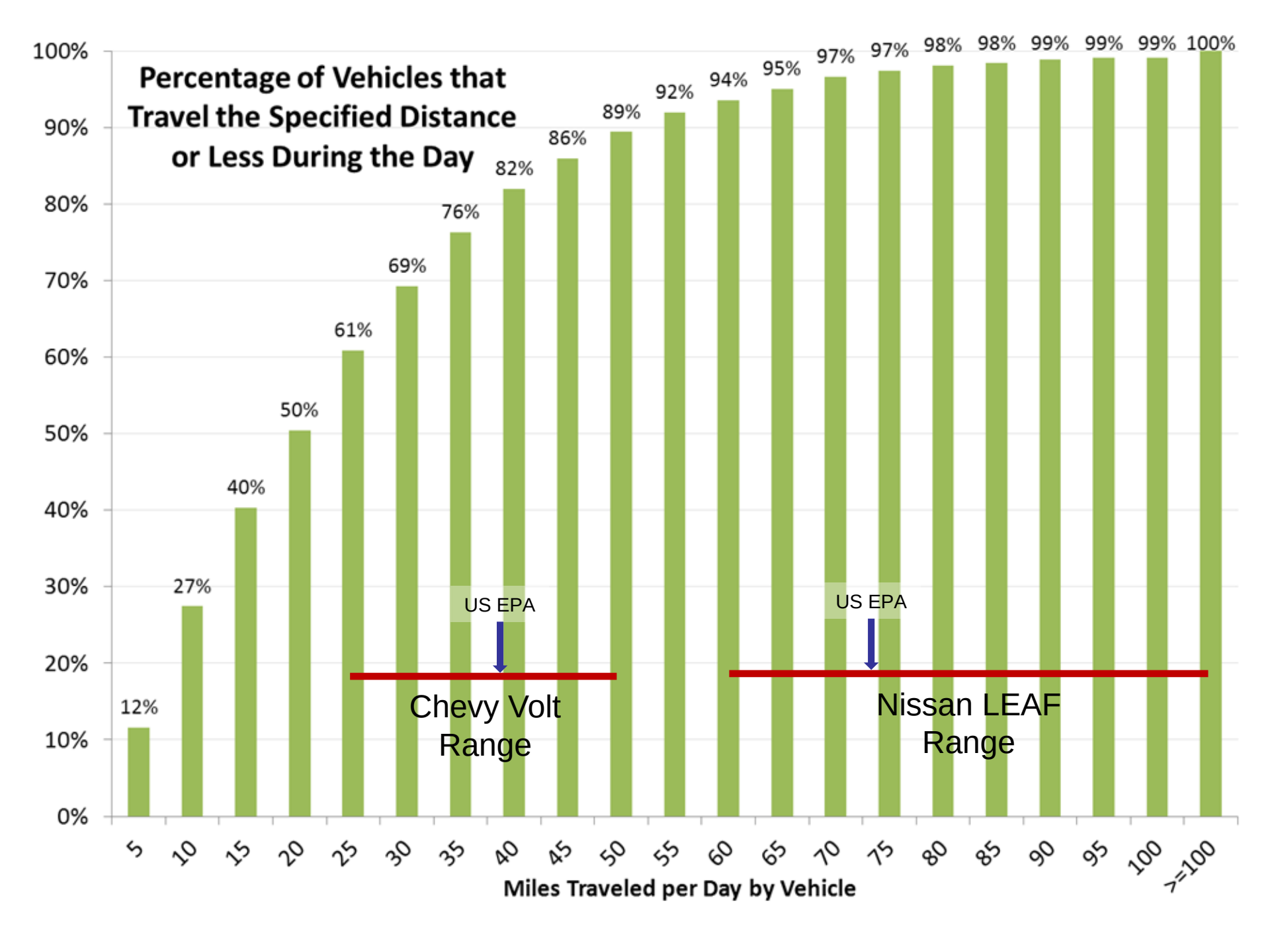
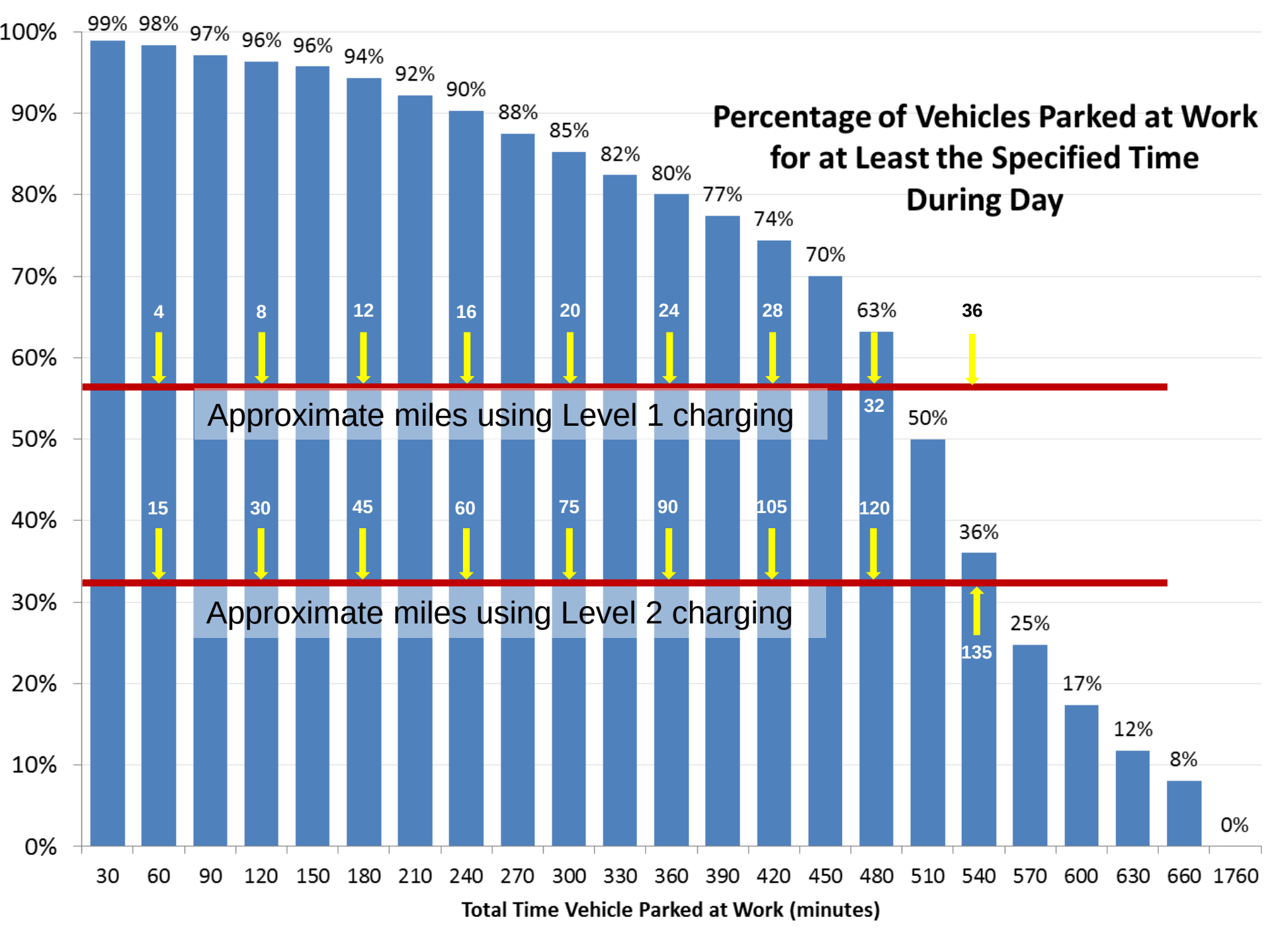

Percentage of Vehicles that Travel the Specified Distance or Less During the Day
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
12%
27%
40%
50%
61%
69%
76%
82%
86%
89%
92%
94%
95%
97%
97%
98%
98%
99%
99%
99%
100%
US EPA
US EPA
Chevy Volt Range
Nissan LEAF Range
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
>=100
Miles Traveled per Day by Vehicle


Percentage of Vehicles Parked at Work for at Least the Specified Time During Day
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
99%
98%
97%
96%
96%
94%
92%
90%
88%
85%
82%
80%
77%
74%
70%
63%
50%
36%
25%
17%
12%
8%
0%
4
8
12
16
20
24
28
36
32
15
30
45
60
75
90
105
120
135
Approximate miles using Level 1 charging
Approximate miles using Level 2 charging
30
60
90
120
150
180
210
240
270
300
330
360
390
420
450
480
510
540
570
600
630
660
1760
Total Time Vehicle Parked at Work (minutes)

Combination of Distance and Time Parked

Combinations of Distance Traveled and Time Parked in SE PA

Distance Traveled (miles)	40 or less	40 or less	70 or less	70 or less
Time Parked at Work (hours)	4 or more	6 or more	4 or more	6 or more
Portion of vehicles meeting both criteria	71%	64%	88%	78%

Conclusions:

- Many vehicles in the region can readily be replaced by EVs.
- Many Volt (and other PHEV/EREV) users can get by with only Level 1 at home charging.
- Many LEAF (and other AEV) users can likely get by with only Level 2 at home charging (no work charging).
- Most at work charging need can be met by Level 1, both for PHEV/EREV users and AEV users.

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Overall lessons for MPOs

- Analysis of vehicle registration data and demographic information can yield insight into likely locations of EV owners.
- Traffic and employment data, together with key venue locations can yield insight into most promising locations for away from home charging, both workplace and “opportunity” charging.
- Household travel surveys can help gauge the prospects for EVs and the general need for Level 1 and Level 2 workplace charging.

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

Questions Welcome!

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