Encouraging Electric Vehicle Adoption at the Local Level

Charlie Forcey | Durham Energy Committee

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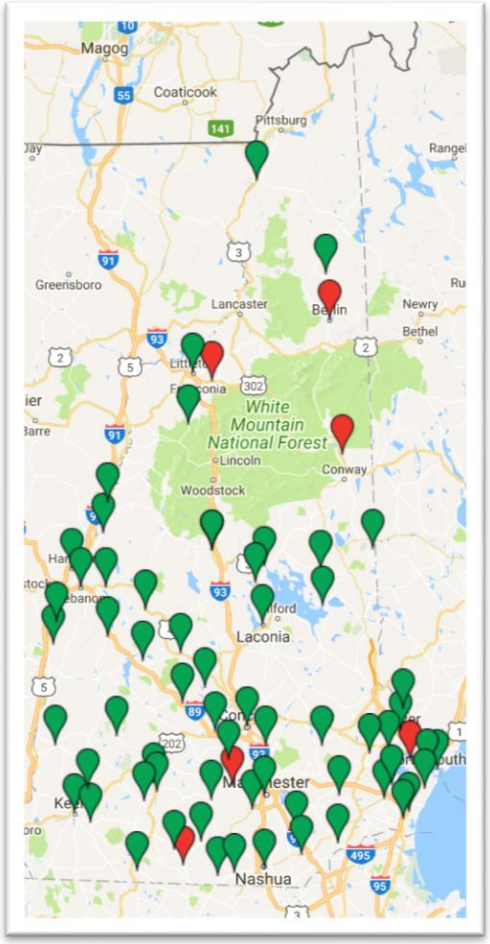
Why electric vehicles?

- ✓Transportation is our single largest source of residential green house gasses, a large portion of municipal, corporate, and personal budgets, and sends dollars out of state, often to global conflict zones.
- ✓Fuel efficiency gains of internal combustion engines have stalled and have diminishing returns.
- ✓EVs immediately lower emissions in New England, sharply increase efficiency, with a lot of room for improvement from greening the grid.
- ✓Consumer excitement and improving affordability make EVs a potentially mass market phenomenon.

Filling the NH donut hole: What can LEC's do?

- ✓**Top Down**: Demand and support EV adoption strategies from federal, corporate, and state agencies.
- ✓**Bottom Up**: Make your town an EV hotspot at the local level where the vast majority of EV driving happens.
- ✓Three steps to becoming an EV Hotspot:
  1. Municipal and school district EV charging and fleet replacements
  2. Corporate workplace charging and EV station sponsorships and siting
  3. Residential education, discount programs, National Drive Electric Week events



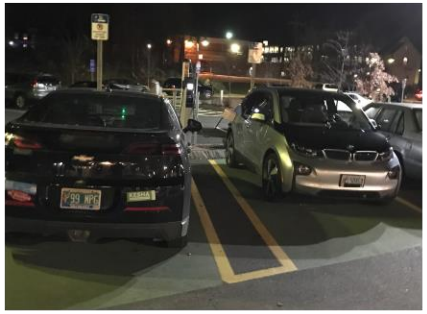
Durham's Plan to Become an Electric Vehicle Hotspot

- ✓**Measure:** Transportation accounts for the largest share of energy use across the country—about 35% for NH. Durham's Greenhouse Gas Emission Inventory (2008) determined that our suburban community beat the state average, attributing 43% of the town's greenhouse gas emissions to personal vehicles.
- ✓**Reduce:** Our 2016 Master Plan identified green house gases from transportation as a key challenge and set the following goal: "Increase use of highly fuel efficient and low-emission vehicles in the community."
- ✓**Renew:** Where possible, encourage the connection of new charging stations coupled with renewable energy systems to accelerate the greening of the grid.

Step 1: Municipal Actions

- ✓ **Public Charging Stations:** Public stations in municipal lots attract business to the downtown, provide alternatives for renters and condominium owners, and a source of data for understanding EV driver behavior.
- ✓ **Municipal Workplace Charging:** Encourage town facilities committees to install chargers on town buildings, or at a minimum prepare conduit and circuits for eventual EV additions to their vehicle fleet.
- ✓ **School Charging:** Encourage your school district to offer workplace and student EV charging in one or more parking lot, and to keep a close eye on EV School Bus and accessory vehicle development.
- ✓ **Fleet Transitions:** Advocate for EV vehicle adoption into municipal fleets especially for light duty parking, inspection, and service vehicles.
- ✓ **Renewable Energy Installations:** Install solar panels or other renewable energy sources to offset and improve the emissions profile of the new electrical usage by transportation.


EV
CHARGING
ONLY



Step 2: Corporate Actions

- ✓**Workplace Charging:** Identify major employers in your town and encourage them to offer workplace charging stations especially around new construction and parking lot renovations when costs are lower
- ✓**Destination/Hospitality Charging:** Identify popular or strategically located restaurants or hotels and encourage them to install destination chargers.
- ✓**Encourage Efficiency/Renewable Energy Systems:** Through a planning tool like Durham's Energy Check List, encourage developers to adopt renewable energy systems and provide lower emissions power to their charging stations.

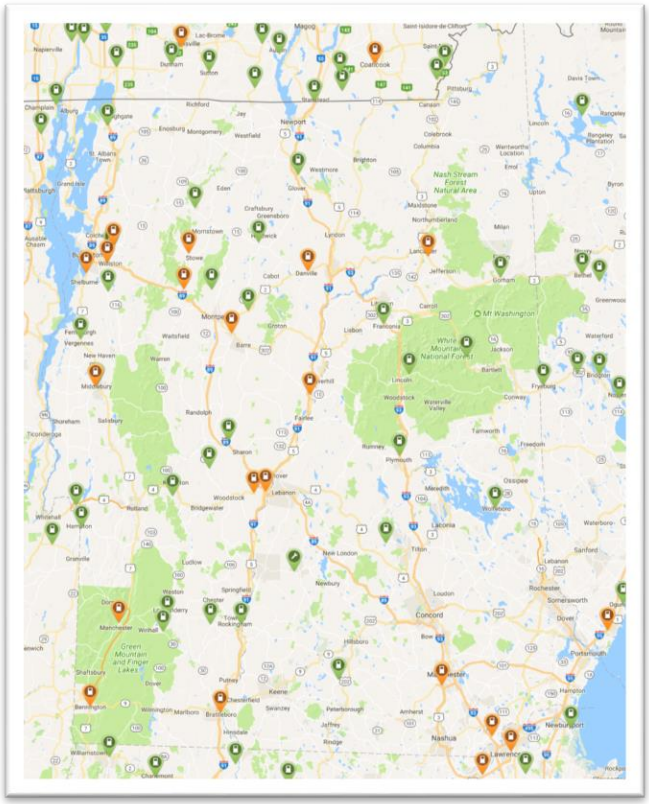
Step 3: Residential Actions

- ✓ **Energy Committee Leadership/Advice:** Four out of nine Durham Energy Committee members own plug in vehicles and consult frequently with residents on EV charging and vehicle model selection.
- ✓ **National Drive Electric Week**: Durham has held these events since 2015 and can attribute several of our towns dozen or so electric vehicles to initial test drives at our events. In 2018, we will join a monthly Seacoast EV Meet Up.
- ✓ **Energize 360 Campaigns:** Encourage residents to "take control of their energy futures" with a holistic approach, combining energy efficiency, renewable energy, and electrification of their heating, cooling, and transportation.
- ✓ **Public Downtown Chargers:** Provides education and exposure to electric vehicles as well as higher speed charging for renters and condominium owners.

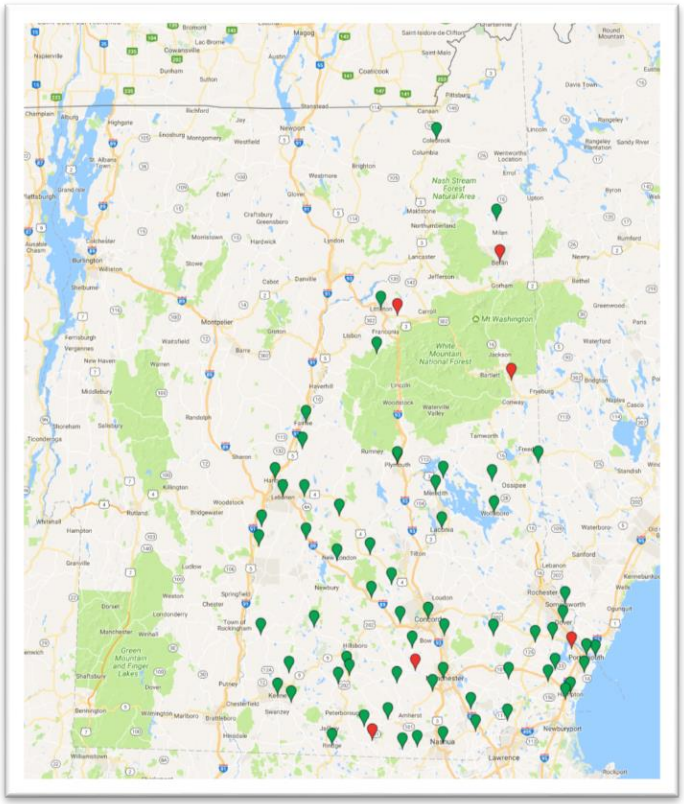

PARKING
PAY
STATION
National Drive Electric Week
DRIVE
ELECTRIC
Nissan LEAF Exclusive Automotive Sponsor

Take (Local) Control of Your Energy Future: Become an EV Hotspot!

Charging Stations



Local Energy Committees

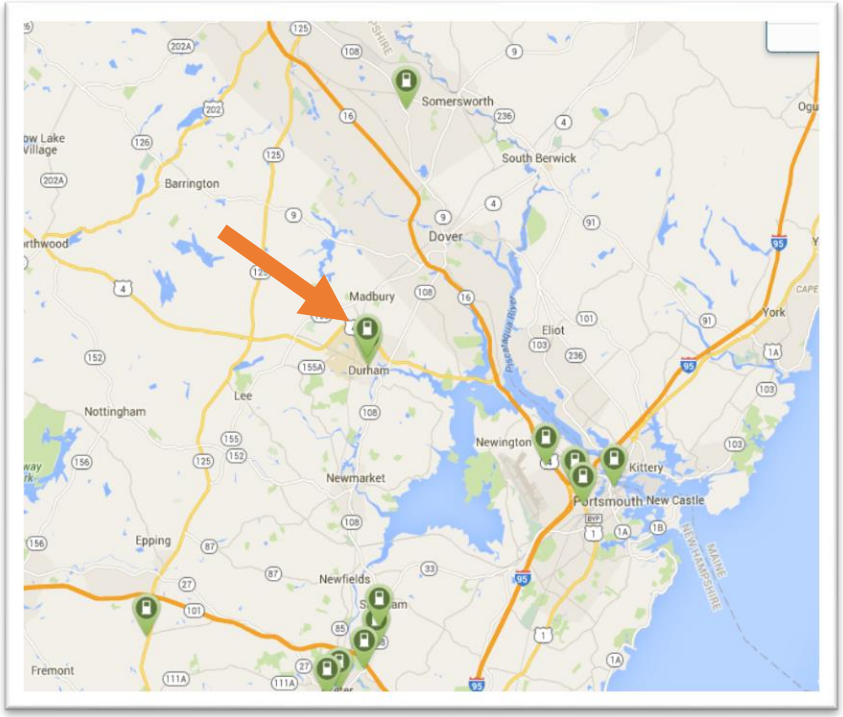


Case Study: Pettee Brook Charger

- ✓ Installed September 4, 2015
- ✓ Total Installed Cost: $8,264
  - ✓ NH DES Grant: $5,000
  - ✓ UNH Contribution: $1,223
  - ✓ Net Town Cost: $1,223
  - ✓ Income to date: $132.40 ($318 estimated for entire year)
- ✓ 2nd Year and Beyond Annual Estimates
  - ✓ Estimated annual income of > $500
  - ✓ Estimated annual electrical cost of $120
  - ✓ Annual network and software fee: $560
  - ✓ Estimated net operating cost of < $400 per year

Why locate a station in downtown Durham?

- On the Route 4 and 16 corridors current underserved by stations
- Home of the University of New Hampshire and a destination town for a large number of visitors from 1-2 hours away (ideal EV distances)
- Location of large cultural and sporting events with > 1 hour duration
- Shopping, entertainment, and dining opportunities suitable for 1-2 hour average charging times
- Pettee Brook Lot had an available electrical panel, potential parking capacity according to the previous 2013 parking study, and was scheduled for re-construction in the summer 2015

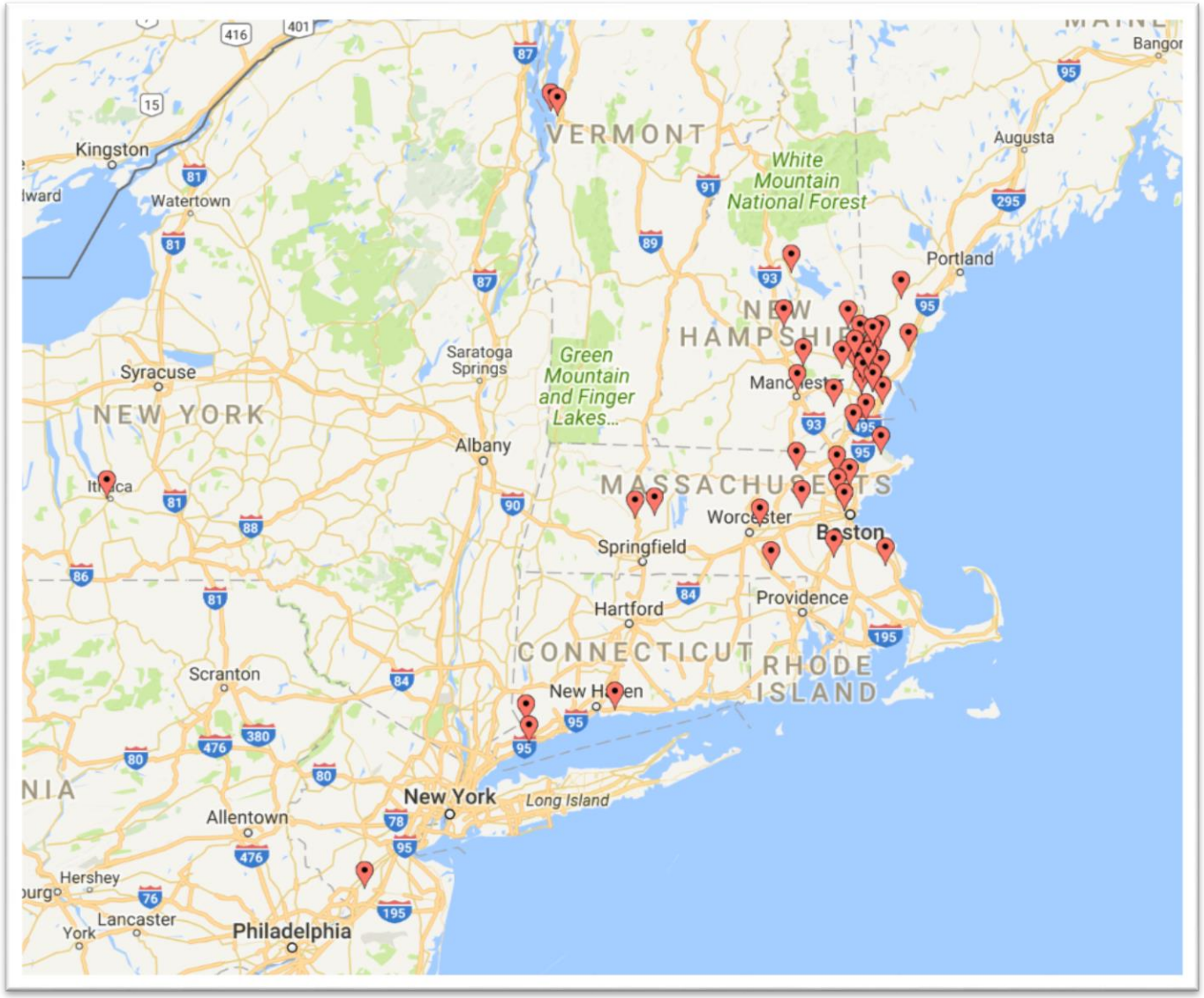


Installation Budget

Durham NH EV Dual Charging Station	
Equipment Cost w Activation and Network 1 Year	$ 7,294
ABM Installation Service and Commissioning	$ 800
DPW Supplies and Materials (Ball Park)	$ 2,000
Total Cost	**$ 10,094**
NH Grant	$ 5,000
UNH Grant	$ 2,500
Net Town Cost	**$ 2,594**
Annual Network Fee After Year 1	**$560.00**

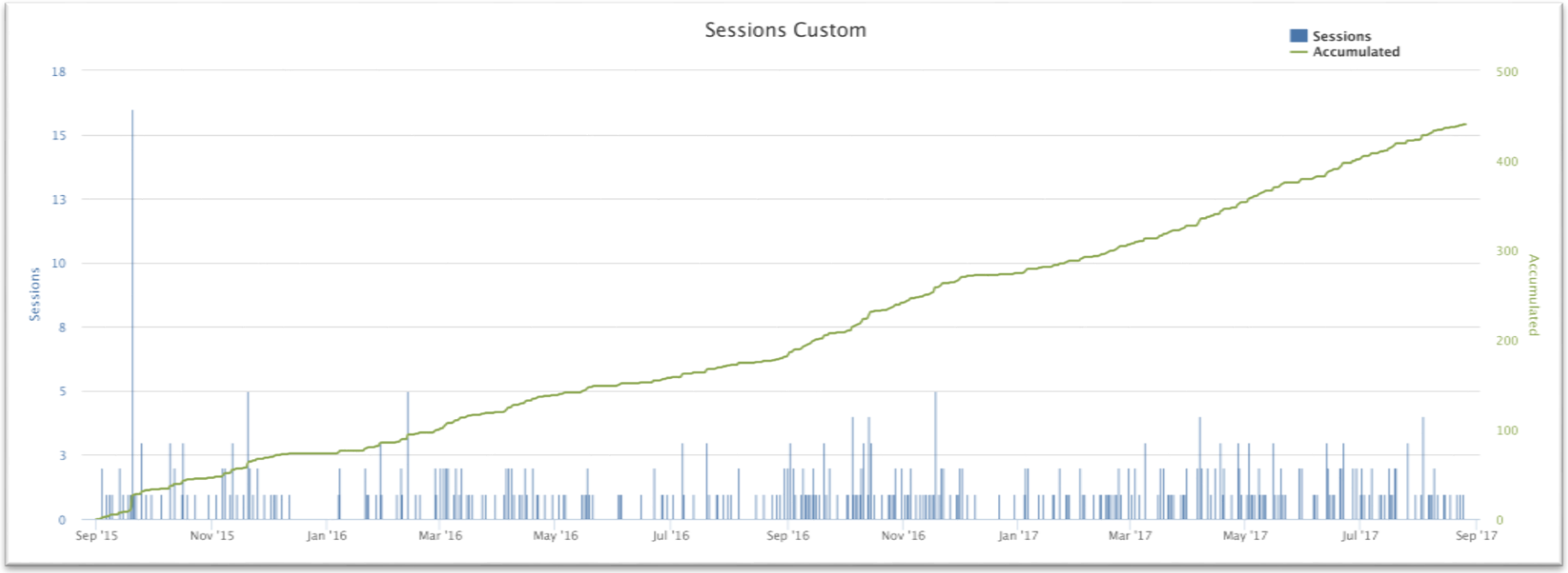
A Wealth of Data (2 Years)

- 61 unique drivers/vehicles from 44 unique zip codes from NH, MA, ME, VT, CT, PA, NY
- 440 charging sessions (~4 per week)
- Average length of session 1:58 minutes
- 2,549 kWh used at $0.16 = $408 lifetime kWh cost
- 1,071 kg GHG emissions avoided (40 trees growing for 10 years)
- Total Revenue: $1,139 vs warranty/fees: $1,880

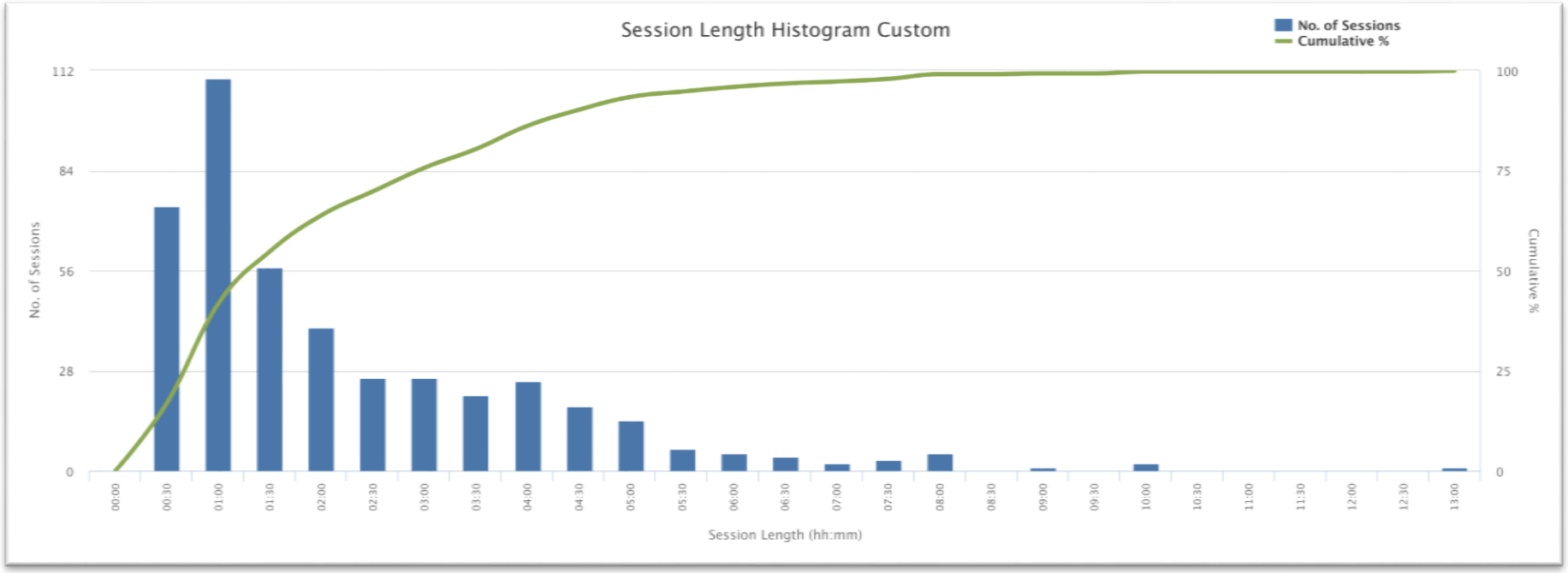


Map of Pettee Brook Station EV users by ChargePoint profile home zip code, 2015-2017.

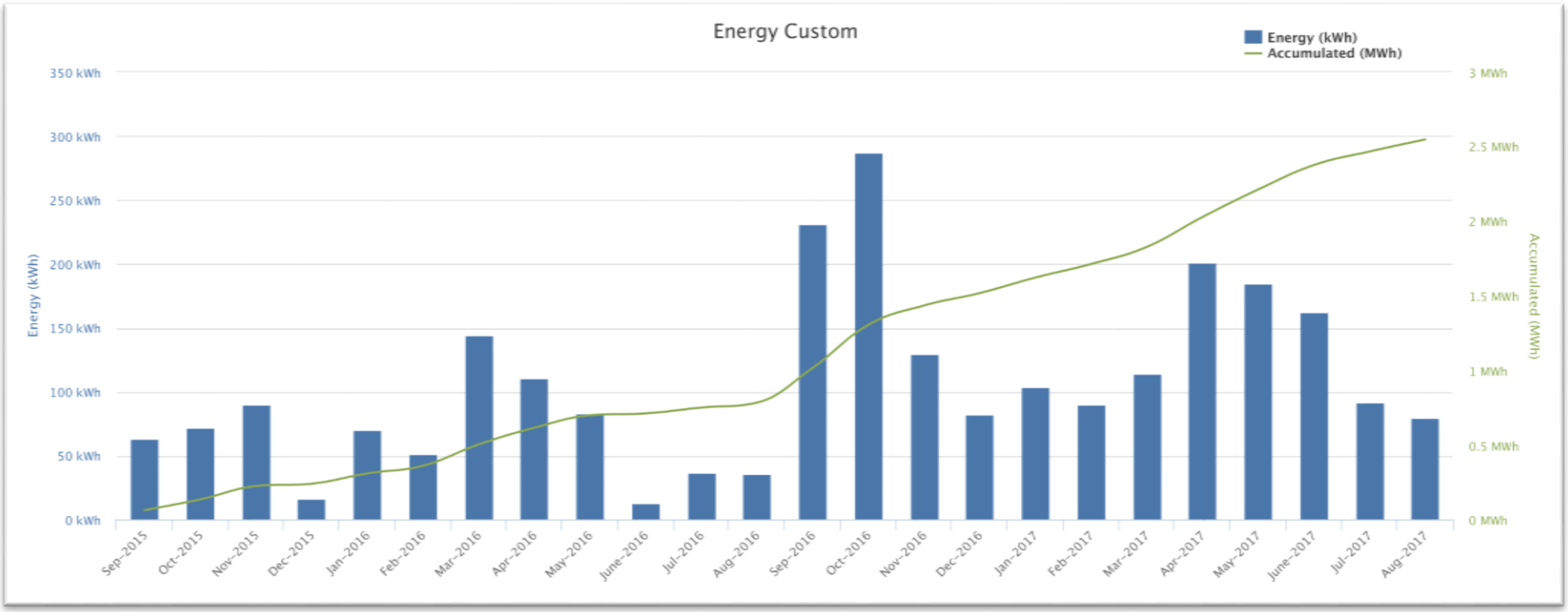
440 sessions (~18 per month)



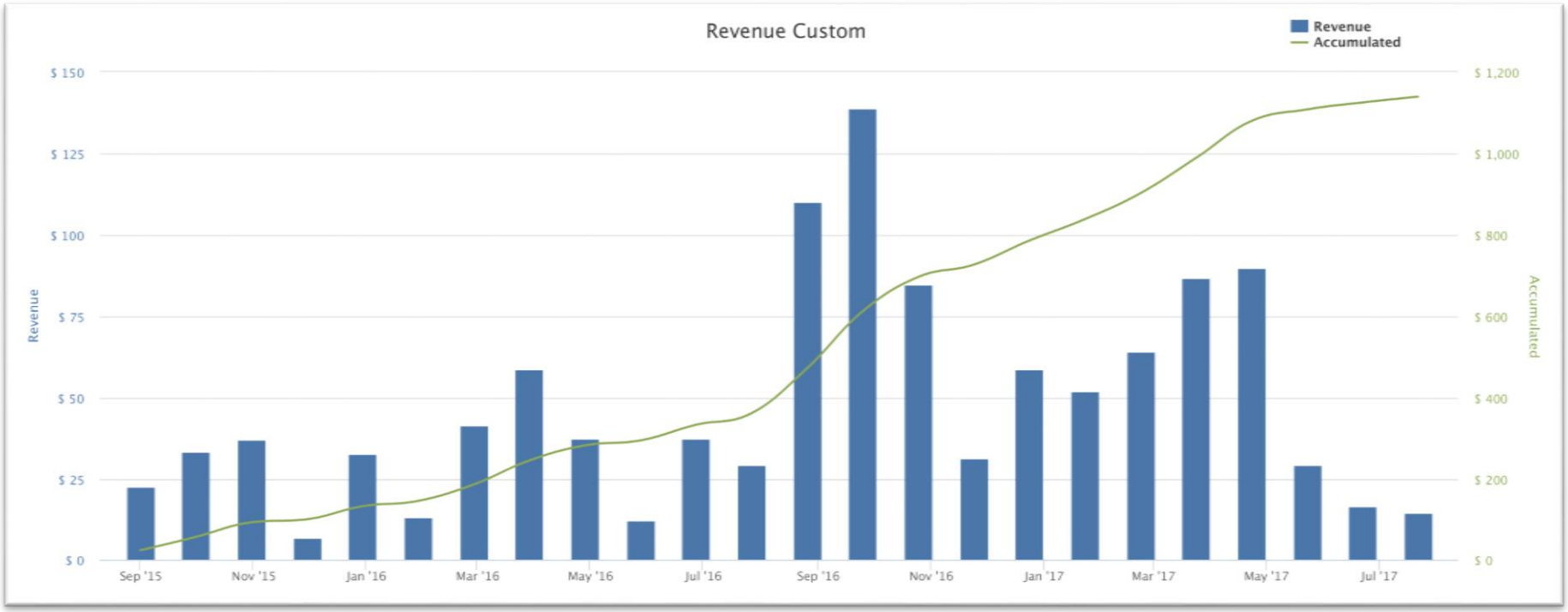
Average Duration: 1:58 minutes



2,549 kWh @ $0.16 = $408



Revenue $ 1,139
$47 per month



Recommended Resources

- **Lawrence Livermore National Laboratory, "Energy Flow Charts: Charting the Complex Relationships among Energy, Water, and Carbon,"** https://flowcharts.llnl.gov.
- **US Department of Energy Charging Stations in New Hampshire**: https://www.dropbox.com/s/as0rbw442wrn8av/doe_ev_stations_nh_20160127.csv?dl=0.
- **Union of Concerned Scientists, "Cleaner Cars from Cradle to Grave"**, http://www.ucsusa.org/clean-vehicles/electric-vehicles/life-cycle-ev-emissions
- **NH Department of Environmental Services Drive Electric NH grant** http://des.nh.gov/organization/divisions/air/drive-electric/e-vehicles.htm

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CLEAN VEHICLES > ELECTRIC VEHICLES

Cleaner Cars from Cradle to Grave (2015)

Over their lifetime, battery electric vehicles produce far less global warming pollution than their gasoline counterparts—and they're getting cleaner.

[DOWNLOAD]

Full report >
Executive summary >
FAQ >

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[RELATED CONTENT]

How Clean Are EVs Where You Live?

How Do Battery Electric Cars Work?

Battery Electric and Hydrogen Fuel Cell Electric Vehicles (2014)

[ON TWITTER]

Drive Oregon @DriveOregon 26 Jan
Drive Oregon's Opinion: Electric vehicles will lower your power bill s.oregonlive.com/4GBuqvE
Retweeted by Jason Barbose
Show Summary

Concerned Scientists @UCSUSA 30 Jan
Connecting midsize Iowa farms to hospitals, schools, & restaurants generates $3 bil: j.mp/2089KtH #iowacaucus #plateoftheunion
Expand

The Science Network @SciNetUCS 29 Jan

http://www.ucsusa.org/clean-vehicles/electric-vehicles/life-cycle-ev-emissions#.Vq62nDalsxY

https://youtu.be/K9m9WDxmSN8

Are Electric Cars Affordable?

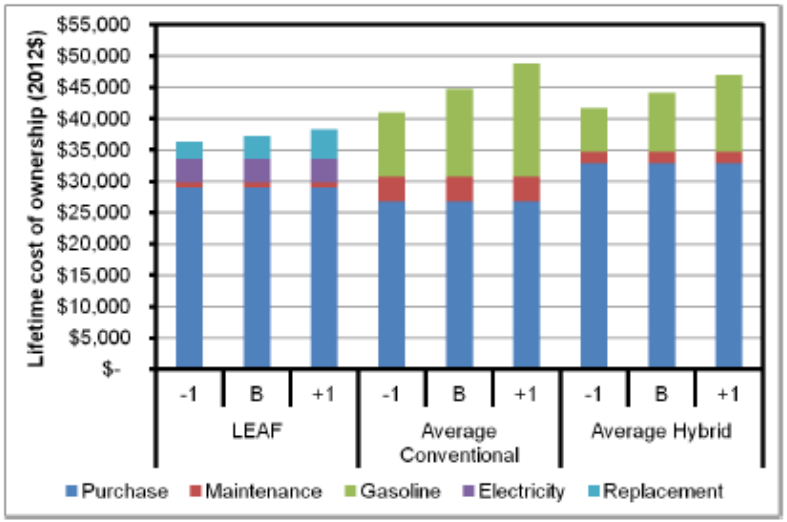
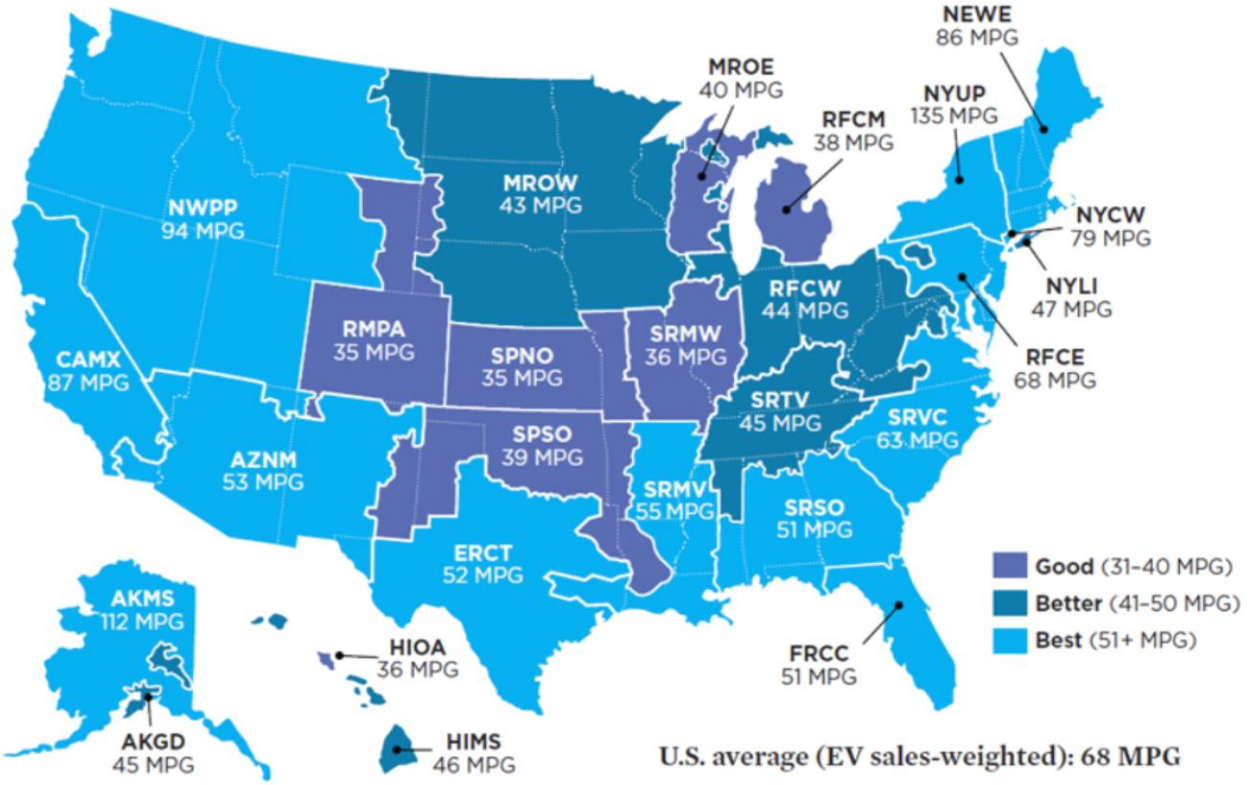


Figure 5-7
Average Total Cost of Ownership for the Nissan LEAF and Comparison Vehicles with Gasoline Prices of +/- $1

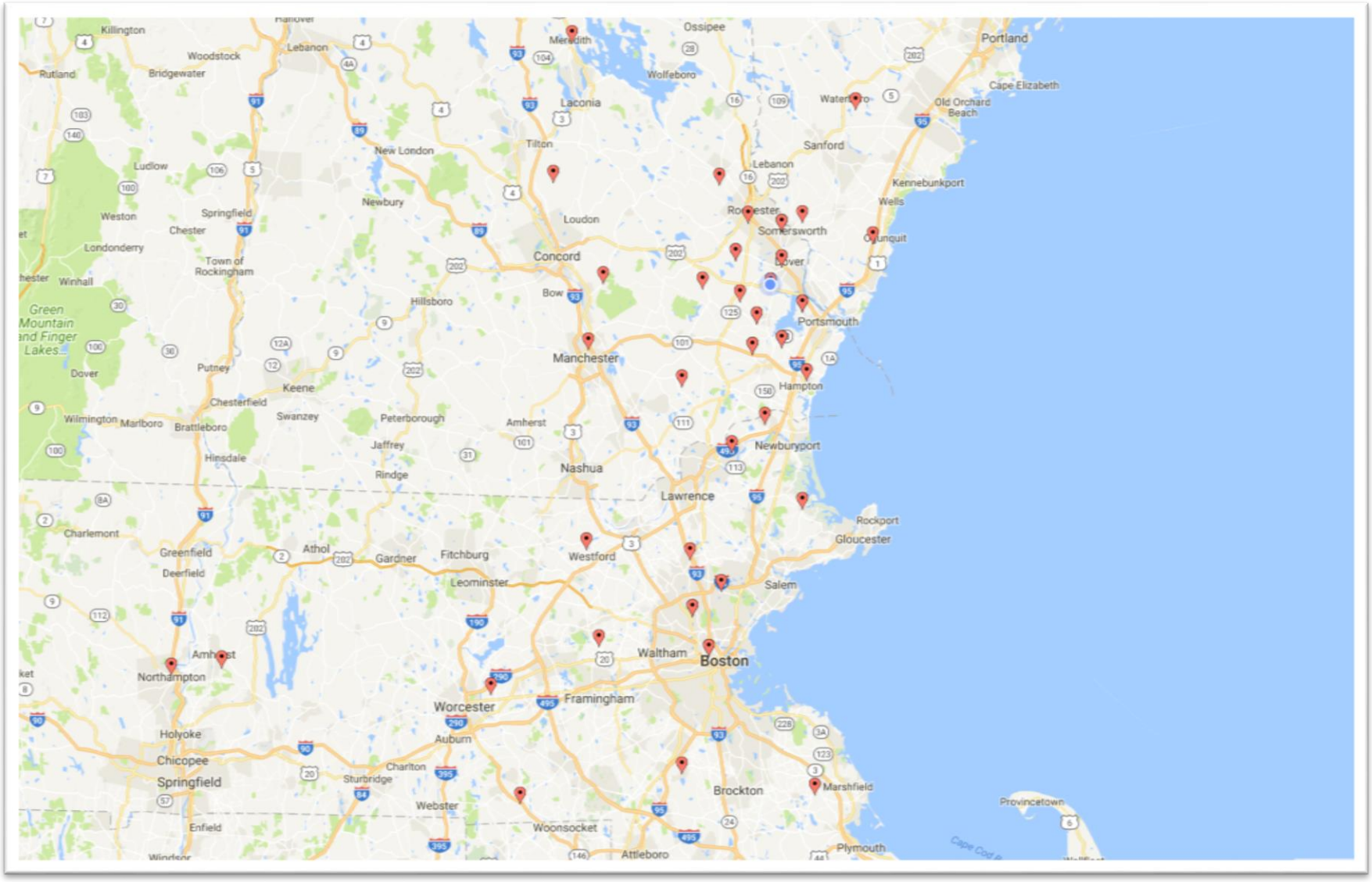
- Chart Source: 2013 Total Cost of Ownership Model for Current Plug-in Electric Vehicles: http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000003002001728
- See also the ”Electric Car Price Guide” http://www.greencarreports.com/news/1080871_electric-car-price-guide-every-2015-2016-plug-in-car-with-specs-updated

Electric Vehicle Global Warming Pollution Ratings and Gasoline Vehicle Emissions Equivalents by Region



Note: The MPG (miles per gallon) value listed for each region is the combined city/highway fuel economy rating of a gasoline vehicle that would have global warming emissions equivalent to driving an EV. Regional global warming emissions ratings are based on 2012 power plant data in the EPA's eGRID 2015 database (the most recent version). Comparisons include gasoline and electricity fuel production emissions. The 68 MPG U.S. average is a sales-weighted average based on where EVs were sold in 2014.

SOURCE: EPA 2015c.



Close up regional map of Pettee Brook Station EV users by ChargePoint profile home zip code, 2015-2017.