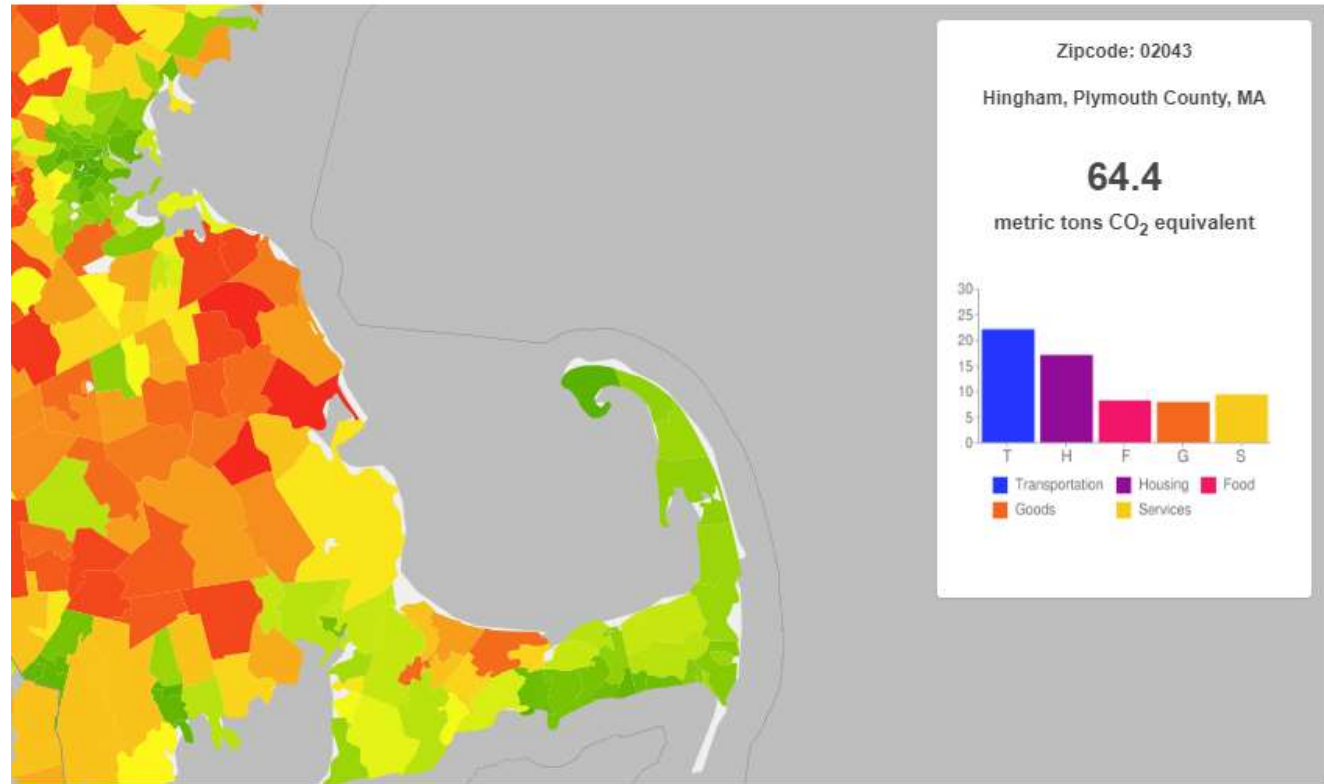


Electric Vehicles



www.hinghamnetzero.org

Why EVs?



Average Household Carbon Emissions in Hingham is 64.4 metric tons per year, greater than national average of 48. t per year. Largest sector comes from Transportation, approx. 22 t per year. The single most effective way to reduce our transportation emissions is to switch to electric vehicles.

Source: UC Berkeley CoolClimate Network, [Average Annual Household Carbon Footprint \(2013\)](#)

Why EVs ?

- MA has set the goal to reduce our statewide carbon emissions by 80 % by 2050.
- Currently 30% of MA emissions come from transportation
- In addition to reducing carbon emissions, electric vehicles are:
 - energy efficient (2-3 times more efficient than gasoline car engines)
 - do not contribute to air pollution
 - are easy to maintain
 - fun to drive (quick response, stable and quiet)
 - are by design safe with large crumple zones
 - get some special parking access in the city

3 Types of Electric Vehicles



All Electric: has only an electric power train. Charged by external power source and deceleration energy also used to charge battery. No carbon emissions from the vehicle.



Plug-in Hybrid: has both an electric motor and a gasoline engine. The battery for the electric motor can be charged by an external power cord as well as regenerative braking. 20 or more miles of travel provided by electric engine while longer trips powered by the gas engine. No carbon emissions for local electric powered travel, therefore reduced emissions overall.



Hybrid: has an electric motor and a gasoline engine. The battery for the electric motor charged by regenerative braking. Sometimes the electric motor does all the work, sometimes the gas engine, and sometimes they work together. The result is less gasoline burned and, therefore, better fuel economy and reduced carbon emissions.

All Electrics (EV or BEV-Battery EV)

68 models available, 141-80 MPGe

- Range: 150 miles up to 300 miles per full charge
- Charging: three types of chargers
 - Level 1 -“trickle charging”- 120 v. “normal household outlet” 16-24 hrs to fully charge
 - Level 2 - 240 v. home charger 8-12 hours to fully charge
 - Level 3 - Rapid Charger- 1-2 hrs to fully charge. Available at some businesses, public parking lots and highway rest stops. Nearest located at Coastal Nissan, Norwell
 - Average cost for Level 2 Home Charger- \$1000-\$1200
 - Federal tax deduction – 30% of installation costs, up to \$1000.
 - HMLP rebate on installation of wifi enabled home charger to support off-peak hours charging - \$300
- Cost: \$30-48K for standard EVs and \$57-110K for luxury EVs
- Maintenance: Lower costs overall-no regular maintenance needed (no oil changes, no radiator fluids etc). One pedal driving results in less brake use. Needs an annual system and brake check. 100K miles warrantee on batteries.
- Rebates/Tax deductions:
 - Federal Tax deduction of \$7500 for all but Tesla and Chevrolet EVs
 - MA rebate - \$2500 for any EV with purchase price < \$50K – also applies to leased cars
 - HMLP - \$50 sign up bonus and off-peak charging credit \$5/mo. Level 1 and \$10/mo. Level 2

Kia NiroEV



Level 2 Home Charger



Commercial Charging Stations



Plug-in Hybrids (PHEV- Plug-in Hybrid EV)

76 models available, 100-48 MPGe electric/31-20 MPG gas

- Range: 12 to 40 miles from full battery charge, unlimited range with gas engine.
- Costs: \$25-40K for standard plug-ins, \$55-160K for luxury plug-ins
- Charging: Same as All Electrics
 - Level 1 works well for most families
 - Level 2 needed only if want to charge more than once a day for more electric miles
- Maintenance Costs: Similar to gasoline powered cars
- Rebates/ Tax deductions:
 - Federal tax deduction – \$2500 -\$7500 depending on battery size (more for larger batteries with greater electric range)
 - MA rebate- \$1500 for any car with purchase price < \$50K – also applies to leased cars
 - HMLP- \$50 sign up award for off-peak charging, \$5/mo credit for Level 1 charging

Examples of Large Plug-in Hybrids

Chrysler Pacifica minivan

Range Rover SUV



Hybrids

140 models available, 58-30 MPG

- Range: Similar to gas engine cars but are more fuel efficient, due to energy captured in regenerative braking and used to power the car.
- Costs: \$22-36K for standard hybrids and \$42-97K for luxury hybrids
- Maintenance: Similar to gas engine cars
- Rebates: No current Federal or State rebates

Should I get an EV?

- What type of driving do you do, local or long distance? Range? Size of car needed for family? For Transfer Station trips? Other hauling?
- Two car families: would having one EV and one plug-in Hybrid or other car with longer range work for your family? Local trips powered by lower carbon electricity, longer trips by gas engine, overall increased efficiency and some carbon reduction
- Availability of charging: Home charger? Workplace charger?
- Costs: Moderate to High end price?
- Rebates on purchase price, on installation of charging station costs as noted above

To learn more about EVs, PHEVs and Hybrids

- To learn about specific models of All Electric or Plug-in Hybrids:
 - <https://www.myev.com/>
 - <https://insideevs.com/reviews/344001/compare-evs/>
 - <https://www.caranddriver.com/features/g15377500/plug-in-hybrid-car-suv-vehicles/?slide=12>
 - <https://www.edmunds.com/electric-car/articles/best-electric-cars/>
- Considerations and Issues with EV's & PHEV's by US Alternative Energy Department:
 - https://afdc.energy.gov/fuels/electricity_benefits.html
- To calculate overall costs to own an EV vs Hybrid vs Gas car over five years: <https://www.edmunds.com/tco.html>
- To compare carbon footprint for vehicles:
<http://carboncounter.com>

Questions

