Boston Complete Streets

BTD
BOSTON
TRANSPORTATION
DEPARTMENT

EVboston

Boston Complete Streets Initiative




Streets define the character of Boston's neighborhoods and are the common ground where people travel, meet and do business on a daily basis.



Complete Streets Vision

Multi-modal

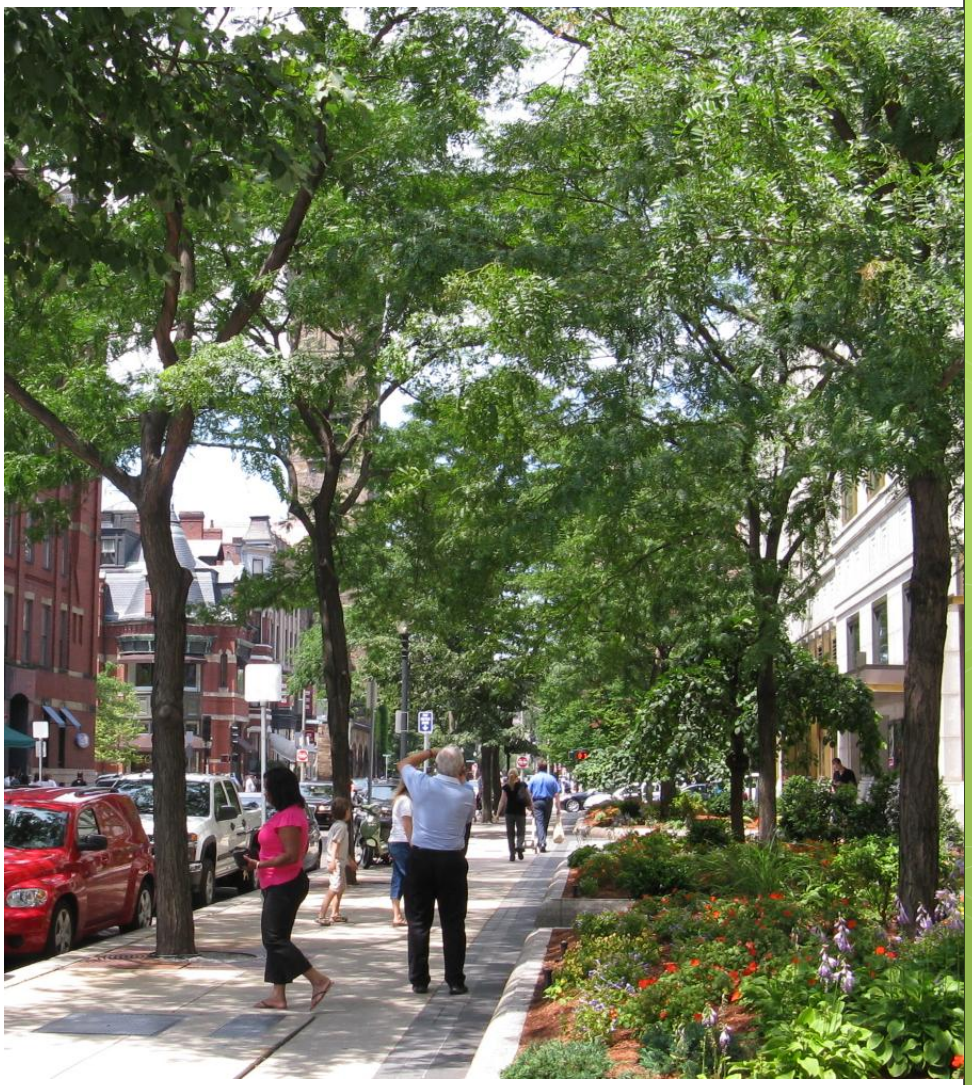
- Pedestrians
- People with Disabilities
- Bicycles
- Transit
- Motor Vehicles

Complete Streets Vision

Multi-modal

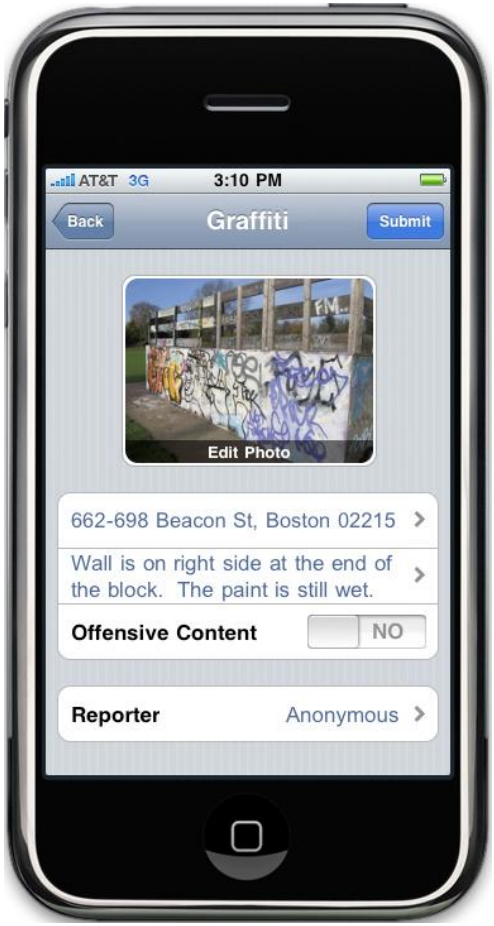
Green

- Street Trees
- Plantings
- Rain Gardens
- LED Street Lights
- Pervious Sidewalks



Complete Streets Vision

- **Multi-modal**
- **Green**
- **Smart**
  - Intelligent signals
  - Smart meters
  - EV Charging
  - Remote monitoring
  - Interactive spaces

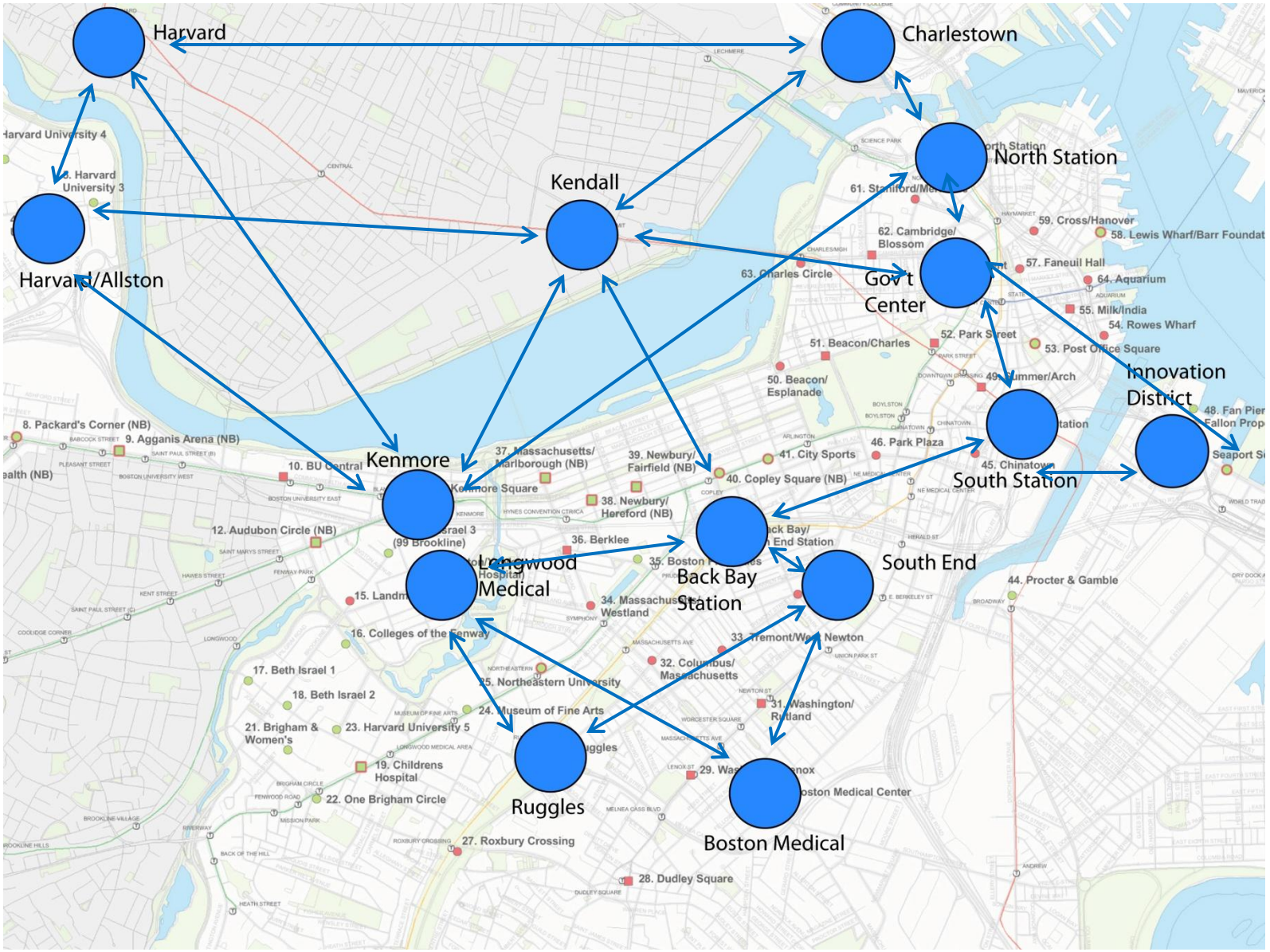


Smart Mobility: Convenience, Cost and Carbon

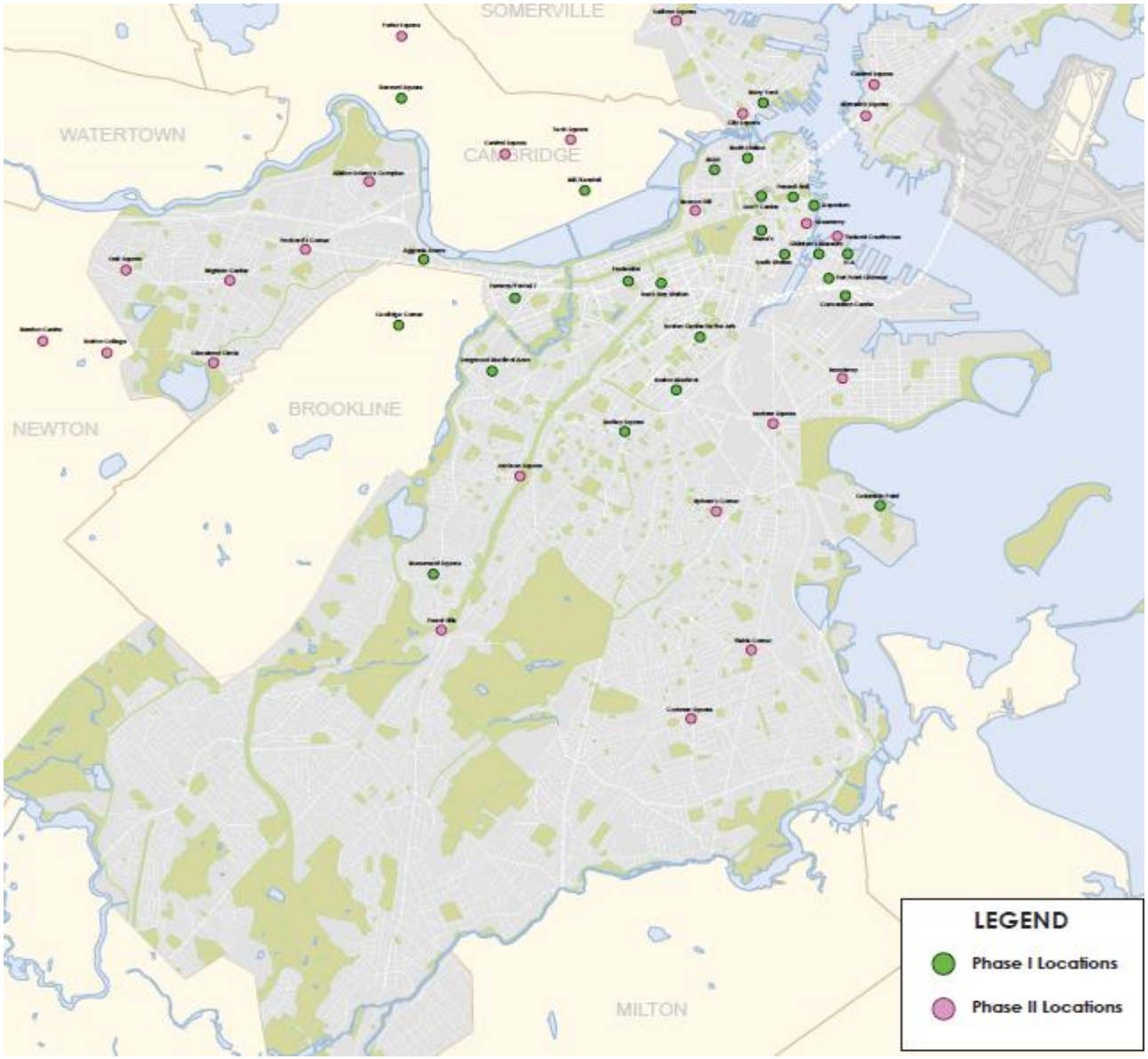
- Mobility choices and connectivity
- Smaller personal carbon footprint
- Availability of on-demand services
- Social networks + mobility info

Mobility Hubs

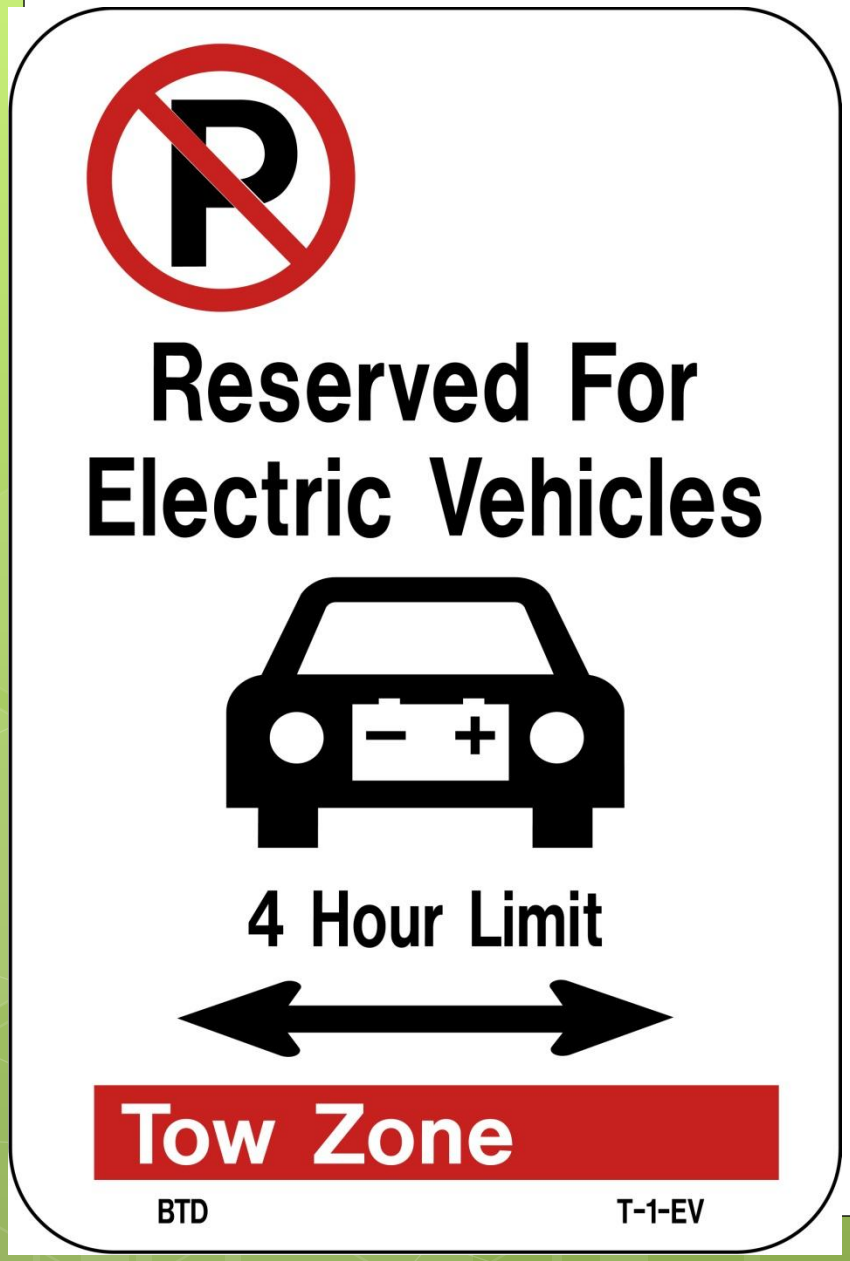
Mobility Hub Network



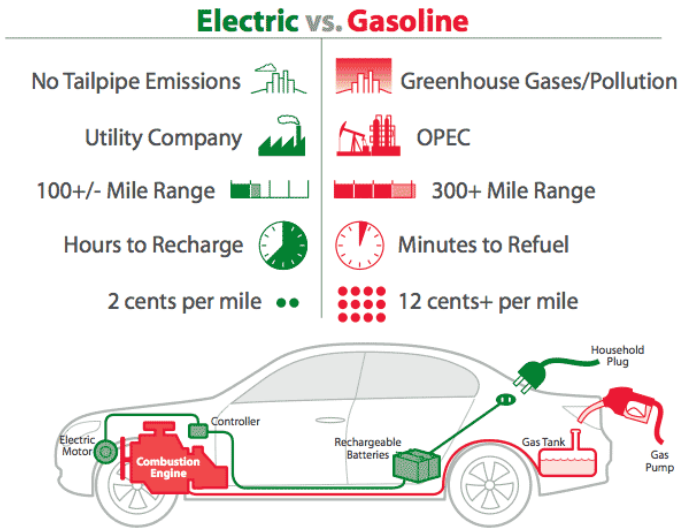
EV & Mobility Hub Locations



Electric Charging



National Habits



More than 90% of drivers drive less than 100 miles a day

- Specifically, most Americans drive **less than 40 miles/day**.
- The *DOT Household Survey* says NO significant change in American driving habits in more than 20 years.
- The average **personal** trip is **10**.06 miles.
- The average **commercial** trip is **26**.8 miles.

Plug-In Road Map | A sampling of efforts around the nation to get ready for electric cars

In August, the U.S. Department of Energy awarded Electric Transportation Engineering Corp., a charging-station maker, $100 million to deploy more than 11,000 charging stations and 4,700 Nissan Leaf vehicles in five states. Nissan is a partner in the venture.

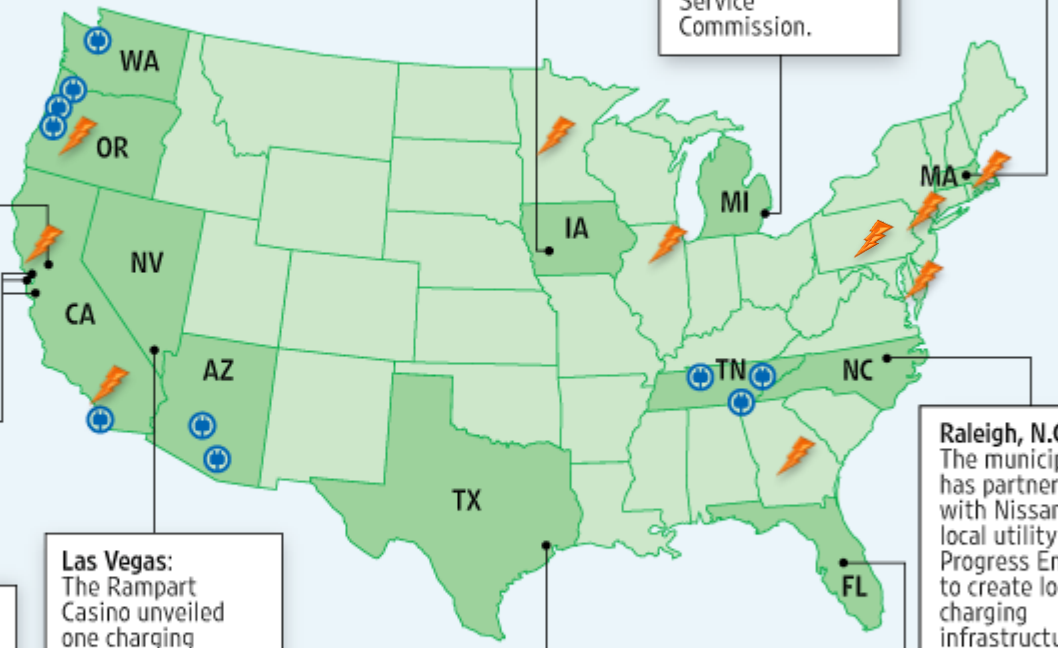
Cities that are part of the project (indicated by blue symbols): Seattle; Portland, Corvallis and Eugene, Ore.; San Diego; Phoenix and Tucson, Ariz.; and Nashville, Knoxville and Chattanooga, Tenn.

Elk Horn, Iowa, installed four public charging stations in November.

Detroit: Coulomb Technologies, a charging-station maker, said in January that it has installed six charging stations in Detroit and Ann Arbor, for a study funded by the Michigan Public Service Commission.

Massachusetts: Nissan and the state government are jointly developing plans for home, workplace and public charging.

West Sacramento, Calif., opened its first electric-vehicle charging station in August, the first of a program by retailer DMC Green Inc. to retrofit gas stations in California.



Las Vegas: The Rampart Casino unveiled one charging station in June 2009.

Raleigh, N.C.: The municipality has partnered with Nissan and local utility Progress Energy to create local charging infrastructure for electric vehicles.

San Francisco, San Jose and Oakland: The California cities are partnering with Better Place, an electric-car company that plans to launch its vehicle in 2012. The plan includes expediting permits and installation of outlets, creating employer incentives for cars to charge in the workplace, and placing 220-volt charging equipment throughout the city. In February 2009, the mayor unveiled three charging stations in front of San Francisco City Hall.

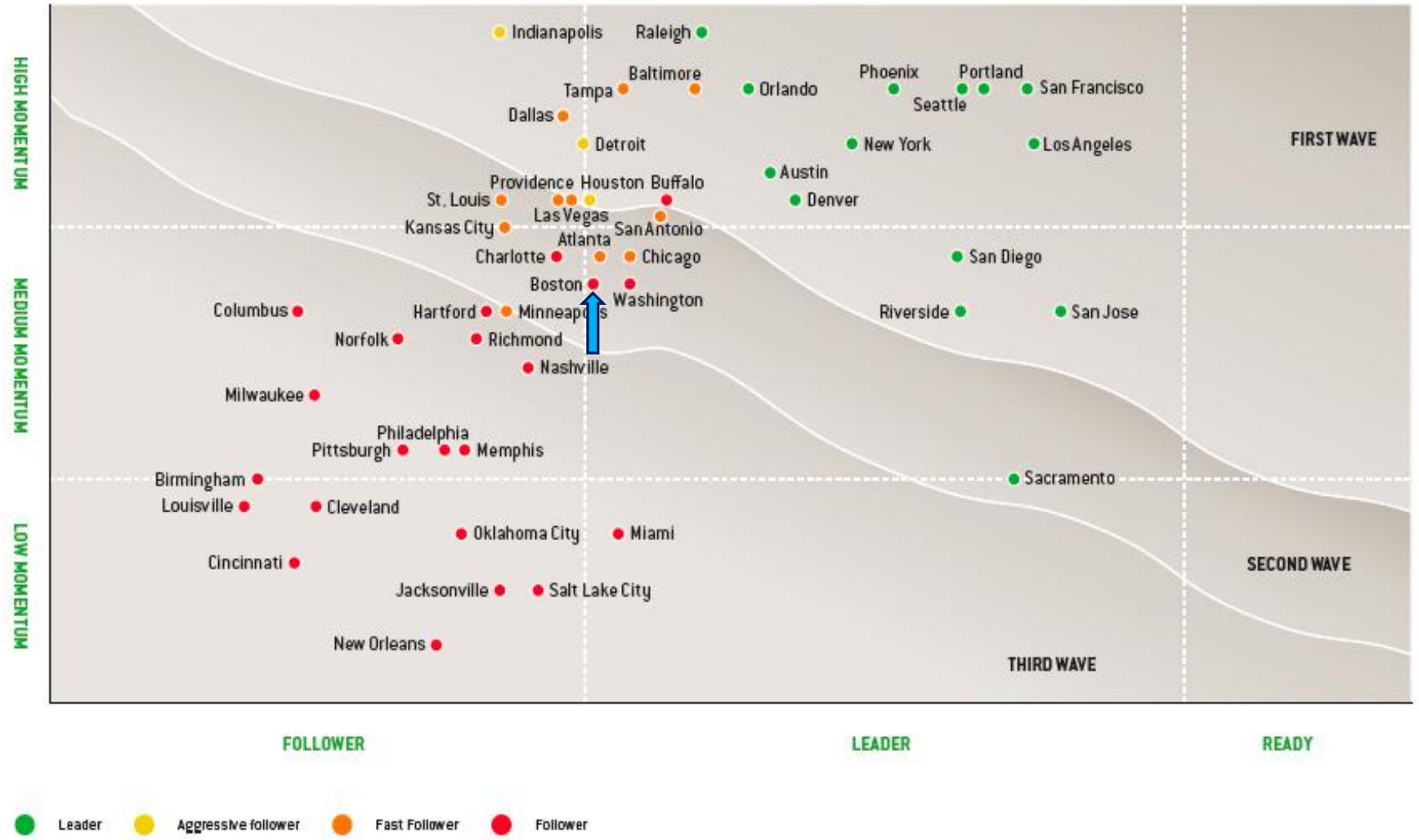
The city of Houston and Reliant Energy have partnered with Nissan to make Houston an early launch market for the Nissan Leaf. The partnership has already installed 10 charging stations—seven of them public—and envisions installing more.

Orlando, Fla.: Nissan, the city of Orlando and the Orlando Utilities Commission have agreed to promote an electric-vehicle network for both area homes and public places.

Source: WSJ reporting

" Charging Ahead, "Wall Street Journal, 5/10/10

National Momentum



Rocky Mt. Institute, fall 2010

Federal Programs

- **9** major automakers have committed to producing a total of **12** mass-market electric vehicles over the next **3** years.
- The White House has outlined a wide-ranging plan of putting **1M** by 2015.

  [**$2.4B** in federal stimulus— with **$200M** for EV deployment in FY'12]
- ARRA funds- tax credit is available for up to **30%** of purchase and installation costs of qualified electric vehicle charging infrastructure acquired in 2011

  (maximum credit of $1,000 for individuals and $30,000 for businesses)
- U.S. DOE: Chargepoint America & Ecotality programs, community-based EV infrastructure readiness planning grant (NEREV partnership)

EV Car Launch Dates

2010 Target Release

- Nissan Leaf (6k early-adopters in MA'11)
- Chevy Volt (nationwide by end of 4th qtr '11)
- Ford Transit Connect (utility van $50-60k)
- Rolls Royce Electric Phantom
- Tesla Roadster

Nissan Leaf ($33k or 25,280 w. rebate/100 mi/4-5hrs)

2011 Target Release

- Audi A1
- BMW e6
- Ford Focus
- Tesla S

Chevy Volt
(41K or $33,500k/100mi/3.5-4hrs)

Model S Tesla
($57k/245 mpc/5hrs)

2012 Target Release

- Ford Focus/Escape
- Hyundai Blue-Will
- Hyundai 10 Electric
- Toyota Prius Plug-in
- Volvo V70
- Fiat 500
- Daimler Smart ED

Electric Mini
($600 mo./100-120mi./3hrs)

***12 mass-market EVs committed by 9 major automakers in next 3 yrs…experts predict 6-8% decline in battery prices every yr. to reduce price premium barrier for customers**

Charging Stations

- **Level 1 (110-120v /20-48 hours)**

- **Level 2 (220-240v/4-8hrs)**
  - The home charging dock will require a 220/240V & 40 amp dedicated circuit connected to a breaker. The charging dock will need to be hard-wired directly to the circuit by a certified electrician.

  - Installation cost $2k (plus tax & licenses + fed tax credit 50% of cost up to $2k)

- **Level 3/ DC- Fast charging**
  (480v/ 15-30 mins)

Electric Vehicles

Benefits

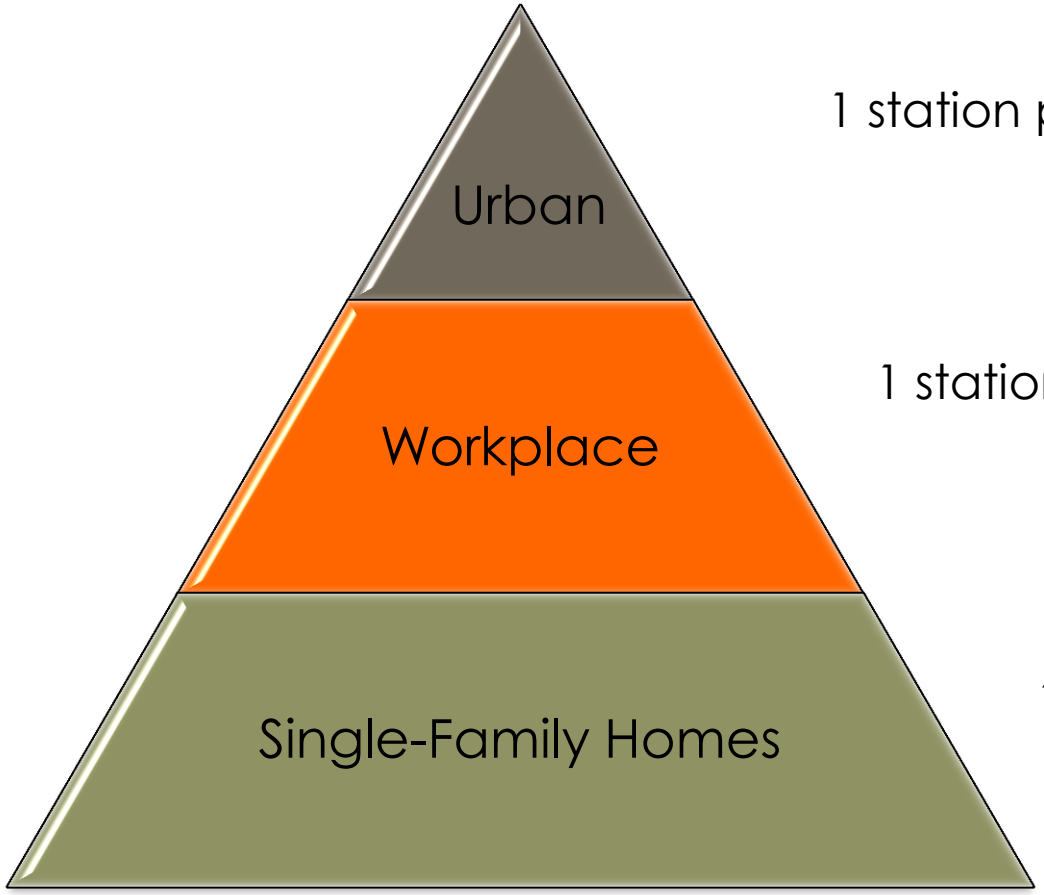
- Cost saving (fuel & maintenance)
- Reduce/eliminate CO2 emissions
- Fuel up at home
- Can provide back-up power to your house

Concerns

- Initial Costs (units & installation)
- Battery Range
- "Garage Orphans"
- Best business model for cities?
- How much to put into it now? (Public L2 may not be necessary in the LT)

Market Focus

Areas of Implementation



1 station per 10-100 vehicles

1 station per 1000+ vehicles

1 station per vehicle

EVboston

Strategy Focus:

- Education
- Partnership
- Infrastructure

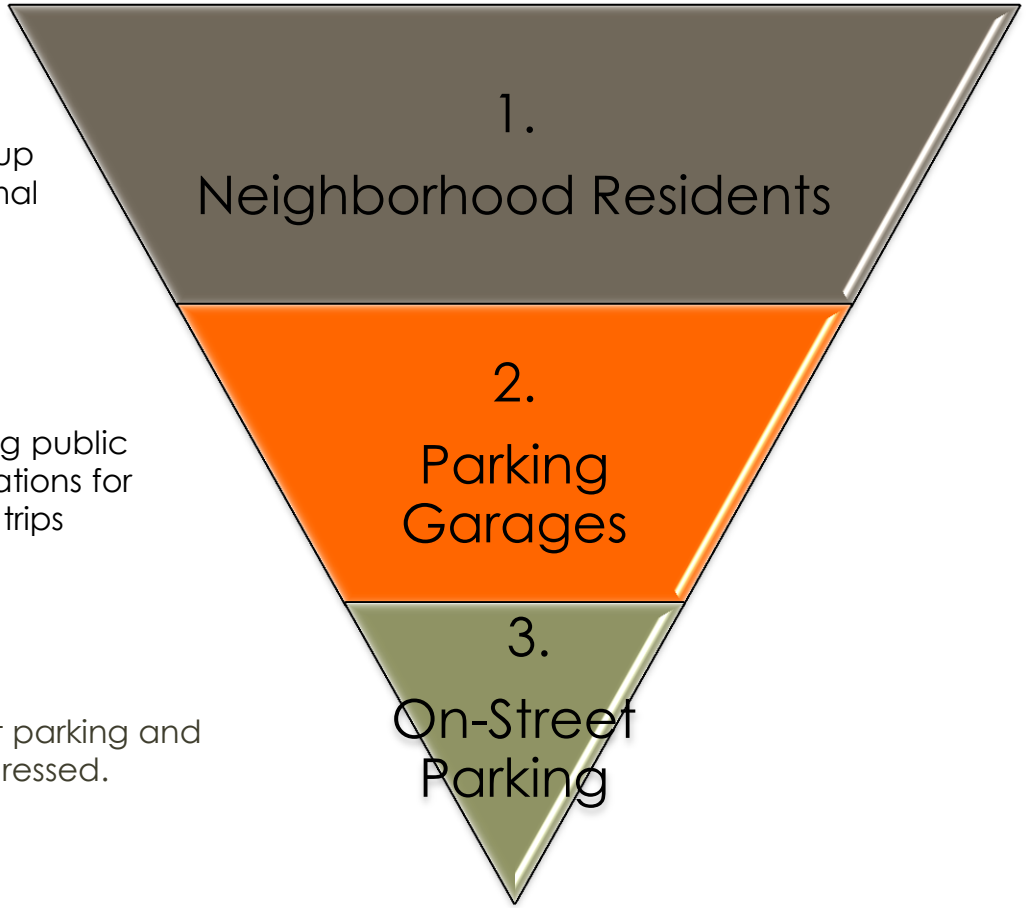
* First Priorities are *alleviating key initial issues for integration*

Focus Areas of Implementation

1. First Priorities and largest group of installation will be in personal garages.

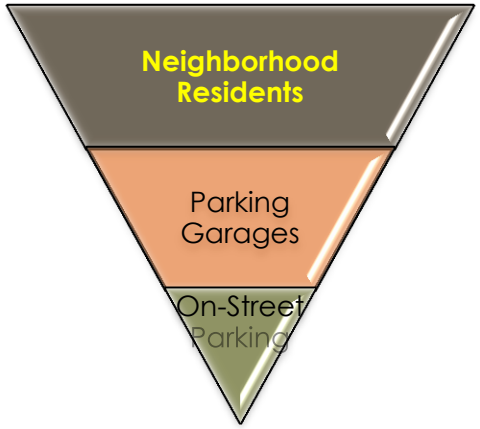
2. Second largest area of implementation. Facilitating public and private garage installations for commuting and shopping trips

3. On-street resident parking and public solutions addressed.



1. Neighborhood Residents

- Focus on helping residents or early-adopters to install charging units at home (in garages or in driveways).
- Streamlined online permitting

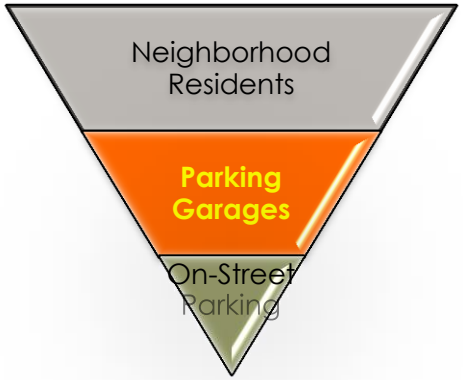


2. Parking Garages

EV/Plug-in in off-street private garage facilities

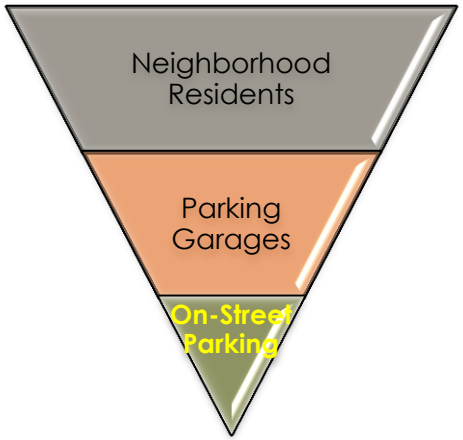
- Transportation Access Plan Agreement **(TAPA)** & Air Pollution Control Commission **(APCC)** enforcement & mitigation
- Starting with 10 different partners 42 for citywide public charging units

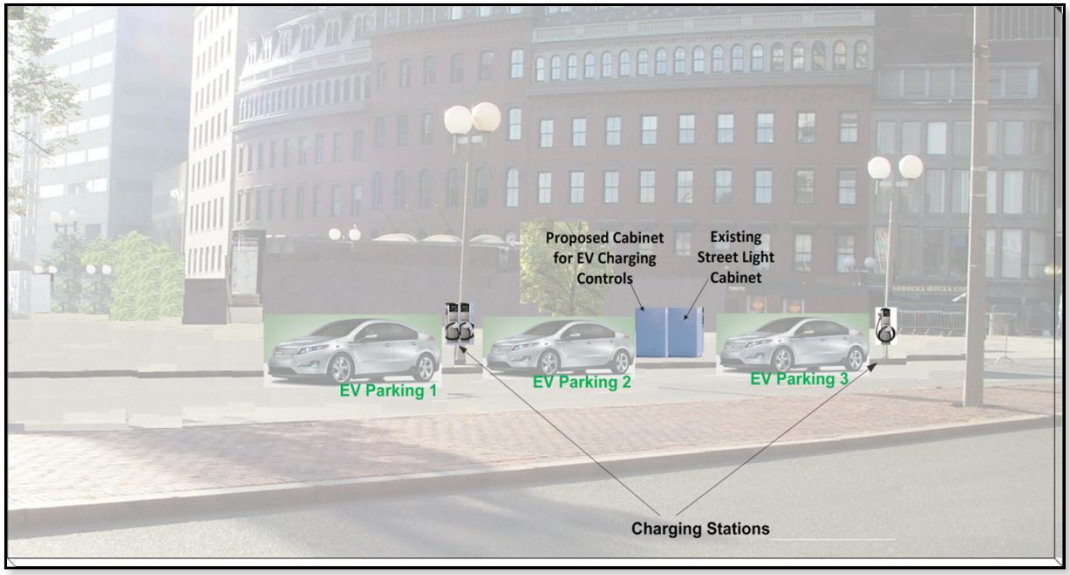
Green Park & Charge
Boston's First EV Charging & Parking Facility
150 Friend Street, Boston, MA



3. On-Street Parking

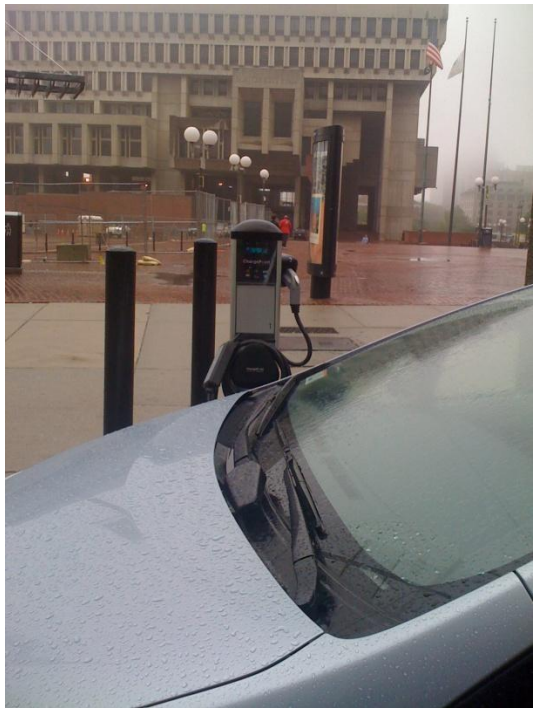
- City of Boston summer 2011 pilot
  - 3 Coulomb on-street/networked stations
- Formation of Area Consortium & Request for Proposal to follow 2012





EV Charging Pilot

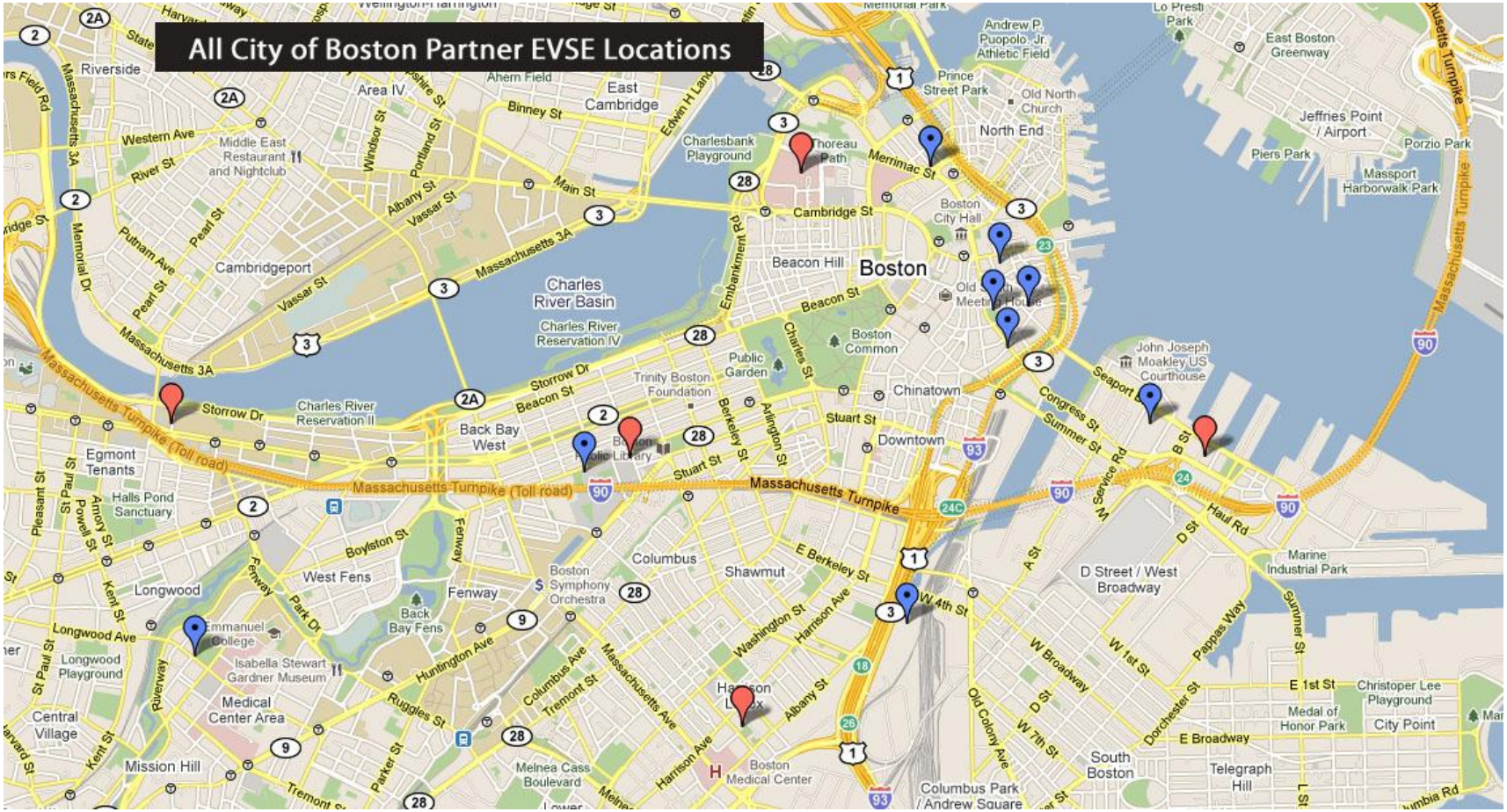
- City of Boston spring 2011 pilot - along Cambridge St.
  - 3 Coulomb on-street/networked stations
  - Free- Charging with metered parking
  - NStar smart-grid pilot integration



EVboston projects

- Northeast Regional Electric Vehicle (NEREV) partnership with New York City and Philadelphia. New group blog: http://www.sustainablecitiesinstitute.org/ev
  - DOE Outreach/ Planning Grant
- EV Vendor fair and forum
- DOER Green Community Grant Recipient
- Public screening of the documentary, "Who Killed the Electric Car?" & Revenge of EV- Cambridge, MA (fall 2011)
- "*EV*boston Consortium" of experts in the industry, equipment and vehicle manufacturers, parking facility owners and interested residents and institutions to advise the City.
- Participation in the Toyota "Plug-In" Fleet Demonstration Program
- BMW pilot test 2012
- RFP for Citywide implementation (TBD)
  - EVSE incorporated into mobility hubs in locations around city

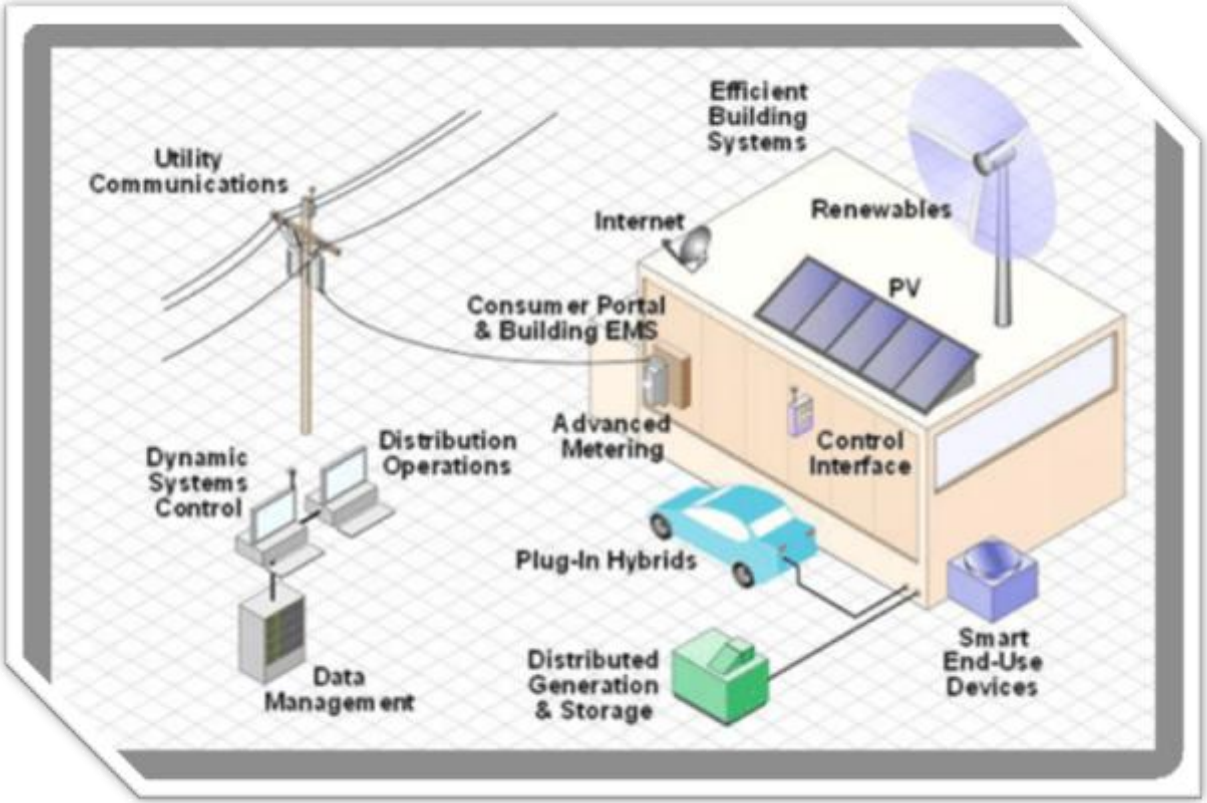
Green Communities: State EVSE Grant Partners



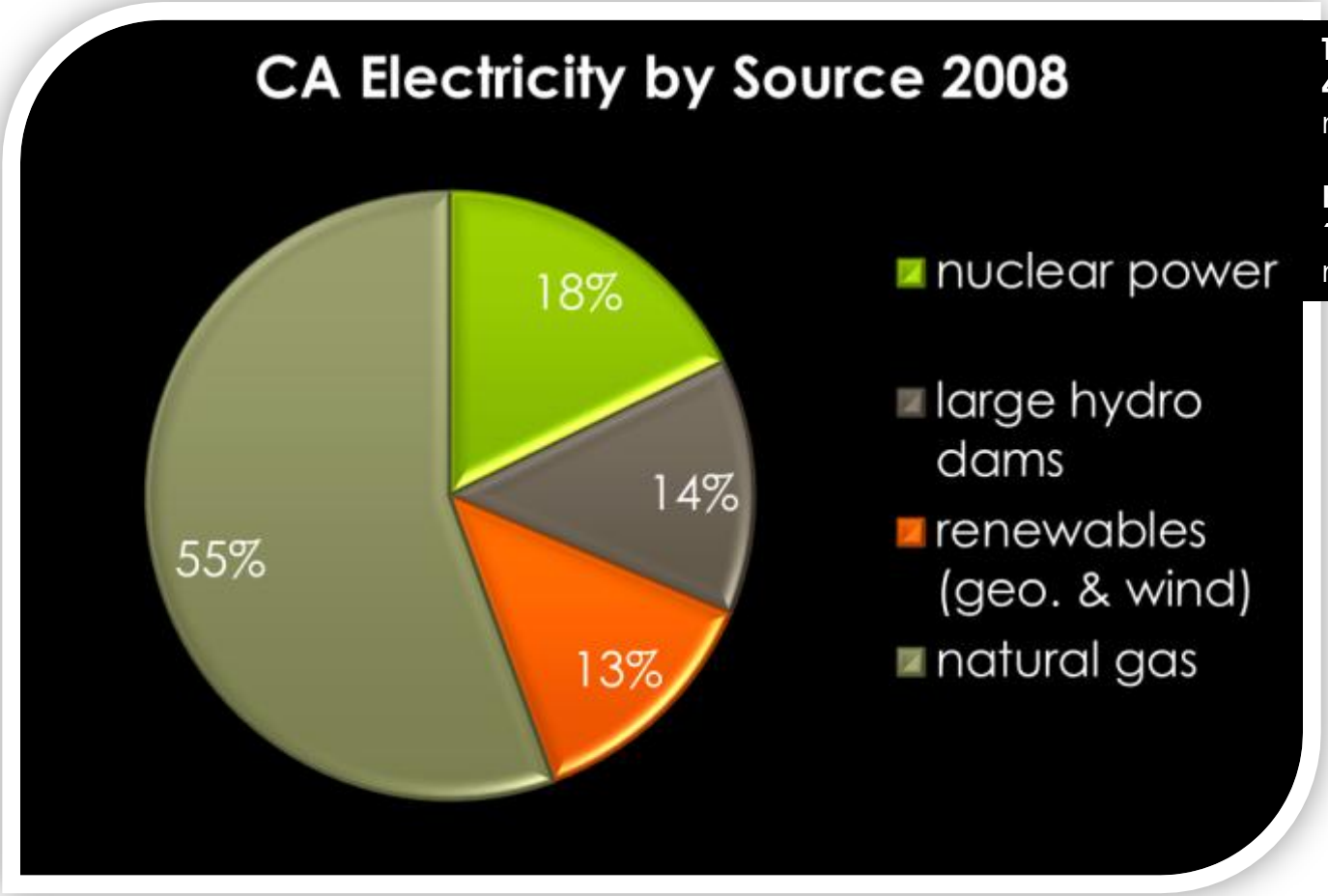
Red- expressed interest
Blue- confirmed applicant

Smart Grid

Cars are only as green as the power grid that supplies their energy!



Comparison by State

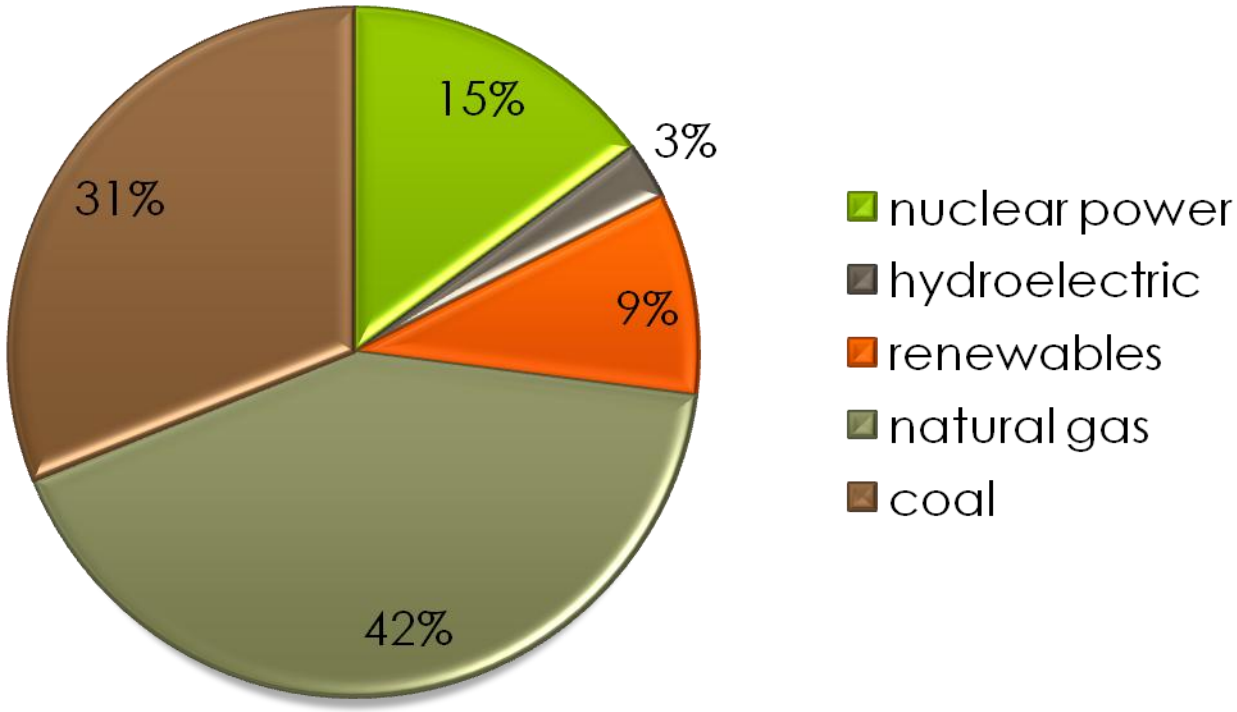


Typical car: **465**g/CO2 per mile

EV on CA grid: **142**g/CO2 per mile

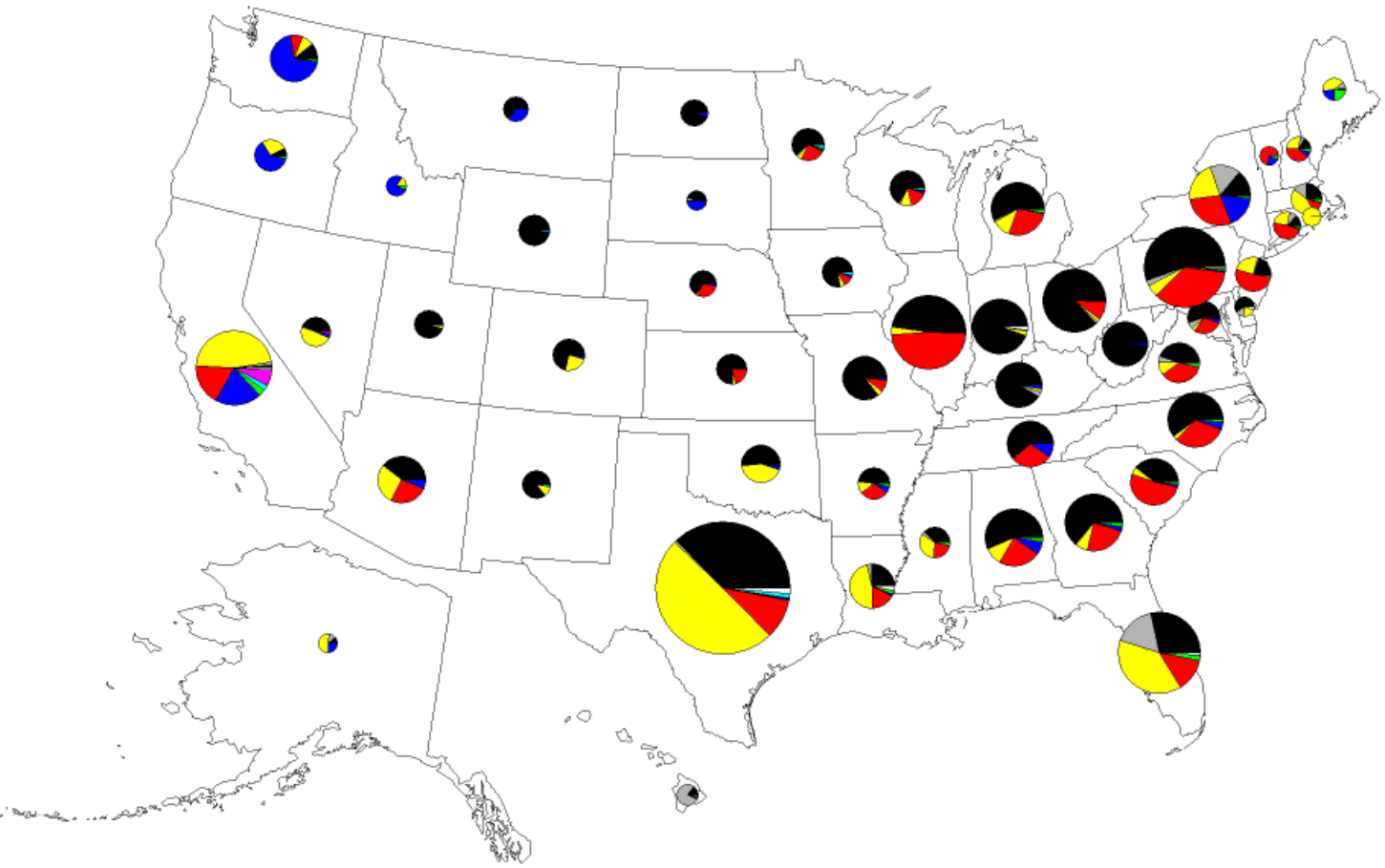
Comparison by State

MA Electricity by Source 2005



- Massachusetts stands to gain a net benefit of $379 per ton of the reduction of Electric Utility Efficiency Programs.
- **Over 90% of our electricity is generated from fossil fuel and nuclear power** resources, causing significant harm to both the environment and public health

National Generation by Fuel Type



eGRID2007 Year 2005 Generation (MWh)

- Coal
- Oil
- Gas
- Nuclear
- Hydro
- Biomass
- Wind
- Geothermal
- Other fossil and other unknown/purchased fuel

Note: Solar generation in AZ and CA are to small (<1%) to be seen in this representation.

226,000 199,000,000 397,000,000

Source: eGRID2007 Version 1.1 Year 2005 data, www.epa.gov/egrid (created September 2008).

Long-term Steps

- Regional & Boston area consortiums
- Communicate with utility companies for funding options
- Develop partnerships with area businesses for state funding
- Post-pilot area early phase implementation plan based on demand, partnerships, charging units
- Smart Grid devices
- Continue to promote other personal transit alternatives such as:
  - public transport,
  - biking,
  - walking,
  - car pooling,
  - car sharing

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