

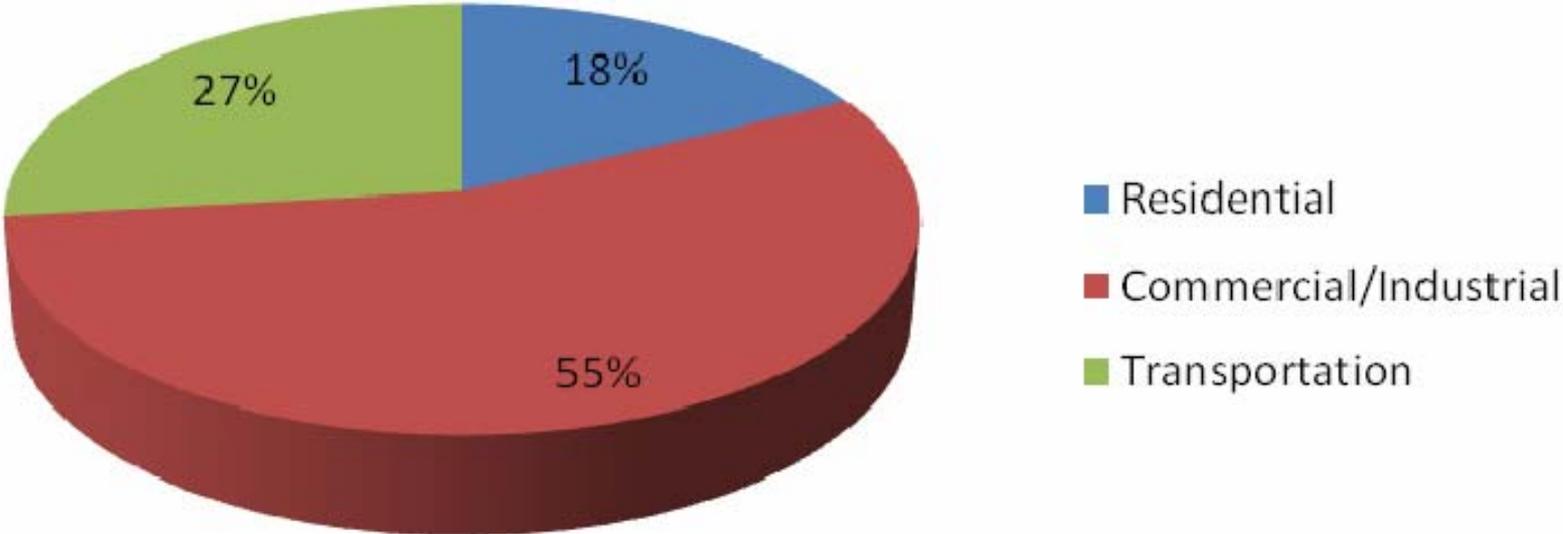
# Reducing Greenhouse Gas Emissions in Boston

Community Workshops

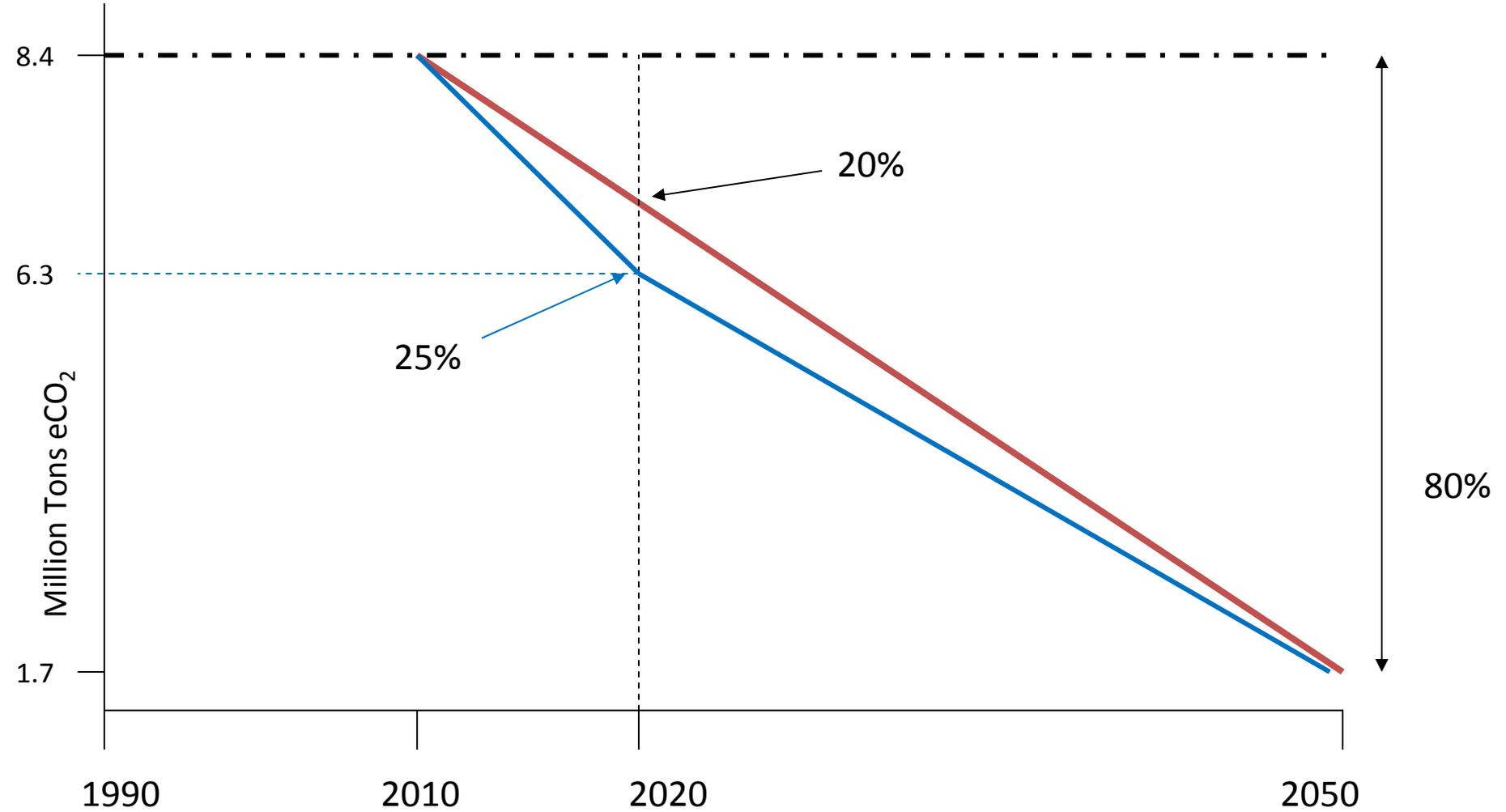
Dr. Jonathan Raab

Raab Associates, Ltd. and MIT

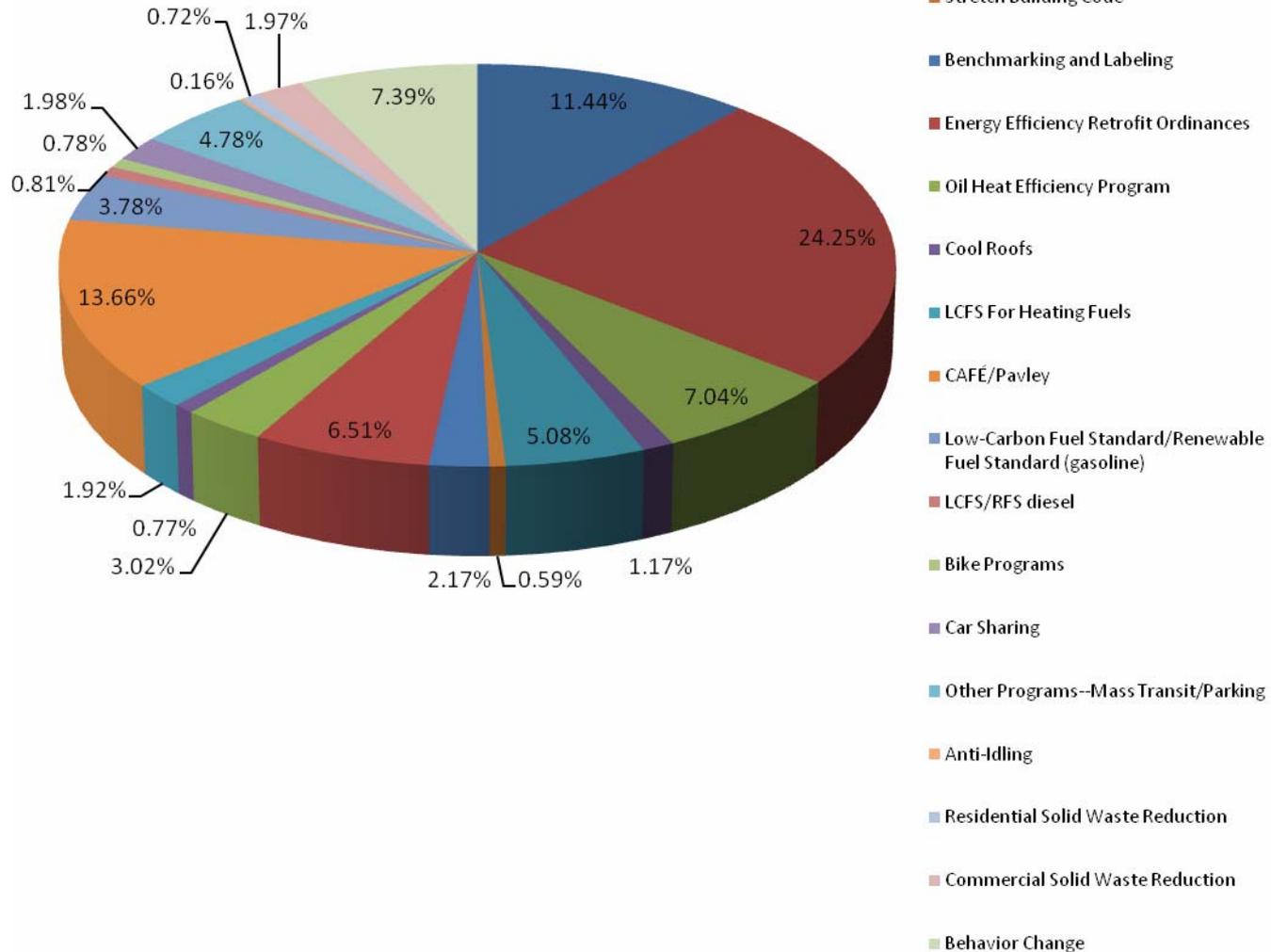
# Boston 2008 GHG Inventory



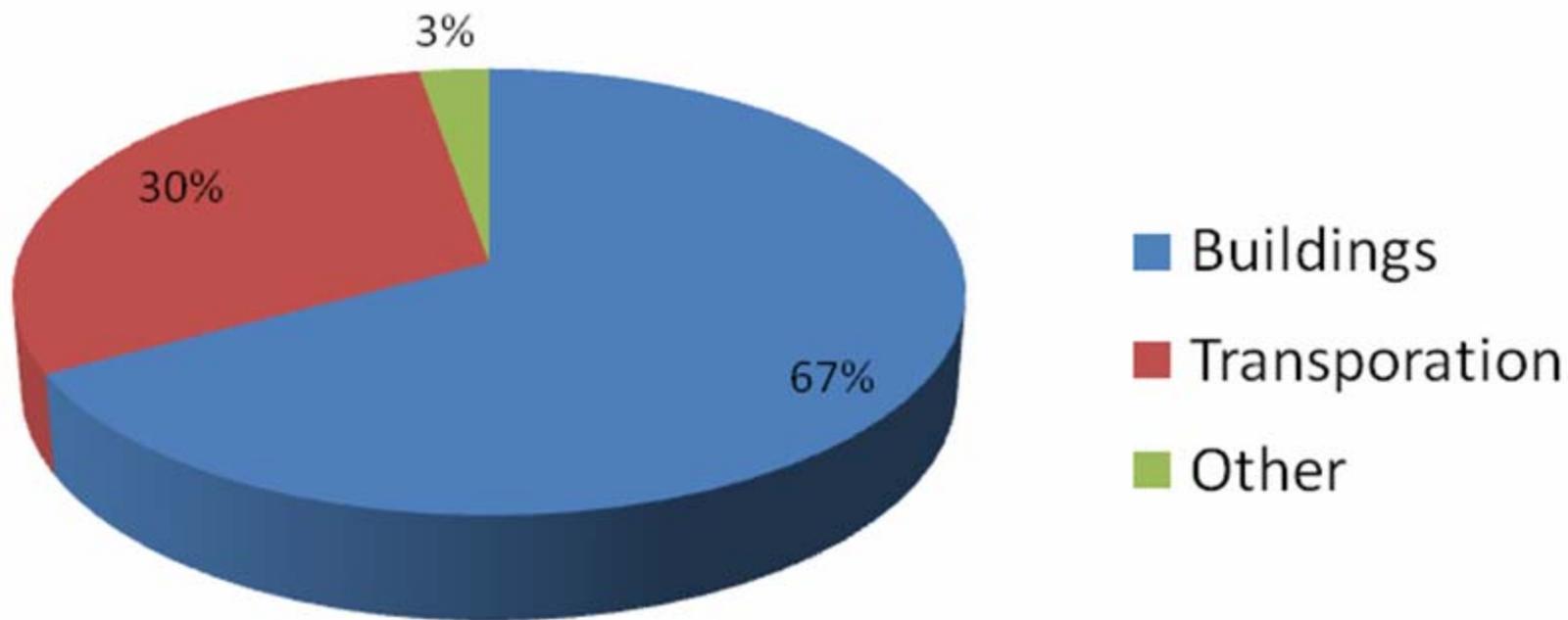
# Reducing GHG in Boston 2010-2050



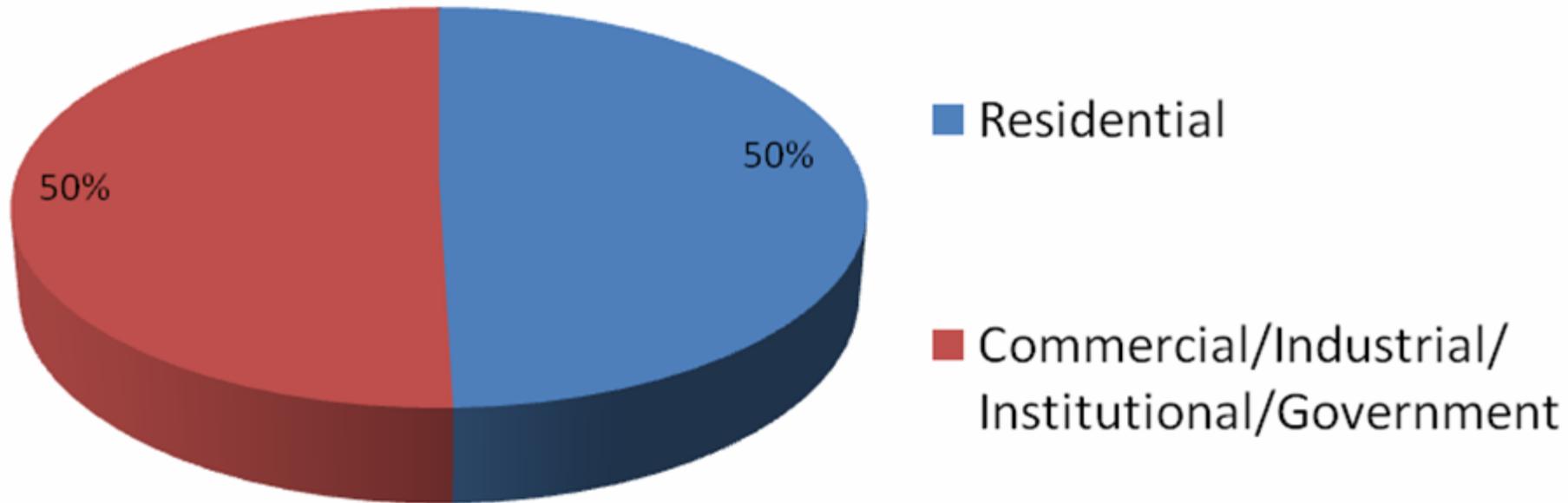
# Boston 2020 GHG Savings by Individual Programs



# Boston 2020 GHG Savings by Primary Program Area



# Boston 2020 GHG Savings by Sector



# Climate Mitigation Policies and Programs for Boston - Residential Buildings

Building Codes/Stretch Code (M/B)  
LEED Requirements (B)

“Cool” Roofs (B)

Solar Boston (B)  
Renewable SBC (M)

Utility Efficiency Programs /Renew Boston (M/B)  
Oil Efficiency Program (B)

**Key:**  
F - Federal  
R - Regional  
M - MA  
B - Boston

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**Color Key**  
Existing  
Modify/Expand  
New/Proposed

Appliance Standards (F/M)

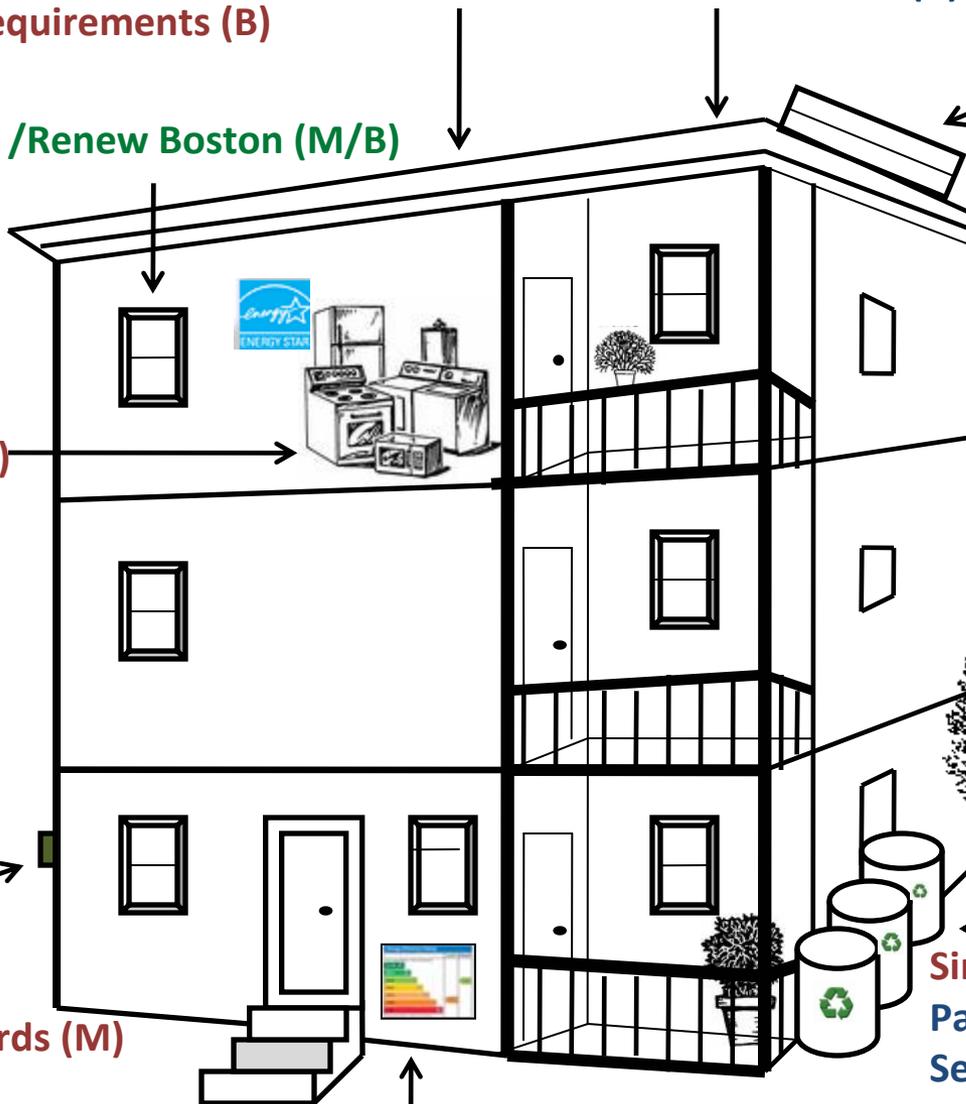
Green Lease (B)



Renewable Portfolio Standards (M)

Energy Rating & Labeling (B)  
Residential Energy Conservation Ordinance (B)

Single Stream Recycling (B)  
Pay As You Throw (B)  
Separate Food Waste (B)



# Home Energy Efficiency Programs

- Utility (electric and gas) Energy Efficiency Programs and Renew Boston
  - Up to \$80 million/year for Boston residents and businesses by 2012
  - Renew Boston help citizens participate in these programs
- Oil/Propane Energy Efficiency Program
  - Seek funds to expand utility programs to cover homes heated by these fuels

# Home Energy Efficiency Standards

- Building Codes and Standards
  - Adopt the “stretch” energy code
  - Require LEED standards for new housing developments
  - Require “cool roofs” --reflective, light-colored roofs or vegetative roofs on new construction and roof replacement
- Home Energy Labeling
  - Require all housing have an energy audit, rating, and energy label
- Residential Energy Conservation Ordinance
  - By 2015, require all owner-occupied and rental housing install basic energy efficiency measures before sale

# Example EU Building Energy Certificate

Energy Efficiency Rating		
	Current	Potential
Very energy efficient - lower running costs		
(92-100) <b>A</b>		
(81-91) <b>B</b>		
(69-80) <b>C</b>		73
(55-68) <b>D</b>		
(39-54) <b>E</b>	37	
(21-38) <b>F</b>		
(1-20) <b>G</b>		
Not energy efficient - higher running costs		

# Renewable Energy

- Renewable Portfolio Standard (RPS)
  - MA requires that 15% of all electricity must come from new renewable energy resources (wind, solar, biomass) by 2020
- Renewable Energy Installations in Boston
  - Funds available for solar installations
  - Renew Boston/Solar Boston guidance

# Solid Waste and Recycling

- Single Stream Recycling
  - All recyclables can now be placed in a single container, separate from trash in Boston
- Food Waste
  - Require that food waste be put in a separate bin so that it can be composted by the City
- Pay-As-You-Throw
  - Charge for each bag or container of trash thrown out (recyclables and food waste would be free)

# Climate Mitigation Policies and Programs for Boston - Personal Automobile

**Car Sharing Program (B)**  
**Ride Sharing Program (B)**



**Parking Permit Program (B)**

**Low-Carbon Fuels**  
**Renewable Fuel Standard (F)**  
**Low Carbon Fuel Standard (R)**

**Efficient Cars:**  
**Café Standards (F)**  
**CA GHG Standards (M)**



**Anti-Idling Law (M)**

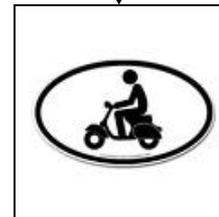
**Promote Alternative Transportation Modes**



**Biking**



**Walking**



**Other Modes**



**Mass Transit**

**Key:**

- F - Federal
- R - Regional
- M - Massachusetts
- B - Boston

**Color Key**

- Existing
- New/Proposed
- Modify/Expand

# Overall Strategy to Reduce Greenhouse Gas Emissions From Cars

- Reduce Automobile Use (Boston)
  - Promote alternative modes of travel (bikes, mass transit, walking, telecommuting)
  - Promote car sharing and ride sharing
  - Make driving more expensive/inconvenient
- Promote More Efficient Driving and Car Maintenance Practices (Boston)
- Federal and State Standards to Improve Car Efficiency
- Federal and State Standards to Reduce Carbon Content of Fuels

# Biking

- Bike Lanes
  - Accelerate installation of bike lanes (currently 10 miles of bike lanes/year)
- Bike Sharing
  - This spring City begins bike sharing program to grow to 3,000 bikes or more
- Bike Infrastructure
  - Require commercial buildings and parking lots to provide bike parking
  - Evaluate network of shower and storage facilities for commuters
  - Increase number of bike cabs

# Car Sharing

- Background: One company currently has over 18,000 members in Boston, who, on average, drive 2,500 miles/year less
- Goal: Every Boston resident should be within  $\frac{1}{4}$  mile of a shared car by 2020
- Strategy: Work with car companies and community based organizations to promote car and ride sharing

# Parking

- Residential Parking Stickers
  - Currently no charge
  - Require an annual fee for stickers
  - Additional cars = higher fees
- Parking Meters
  - Raise parking meter rates and increase hours
- Use additional revenues to promote alternative means of travel

# Behavior Changes



 Buildings       Transportation

\*Derived from T. Dietz et al. "Household actions can provide a behavioral wedge to rapidly reduce U.S. carbon emissions," PNAS, 18452-18456, November 3, 2009, [www.pnas.org/cgi/doi/10.1073/pnas.0908738106](http://www.pnas.org/cgi/doi/10.1073/pnas.0908738106)

# Boston Residential Greenhouse Gas (GHG) Saving Programs

Measures	GHG Savings in 2020
CAFÉ/State GHG Standards (F/M)	3.4%
Behavior Change (buildings/transportation) (B)	1.9%
Low Carbon Fuel Standard (transport/ heating fuels) (R/M)	1.5%
Utility Energy Efficiency (electric/gas) / Renew Boston (M/B)	1.5%
Mass Transit/Parking (B)	1.1%
Appliance Standards (F/M)	0.6%
Renewable Portfolio Standard (M)	0.5%
Car Sharing (B)	0.5%
Energy Efficiency Retrofit Ordinances (B)	0.4%
Oil Heat Efficiency Program (B)	0.4%
Bike Programs (B)	0.2%
Residential Solid Waste Reduction (B)	0.2%
Buildings Codes and Stretch Code (M/B)	0.1%
Cool Roofs (B)	0.1%
Benchmarking and Labeling (B)	0.1%
Anti-idling (M)	0.02%
<b>Total</b>	<b>12.5%</b>

Buildings
  Transportation
  Behavior Change

Color Key
Existing
New/Proposed
Modify/Expand

Letter Key: (F) Federal, (R) Regional, (M) Massachusetts, (B) Boston

- What are your greatest concerns about climate change and Boston?
- Thinking about the proposals to reduce greenhouse gas emissions, which make the most sense for Boston?
- What else might the City do to reduce energy use and greenhouse gas emissions?