



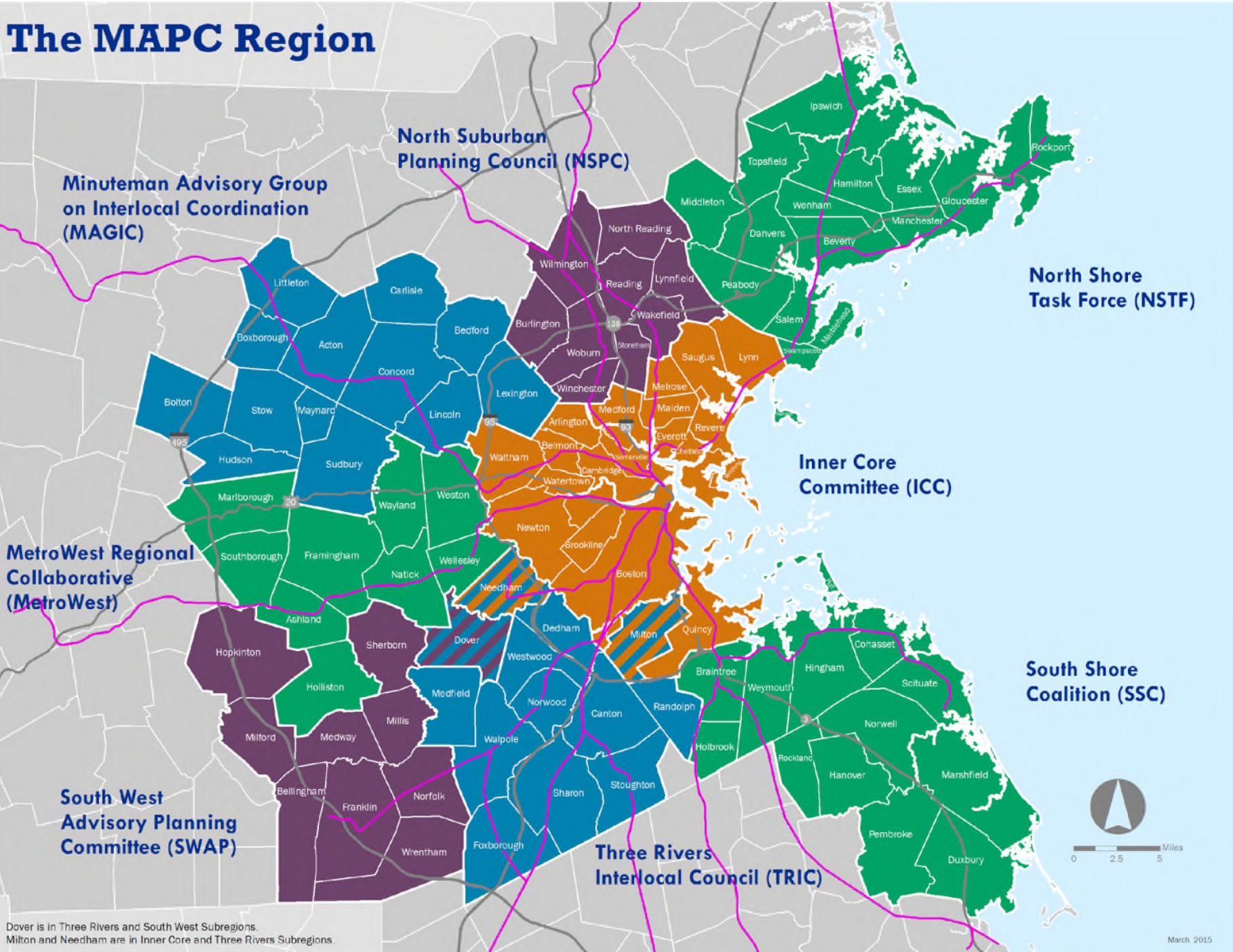
Combatting Climate Change With Clean Energy

***2018 MMA Annual Meeting & Trade Show
January 19, 2018***

**Metropolitan Area Planning Council
*Overview of Clean Energy Opportunities***

**Cammy Peterson | Director of Clean Energy | MAPPC
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The MAPC Region



101 municipalities

1,440 square miles

Nearly 3.2 million residents

1.8 million jobs (2010 Census)

Dover is in Three Rivers and South West Subregions.
Milton and Needham are in Inner Core and Three Rivers Subregions.

CLEAN ENERGY EXPERTISE

1) Regional Energy Projects

- ESCO Procurement
- Municipal and Community Solar
- LED Streetlight Purchasing Program
- Solar Hot Water
- Green Municipal Aggregation
- Green Mobility Program
- Energy Resiliency

2) Climate and Energy Planning

- Connecting municipalities with incentives + plug-and-play programs
- Community energy and climate data, baselining, planning, and strategizing
- Outreach programming and education
- Net Zero Planning

3) Energy Technical Assistance

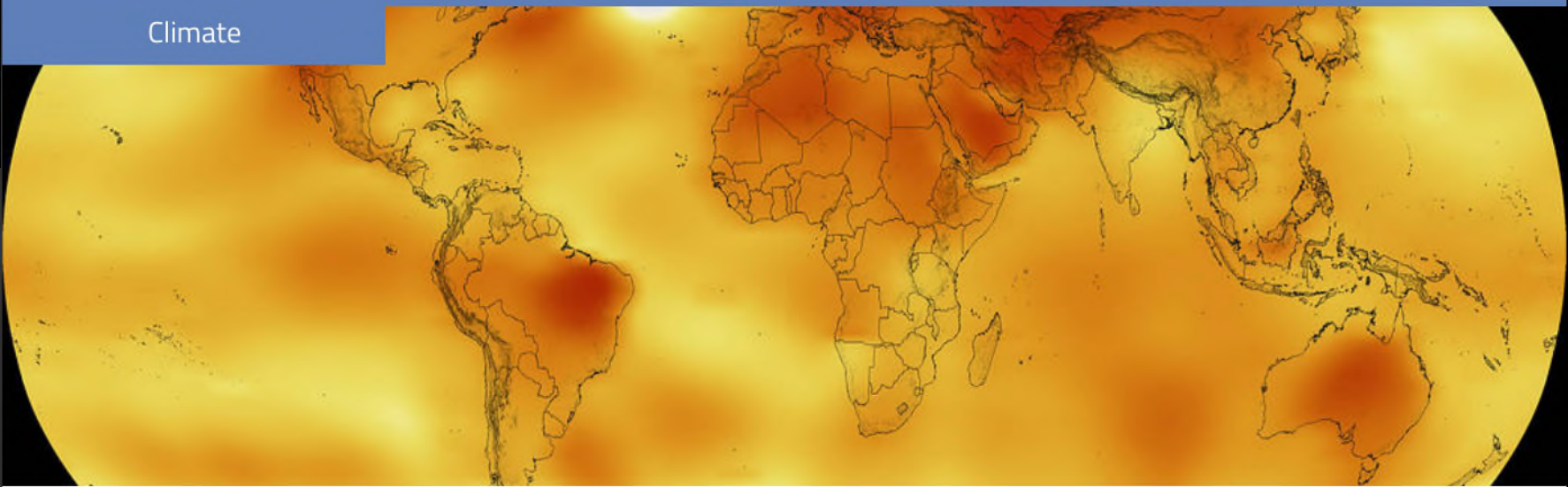
- Grant Writing
- Green Communities
- Methane Leaks
- Data Analysis
- Solar Permitting and Zoning
- State and Local Policy
- Net Zero Guidance & Education
- Peak Demand Management



Urgency of Now



Climate



Jan. 18, 2017
RELEASE 17-006

NASA, NOAA Data Show 2016 Warmest Year on Record Globally



Earth's 2016 surface temperatures were the warmest since modern recordkeeping began in 1880, according to independent analyses by NASA and the National Oceanic and Atmospheric Administration (NOAA).

Globally-averaged temperatures in 2016 were 1.78 degrees Fahrenheit (0.99 degrees Celsius) warmer than the mid-20th century mean. This makes 2016 the third year in a row to set a new record for global average surface temperatures.

Cities and Towns as Climate Leaders



Politics & Government

Somerville Pledges Support Of Paris Accord After Trump Withdrawal

Despite the president withdrawing from the international agreement, "Somerville is still in."

By Alex Newman (Patch Staff) - Updated June 2, 2017 3:03 pm ET



Mayor Marty Walsh 
@marty_walsh



.@realDonaldTrump says that the U.S. is pulling out of the #ParisAccord. He better check his geography because Boston will do no such thing.

3:46 PM - Jun 1, 2017

1,010 replies 13,019 retweets 35,658 likes

Metro Mayors reaffirm commitment to Paris Climate Accord

Updated Jun 27, 2017 at 4:33 PM



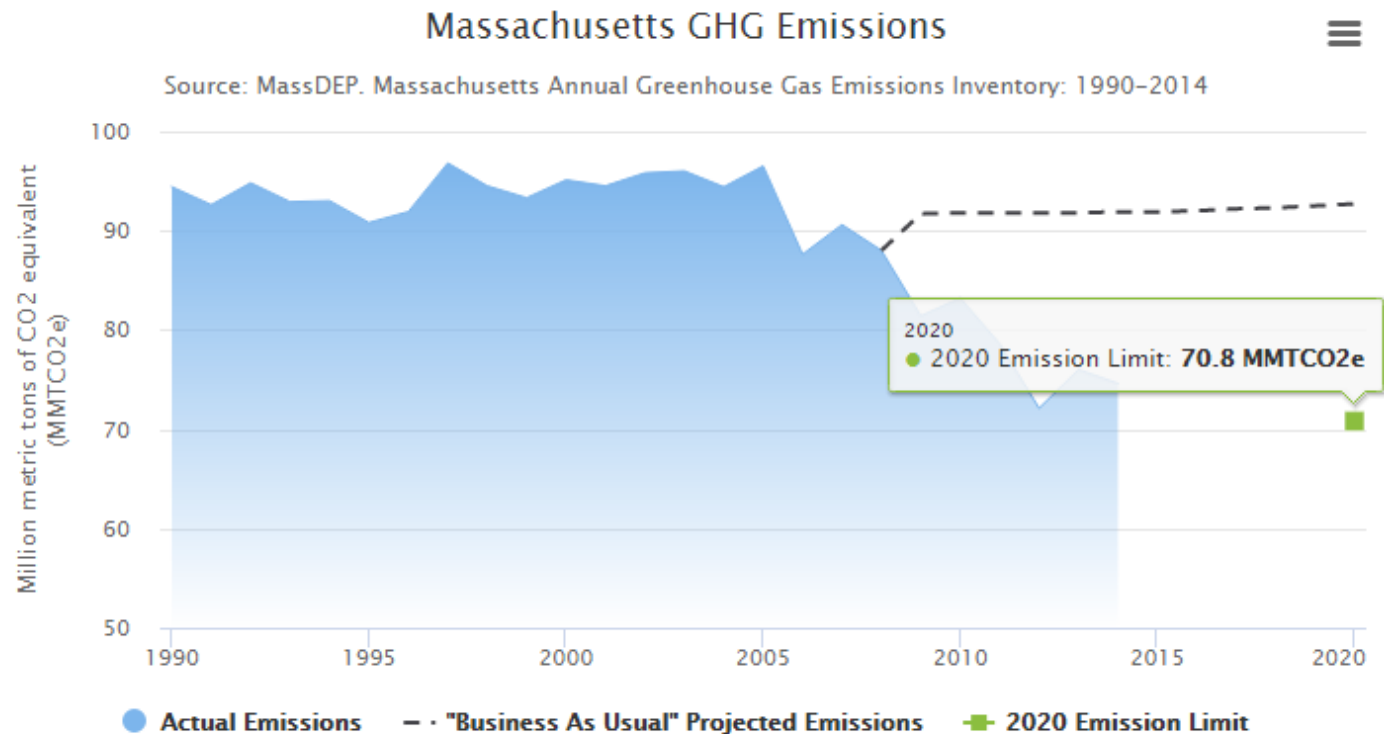
ZERO to **101**

Bringing Net Zero to 101 Cities and Towns and Beyond

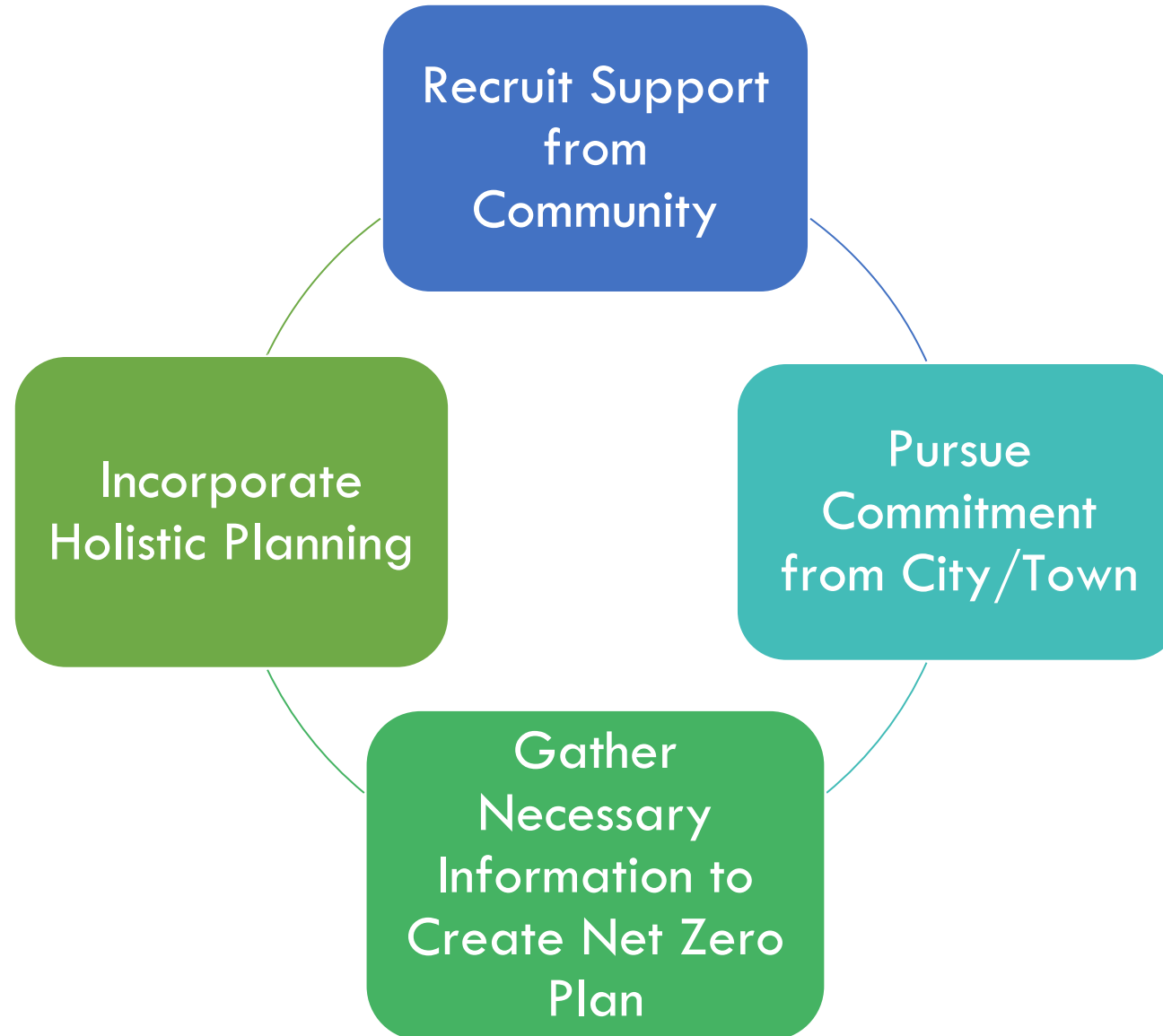
Net Zero as a Framework for Holistic Climate Planning

Multi-Benefit Outcomes

- Energy
- Economic
- Environmental
- Public Health
- Equity
- Livability

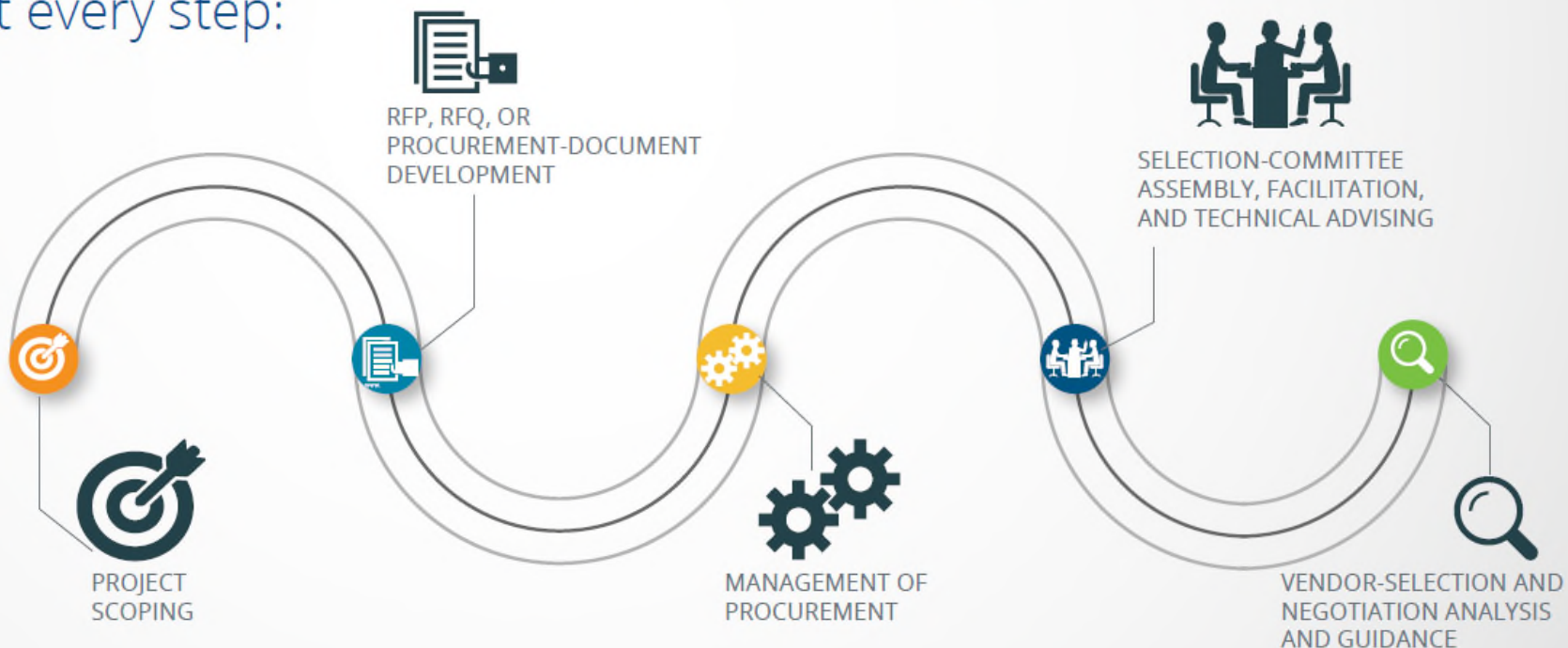


Net Zero Planning: The Process



GROUP PURCHASING

We provide help — as much or as little as you need —
at every step:



And ongoing advice and support throughout the process.

LED STREETLIGHT RETROFITS

LED Streetlight Benefits

- **Reduce energy use 50%-70%**
- **More even light distribution**
- **Improved color rendering**
- **Less light pollution**
- **Longer life = lower maintenance costs**
- **HPS last 5-8 years vs. LEDs rated for > 20 years**



MAPC & Streetlight Retrofits



2013 – 2016

Provided technical and organized collective procurements to help over 30 municipalities retrofit 60,000 streetlights

2017 - Present

Currently working across Massachusetts with an additional 45 municipalities to retrofit 75,000 streetlights

Annual Savings:

- 30,000 MWh
- 12,000 MT GHGs
- \$6 Million USD

DOER Grant Funding

- Funds 30% of material and installation costs
- Reimbursement
- Applied after utility incentives subtracted
- Eligibility: A) Streetlight inventory audit within last 3 years; B) Control-ready; C) Finish by Dec 31, 2018



GREENING MUNICIPAL FLEETS

VEH102 SERVICE CATEGORIES

Service Category 1: Electric Vehicle Supply Equipment (EVSE), Hardware, Software, and Ancillary Services

Service Category 2: Idle Reduction Technologies for Heavy, Medium, and Light Duty Vehicles; and Heavy Duty Equipment

Service Category 3: After-market conversion technologies – all vehicle classes



Scituate, MA – EVIP vehicles and charging stations

OPPORTUNITY IDENTIFICATION

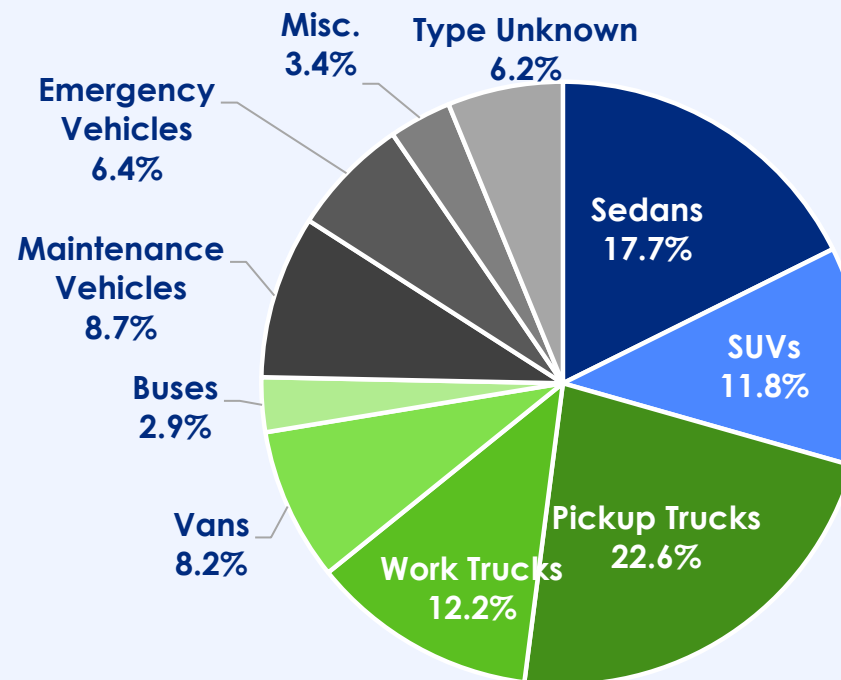
Nearly 50% of municipal fleet vehicles are



Other popular **makes** include



Green Communities - Common Vehicle Types



GREEN MUNICIPAL AGGREGATION

BRIGHT IDEA: More Local Renewables

Add at least 5% Class 1 renewable energy
above what is required by RPS

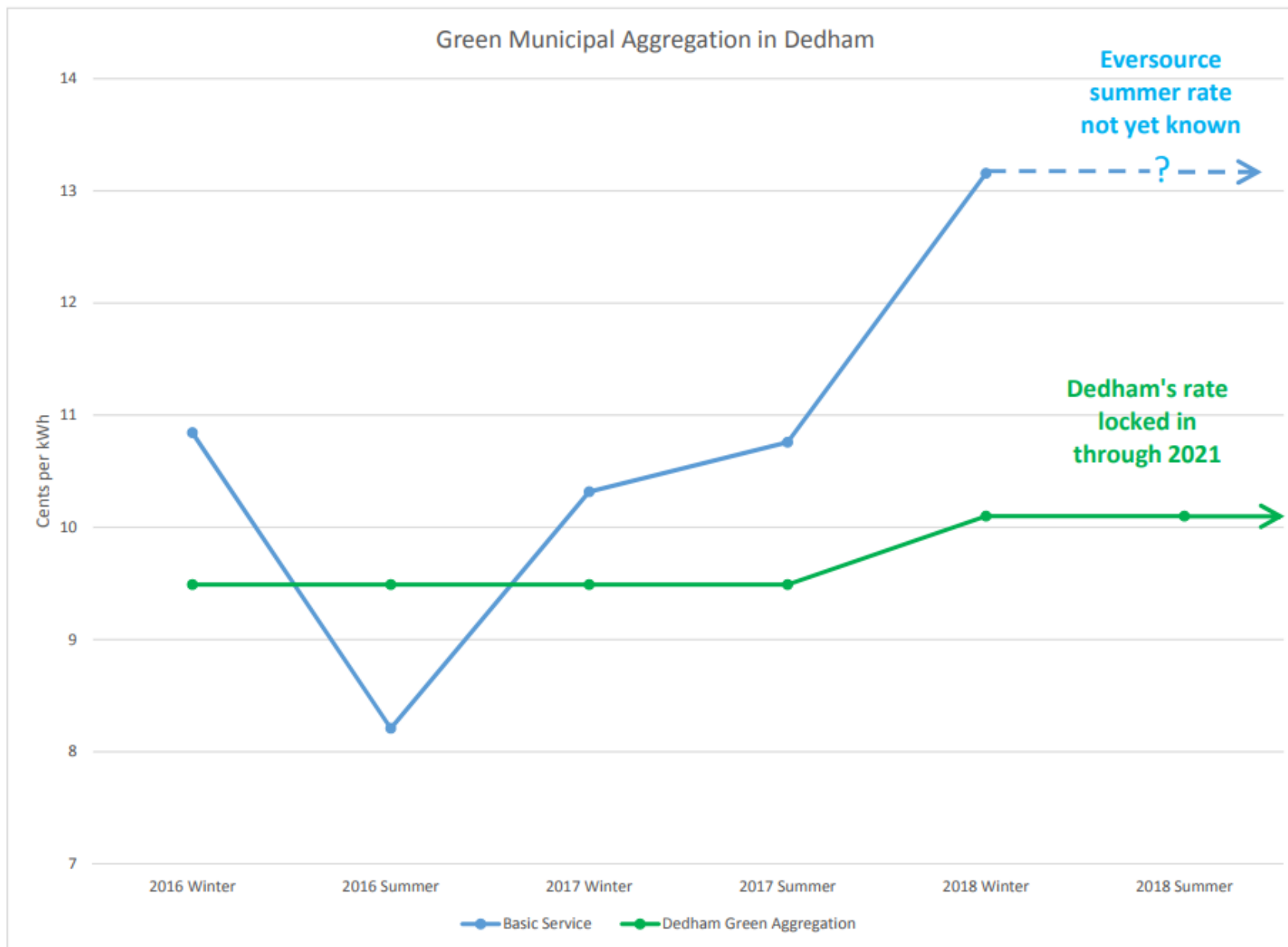
$$13\% + 5\% = 18\%$$

Your town's electricity mix could be 18% local renewables – or more.

Residential Savings Analysis for Five MAPC Communities

		2017		2018*		
		Savings/Loss	Percentage	Savings/Loss	Percentage	Total Loss/Savings
Arlington	ES	\$ 8,255	0%	\$ 1,167,017	18%	\$ 1,175,272
Brookline	ES	\$ (135,039)	-3%	\$ 1,000,787	16%	\$ 865,748
Somerville	ES	\$ 96,794	2%	\$ 1,211,363	20%	\$ 1,308,157
Sudbury	ES	\$ 1,613	0%	\$ 679,126	18%	\$ 680,739
Winchester	ES	\$ (29,841)	-1%	\$ 1,097,997	17%	\$ 1,068,156
TOTALS		\$ (58,218)		\$ 5,156,290		\$ 5,098,072

The collective impact of these new communities could result in 17 new, local 1-MW wind turbines



**NEW OPPORTUNITY:
CLEAN HEATING AND COOLING**

Heating and Cooling Technology

MassCEC Incentive



Air Source Heat Pumps, also known as mini-splits, are an efficient source of heating and cooling in cold climates like Massachusetts. Commercial-scale mini-splits and Variable Refrigerant Flow (VRF) heat pumps can reduce heating costs by over 60% compared to conventional electric heat and typically offer more efficient air conditioning.

Up to \$250,000



Ground Source Heat Pumps, the most efficient type of heat pump, use the nearly-constant temperature underground to derive energy to heat and cool a building. While the up-front costs are higher than traditional systems, they offer very low operating costs and long system lifetimes.

Up to \$250,000



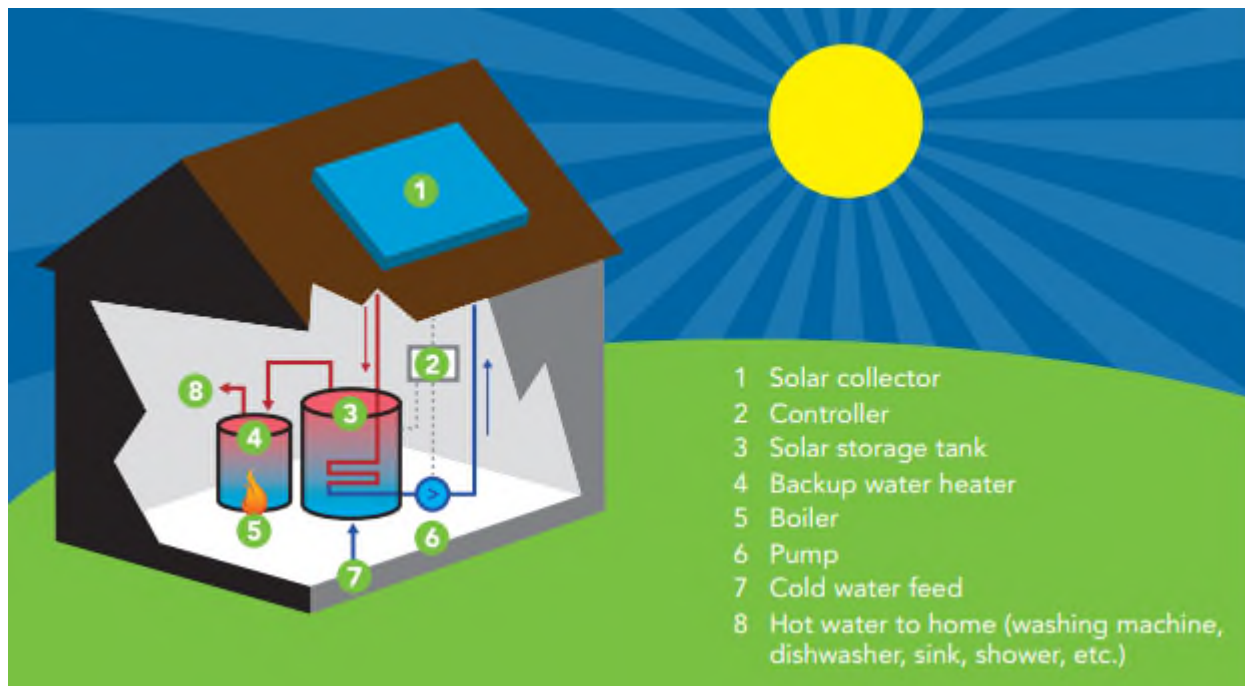
Solar Hot Water systems capture heat from sunlight to heat a water tank. The systems cut energy costs and reduce the usage of traditional water heating fuels, such as oil, electricity, or natural gas. These systems can heat water for domestic or commercial uses.

Up to \$100,000



Modern Wood Heat boilers are fully-automated and use renewable sources such as wood pellets or wood chips to produce heat, much in the same way traditional boilers and furnaces use oil, propane, or natural gas. Wood pellet and chip delivery is available in most areas of Massachusetts. Wood pellets and chips often produce the same amount of heat at a lower cost than heating with fossil fuels via electric heat, oil, or propane.

Up to \$250,000



Residential Evacuated Tube System - Boston, MA



Residential Flat Plate System – Saugus, MA





Solar hitting the Earth in one hour is enough to power the entire world for a year.



Thank You!

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