Combatting Climate Change
With Clean Energy

2018 MMA Annual Meeting & Trade Show
January 19, 2018

Metropolitan Area Planning Council
Overview of Clean Energy Opportunities

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101 municipalities
1,440 square miles
Nearly 3.2 million residents
1.8 million jobs (2010 Census)
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
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

Cities adopt the Paris Climate Agreement goals
369 Climate Mayors, representing 67.5 million Americans, commit to upholding the Paris goals

Forms & 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

Metro Mayors reaffirm commitment to Paris Climate Accord

Updated Jun 27, 2017 at 4:39 PM
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

1. Recruit Support from Community
2. Gather Necessary Information to Create Net Zero Plan
3. Incorporate Holistic Planning
4. Pursue Commitment from City/Town
GROUP PURCHASING

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

- Project Scoping
- RFP, RFQ, or Procurement Document Development
- Management of Procurement
- Selection Committee Assembly, Facilitation, and Technical Advising
- Vendor Selection and Negotiation Analysis and Guidance

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
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
**OPPORTUNITY IDENTIFICATION**

Nearly 50% of municipal fleet vehicles are **Sedans** (17.7%), **Pickup Trucks** (22.6%), **Work Trucks** (12.2%), **Vans** (8.2%), **Buses** (2.9%), **Emergency Vehicles** (6.4%), **Maintenance Vehicles** (8.7%), **Misc.** (3.4%), **Type Unknown** (6.2%), **SUVs** (11.8%), and **Green Communities** - Common Vehicle Types

Other popular **makes** include **Ford**, **Freightliner**, **Chevrolet**, **Blue Bird**, and **International**.
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

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

The collective impact of these new communities could result in 17 new, local 1-MW wind turbines.
Green Municipal Aggregation in Dedham

- Eversource summer rate not yet known
- Dedham's rate locked in through 2021

Cents per kWh


Basic Service, Dedham Green Aggregation
NEW OPPORTUNITY:
CLEAN HEATING AND COOLING
<table>
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<tr>
<th>Heating and Cooling Technology</th>
<th>MassCEC Incentive</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Air Source Heat Pumps</strong>, 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.</td>
<td>Up to $250,000</td>
</tr>
<tr>
<td><strong>Ground Source Heat Pumps</strong>, 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.</td>
<td>Up to $250,000</td>
</tr>
<tr>
<td><strong>Solar Hot Water</strong> 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.</td>
<td>Up to $100,000</td>
</tr>
<tr>
<td><strong>Modern Wood Heat</strong> 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.</td>
<td>Up to $250,000</td>
</tr>
</tbody>
</table>
1 Solar collector
2 Controller
3 Solar storage tank
4 Backup water heater
5 Boiler
6 Pump
7 Cold water feed
8 Hot water to home (washing machine, dishwasher, sink, shower, etc.)
Solar hitting the Earth in one hour is enough to power the entire world for a year.
Thank You!

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