

# Harvard's Path to Energy Efficiency & Sustainability

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(HEAC)



# Agenda Overview

- Community Roots of Energy Efficiency
  - Volunteers and local activists get involved
- Green Community Program in Harvard
  - Evolutionary steps
  - Results and Lessons Learned so far
- Cascading Benefits
  - Outgrowths of Initiatives
- Moving Onward
  - Locally Owned Solar Power Generation

# Town of Harvard: background

- Small residential community (mostly prop. tax)
  - 1500 homes, 6000 residents
  - Own school district – serves some Devens residents
  - Town Manager, Board of Selectmen, ATM
  - “Volunteer Government”, many residents serve
- Energy Use Characteristics:
  - Aging municipal building stock
  - Schools are well over 50% of energy budget
  - Energy Costs to town in 2008: \$678K
  - Many distributed utility/fuel accounts, no overview of energy as an expenditure

# Roots of Energy Advisory Committee

- “Harvard Local”
  - People gathering together to discuss environment, energy, sustainability – built awareness and knowledge through workshops and local efforts
  - Environmental/climate-related (350.org) events
- Led to local energy/sustainability initiatives:
  - Community garden
  - “Low Carbon Diet” Workshop
  - Promote energy audits & home energy savings ideas
  - Started application process for DOER “Energy Audit Program” - town buildings

# Genesis of HEAC

- Annual Town Meeting in 2008
  - Energy budget review revealed savings opportunities
  - Citizen recollection of 1970's town energy committee, BOS decided to convene
- HEAC formed with energy-savings agenda
- DOER building audit application submitted
  - Members were already involved in writing proposal
- Green Communities program was announced within our first year (2009)
  - HEAC had been reviewing expenditures and efficiency issues, managing building audits

# Green Communities Timeline

- HEAC advises pursuit of GC to BOS in Aug 2009
- Application accepted, consultant hired: Jan 2010
- Developed Strategy around 5 Requirements:
  - 20% Reduction, As-of-Right Siting for RE, Expedited Permitting, Enhanced Building Code (Stretch), Efficient Vehicle Policy
- Initial meeting with Town Officials: March 2010
  - Areas of concern: AOR Siting, Stretch Energy Code
- Forums – panel discussion, focus on Stretch
- Special Town Meeting: Oct. 2010 - voted approval
- Application Accepted: Dec. 2010
- Grant Application: Jan 2011 - approved April 2011

# Green Community: Our Approach

- Build on the work of others!
  - e.g. web site from Lexington, slides from Acton
- Answer questions with information vs. opinion
  - Stretch is complicated: is good or bad for the town?
  - Identify and Discuss pros & cons
- Identify, Involve stakeholders & constituencies
  - Realtors, Building Inspector, Builders, DOER, etc.
- Forums & Town meeting: stay on message in the midst of hype: *informed voters usually make the right choice!*



# Initial Benefits of GC Program

- 5 Year Plan: Reduce Municipal Energy by 20%
  - New view of dept. budgets – energy as line-item
  - Building Usage Policies (thermostats, power-savers)
  - More than %20 goal, > \$250K savings
  - Further reductions will require different approaches
- \$141K for energy efficiency projects:
  - Boiler Replacements
  - HVAC & Building Automation System Upgrades
  - Energy Modeling for Town Hall Retrofit
- Mass Energy Insight Database



# Initial Lessons of GC Program

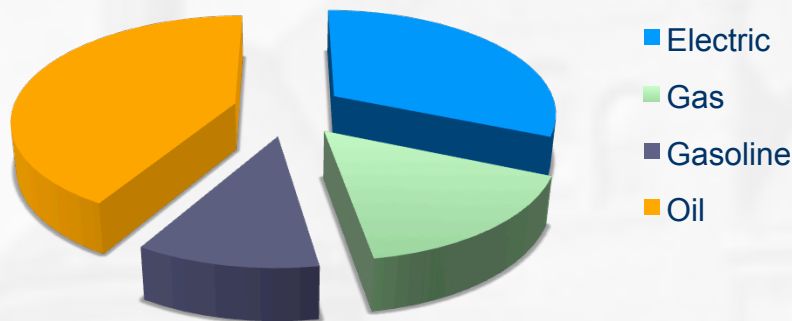
- Savings Aren't Always What They Seem
  - One year reduction of almost 20% was anomaly
  - Systems require balancing, ongoing maintenance (you're never "done")
- Entrenched Behaviors may be hard to change
  - Need buy-in from everyone involved
- Not simple to acquire and spend \$ (grants)
  - Administration, coordination, vendor tracking, etc.
- Utility Incentives – Gas & Electric, Lighting
  - Continuously changing, 3<sup>rd</sup> parties involved in quotes

# Other Lessons Learned

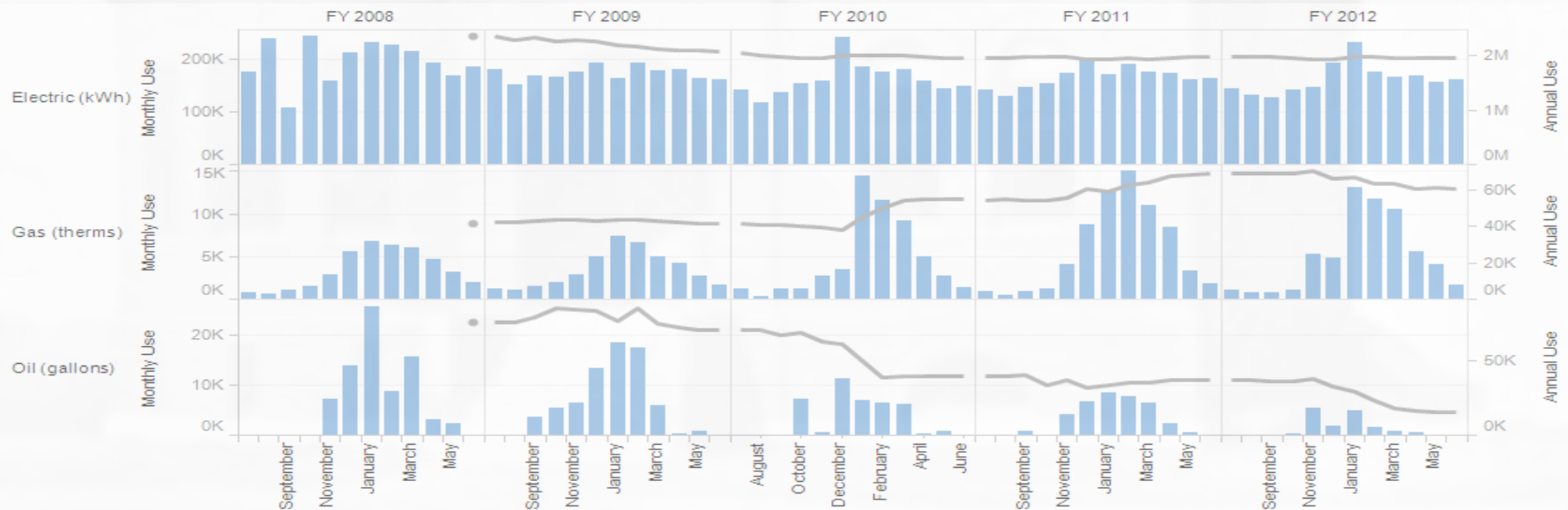
- Energy Projects for every town's list:
  - DOER Building Audits – create ECMs for each bldg
  - Maximize Utility Incentive programs
    - Lighting Upgrades (incentives ~ 40%)
    - Consider Oil->Gas Conversion (many suppliers)
  - Get (your data) into MassEnergyInsight!
  - MSBA Green Schools (new/retrofit) & Green Repair
  - Get quotes for Energy Service Co's (ESCO) & PPAs
- Then the real work begins (unless ESCO contract)
  - Measurement & control
  - Thermal Envelope Work: the next big payoff...

# Harvard's Energy Use Profile

## BTU usage 2008

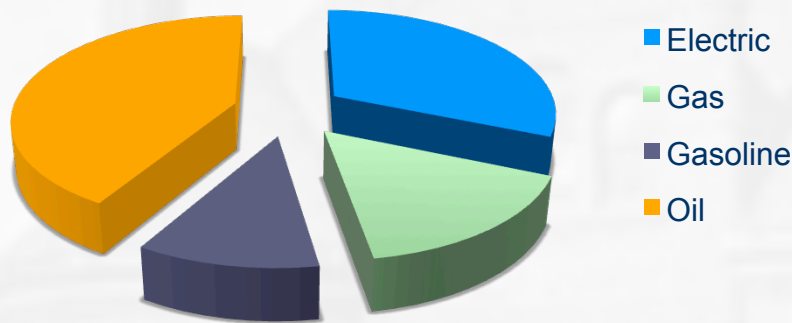


- Oil & Electricity are top
- Baseline year: 2008
- Reductions 1<sup>st</sup> two years
- Plateau: oil > gas, new HVAC
- 2012: further reductions



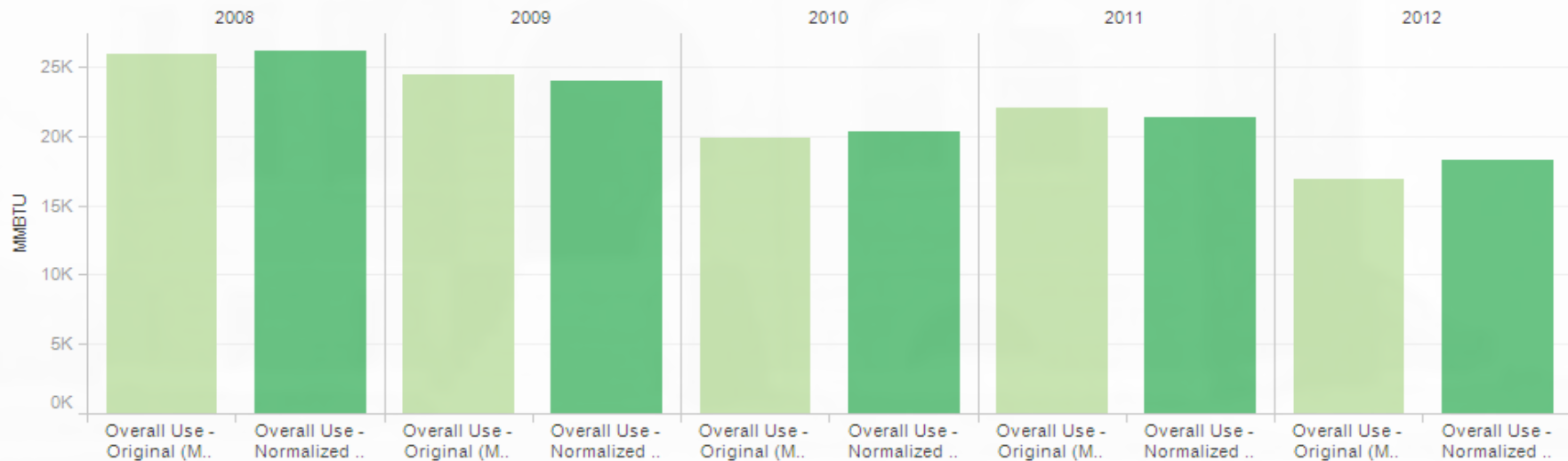
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## Baseline - Weather Normalized



# Cascading Benefits of GC status

- Cost Savings: relatively permanent reductions
  - As are new energy budgeting and usage guidelines
- Solarize Mass pilot – Harvard one of 4 selected
  - GC/CEC program = direct benefit to residents
  - significant involvement from community
- Grant funding to streamline PV Solar projects
  - Due to Solarize experience, Harvard participating
  - upgrade permitting process, zoning, interconnection
- Harvard “Solar Garden”
  - Building on both of the above, taking a step further

# Solarize Mass - Program / Challenges

- Solarize Mass
  - 3 way partnership (state, installer, community)
  - Town-wide “market” for installed pricing
  - Limited time period (May – Sept)
- Challenges
  - Outreach, education to residents (during summer)
  - Coordination with town, installer and DOER
  - Not everyone qualifies (80% capture threshold)
  - Large commitment for volunteers and Installer (NECE)

# Solarize Mass - Campaign Aspects

- Communication - regular flows of targeted info
  - Surveys, Meetings
  - Traditional (print, email) and social media (FB, etc.)
  - Web sites, Local Paper, eNewsletters, yard signs
  - Engaging with townspeople at gathering places
- Teamwork and Cooperation
  - Enthusiastic and dedicated volunteers
  - Installer: local, visible, involved, and aligned
  - State and local government participation
  - Flexibility, reassessment when necessary



# Solarize MASS - Harvard Results

- Stats

- 429 contacts directly by installer, 1000+ by vols
- 234 site visits, 151 sites qualified
- 402 kW contracted, 75 sites

- Notables

- National finalist RE World Innovative Policy category
- kW per capita of 0.088 (res) and 0.16 (all)
- \$4 per watt – lowest price for residential solar ever?
- New England Clean Energy - Small Business of year
- Worcester Business Journal

# Community-Scale Solar Solution

- Alternative for disqualified sites
  - Still qualify for Comm Solar II grants & Net Metering
- Scale: bigger is good, mega is ?
  - 60kW up to 1mW in size qualify for full Net Metering
  - Allows for in-neighborhood siting (vs. industrial zone)
- Maximum benefits to community
  - Participants get all credits after any loans paid
  - Allows for anyone in town to participate – business
  - Local jobs, local financing, no outflow of dollars

# Harvard Solar Garden – Model basis

- “Class II Net Metering Facility” (>60 kW <1 MW) provides full retail credit, including distribution
- SREC income (initially > \$500/mW, now half that)
- ARRA Section 1603 grant (30% grant paid once up)
- Commonwealth II Solar Grant (base + MA adder)
- LLC Structure - lightweight, can use tax credits & dep.
- Zoning: MA General Law 40A Section 3:

*No zoning ordinance or bylaw shall prohibit or unreasonably regulate the installation of solar energy systems or the building of structures that facilitate the collection of solar energy except where necessary to protect the public health, safety, or welfare*

# Harvard Solar Garden – Phase 1

- Phase 1
  - 250 kW, 36 residents, 3 small businesses
  - Pricing similar to Solarize Tier 4 ground mount: \$5.40/w before tax incentives, \$3.85 (or less) after
- Initially sited on residential parcel
  - Owner would be a participant and receive “rent”
  - Permit rejected - considered “commercial facility”
- Second Site on commercial property
  - 2<sup>nd</sup> Permit app. rejected due to “non-accessory use”
  - Final permit granted in Oct. after Special Town Mtg.

# Harvard Solar Garden – Phase 2

- Phase 2
  - Additional 250 kW
  - Adjacent to Phase 1 site
  - Amortize site prep, structural, O&M costs
- Financing
  - Local Bank?, resident investors, shareholders
- Shares available to over 70 towns in load zone
  - Outreach and Education:  
*“Locally Owned Sustainable Electric Power Generation”*

# Community Solar - Challenges

- Organizational and legal costs
  - Proprietary Aspects of Model (other entities)
- Upfront design and construction costs
  - Usually require financing
  - Banks still not “all in”
  - Section 1603 Grant expired (safe harbor)
- Siting & Permitting Snags
  - 3-phase power, Residential abutters, zoning, etc.
  - MGL 40A: what are “reasonable restrictions”?
- Utility Interconnection timeline can be 1 year

# Community Solar – Help On Way?

- Mass CEC awarded Grants under US DOE “Sunshot” Program: “Rooftop Solar Challenge”
- Focus Areas:
  - Community Solar Model - outline different approaches
  - Financing Models for Banks – outreach & education
  - Streamlined Interconnection – working with utility
  - Streamlined Permitting – working with BBRS & locals
  - Model Local Bylaw – state survey, best practices
- Harvard participating and benefitting
- Other towns stand to benefit in near future



# Additional Info & Questions

- [www.hsgarden.org](http://www.hsgarden.org)
  - Info sheets
- NREL “Guide to Community Solar”
- Clean Energy Collective in Colorado
  - <http://www.easycleanenergy.com/>
- Look for Mass CEC Community Solar Report