Agenda:

6:00 pm Monthly Project Update & Review of Agenda

6:05 pm Report Back from Working Groups
   • Energy Supply & Offsets
   • Regulation & Planning Approaches
   • Incentives & Financing Tools
   • Engagement & Behavior Change

6:25 pm Conversation about Net-Zero Emissions as a target

6:45 pm Preliminary Discussion of energy supply & Renewable Energy Options note to

7:15 pm Engagement Strategy during NZTF

7:45 pm Next Steps & Public Comment

8:00 pm Adjourn
#netzerocamb
“The best way to predict the future is to create it” - Peter Drucker
“The City is change. We as citizens, leaders, planners and designers are responsible to ensure that this change happens justly”

Jan Ghel
“Cities are not about a singular idea they are the product, and the process of the collision of multiple objectives in time and space.” - Charles Holland
Regulatory Planning

**Regulations drive max energy efficiency across all sectors**
- Use zoning, permitting, ordinances, fees, trusts to create requirements for: building disclosure, energy audits, commissioning, energy plans, energy reporting, carbon accounting, solar ready, green/cool roof ready,

**Regulations create new areas dedicated for specific clean energy uses**
- Districts or zones can be defined for future development that are conducive to renewables, energy storage, microgrids, district energy

**Regulatory tools address tenant controlled spaces**
- Standards can be developed specific for turnover/fit outs or targeting lighting power density and similar issues.

**Funding sources have requirements to drive energy efficiency & renewables**
- Leverage existing funds (AHT) and create new (Carbon Trust), fee-bate program

Finance Incentives

Sources & Offsets

Behavior Change

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Trust  |  Nurture  |  Inspire
Energy Efficiency
  Visual campaign (signage, etc)

Building Owners
  Financing against rent, “utility free” programs,

Carbon Tax
  Carbon becomes tangible currency providing incentives and dis-incentives

New Utility MOU
  Target specific outcomes with new programs

Recognition Program
  Focused on specific stakeholder groups (Labs, Multifam)

RECs
  New local program provides alternative means for participating in renewables

Permitting & Zoning
  Driving radical shifts in development and creating opportunities for districts
### Generation
- Develop resource plan identifying underutilized assets and areas to target
- Solar thermal hot water heating
- Anaerobic digesters – compost and sewage
- Fuel switching to lower carbon content

### Storage Capacity
- Identifying areas where storage can be located, partners for underutilized assets
- Push to improve grid capacity
- Alternative storage strategies – electric vehicle infrastructure

### Distribution
- Microgrids
- Metering
- Grid capacity

### Offsets
- Community Solar program
- Local carbon trading /SREC II
Public Awareness
- Visual campaigns (videos, signage, etc) partner w supermarkets, schools, etc

Educational campaigns
- Partner with museums, schools, community Groups
- Building industry professionals continuing ed.

Utility Engagement
- Ensure that everyone knows how to max out on their incentive programs

Competitions & voluntary disclosure
- By neighborhood, by building type (lab, commercial, multifamily, school)

Technology
- Leverage “cool” factor to engage behavior change (Nest, social media)

Data Feedback
- Disclosure of public & priv. sector bldg energy use leveraged to influence actions
Definition of NetZero

Cambridge Net Zero Task Force

By Dave Ramslie MSc, LEED AP
Principal, Integral Group

May 14th 2014
What is NetZero?

Cambridge Buildings

COE₂

Electricity
Natural Gas
Fuel Oil

Trust | Nurture | Inspire
Carbon Neutral Buildings Target

- Fuel Oil
- Electricity
- Natural Gas
- Renewables

2015 - 2022 - 2030

30%
Renewable Energy

Cambridge Net Zero Task Force

By Dave Ramslie MSc, LEED AP
Principal, Integral Group

May 14th 2014
Energy Supply & Renewables

• What are the technologies?
• What are the applications?
• What is the potential?
• What are the barriers?
What Determines the use of Renewables?

• Solar Conditions
• Geological Conditions
• Age of building stock
• Load density and profile
Technology

Hydro | Wind | Solar PV | Combustion | Heat-pumps & Energy Recovery | Solar Thermal

Electricity | CHP | Heating/Cooling

New & Existing Buildings | Biased to New Buildings
Onsite
District Scale
Grid Scale
Retrofits
Replacement
Engagement
Reduction
Renewables

Target

Solar & Geo Exchange
Onsite
CHP, Waste Heat Recovery, Heat-Pumps
Wind Farms, Hydro

Trust | Nurture | Inspire
Cambridge Applications

- Solar Potential mapped to achieve a max of 5-30% at $2.7 billion of investment
- What is a realistic?
- What is the requirement for storage?
- Can our grid handle this?
Cambridge Applications

- Massachusetts Renewable Energy Portfolio Standard (RPS)
  - Currently 9%
  - Targeted to be 15% by 2020
  - Potential for Cambridge to purchase its own grid tied renewables
  - Could be higher to 2030? (25%)
Cambridge Applications

What remains?

- Greening of legacy steam systems
- Development of new heating cooling and CHP systems
- Building to building energy sharing
Cambridge Applications

• Existing Veolia Natural Gas CHP System.
  - 256 Megawatt System
  - Limited Service in Cambridge

• Harvard & MIT

• Biogen 5MW system
Cambridge Applications

Biomass CHP

Positives:
- Excellent energy density to support existing steam infrastructure
- Scalable solution
- Addresses whole energy spectrum

Negatives:
- Biomass a contentious fuel source
- Tough to connect existing loads
Cambridge Applications

- Waste Heat Recovery from sewers or industrial/lab process,
- Ambient Systems based off infrastructure
- Deep water cooling
Lonsdale Energy Corp.
A Point in History...

The New Tandy 2000
“Simply Incredible.”

Meet the Incredible new Tandy® 2000 Personal Computer. A truly remarkable machine that you should get to know. Why? Because the Tandy 2000 offers more than other MS-DOS computers on the market.

For instance, it’s faster than the others. It offers more disk storage, and more detailed graphics. Expansion couldn’t be easier. Even the IBM PC can’t compare.

With the Tandy 2000, you get to choose from the most popular and advanced MS-DOS software around, from word processing to electronic filing to spreadsheet analysis.

The beautiful, ergonomic design makes the Tandy TRS-80 Model 2000 a wonder to look at and a breeze to use. And don’t forget Radio Shack’s extensive service network.

Ultra High performance Tandy TRS-80® Model 2000 systems start at $2,999. Incredible? You bet!

Radio Shack Computer Centers are participating Radio Shack stores.

Information and prices subject to change. Copyright 1980, Radio Shack.

Trust | Nurture | Inspire
High Performance Urban Buildings
Engagement Strategy

“We shape our cities and then they shape us.” - Winston Churchill
Engagement Strategy

• Identify who, what, and how we are going to engage with stakeholders on this topic
• Identify initial issues that need to be resolved
• Define success for good engagement on this topic.
Engagement Strategy - What

- Broad-based agreement from the Task Force and key stakeholders on a methodology, strategy, targets, and timeline for achieving net zero emissions, including agreement on the definition of the scope of net zero for the purposes of this initiatives.
- A comprehensive list of recommendations outlining a set of short-term (1-3 years) actions and a set of longer-term (4-10 years) actions. These recommendations will include direction on regulation, planning measures, incentives, and renewable energy generation initiatives that are within Cambridge’s direct control.
- The projected impacts of each action (to assist in decision-making and implementation of the recommendations, and in tracking and reporting progress and impacts of each action over time).
- Identification of roles and responsibilities associated with each of the recommended action, including who (i.e. City, state gov't, stakeholder group) will lead and/or support implementation of each.
- A comprehensive list of additional, promising action areas that require further research.
- Identification of resource needs to begin work on short-term actions and high-priority research topics.
- **Commitments of support or alignment from partners who are critical to the success of the plan.**
- Agreement on an ongoing communication, reporting and accountability strategy.
Engagement Strategy – Who?

Exercise: Issues Mapping (10 minutes)

- Stakeholder mapping done with the Engagement Working group
- Stakeholders shortlisted by staff

Write on sticky notes what potential issues you think will need to be addressed in order to achieve support for this initiative from these stakeholders?
NEXT STEPS…
Next Meeting June 4th

Working Groups already Scheduled
## Energy and GHG savings at scale*

- Fuel switch on existing systems = 35-85,000t
- New brownfield DE systems = 7-15,000t
- Green Building Policy (25%) = 10,800t
- Near net-zero building = 400t
- Deep green retrofit = 100-150t
- LEED Gold Building = 30-50t
- Typical retrofit = 50-70t
- Retro-commissioning = 30-60t

*data based on actual projects – Normalized for Cambridge