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

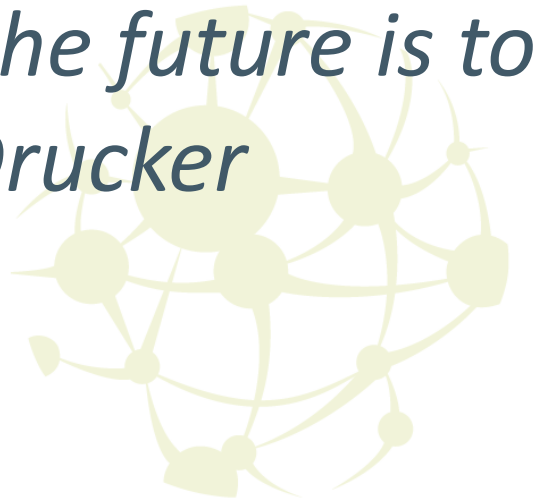
7:15 pm Engagement Strategy during NZTF

7:45 pm Next Steps & Public Comment

8:00 pm Adjourn

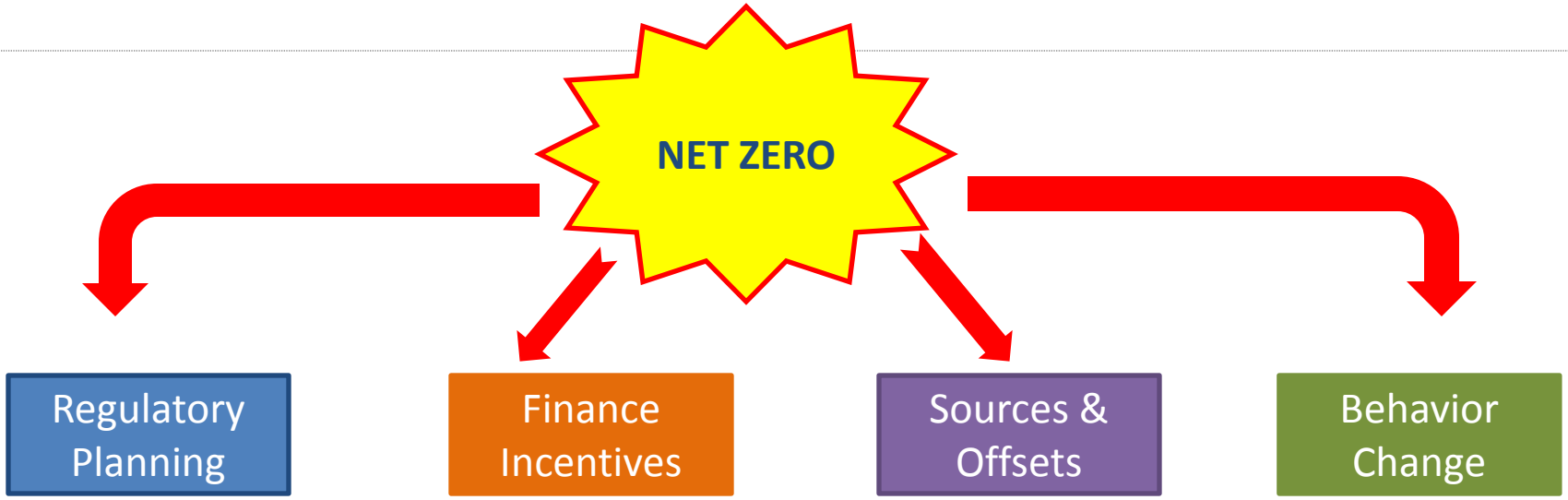
#netzerocamb

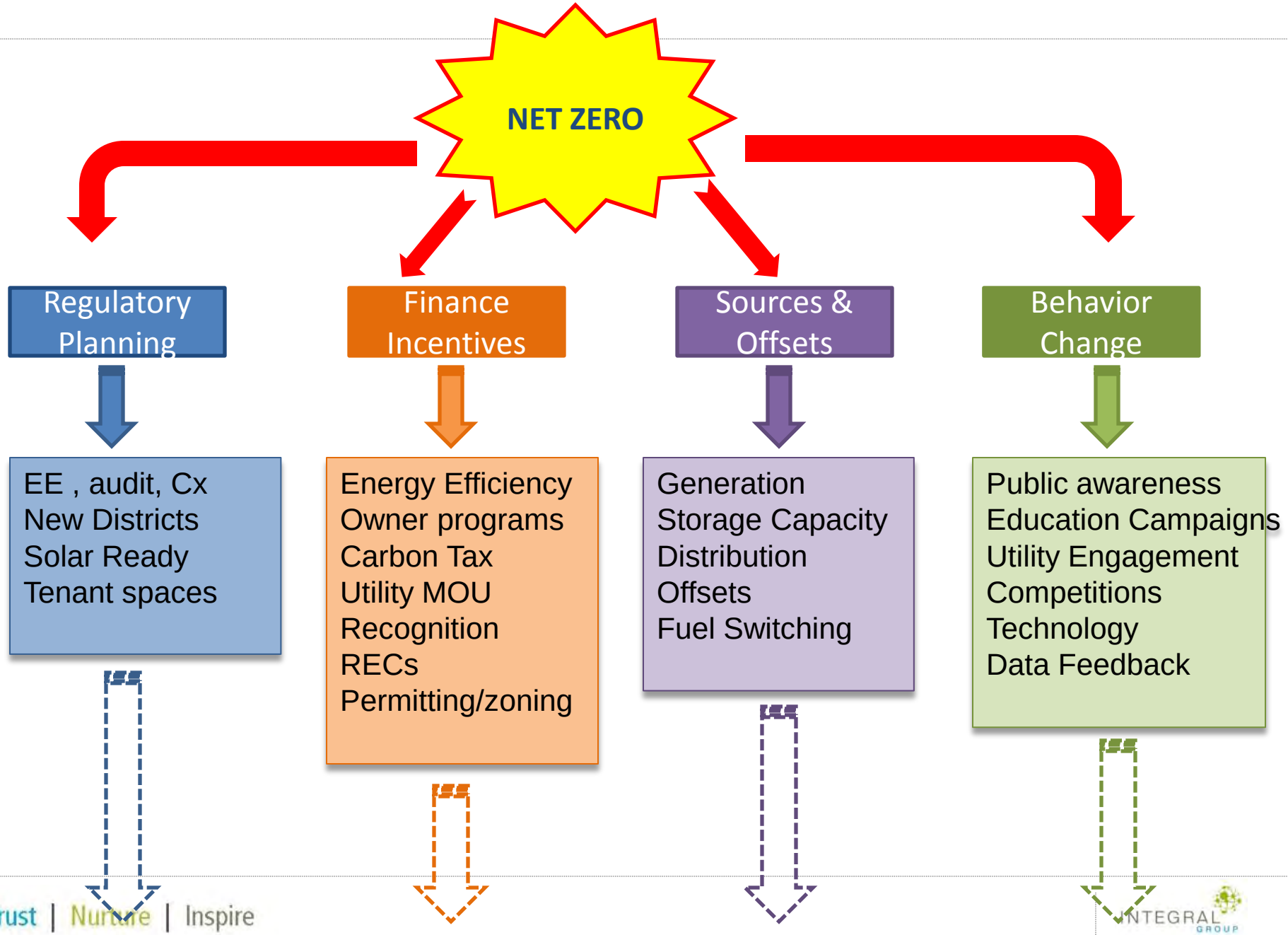
“The best way to predict the future is to create it” - Peter Drucker



"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


NET ZERO
Regulatory Planning
Finance Incentives
Sources & Offsets
Behavior Change

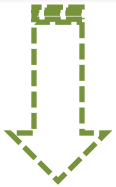

NET ZERO
Regulatory Planning
Finance Incentives
Sources & Offsets
Behavior Change
EE , audit, Cx
New Districts
Solar Ready
Tenant spaces
Energy Efficiency
Owner programs
Carbon Tax
Utility MOU
Recognition
RECs
Permitting/zoning
Generation
Storage Capacity
Distribution
Offsets
Fuel Switching
Public awareness
Education Campaigns
Utility Engagement
Competitions
Technology
Data Feedback

New Districts
Solar Ready
Ordinances
EE , audit, Cx

Energy Efficiency
Owner programs
Carbon Tax
Utility MOU
Recognition
RECs
Permitting/zoning

Generation
Storage Capacity
Distribution
Offsets
Fuel Switching

Public awareness
Education Campaigns
Utility Engagement
Competitions
Technology
Data Feedback



1. New Districts
   a. xyz
   b. xyz
   c. xyz
2. Solar Ready
   a. xyz
3. Ordinances
   a. xyz
   b. xyz
4. EE , audit, Cx
   a. xyz
   b. xyz
   c. xyz

1. Energy Efficiency
   a. xyz
   b. xyz
2. Owner programs
   a. xyz
3. Carbon Tax
   a. xyz
4. Utility MOU
   a. xyz
5. Recognition
   a. xyz
6. RECs
   a. xyz

1. Generation
   a. xyz
   b. xyz
2. Storage Capacity
   a. xyz
   b. xyz
3. Distribution
   a. xyz
   b. xyz
4. Offsets
   a. xyz
5. Fuel Switching
   a. xyz

1. Public awareness
   a. xyz
2. Edu. Campaigns
   a. xyz
   b. xyz
3. Utility Engagement
   a. xyz
4. Competitions
   a. xyz
   b. xyz
5. Technology
   a. xyz
6. Data Feedback
   a. xyz

Regulatory Planning | Finance Incentives | Sources & Offsets | Behavior Change

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

Regulatory Planning | Finance Incentives | Sources & Offsets | Behavior Change

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

Regulatory Planning

Finance Incentives

Sources & Offsets

Behavior Change

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

Regulatory Planning | Finance Incentives | Sources & Offsets | Behavior Change

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

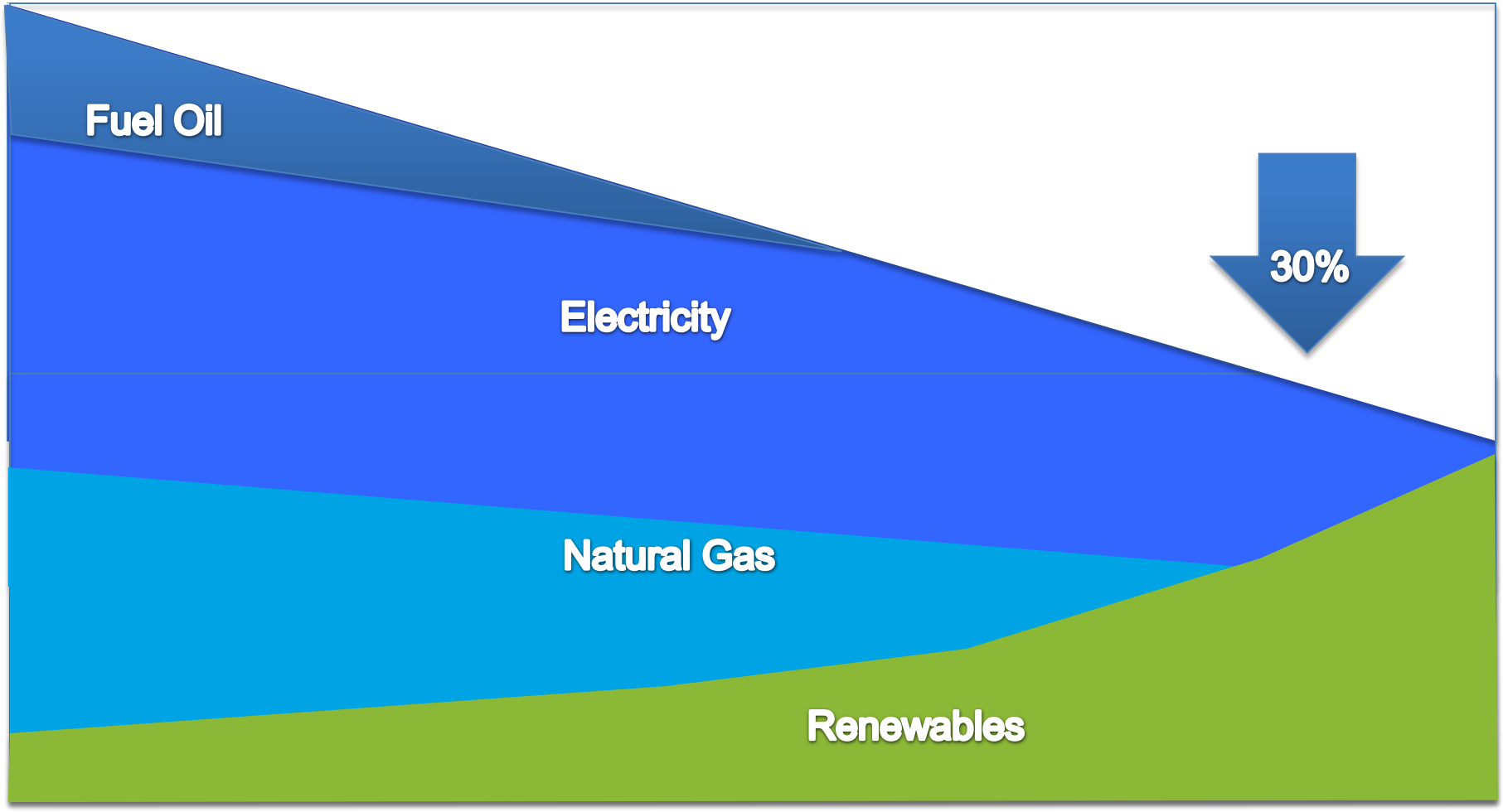
What is NetZero?

Electricity
Natural Gas
Fuel Oil

Cambridge Buildings

COE_2

Carbon Neutral Buildings Target



Renewable Energy

Cambridge Net Zero Task Force

By Dave Ramslie MSc, LEED AP
Principal, Integral Group

May 14th 2014

Energy Supply & Renewables

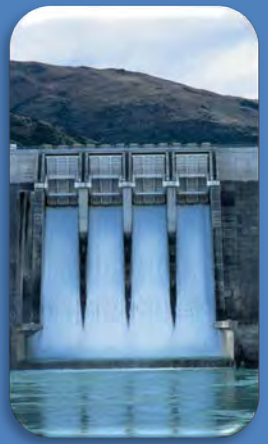
- What are the technologies?
- What are the applications?
- What is the potential?
- What are the barriers?

What Determines the use of Renewables?

- Solar Conditions
- Geological Conditions
- Age of building stock
- Load density and profile

Technology

Hydro



Wind

Solar PV

Combustion

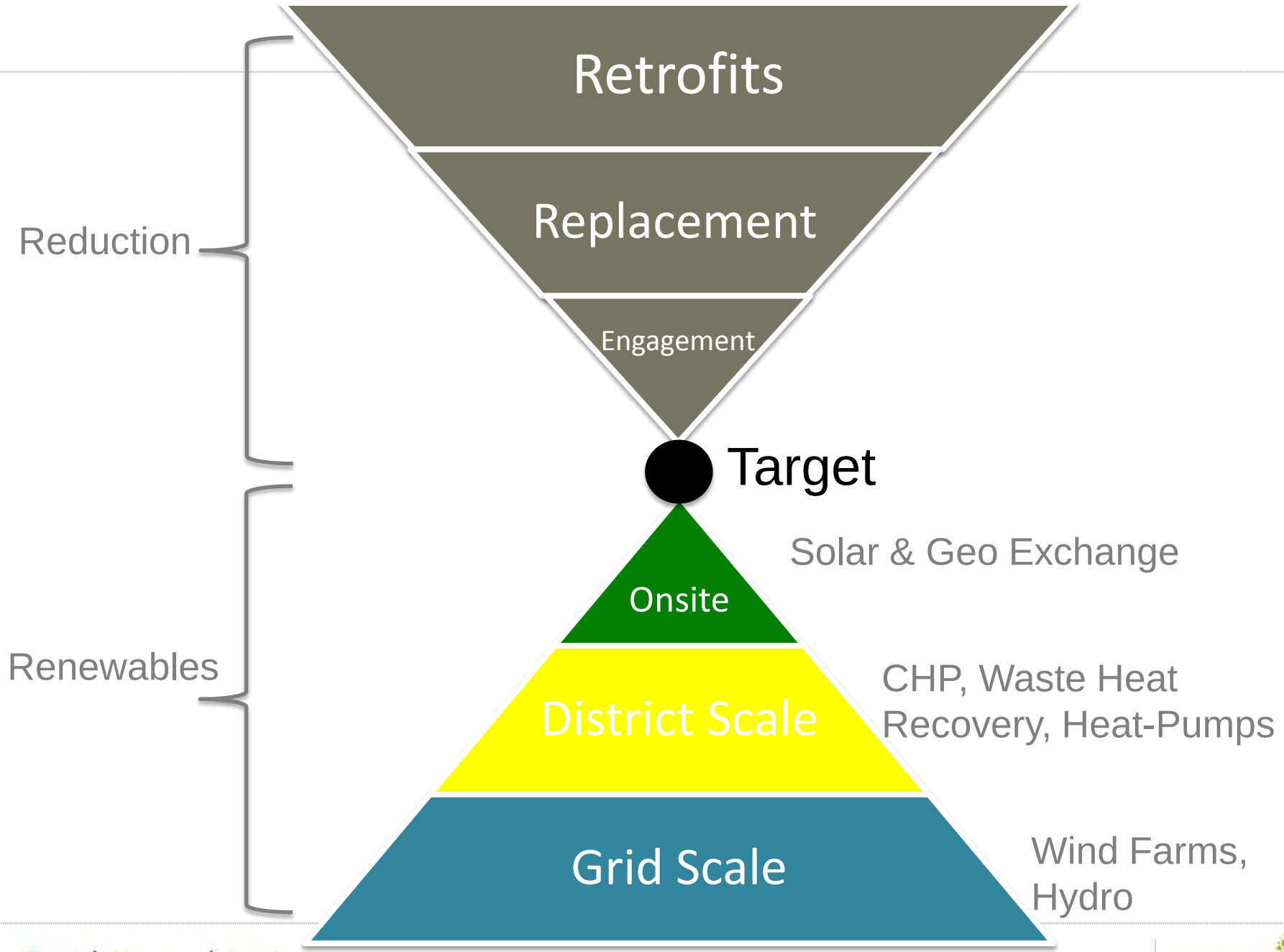
Heat-pumps & Energy Recovery

Solar Thermal

Electricity | **CHP** | Heating/Cooling

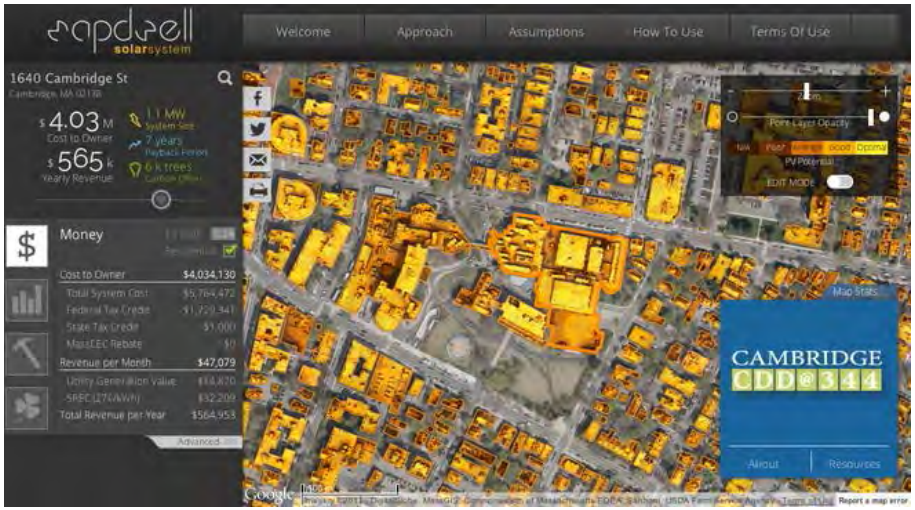
New & Existing Buildings

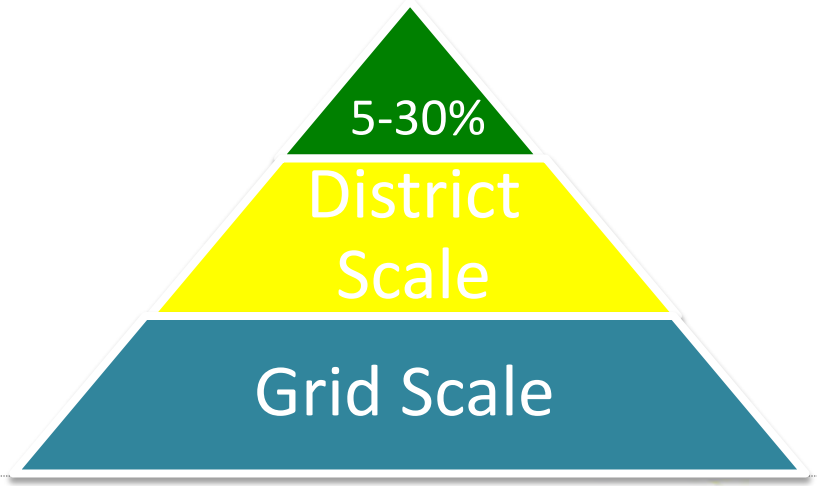
Biased to New Buildings


Retrofits
Replacement
Engagement
Reduction
Target
Solar & Geo Exchange
Onsite
Renewables
CHP, Waste Heat Recovery, Heat-Pumps
District Scale
Grid Scale
Wind Farms, Hydro

Cambridge Applications

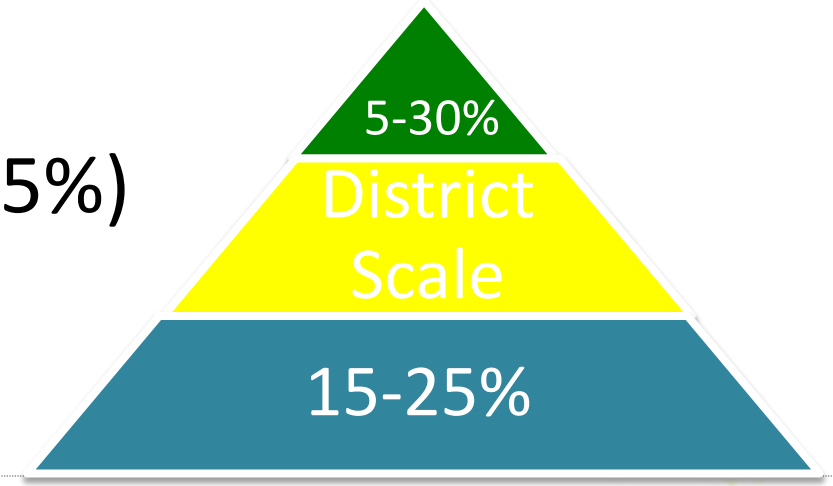
- Solar Potential mapped to achieve a max of 5-30% at $2.7 billion of investment
- What is a realistic ?
- What is the requirement for storage?
- Can our grid handle this?





Cambridge Applications

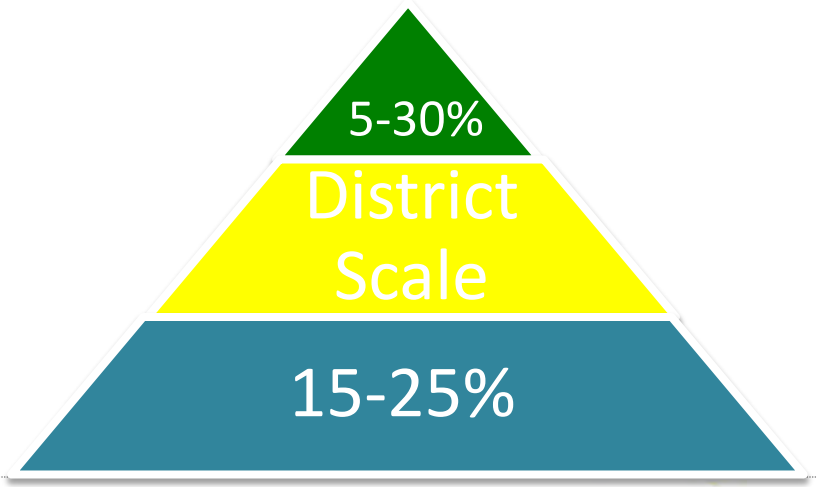
- Massachusetts Renewable Energy Portfolio Standard (RPS)
- Currently 9%
- Targeted to be 15% by 2020
- Potential for Cambridge to purchase its own grid tied renewables
- Could be higher to 2030? (25%)



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:

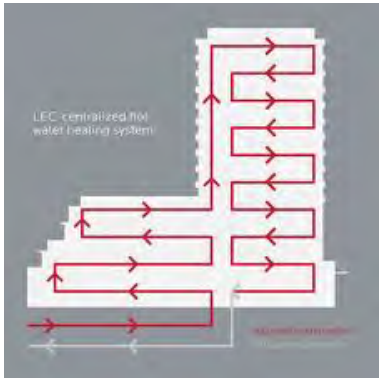
- Biomass a contentious fuel source
- Tough to connect existing loads

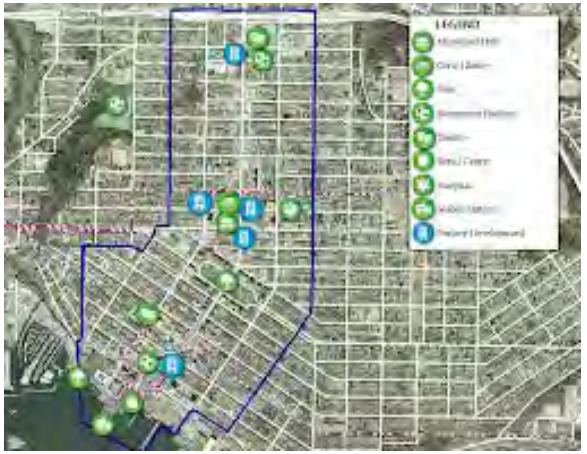
Cambridge Applications

- Waste Heat Recovery from sewers or industrial/lab process,
- Ambient Systems based off infrastructure
- Deep water cooling

Lonsdale Energy Corp.

lonsdale energy corp.
sustainable • innovative • award winning





A Point in History…

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