

A study of carbon offsets and RECs to meet Boston's mandate for carbon neutrality by 2050

Prepared as part of MIT Sloan's Sustainability Lab
Spring 2018

Vanessa Barreto, Alexandra Gonzalez, Rosie Mate, Eric Zuk

Agenda

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MIT Sloan Team



Vanessa Barreto

Sloan MBA

BA in Computer
Engineering



Rosie Mate

Sloan MBA

BA in Economics &
Envi Science



Ale Gonzalez

Harvard MPA
Sloan Sustainability

MA Economics



Eric Zuk

Sloan MBA

SB Math &
Finance

Project introduction

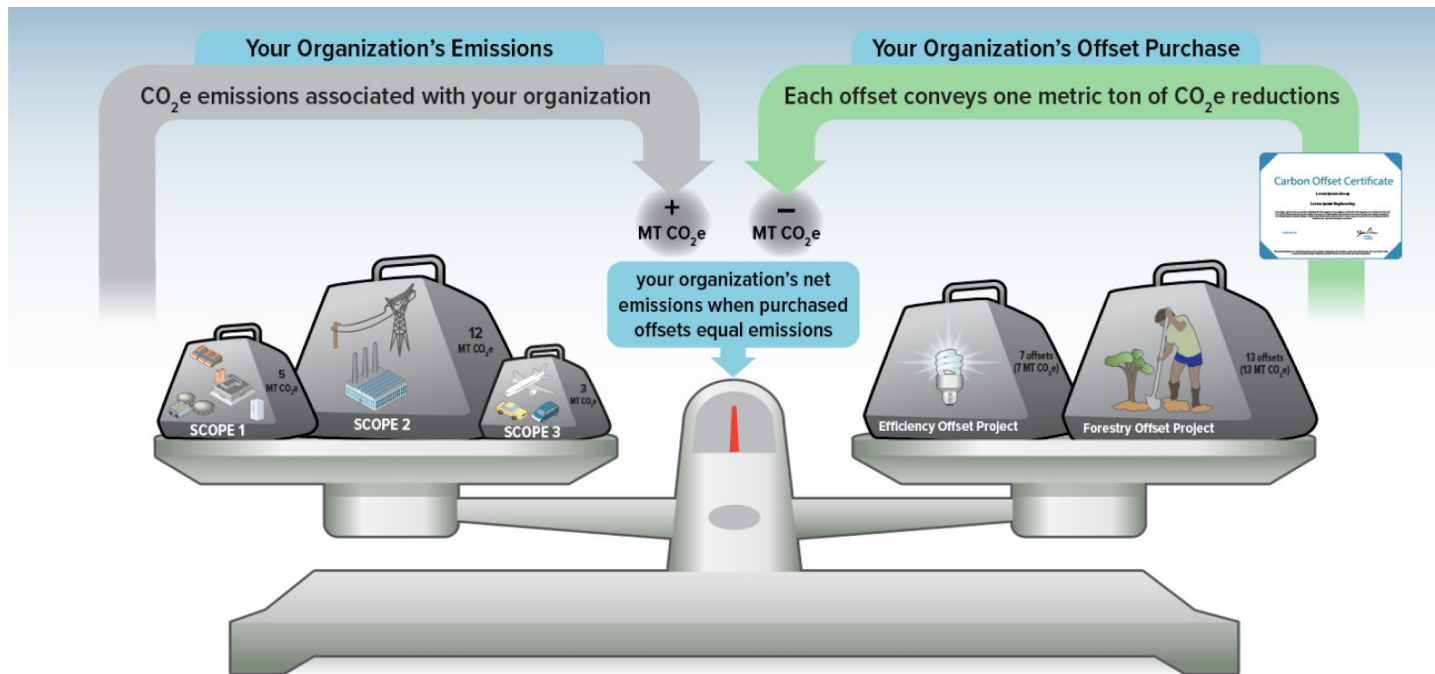
Current State



Desired State

- BU ISE is undertaking a full analysis of greenhouse gas reduction mechanisms to the City of Boston to help develop a plan for its **goal of net zero scope 1 and 2 greenhouse gas emissions by 2050**
 - Current analysis focuses on quantifying sources of attainable abatement and mitigation
- Expand the scope of ISE's research to **incorporate an analysis of carbon offsets and Renewable Energy Certificates (RECs)**
 - Produce a report that details how **carbon offsets and RECs could be used effectively to help Boston achieve net zero carbon**

Defining offsets and RECs



Offset: Formal credit for a metric ton of emissions avoided or reduced

REC: Legal ownership of 1 MWh of renewable electricity generation

Differences between offsets and RECs

Topic of Difference	Offset	REC
Purpose of commodity	Provide support for GHG reductions with supplemental revenue that increases the financial viability and thus feasible scope of GHG mitigation projects	Provide mechanism to drive market demand for renewable energy and increase development rates
Appropriate GHG accounting application	May be credited towards the owner's scope 1, 2, or 3 emissions	May be credited towards the owner's scope 2 emissions from electricity usage only
Measurement Unit	Metric tons of CO ₂ or CO ₂ equivalent	Megawatt hours
Types of qualifying projects	Any project that is certified to reduce or avoid emissions	Renewable energy generation projects
Rights conveyed	Right to claim reducing or avoiding GHG emissions outside the owner's operations	Right to claim use of zero-emission electricity, or to avoid the emissions associated with conventional electricity use
Certification criteria	Credible offsets will satisfy the P.A.V.E.R. criteria and often additional criteria such as the generation of co-benefits and contemporary relevance	Not required to test additionality
Benefits conveyed	Greenhouse gas reductions	The full suite of social, economic and environmental benefits associated with renewable energy

The Offsets and REC Debate

Moral Hazard: Risk of reducing incentives to take direct actions to reduce GHG emissions

- Use offsets and RECs to help internalize the cost of carbon and thus drive additional investment in direct reductions

Equity: Risk of implying that Boston as a wealthy city can buy the right to pollute from less well-off regions

- Use offsets and RECs to intentionally redistribute wealth

Credibility: Risk of relying on mechanisms that do not yield true net reductions in GHG

- Use rigorous criteria to evaluate high quality offsets and RECs

PAVER+ criteria for Offsets and RECs

The P.A.V.E.R. framework:

- **Permanent:** non-reversible, lasts in perpetuity
- **Additional:** beyond business as usual (uneconomical, not policy driven)
- **Verifiable:** measureable, must be confirmed and monitored
- **Enforceable:** clearly defined, exclusive ownership (avoid double-counting)
- **Real:** not subject to leakage, generates a true *net* reduction of emissions

Additional Criteria:

- **Co-benefits:** Socio-economic or other benefits beyond CO2 reductions
- **Contemporary Relevance:** Timeframe of offsets matches emissions

Key Players in the Offset market

- **Project Developers:** Run offset generating programs
 - Potential conflict of interest - project developer hiring auditors /certifiers
- **Multiple Rating Agencies, including:**

Rating Agency	Description
Clean Development Mechanism (CDM) & Joint Implementation (JI) Track 1	Offset projects under the Kyoto Protocol.
Climate Action Reserve	The premier carbon offset registry for the North American carbon market
Gold Standard	It can be used as add-on certification to CDM and JI projects. The most recent version helps certify the attainment of SDGs.
Verified Carbon Standard	This program allows projects to turn their greenhouse gas emissions reductions into tradable carbon credits. Largest voluntary carbon credit market.
Climate Community & Biodiversity Standard	criteria for evaluating the co-benefits generated for the community and biodiversity by land-based carbon mitigation projects.

- **Retailers or Market Platforms:** Facilitate buying and selling of offset credits

Types of offsets

- **Renewable Energy**

- *Example:* Develop solar or wind farms (can generate either offsets or RECs)

- **Carbon Sequestration**

- **Biological**

- *Example:* Afforestation, Reforestation, Forestry practice, Preventing deforestation

- **Geological**

- *Example:* Storing CO₂ gas in sedimentary basins

- **Energy efficiency**

- *Example:* Retrofit HVAC systems, upgrade lighting, improve building envelope

- **Methane combustion**

- *Example:* Capturing and combusting methane produced from landfills

- **Industrial gas mitigation**

- *Example:* Capturing high GWP gases (e.g. HFCs) in industrial settings

- **Carbon permit retirement**

- *Example:* Purchase carbon permits from existing cap and trade system, retire them

PAVER+ analysis by type of offset

Difficulty level	Type							
	Renewable Energy (offsets)	Renewable Energy (RECs)	Biological Carbon Sequestration	Geological Carbon Sequestration	Energy Efficiency	Methane combustion	Industrial gas mitigation	Carbon permit retirement
Permanent	Easy	Easy	Hard	Hard	Easy	Easy	Easy	Easy
Additional	Moderate	Easy (not required)	Hard	Hard	Moderate	Moderate	Moderate	Moderate
Verifiable	Easy	Easy	Moderate	Moderate	Moderate	Easy	Moderate	Moderate
Enforceable	Easy	Easy	Moderate	Hard	Easy	Moderate	Hard	Moderate
Real	Easy	Easy	Moderate	Hard	Moderate	Easy	Moderate	Moderate
Co-benefits	Moderate	Moderate	Easy	Hard	Easy	Moderate	Hard	Moderate

Risk analysis by type of offset

	Type							
Risk	Renewable Energy (offsets)	Renewable Energy (RECs)	Biological Carbon Sequestration	Geological Carbon Sequestration	Energy Efficiency	Methane combustion	Industrial gas mitigation	Carbon permit retirement
Market / Financial	Medium	Low	Low	High	Low	Medium	Low	Low
Tech / Implementation	Medium	Low	Low	High	Medium	Low	Low	Medium
Policy / Regulation	Medium	Medium	Low	Medium	Low	High	High	Medium
Supply Chain	Low	Low	Low	Medium	Low	Medium	Low	Low
Reputational	Low	Low	Medium	High	Low	Medium	High	Medium

How to select the best offset or REC for the circumstances

3 main topics are usually a priority when organizations weighed which offset was best for their circumstances:

1

LEVERAGE LOCAL RESOURCES

- Local impact:
 - Community's natural resources
 - Local political motivations
 - Support local organizations
- Example: *Duke University Carbon Offsets Initiative*

2

OPTIMIZE FOR INSTITUTIONAL OBJECTIVES

- Alignment with broad objectives that drive their day to day decisions:
 - Universities: education of its students
 - Cities: strengthen community bonds
 - Organizations: synergies
- Example: *MIT offset initiative*

3

BALANCE STAKEHOLDERS' NEEDS

- Opinions from internal and external stakeholders:
 - Local, state and federal governments
 - Local communities
 - Utilities companies
- Example: *Apple and state utilities commission create new regulatory structure*

How to structuring a carbon offset program

Main approaches to investing in offsets:

1

QUICK WIN

- Buy available, approved, validated offsets to offset emissions ASAP
- Example: Austin airport “Good Traveler” program

2

REINFORCING FEEDBACK SYSTEM

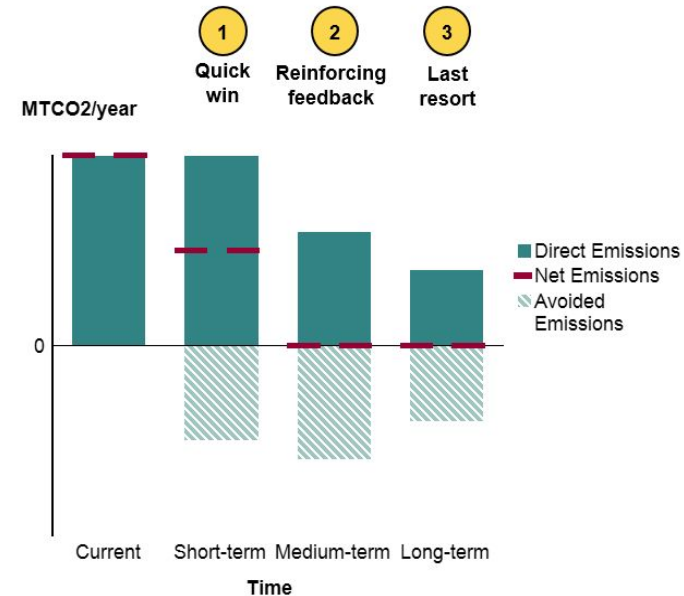
- Build a system of incentives that utilize market dynamics to reduce emissions through offsets
- Example: Cambridge housing heating market idea

3

LAST RESORT

- Focus on direct emissions as much as possible, only use offsets as a last resort
- Example: Initial Boston approach

ILLUSTRATIVE

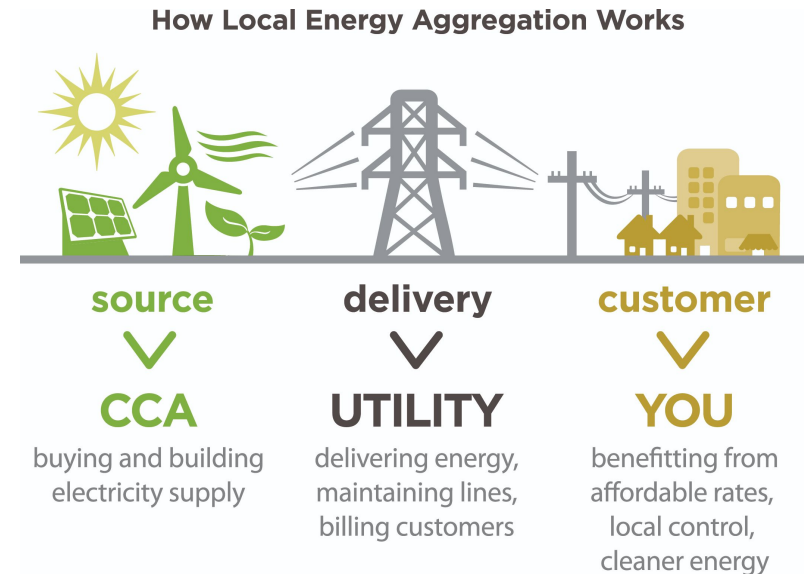


Community choice aggregation

- Aggregate electrical load of customers to procure competitive supply
- Participate in a voluntary basis
- Example of Cambridge:
 - *Standard green*: 25% more solar energy than required by the state, Opt Out choice
 - *100% green*, 100% Massachusetts Class I Recs

Some of the benefits of the program include:

- Reduction in the electricity bill price for consumers
- Increase greener energy sources and use
- Citizens' engagement in the GHG emissions goal by 2050



Source: Lean Energy US, 2018.

Next steps for Boston

- **Identify stakeholders**
 - Who are the key stakeholders to incorporate in the decision making process?
- **Pool resources**
 - What resources are available? What are stakeholders' strengths?
- **Brainstorm project specifications**
 - *Institutional objectives* - are stakeholders looking to align this project with their objectives?
 - *PAVER+ criteria* - which ones to prioritize?
 - *Carbon potential* - how much CO2 will need to be offset?
 - *Budget* - what's a realistic budget?
 - *Timing* - what offset design makes the most sense? Short term / long term?
 - *Politics* - are there political initiatives the city can align with to gain public support?

Discussion and Questions?