



Local & Regional Responses to Greenhouse Gases

ACI Home Performance Conference 2007

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About CSG

- Founded in 1984; nonprofit corporation
- Nearly 300 staff, 12 offices nationwide
- More than 100 clients
- Design, develop, and deliver energy efficiency and clean energy programs and projects
- Over 1 million homes and facilities served
- Net Zero Greenhouse Gas and Climate Leader



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Introduction

- New opportunities for financing energy efficiency programs and projects from capturing the full value of efficiency
- Monetization of environmental and regional power market value of efficiency
 - What are these finance mechanisms?
 - How do they work?





Market #1

Greenhouse Gas (GHG) offset markets





Why is this important?

1941



Riggs Glacier, Glacier Bay National Park was 2,000 feet thick

Photos: U.S. Geological Survey and Bruce Molnia

2004



Water vapor, carbon dioxide, methane, nitrogen oxides, and ozone contribute to global warming/climate disruption



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Site reduction vs. offsets

- Factory A - 10 tons emissions with a 9 ton allowance cap
- Options:
 - 1. Reduce emissions to 9 tons (may not be possible)
 - 2. Buy 1 ton of reduced emissions from another location (this 1 ton is an offset)

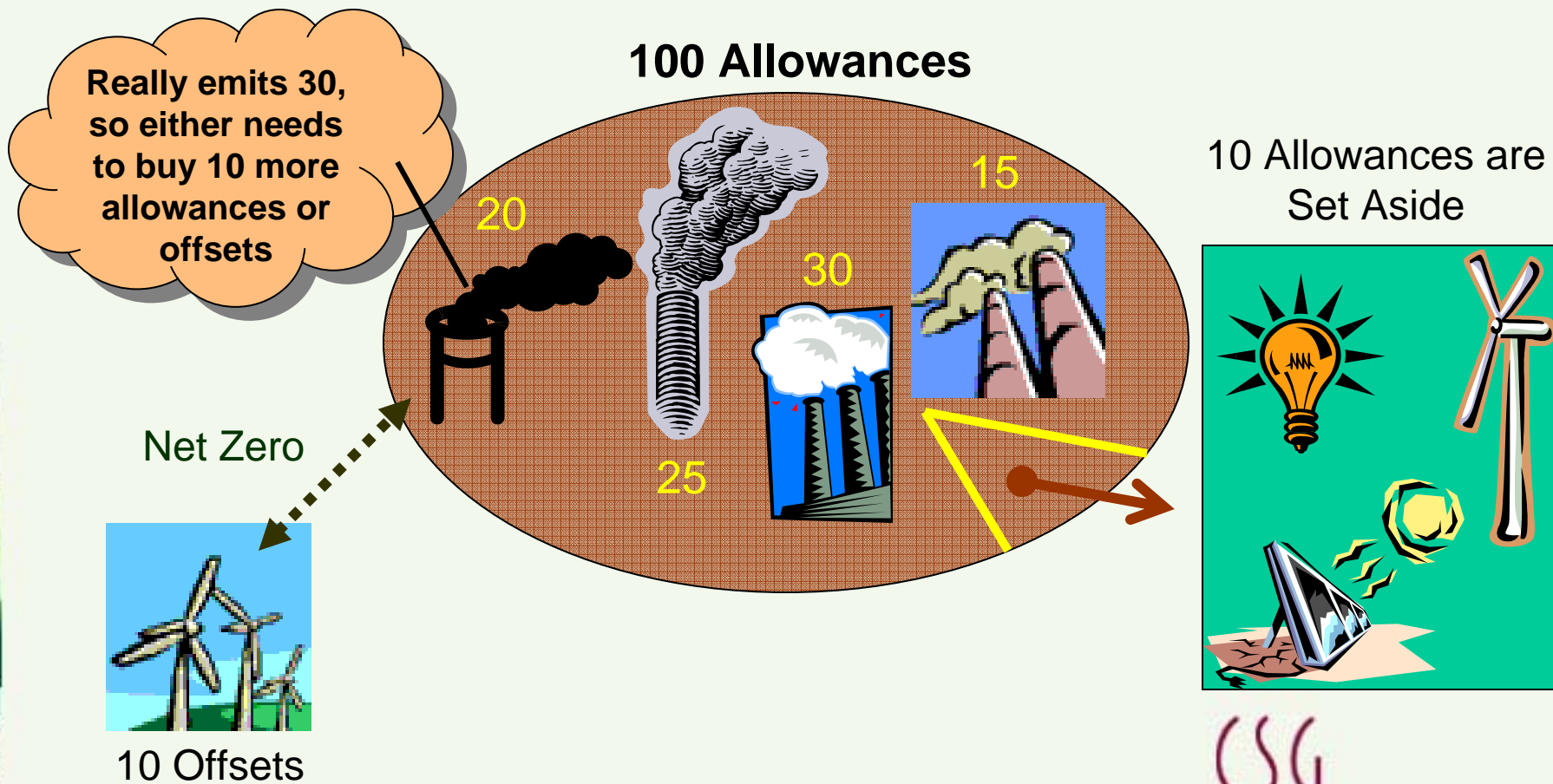


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Allowances? Set-Asides? Offsets?





Carbon Cap and Trade

- A mandatory program administered by a governmental entity
 - Government issues (“mints”) allowances up to the Cap for each compliance period, up to total amount of emissions from regulated entities
 - Initial allowances may be given to regulated entities or auctioned to them (major policy issue)





Carbon Cap and Trade

- Regulated entities (generally large sources) must have an allowance for each ton of GHG emitted during a compliance period
- Entities can trade among themselves to achieve mandated result or use offsets





Carbon Cap and Trade

- Non-regulated entities – such as EE projects at locations not owned by regulated entities – can verify the reductions of emissions to the satisfaction of the program administrator
- These non-regulated entities will receive a GHG offset (see above) that can be sold to regulated entities, which they can use for compliance





Example of 1 ENERGY STAR Home

- “Laurelwood” - North Smithfield, Rhode Island
 - Increased insulation, advanced air sealing, ENERGY STAR appliances and lighting, efficient furnace
- Electricity annual savings*
 - 1559 kWh = 1247 lbs CO₂
- Natural gas annual savings
 - 236 therms = 2714 lbs CO₂
 - = Two tons of carbon reduction**



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**average per unit, first 31 units*

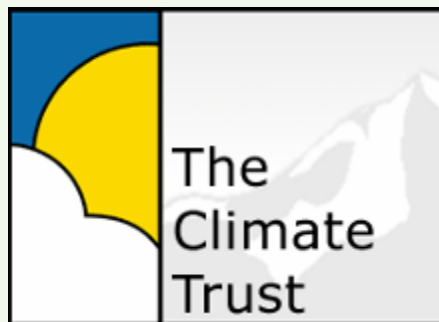


Example: Program funding from offsets

Property owners transfer legal title to resulting CO₂ offsets to The Climate Trust



City of Portland assists property owners in improving energy efficiency

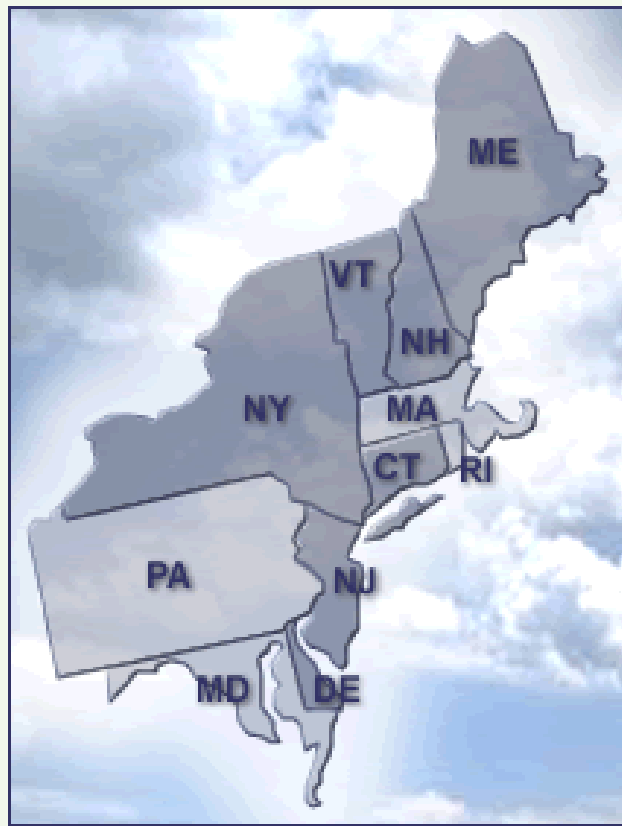


Climate Trust funds City of Portland program





Regional Greenhouse Gas Initiative



- First mandatory Cap and Trade in U.S.
 - How many allowances will be controlled by RGGI?
 - MA share = 26 million tons
 - Expected price per allowance: \$1 to \$5 per ton
\$26-130 million
 - SBC in MA currently = \$120+ million





Purpose of additionality

- avoiding unnecessary free ridership or “public” payments that will get the job done
- sending clear market signals to projects that achieve public benefit – great rewards to those projects that achieve greater public benefit





Leakage

- Environmental Savings from one region moving to another region without adequate verification and controls
- Additionality plus out of market transparency





Carbon Cap and Trade: Creates a market for your offsets

- Regional CO₂ cap-and-trade programs
 - RGGI (rules do not allow non-regulated offsets)
 - Southwest Climate Initiative
 - Powering the Plains
 - Western Regional Climate Action Initiative
 - Oregon Climate Trust
 - Climate Action Plans

National CO₂ cap-and-trade programs:
coming to a country near you!





Market #2

- NO_x Allowance markets





Environmental/Emissions Markets

- NO_x emissions reductions (nitrogen oxides)
- EPA mandated cap on emissions to eliminate smog
- State Implementation Plans required when emissions exceed the cap: “non-attainment”





NO_x – Public Benefit Set Aside

- Ability to claim allowances that a state has “set aside” for Public Benefit
- Administered state-by-state
 - MA is example of early action
- Denominated in Tons (royal)





Example: Massachusetts

- 1996 & 1997 DEP regulations developed to create a set aside of NO_x allowances for energy efficiency – 5%
- CSG was primary intervener
- Set asides essentially lowered cap by 5%; allowances would revert to polluters in the event that Clean Energy providers could not claim





Example: Massachusetts

- 2004 – first year for NO_x set asides
- 687 tons of allowances available
- DOER could claim on behalf of efficiency programs
- ESCOs and customers could claim

Value example:

NO_x: 1 MWh during 5 month season = 1.5 lbs emissions or .00075 tons

1 allowance = 1 ton = \$2,000

1 MWh = \$1.50 per year (\$.0015 per kWh)





Example of 1 ENERGY STAR Home

- “Laurelwood” - North Smithfield, Rhode Island
 - Increased insulation, advanced air sealing, ENERGY STAR appliances and lighting, efficient furnace
- Electricity annual savings*
 - 1559 kWh = 2.34 lbs NO_x
- Natural gas annual savings
 - 236 therms = 3.5 lbs NO_x
 - = **.003 tons NO_x reduction = \$6/yr**



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**average per unit, first 31 units*



Market #3

- Capacity Markets



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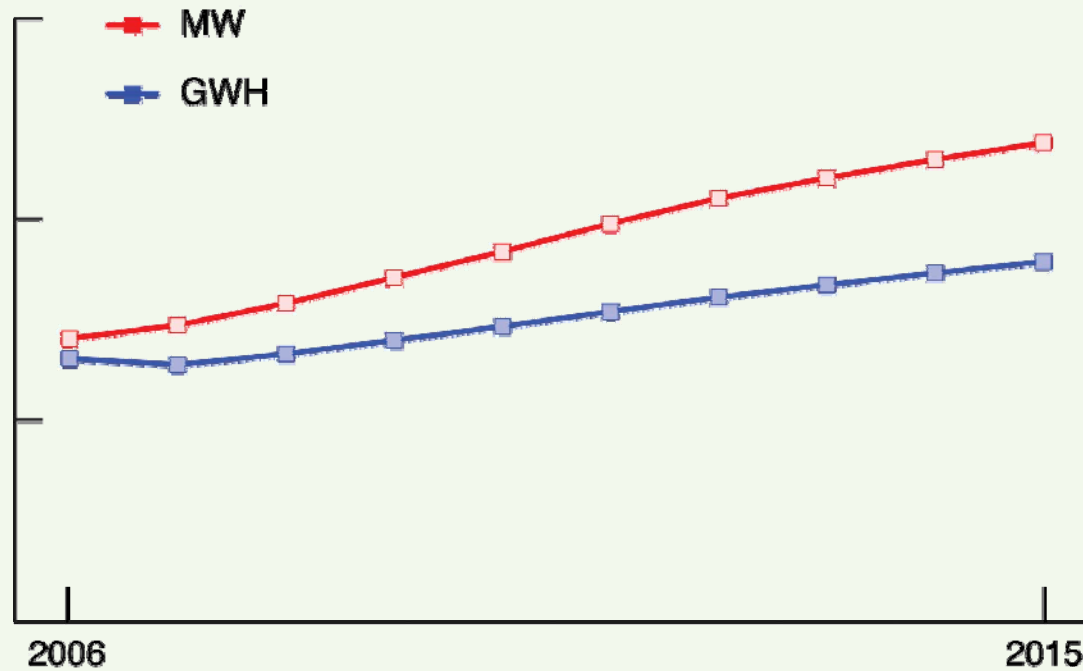
Capacity Supply

- Capacity = amount of electricity available from a generating unit or needed by users at any moment in time
 - Measured in kilowatts (energy = that amount over time or kilowatt-hours)
- Power Markets and System Operators need both kW and kWh





Peak vs Average energy growth





Approaches to power market needs

- Traditional:
 - Build new power plants by regulated utilities
 - Establish a new market to buy additional power plant capacity in competitive markets
- New Capacity Market:
 - New England ISO and Power Pool proposed new capacity market based on traditional model
 - CSG intervened in settlement negotiations, citing advantages of demand resources





Settlement Agreement

- Agreement to incorporate Demand Resources into market
- Forward Capacity Auction
 - Three years forward
 - Existing capacity gets one year commitment
 - New capacity to select 1 to 5 year commitment
 - Opportunities to de-list or retire by bids
- Demand resources fully participate and have special treatment
- Measurement and Verification required





Value potential

- 1 year-round kW of load reduction in an ENERGY STAR Home through reduced AC, appliances, lighting etc. = \$36 (transition) to \$100 (\$8 clearing price) per year for 20 years or a NPV of up to \$1,000 or more





FCM Value from Efficiency Programs in Massachusetts (proposed 168 million/yr)

- 2007- \$ 1.8 Million
- 2008- \$ 5.3 Million
- 2009- \$ 9.3 Million
- 2010- \$23.7 Million
- 2011- \$31.3 Million
- 2012- \$39.9 Million





Market #4

- White Tags



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White Tags

- A term of art for verification that one MWh of electricity was not used during a specified time period as the result of an approved energy efficiency measure
- Administered:
 - CT first state with an official program
 - Sterling Planet launched initiative to create a voluntary market
- Trading deadlines vary by market similar to RECs





Use of White Tags

- Compliance Markets such as Renewable Portfolio Standards
- Voluntary Markets where a MWh of reductions can be sold as part of “green power” products
- Need similar measurement; verification and accounting to offsets and capacity values
- Value not yet established but it is coming!





\$ → Projects → M&V → Ingredients → Products → Buyers

- FCM
- RGGI
- NOx
- SBC



- inspection
- sampling
- baseline
- metering
- deemed

- kW
- kWh

- FCM
- CO₂ tons (reduction)
- NOx tons (reduction)
- White tags
- (MWh reduction)

- National Grid
- NSTAR
- Constellation
- CCX
- Mirant (power plant)
- Voluntary market

\$ \$ \$ \$





Challenges to all these markets

- Complex participation requirements
- Minimum size to participate
- Measurement and Verification Standards are required for market confidence
- Accounting systems are needed for transparency
- Aggregation and balancing needed
- Trading and sales needs specialists





Closing thoughts



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Thank you!

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