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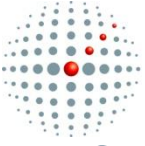
Regulatory Response: International and Regional Carbon Markets

EU, RGGI, WCI, MGGG, California, etc.

July 31, 2008

Joel N. Swisher, PhD, PE





Carbon Emission Trading

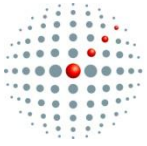
CO₂ and other greenhouse gases (GHGs) are *global and cumulative* in their impact

Therefore, unlike criteria pollutants like NO_x and SO₂, the location of emissions, and thus emission reductions, is not important

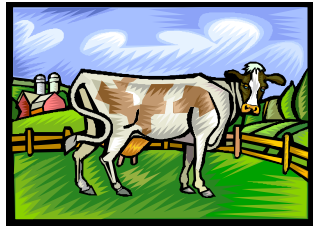
Moreover, the timing is not important either (as long as reductions are implemented soon)

This enlarges the potential scope of emission trading to global dimensions





GHG Emissions Cap

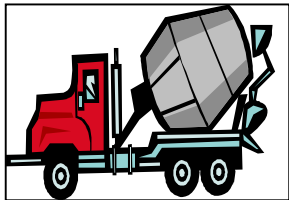


GHG Emissions Cap = 100
Metric Ton

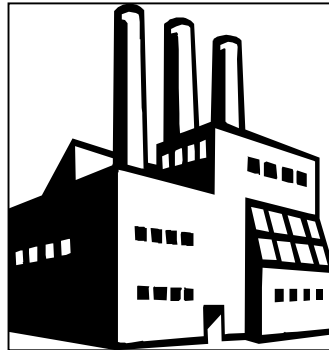
Total Allowances =
100

1 MT = 1 Allowance

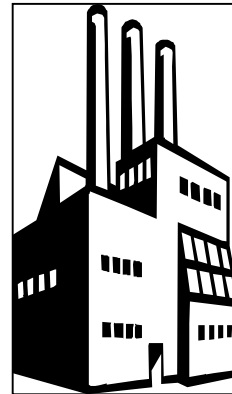
10 A



25 A



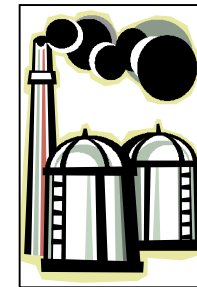
30 A



15 A



20 A



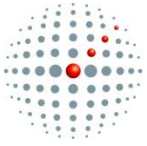
Emissions = 10 MT

25 MT

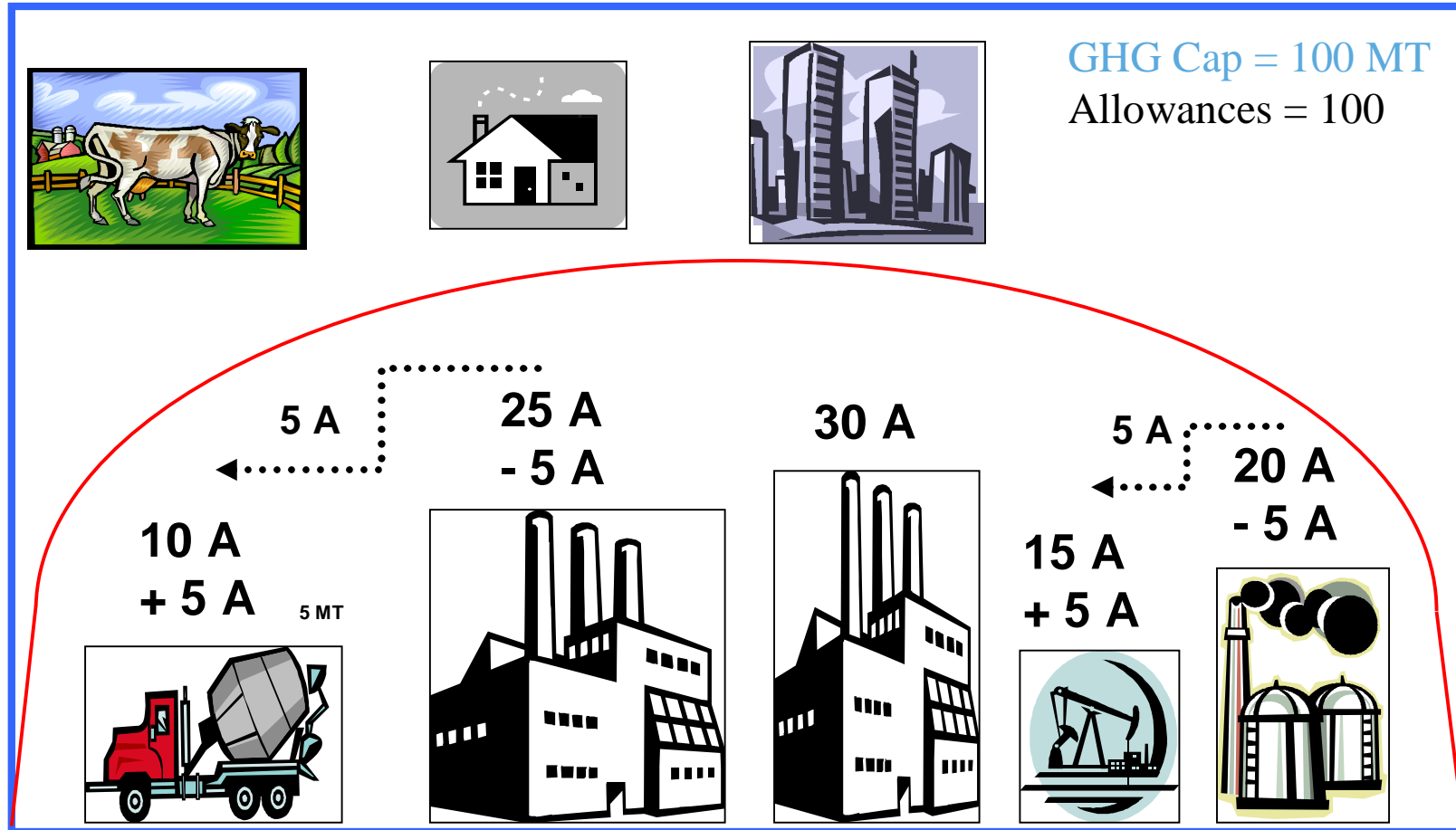
30 MT

15 MT

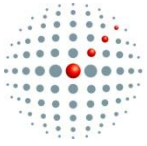
20 MT = 100 MT



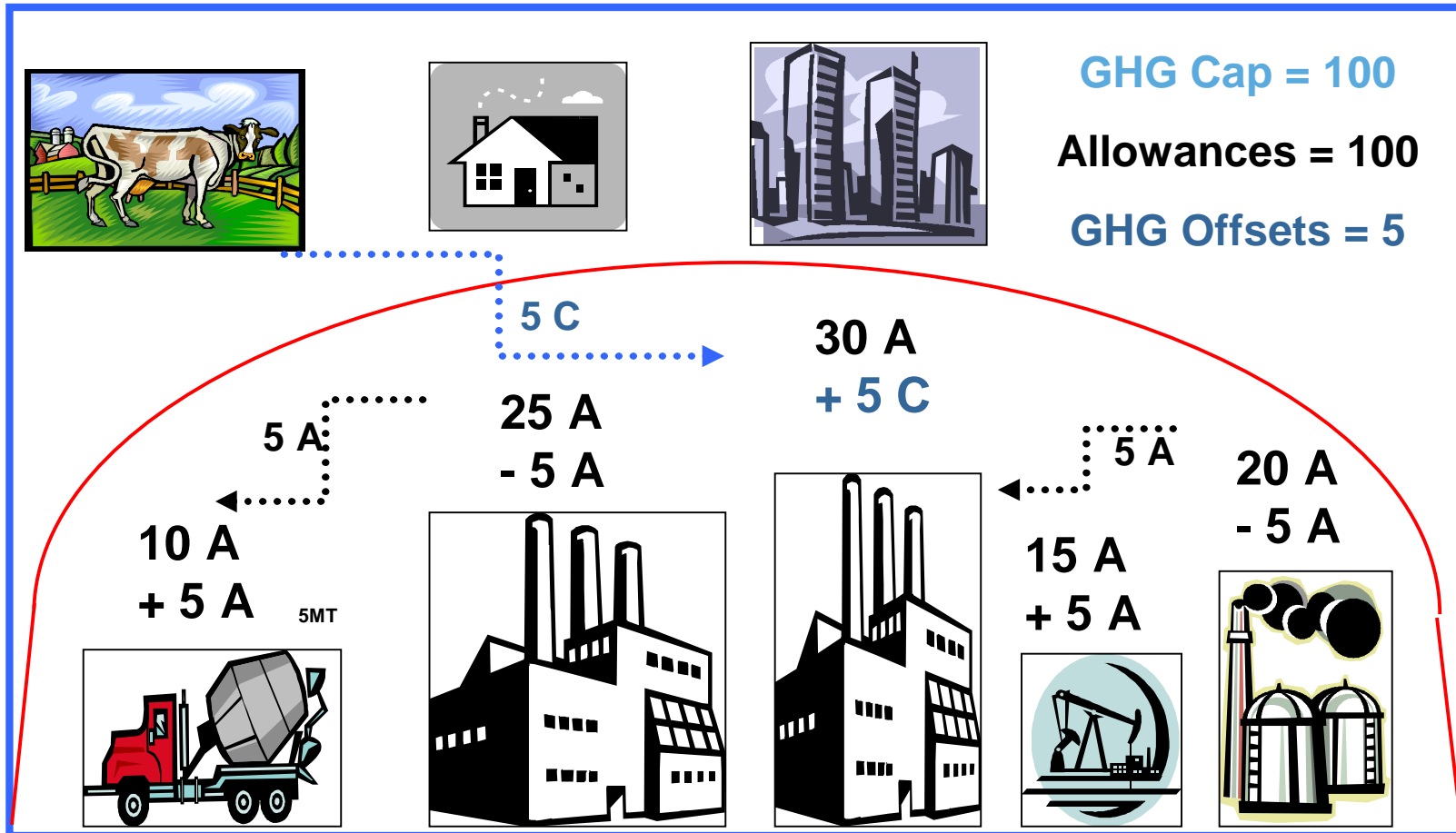
GHG Emissions Cap and Trade



Emissions = 15 MT 20 MT 30 MT 20 MT 15 MT = 100 MT

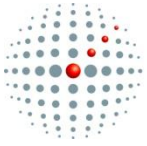


GHG Emissions Cap & Trade and Offsets



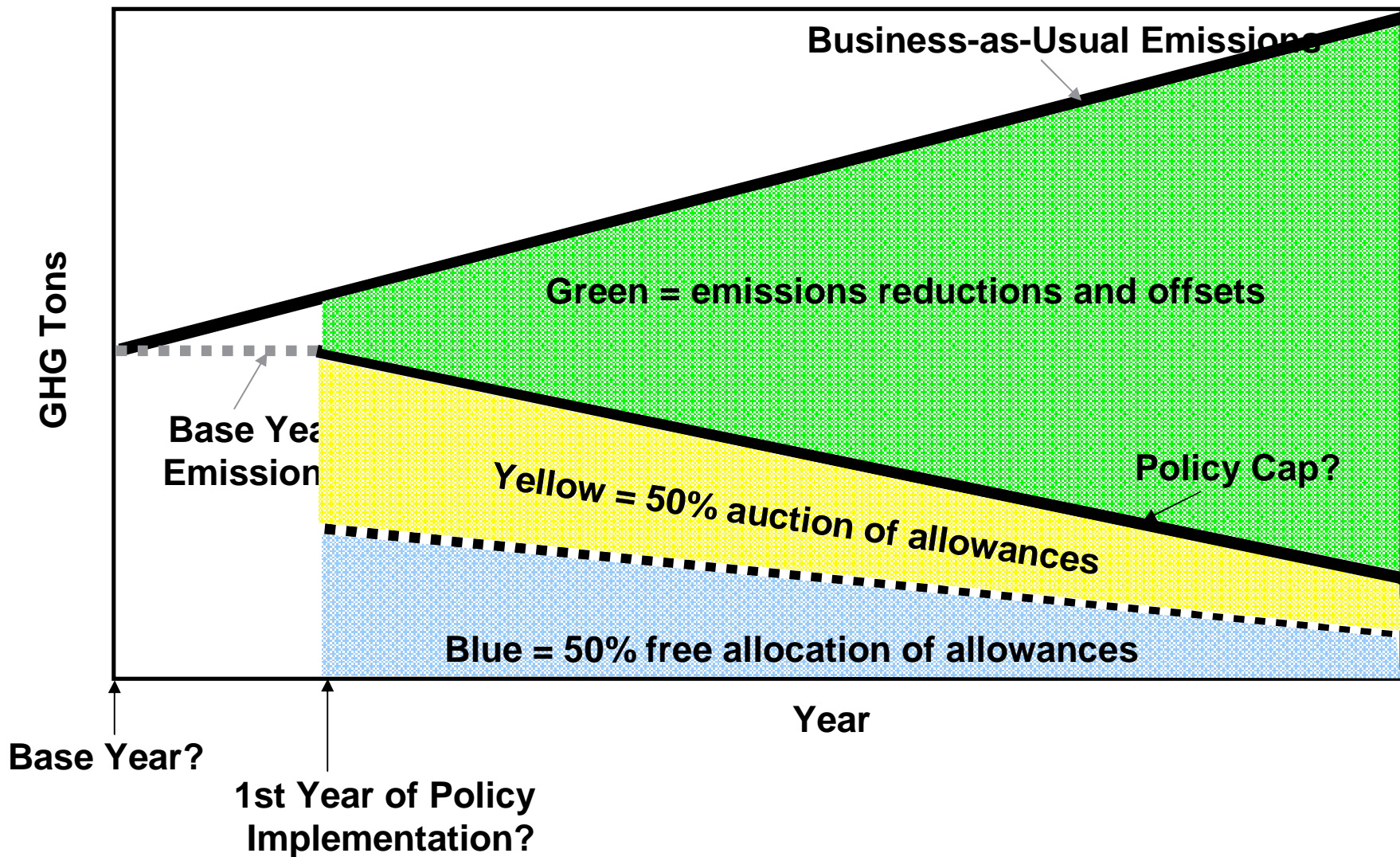
Effect:
Cap Broker
But
Credits from dairy offset imbalance

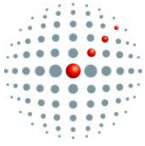
Emissions = 15 MT 20 MT 35 MT 20 MT 15 MT = 105 MT



Multi-Year Illustration of Potential GHG Regulation

Example: 50% Free Allowance Allocation





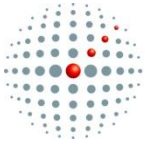
Status of the Kyoto Protocol to the UN FCCC

- The UNFCCC was completed in Rio in 1992, ratified almost universally, and entered force in 1995.
- The Kyoto Protocol, negotiated in late 1997, included the first quantitative emission reduction commitments and formalized three “flexibility mechanisms” for global carbon emission trading, which are now in operation.
- The Kyoto Protocol has not been ratified by the U.S.
- However, it entered force on 16 Feb 2005 following Russian ratification, and now commits 30 countries, which account for ~45% of global emissions, to limit 2008-2012 emissions ~7% below 1990 levels.
- The diplomatic focus is now on post-Kyoto (2013-) emission limits, and how to reengage the U.S. and to treat developing country emissions in the future...



EU Carbon Emissions Trading System (EU ETS)

- **The world's first large-scale GHG trading program, designed to meet EU-27 member state targets under Kyoto.**
 - 12,000 installations in 25 countries, 7 industrial sectors (covers ~50% of CO₂ emissions, other GHGs may be added in the future).
 - Went into effect 1 January, 2005.
 - Phase 1 (2005–2007) was a trial period to work bugs out of the system; but in all respects, it is a mandatory and binding cap-and-trade system.
 - Phase 2 (2008–2012) coincides with the first Kyoto commitment period.
 - Specifications regarding future phases have yet to be established, but the program is intended to run indefinitely.
- **Offers firms flexibility to choose targets, as opposed to command-and-control, across sectors and within companies. Firms with low-cost reductions can sell allowances to sources where reductions would be more costly.**



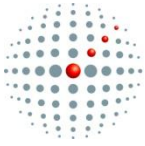
Existing Carbon Markets – the EU ETS dominates

	2006		2007			
	Volume (MtCO ₂ e)	Value (MUS\$)	Volume (MtCO ₂ e)	y-to-y growth rate	Value (MUS\$)	y-to-y growth rate
EU ETS	1,104	24,436	2,061	87%	50,097	105%
New South Wales	20	225	25	26%	224	-1%
Chicago Climate Exchange	10	38	23	124%	72	90%
UK ETS	na	Na				
TOTAL	1,134	24,699	2,109	86%	50,394	104%

EU ETS

- 2 billion EUAs exchanged worth \$50 billion in 2007 (\$24B in '06, \$8B in '05)
- Market prices for the EU-ETS have been volatile
 - In 2005-6, phase 1 prices fluctuated between €8-12 and €20-25 per ton-CO₂
 - Currently at about €20 (for Phase 2 allowances)
- Beginning Phase 2 as of 1/1/2008
 - Auctioning of allowances up to 10%
 - Banking EAU's allowed from Phase II onward
 - Scope – expanded: chemical sector & ammonia producers

http://carbonfinance.org/docs/State_Trends--formatted_06_May_10pm.pdf



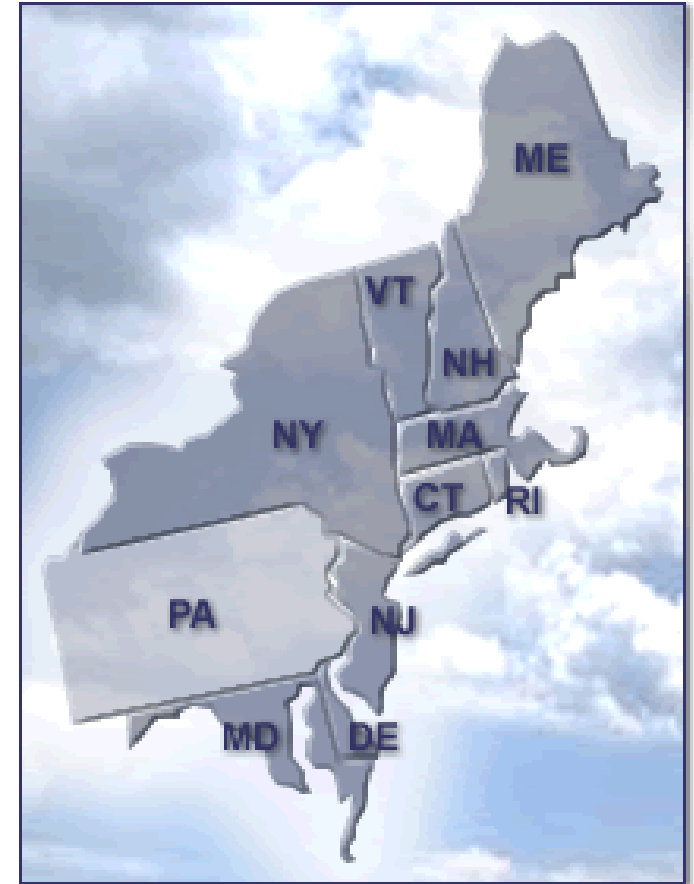
Regional Greenhouse Gas Initiative (RGGI)

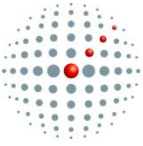
- Regional Cap-and-Trade Program
 - CO₂ emissions generated by **electric power generators**
- CO₂ Budget Trading Program: Jan. 1, 2009
 - Applicability: fossil-fuel fired electric generators 25MW or larger
 - Cap: 1. Stabilize emissions (2009-2014)
 2. Reductions = 2.5% annually (2015-2018)

Result à **10% reduced emissions budget 2018** (vs. 2009)

 - Permitting – Budget emissions monitoring plan
- CO₂ Allowance Auctions: September 25, 2008

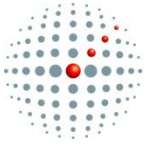
State	Allocation Year 2009 CO ₂ Allowances to be Auctioned	%
Connecticut	1,372,530	11.0%
Maine	872,506	6.9%
Maryland	5,331,781	42.4%
Massachusetts	4,347,534	34.6%
Rhode Island	438,774	3.5%
Vermont	202,262	1.6%
Total	12,565,387	100.0%





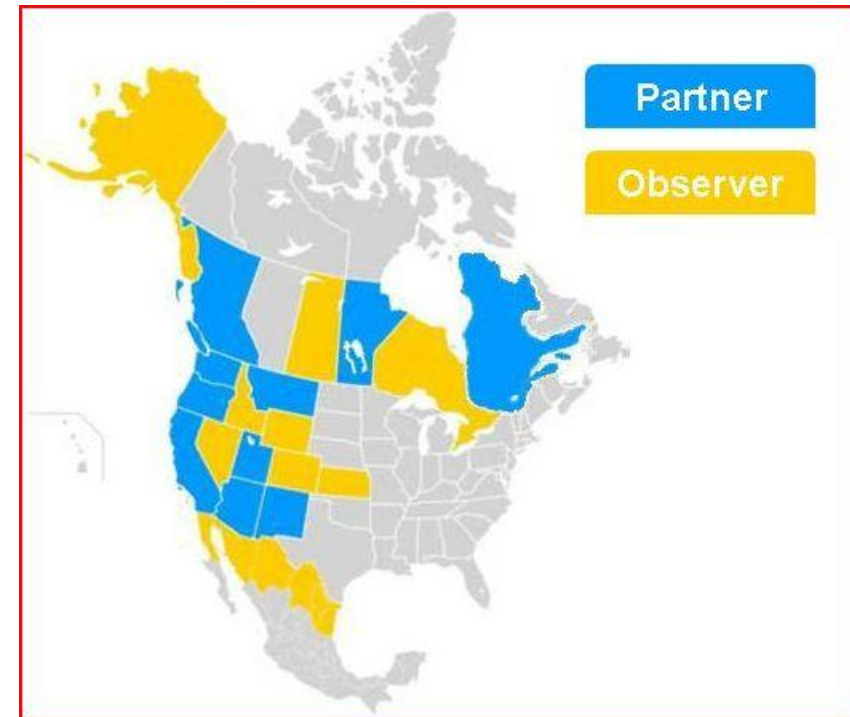
RGGI cont.

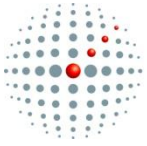
- Early Reduction Allowance (ERA) provision
 - ERAs awarded to CO₂ budget source (not in auction, addition to cap)
 - Application prior to May 1, 2009
 - **Absolute reduction** in CO₂ in early reduction period(2006-2008) versus baseline period (2003-2005)
 - Facility shutdowns are ineligible for early action credit
- Offsets
 - Up to 10% of compliance requirement, at allowance price > \$10/tonCO₂
 - Landfill methane capture and destruction, reduction in SF₆, sequestration due to afforestation, end-use energy efficiency programs in building sector, ag-methane management
 - Must prove regulatory and financial **additionality**
- Temporal Flexibility Mechanisms
 - **Banking** – no restrictions
 - 3 year **compliance period extension**
 - **Price Triggers:** set at \$7 and \$10, allow more offsets, extend compliance period



Western Climate Initiative (WCI)

- Launched in 2007
- Reduction Goals
 - Aggregate reduction: 15% below 2005 levels by 2020
 - Membership Criteria:
 - Adopted an economy-wide GHG reductions goal
 - Developed/developing comprehensive climate action plan
 - Committed to GHG tailpipe standards for passenger vehicles
 - Participating in the Climate Registry
- Initial Thresholds:
 - Reporting: 10,000 metric tons of CO₂e emitted annually
 - Regulation: 25,000 metric tons of CO₂e emitted annually
- July 2008: Draft Design & Essential Requirements for Reporting Released



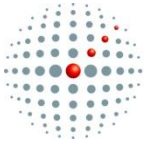


WCI cont.

Draft Design of the cap-and-trade program (7/23)

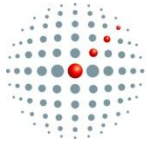
Program start: January 1, 2012

- Scope: first compliance period – **electricity generation, combustion, and industrial processes**; second compliance period – include residential, commercial, and industrial fuel combustion at facilities below WCI thresholds, and transportation fuel combustion
- Facility threshold for regulatory compliance: **25,000 metric tons/year** carbon dioxide equivalents
- Initial Cap: best estimate of **expected actual emissions in initial year** of program & “will recognize early action”
- **Banking is allowed** without limitation
- **No Borrowing**
- **Offset limits – considering 10%**
- Offset Project Types: Agricultural, Forestry, and Waste management - only projects located in the U.S., Canada, and Mexico
- May include allowances from other GHG emissions trading regimes, and may allow CDM/JI credits



Midwest Governor's Association: Energy Initiatives

- Energy Security and Climate Stewardship Platform
 - Goal: “Maximize the energy resources and economic advantages and opportunities of Midwestern states while reducing emissions of atmospheric CO₂ and other greenhouse gases.”
 - Strategies: energy efficiency programs, CCS (including EOR), wind energy, biofuels, fuel supply transportation and infrastructure, regional clean tech
- Midwest Greenhouse Gas Accord
 - Establish GHG reduction targets/timeframes, multi-sector cap-and-trade development, join the Climate Registry, and develop additional mechanisms like a low-carbon fuel standard and incentives and funding mechanisms
 - Enable linkage, credit past and current emissions reductions efforts, address integration with federal policy



California Climate Policy

California (the world's sixth largest economy) has an array of recent climate-related legislation

The Pavley bill AB 1493 (2002) set a standard for emission rates from vehicles

- >10 other states support the standard
- Pending Supreme Court ruling on Federal preemption before standards will go into force

AB 32 (2006) sets a statewide target to return emissions to 1990 levels by 2020

- Cap-and trade system and other regulatory structures now being designed

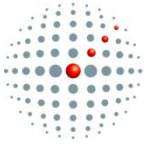
SB 1368 (2006) sets a standard for the carbon intensity of power produced in or imported to CA

Low carbon fuel standard requires petroleum refiners and gasoline sellers to cut GHG emissions of the fuels they sell by 10 percent

SB 1037 (2006): Loading order for utilities is cost-effective energy efficiency before new power plants or transmission lines, efficiency targets established

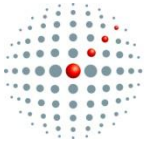
AB 2021: CEC must establish 10 year statewide EE targets for municipal utilities

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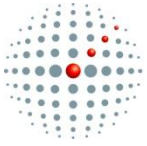
AB 32 – California Global Warming Solutions Act of 2006

- Comprehensive regulatory *and* market mechanisms
 - à Real, Quantifiable, Cost-effective GHG Reductions
- Governor can invoke a safety valve in time of “extraordinary” circumstances
- Preliminary Recommendations (Draft Scoping Plan, June 2008)
 - Expansion and strengthening of existing **energy efficiency programs** and building and appliance **standards**;
 - Expansion of the **Renewable Portfolio Standard from 20% to 33%**
 - Develop cap-and-trade state program to link with other WCI partner program
 - à **regional cap-and-trade program**
 - Implement existing State laws and policies: clean car standards, goods movements measures, and the **Low Carbon Fuel Standard**
 - Targeted fees to fund the AB 32 administration in the long-term



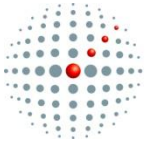
Florida – Electric Utility GHG Reduction Program

- Executive Order 07-126: “Leadership by Example: Immediate Actions to Reduce Greenhouse Gas Emissions from Florida State Government.”
- Reduction Goals
 - § 10% reduction from current emissions levels by 2012
 - § 25% reduction from current levels by 2017
 - § 40% reduction from current levels by 2025
- Energy Assessment for 2006-2007 = baseline → Greenhouse Gas Reduction Scorecard
- Building Standards: LEED-NC for all new buildings and LEED-EB for all currently owned
- New leasing agreements must meet Energy Star building standards
- Energy conservation measure and guidelines for new and existing office space occupied by state agencies that exceed 20,000 sq. feet



Other State Climate Policy Activities

- Hawaii Global Warming Solutions Act of 2007: State must reduce GHG emissions to 1990 levels by 2020
- New Jersey Global Warming Response Act of 2007: Requires State to reduce GHG emissions to 1990 levels by 2020, and 80% below 2006 levels by 2050
- Minnesota Next Generation Energy Act of 2007: Sets statewide GHG reduction goals: 15% by 2015, 30% by 2025, 80% by 2050
- Oregon HB 3543 requires the State to reduce GHG levels 10% below 1990 levels by 2020; 75% below 1990 levels by 2050
- Washington SB 6001, signed into law 05/03/07, requires the State to reduce GHG emissions 25% below 1990 levels by 2035
- Both Oregon and Washington have CO2 emission standards for new power generation facilities that are lower than the emission rates for a CCGT; thus require offset purchases for compliance.

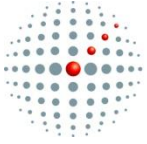


Chicago Climate Exchange - CCX

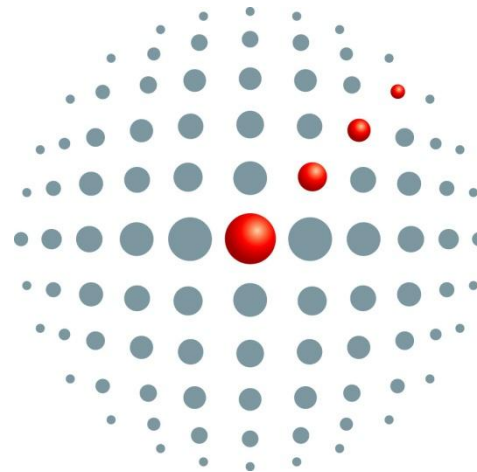
- Voluntary and Legally Binding Commitments, launched in 2003
- CFI contracts – Carbon Financial Instruments = 100 metric tons of CO₂e

- Commitment: 6% reductions from baseline (1998-2001) by 2010
- 2007 Volume: 23 MtCO₂e (2X 2006)
- Value: \$72 million

- According to the WWF Comparison of Offset Standards:
 - § No formal definition of additionality
 - § CCX Offsets Committee determine project eligibility
 - § Highly unusual practices



Thank you!



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