



Center for
Clean Air Policy

Sector-Based Approach for “Post-2012”

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Presentation Outline

- | Sector-based approach
 - » What is it?
- | Overview of sector GHG emissions and projections
 - » Global, Non-Annex I
- | Overall structural options
 - » Sector-wide & Country-based sectoral
- “Straw” sector proposal
 - » Covered sectors and countries
 - » Establishing the “No Lose” Target
 - » Technology Finance Package
 - » Application to Developed Countries, Emissions Trading/CDM
- | Sectoral Program’s potential to maintain 450ppm path
 - » Three Global Scenarios & Preliminary Results



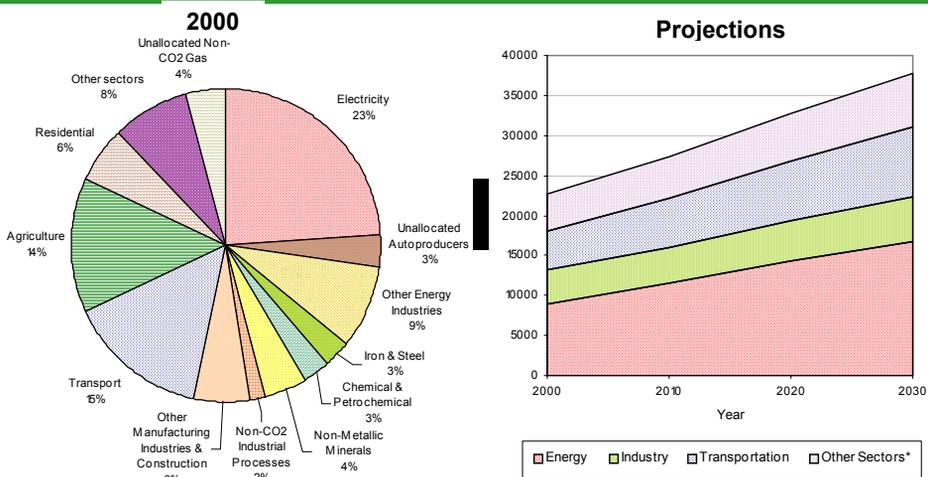
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What is a Sectoral Approach to Post-2012 GHG Reductions?

- | Bottom-up method for encouraging developing country sectoral (e.g. steel, cement, electricity) pledges and for deriving Annex I country targets
- | Based on analysis of what is technologically feasible and economically cost-effective in each industrial sector both globally and in each country
- | For developing countries, goal is no-lose target – pledge to reach intensity level in given sector, rewarded if achieved, no penalty if not achieved
- | For A1, creates building block for next national target

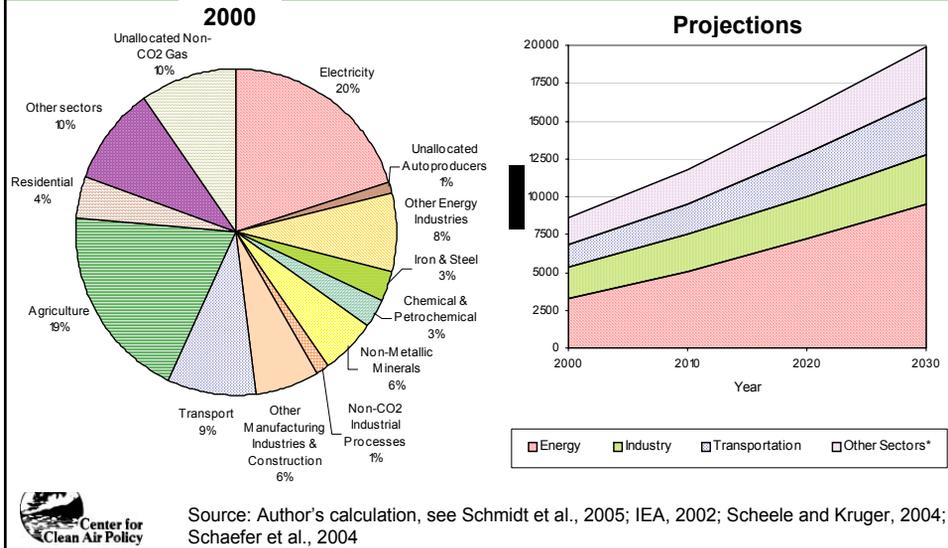


Global Sector GHG Emissions (without LUCF) & Sectoral CO₂ Projection



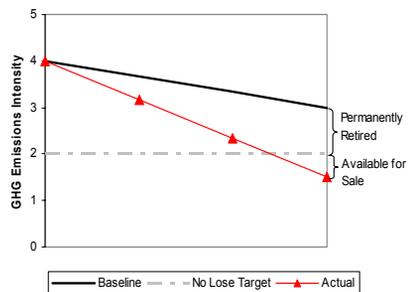
Source: Author's calculation, see Schmidt et al., 2005; IEA, 2002; Scheele and Kruger, 2004; Schaefer et al., 2004

Non-Annex I Sector GHG Emissions (w/o LUCF) & Sectoral CO₂ Projection



Establishing the "No-Lose" Sector Target

- | A voluntary "no lose" intensity target (e.g., CO₂ / ton of steel) is established
 - » No penalty for not meeting the pledge
- | Emissions reductions beyond the "voluntary pledge" are eligible for sale
 - » As emissions reductions credits (ERCs) for sale to developed countries
 - » Voluntary intensity target effectively becomes the country's CDM baseline



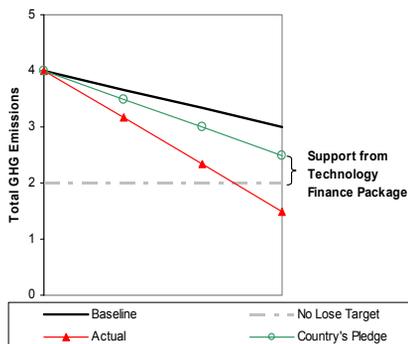
“Technology Financing and Assistance Package”

I “Technology Finance Package”

- » available to encourage more aggressive “no lose” target
- » Package could include G-8 style assistance:
 - commitments to demonstration
 - a pool of concessionary financing with WB, ECAs, loans, grants, & securitization
 - etc. (more later in Dialogue)

I Multilateral or bilateral?

I Scope of amount based upon bottom-up assessment in targeted sectors



Negotiation Process

I Negotiation of the program could proceed as follows:

- 1) Agree on which countries will participate – minimum global coverage needed in each sector
- 2) Independent agency defines BAT-like energy intensity benchmark for a given sector as starting point for negotiations – a la Triptych EU process
- 3) Negotiate a GHG intensity using such factors as the energy intensity BAT, fuel mix, and cost – one for new facilities and one for existing in each sector
- 4) Link the program to a technology finance package – assistance from tech finance is incentive to stronger pledge levels
- 5) Link to Annex I target setting process
- 6) Agree on structure of trading, link to CDM



Key Operational Questions?

- | What sectors?
- | Country-based or Industry-based?
- | Structure of the target?
- | Creation of emissions reduction credits?
- | What role for Annex I?
- | Role and structure of a “technology financing and assistance package”?
- | How does the sectoral pledge and financing package relate to the CDM?



Which Sectors Covered?

- | Program could focus on the Energy and Major Industry Sectors
 - » electricity, iron & steel, oil refining, cement & lime, paper, pulp & printing
 - » relatively small number of entities, easier data collection, relatively homogenous products (except oil refining and pulp & paper), and operate in international trade (except electricity)
 - » 32% of non-Annex I emissions (2000; w/o LUCF)
 - » 15% of global emissions (2000; w/o LUCF)
 - » Bottom-up definitions (e.g., electricity facilities >20 MW) used to define individual facilities involved in the system
 - » Only direct emissions (e.g., on-site fuel combustion) included for the sectors

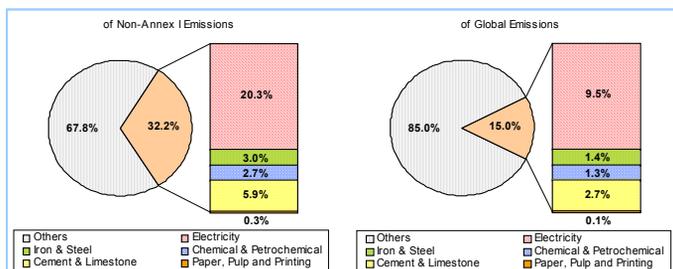


Figure 2. Share of non-Annex I and global emissions attributed to sectors in the proposed program

Source: Schmidt et al. 2005; authors' calculation



Sector Coverage (2)

- | Other sectors (transportation, residential & commercial)
 - » eligible to participate in project- or sector-based credit generation mechanism (e.g., Sector-CDM)
- | OR Sectoral approach for transportation and LUCF?
 - » Transportation sectoral approach options include:
 - Greenhouse gas vehicle standards
 - Alternative fuel standards
 - Upstream regulation of oil refineries.
 - » LUCF sectoral approach could involve the development of “targets” based upon country-wide net carbon flows.
 - The key question is how to handle different deforestation rates.

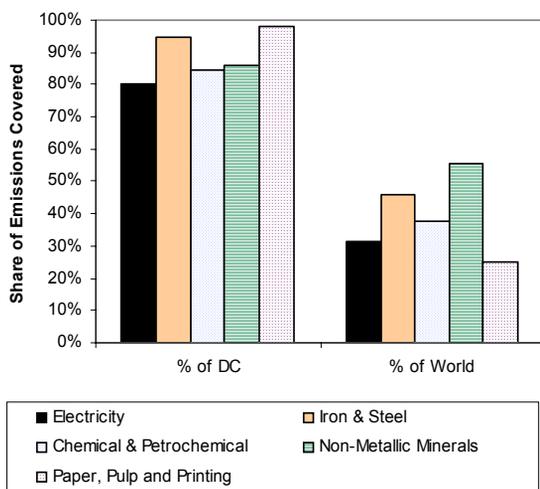


Country – based Structure

- | Program will aim to include all major developing countries, but at least 80% of sector’s emissions
- | Variety of approaches could be used:
 - » All countries
 - » Ten developing countries w/ the highest emissions in each sector
 - » Sufficient countries to cover 80% of sector’s DC emissions
- | Key is to cover enough of the sector to address leakage concerns
- | Select internationally competitive industry sectors - for many sectors, small number of countries account for a large share of emissions
 - » What if one key country holds out?
 - » What if other countries want to opt in?



Possible Thresholds: "Top 10"



Share of Non-Annex I and World Emissions from the Covered Sectors Accounted for by the Ten Highest Emitting Non-Annex I Countries for each Sector in 2000



Source: Author's Calculation based upon data in Schmidt et al., 2005

Alternative Structure: Global Industry-based

- | Covers all or major actors in the global sector to address concerns of
 - » Leakage: e.g., firms moving operations from covered to non-covered countries
 - » Competitiveness: e.g., one firm is covered, but its competitor are not
- | Can be managed similarly to a country-based approach that involves all or all major countries
- | Enforcement
 - » Countries responsible for companies in their jurisdiction OR
 - » New international legal framework?



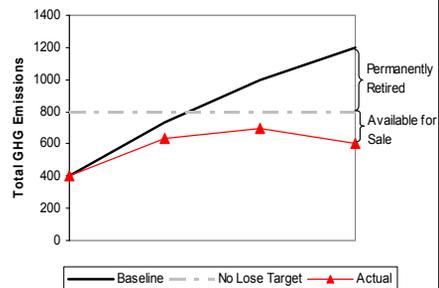
How is the Target Established?

- | Independent agency (e.g., IEA) assesses and defines a best available technology (BAT) benchmark using commercially available technology.
 - » Defined as energy intensity of commercially available technology
 - » Updated every 7 years (similar to the CDM)
- | Participating countries “pledge” a GHG intensity target (e.g., GHG / ton of steel) for each sector based upon the BAT benchmark, fuel mix, and cost impact of chosen level
- | Based on:
 - » New facilities: BAT intensity
 - Could also be based upon support of “technology financing and assistance package” given difficulties in accessing BAT for new facilities
 - » Existing facilities: negotiation of the “technology financing and assistance” package that reflects the pace that existing facilities retired or retrofit cost effectively
- | Likely negotiation will produce different “no lose” targets for each country



Emissions Trading

- | Emissions Reduction Credits (ERCs)
 - » Earned sector-wide; managed by individual participating countries
 - » Need to be converted from rate-based to a fixed quantity of reductions
- | Ex-post conversion conducted every two years
 - » ERCs equal difference b/t “no lose” target and actual intensity target multiplied by actual operations in previous two years
 - » Therefore ERCs calculated two years into the five year target period and at the end
- | ERCs eligible into other trading systems (e.g., EU ETS)



Developed Countries

- | Retain “hard economy-wide targets” – use BAT Benchmarks as building block similar to the EU Triptych approach
 - » Bottom-up development of the sectors AAUs (e.g., national allocation plans) using the BAT energy-intensity benchmark
- | Requiring BAT Benchmark in A1 as a minimum threshold for new facilities
 - » “Levels the playing field” since the covered sector in both developing and developed countries have the same minimum requirement
- | Trading allowed to provide covered sectors flexibility to improve cost-effectiveness, helps to offset disadvantage that DCs have sectoral intensity targets rather than hard targets



“No Lose” Target and CDM

- | New pledge process would replace CDM in the sectors and countries participating developing countries
 - » ERCs in these sectors generated by exceeding the sectoral intensity target
- | For sectors not included in the proposal, CDM would proceed as in the past
- | For countries not participating in sectoral pledge:
 - » Energy-intensity benchmark developed in pledge process would become minimum threshold for CDM baseline for new facilities
 - » CDM Meth process would continue to set precedents for the final CDM project baseline on a project, country, or regional basis as appropriate
 - » Sectoral pledge could create a new sectoral CDM process for these countries



Alternative Sectoral Designs

- | Process outlined could be viewed as too complex to negotiate
- | Similar advantages might be gained by other alternative approaches to sectoral focus:
 - » Negotiate sectoral approach to electricity as outlined above, cover other sectors via a sector-based, standardized baselines approach to CDM where all facilities in a given sector are included in the program
 - » Develop agreement on harmonized policies and measures for key sectors – e.g. renewable portfolio standard for all countries, global automobile efficiency standards, etc.



Emissions Implications of the Sectoral Program

- | “Top-down” analysis conducted by ECOFYS
 - » Evaluated implications of sector-based proposal on emissions level in key countries & global CO₂ stabilization trajectories
- | Data, Sectors, & Countries used in the analysis
 - » Data: physical production, energy use, and GHG emissions
 - » Sectors: electricity, iron & steel, cement
 - ➔ 91% of emissions covered in this proposal
 - » Countries:
 - Annex I: EU-15, USA, Japan, Canada, Russia
 - Non-Annex I: Brazil, China, India, Mexico, South Africa, South Korea
 - ➔ 72% of total global emissions; 79% of three sectors’ global emissions
- | Three Global Scenarios
 - » “Mild,” “Strong,” and “Sectoral Only”



Three Global Scenarios

Scenario	Condition	
"Mild"	Annex I excl. USA	-15% below 1990 level in 2020
	USA	+10% above 1990 level in 2020
	Non-Annex I	Reference
"Strong"	Annex I excl. USA	-30% below 1990 level in 2020
	USA	+0% at 1990 level in 2020
	Non-Annex I	"Sectoral" for electricity, iron & steel and cement
"Sector only"	All countries	"Sectoral" for electricity, iron & steel and cement

Electricity	Reduce carbon intensity of production (C/kWh) by 3% per year; growth in electricity production reduced by 0.5% for EE improvements
Iron & Steel	Convergence in CO ₂ /t steel by 2025 to 0.80 (today's avg. 1.63)
Cement	Convergence in CO ₂ /tcement by 2020 to 0.60 (today's avg. 0.78)

- | Annex I countries' economy-wide emissions are limited to fixed quantities
 - » NOT implied that emissions reductions must be achieved
 - » Domestic emissions could exceed these levels if additional ERCs were purchased
 - Annex I countries can purchase ERCs from both covered sectors w/ "No Lose" target or other sectors (e.g., transportation through sectoral CDM)



Preliminary Results: Through 2020

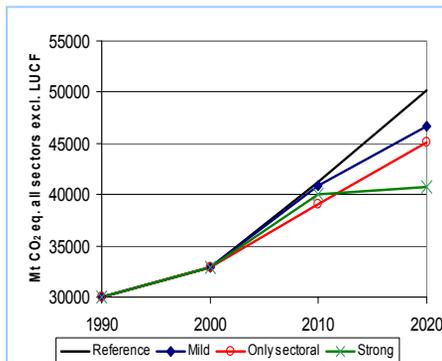


Figure 7. Global GHG Emissions Under the Sector Analysis
Source: Höhne et al., 2005

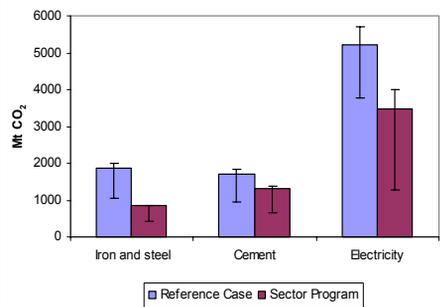
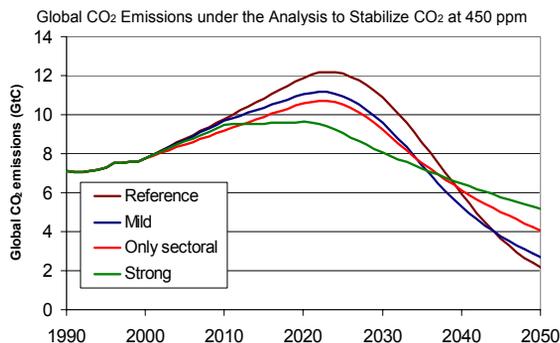


Figure 8. Sector Emissions Levels in 2020 Achieved in Non-Annex I Countries in Electricity, Cement, and Iron & Steel
Source: Author's calculation; Höhne et al., 2005



Implications for Emissions Stabilization Levels: Preliminary Results



- | Required reductions for global CO₂ stabilization levels after 2020:
 - » 450ppm: Strong 6.5% per year; Mild: 2.2% per year
 - » 550ppm: Strong 0.9% per year; Mild: 0.6% per year



Source: Höhne et al., 2005

Conclusions and Key Questions

- | Sectoral No-Lose target approach can maintain needed progress in 2020 to stay on course for 450 ppm CO₂ concentration goal provided A1 countries take strong targets for 2020
- | No-lose target has political and cost-effectiveness attractions – simplifies current CDM issues
- | Involving the broadest set of countries and under what structure for each country?
- | Inclusion of which sectors and under what structure for each sector?
 - » Electricity and major industry sectors?
 - » LULUCF?
 - » Transportation?
 - » Others?
- | Key to negotiating DC pledges lies in design of technology finance package & individual negotiations
 - » What will the G8 financing package look like? What are the appropriate “carrots” for encouraging aggressive targets?



References

For more information, visit our website:
www.ccap.org/international/future.htm

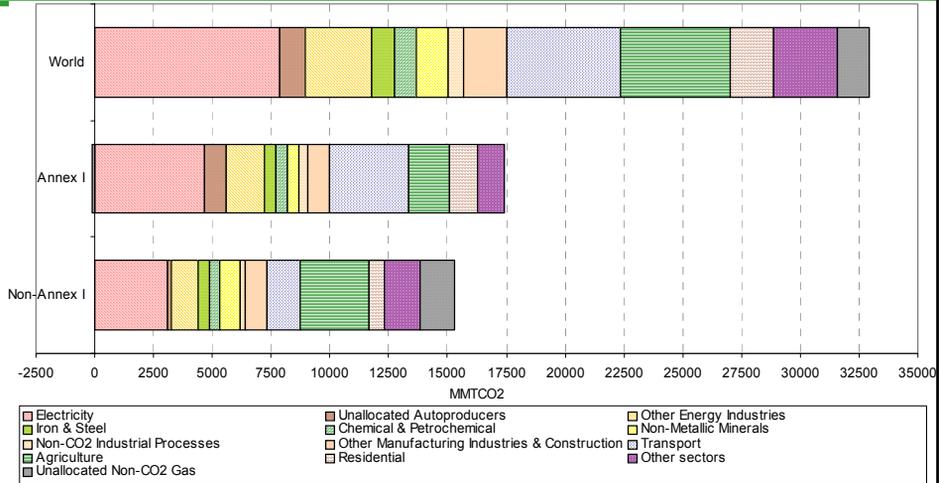
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Appendix A: Global Sector Emissions



Global Sector Emissions in 2000 (without LUCF)



Source: Author's calculation, see Schmidt et al., 2005; IEA, 2002; Scheele and Kruger, 2004; Schaefer et al., 2004