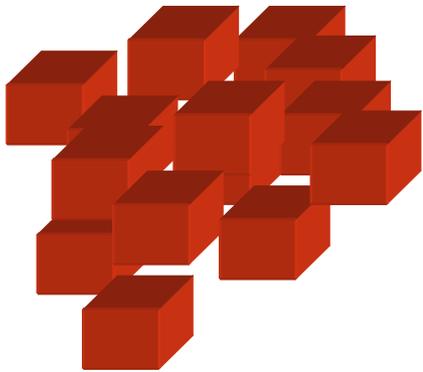


2010 SUMMER COURSE

Climate Change: Zooming in the problem and its solution

Climate Change and Energy

Paulina Beato



San Sebastián, July 21, 2010

Contents

- **Introduction**
- Global Public Good
- Energy versus non-energy emissions
- Copenhagen Agreement
- EU Climate Change and Energy
- Integrating Relevant Issues
- Concluding Remarks

Introduction

The four main points of this presentation are the following

- Climate change is a global public good, which means:
 - low incentive to reduce individual emissions
 - that participation of world larger emitters is required and cannot be imposed
- Strategies for stabilizing world's emissions should focus on reducing energy-related emissions
 - Their current and expected participation on total emissions is huge
- Non-energy emissions and other elements must go into the picture as proposed in the Copenhagen Agreement
 - They provide incentives for the participation of large emitters
- Moving forward with the Copenhagen Agreement requires developing these other elements
 - The EU Climate Change Package for energy must take care of such new elements

Introduction

The organization of the presentation is the following

- First, we analyze the climate as a global public good and look at the requirements for dealing with such “**good**”
 - Efficiency, flexibility, enforceability, flexibility
- Second, we see figures on energy and non-energy emissions
 - Energy emissions are huge, but other emissions are important in emerging markets and their reduction is cheaper than the reduction of energy ones
- Third, we discuss to which extent Copenhagen Agreement is the germ of a good mechanism
 - It may be the germ, but it must be completed
- Fourth, we set ideas on how to advance in Copenhagen Agreement taking into account EU Climate change policies
 - Integration of CO2 markets seems a priority

Contents

- Introduction
- **Global Public Good**
- Energy versus non-energy emissions
- Copenhagen Agreement
- EU Climate Change and Energy
- Integrating Relevant Issues
- Concluding Remarks

Climate as Global Public Good

Climate is global public good

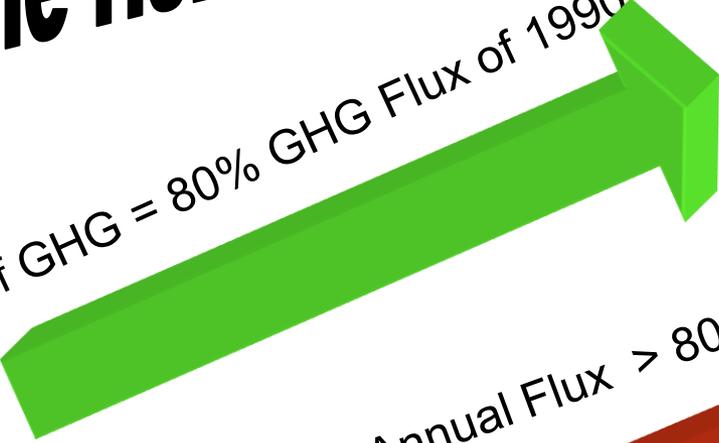
- All persons living in the future will benefit of climate stabilization independently of each person's contribution to avoid increasing temperatures
 - People making efforts now will not see the benefits because the bad climate will come later
 - We are not sure which generation will benefit because we do not know when benefits or costs will occur
 - Individual efforts are useless because no profits will arise without the efforts of many people
- Market fails to achieve an optimal reduction of emissions
 - As it fails for the production of other public goods as defense or public light
 - The reason is that there is no possibility to exclude from their use to those that do not pay for it
 - Other mechanisms are needed

Climate as Global Public Good

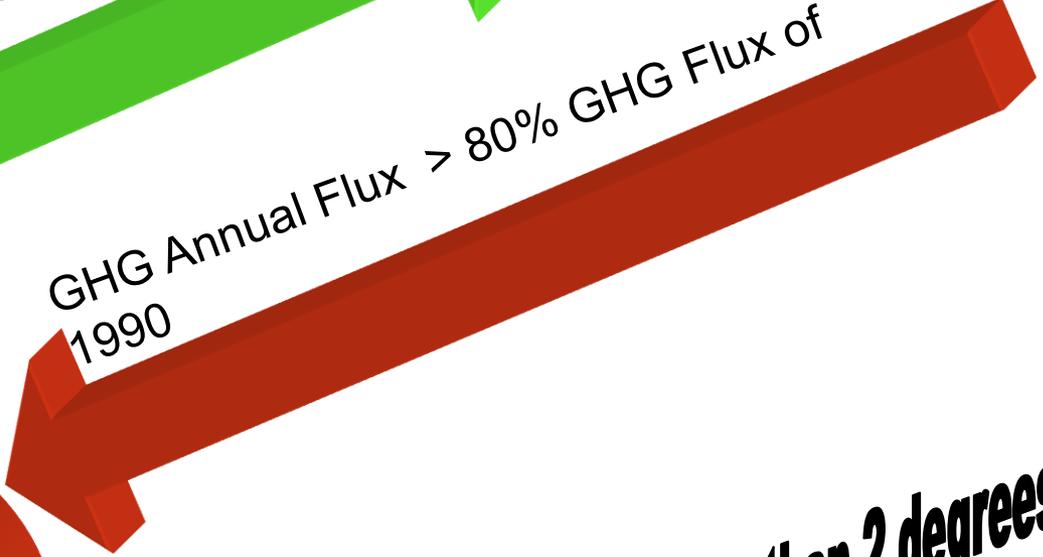
- Designing and implementing a mechanism that efficiently limits the emissions and distributes the costs among actors is a difficult job
 - Much difficult than implementing a mechanism to provide defense or *public lights*
- A mechanism to reduce emissions has the same problems of mechanisms to produce public goods, and three additional ones
 - A world-wide agreement is needed in a world without a Global Government but with National Governments
 - Country equity issues due to different perception of the role of past damages and level of income for distributing costs
 - Intergeneration equity issues due to the asymmetry between benefits and costs across generations

Where is the risk?

Absorbing Capacity of GHG = 80% GHG Flux of 1990



GHG Annual Flux > 80% GHG Flux of 1990



Now:
280ppm



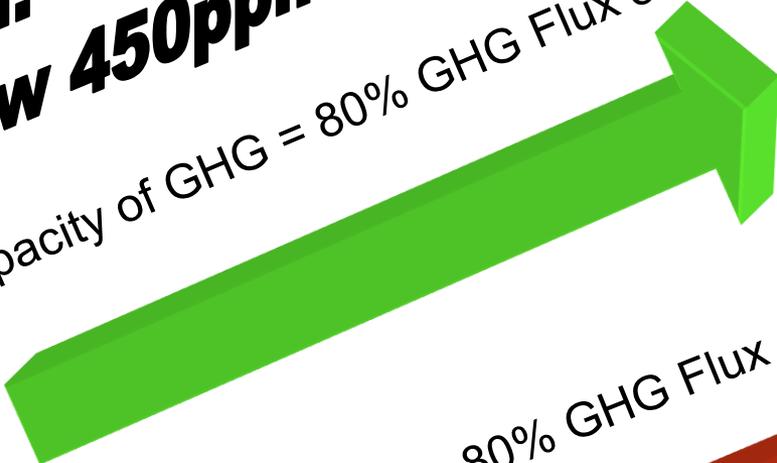
Stock GHG
larger than
450-500 ppm



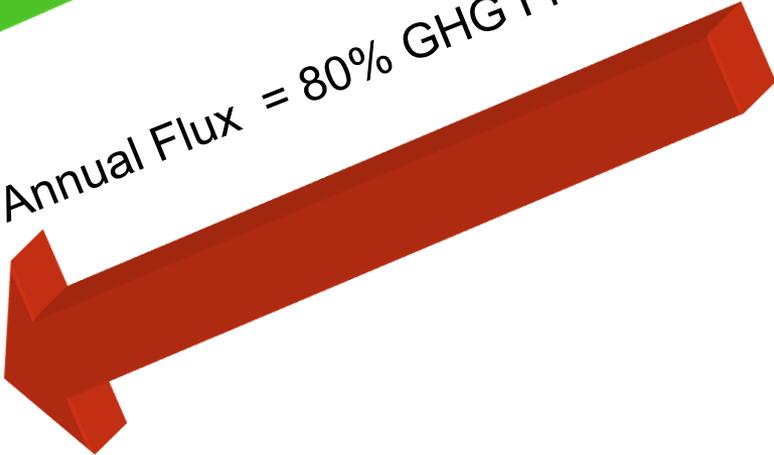
Temperature might go up more than 2 degrees

**The goal:
stabilization below 450ppm**

Absorbing Capacity of GHG = 80% GHG Flux of 1990



GHG Annual Flux = 80% GHG Flux of 1990



Stock GHG
Smaller than
450-500 ppm

In which year?

Issues for a global agreement

What features should a global agreement have to ensure stabilization of GHG stock?

- **Efficiency**
 - The cost of reducing emissions must have minimum cost. This means taking into account the costs of reducing emissions with old and new technologies
- **Equity**
 - The distribution of costs and benefits among world citizens and generations should be fair
- **Flexibility**
 - It should include mechanisms for adapting the path of emissions to scientific and technological advances
- **Enforcement**
 - The fulfillment of commitment of emissions reduction must be ensured. This means:
 - supervision mechanisms; and
 - punishment tools

Issues for a global agreement

Efficiency is a function of many variables and has large uncertainty

- Two extreme cases show the close relation between efficiency and technological path
 - Lack of new technologies
 - » The cost of stabilizing emissions would be smaller, the earlier investment in emission reduction start
 - » All new investment will use the cleanest technologies among the existing ones
 - Certainty on the appropriate technical progress
 - » If we would know than in 10 years a new and cheap technology will be able to eliminate CO₂,
 - » Efficiency would recommend to ensure than in the next 10 years concentrations are below 450ppm and using the new technology after 10 years
- The expected path is different from those extreme cases
 - New and cleaner technologies will likely be available
 - Having available a magically clean technology has low probability

Issues for a global agreement

Equity is a central issue

- The current stock of GHG mainly comes from emission on industrialized countries
 - Emerging countries demand the right to accumulate a similar stock in the future
 - But if emerging countries make such level of emissions, the risk of increasing temperatures may be too large
 - In addition, emerging markets are more vulnerable than industrial ones in terms of drought and floods
- Intergenerational equity is also an issue
 - Emission reductions benefit future generations, but costs are supported by previous generations
 - If present generations are making efforts investing in new technologies, they may claim the right to make emissions today
 - But, what would happen if efforts on new technologies do not become successful?

Issues for a global agreement

Intergenerational equity and technological path of innovation demand flexibility

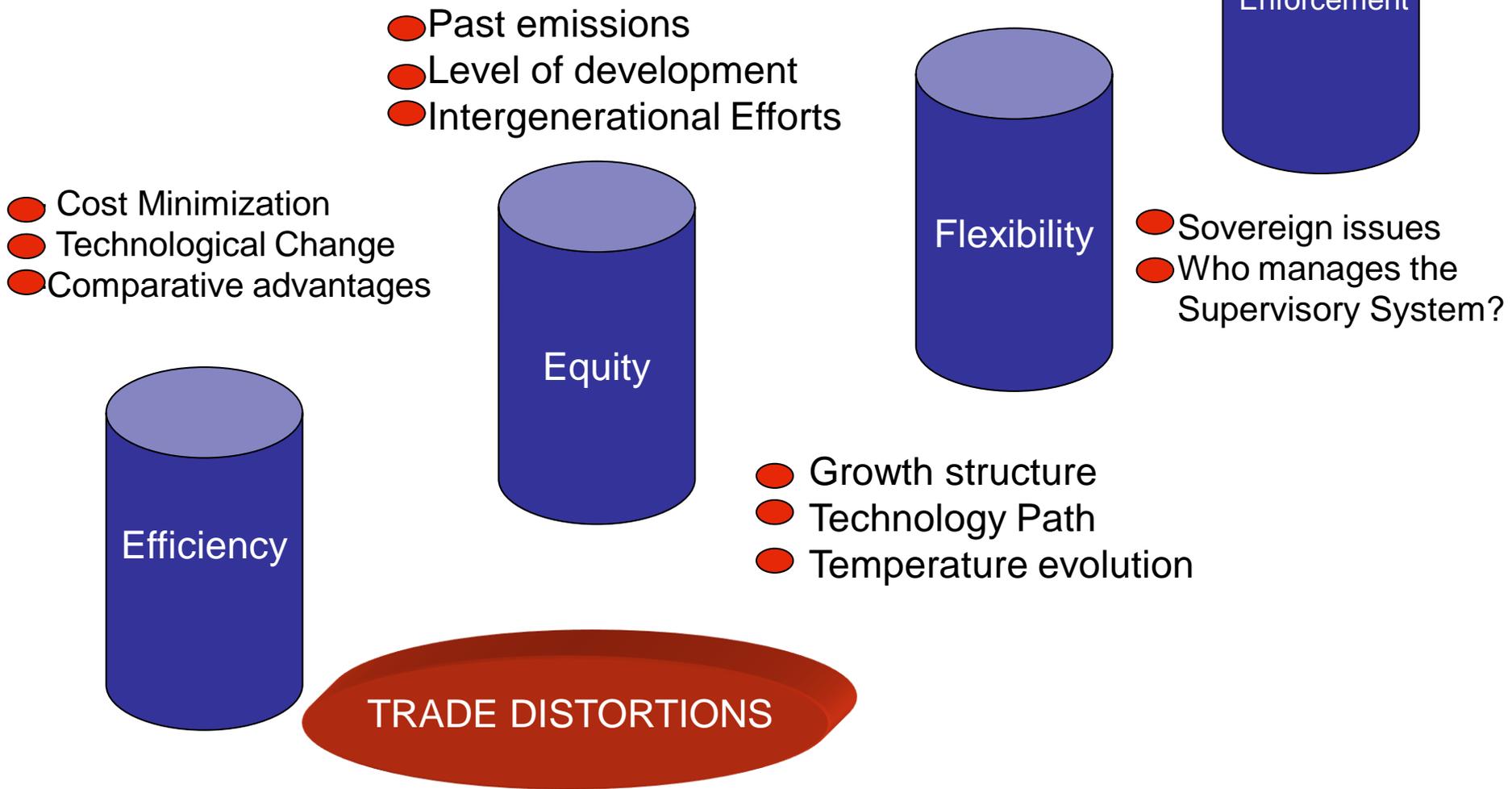
- Global agreements should be revised to adapt commitment to technological advances
 - If more technological advances allow more emissions
 - Efforts on R&D will be larger
- Advance of temperature predictions may change the appropriate emissions' target, but it may reinforce the need of adaptation measures
 - Island and agriculture adaptation is quite sensible to temperature

Issues for a global agreement

Enforcement of commitments

- Lack of enforcement is a major issue
 - It was one of the reasons alleged by USA for not signing the Kyoto Protocol
 - Copenhagen Agreement accepts enforcement mechanisms, but does not specify their features
- Countries are quite reluctant to accept enforcement mechanisms
 - Such mechanisms may jeopardize a country's sovereignty
 - The management of supervisory systems is a major point
 - The establishment of penalties is another

Issues for a Global Agreement



Contents

- Introduction
- Global Public Good
- Energy versus non-energy emissions
- Copenhagen Agreement
- EU Climate Change and Energy
- Integrating Relevant Issues
- Concluding Remarks

Energy versus non-energy related emissions

- World energy related emissions represent 65% of world total emissions
 - Therefore, efforts for limiting world emissions mean dealing with energy
- Industrial country participation of energy related emissions is even larger
 - 88% in USA and 82,3 % in EU (27)
- Moreover, the participation of energy related emissions increased
 - from 64.5% to 65.8% in period 2000-2005
- Therefore, if world emissions must be reduced, energy emissions are the first candidate

World Total GHG Emissions

	2000		2005	
	MTCO ₂ e	%	MTCO ₂ e	%
Energy	24,774.2	64.5	28,435.9	65.8
•Electricity & Heat	10,320.8	26.9	12,335.8	28.6
•Manufacturing & Construction	4,486.9	11.7	5,230.1	12.1
•Transportation	4,836.8	12.6	5,369.0	12.4
•Other Fuel Combustion	3,532.3	9.2	3,753.6	8.7
•Fugitive Emissions	1,597.4	4.2	1,747.4	4.0
Non-energy	13,625.1	35.5	14,754	34.2
•Industrial Processes	1,369.4	3.6	1,883.9	4.4
•Agriculture	5,729.3	14.9	6,075.2	14.1
•Land-Use Change & Forestry	5,165.9	13.5	5,376.2	12.4
•Waste	1,360.5	3.5	1,418.7	3.3
Total	38,399.3	100	43,189.9	100

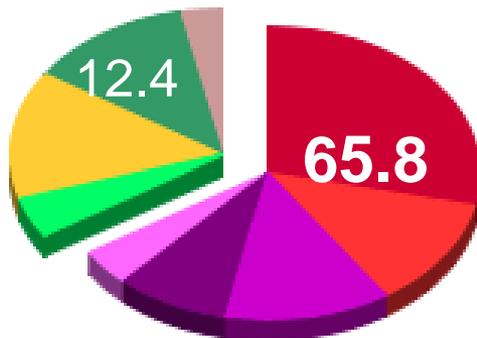
Energy versus non-energy related emissions

Other emissions as change of land use and forestry are important

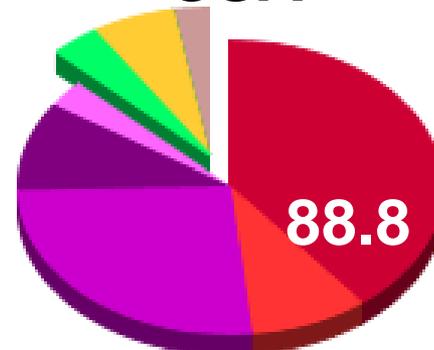
- Reducing non-energy emissions to 1000 MTCO₂ implies a 13% reduction on the 2005 total emissions
- Emissions from change of land use and forestry are quantitatively important in some regions: specially LAC, but also in Asia
- These regions have low emissions and low income per capita
- They also have relatively low responsibility on past emissions
- However, these regions have an important and increasing share in total emissions, in fact China is now the first emitter

Energy versus non – energy related GHG Emissions 2005

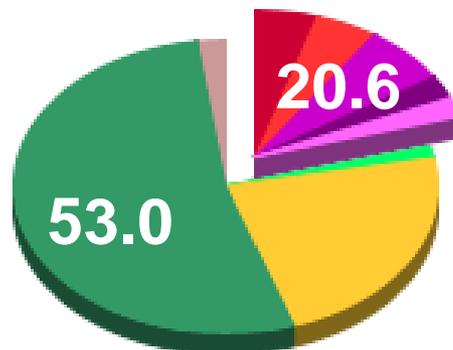
World



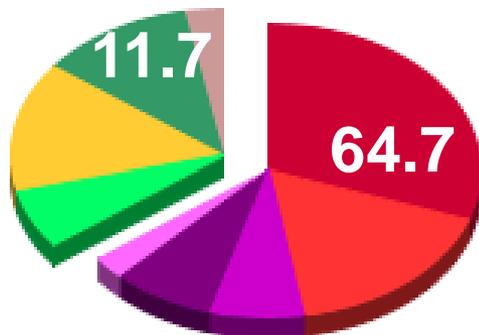
USA



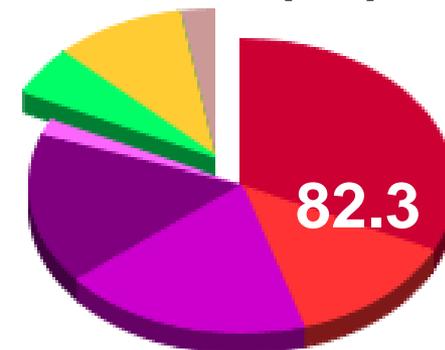
South America



Asia



EU (27)



Countries with low income and low emission per capita fear to jeopardize growth by accepting commitments for reducing emissions

	Income per Capita 2005		Emissions Per Capita 2005	
	US\$	Rank	MT CO2	Rank
China	4524	(106)	5.5	(82)
United States	42672	(8)	23.5	(9)
European Union (27)	27642	(27)	10.3	(43)
Russian Federation	12797	(57)	13.6	(22)
India	2416	(129)	1.7	(149)
Japan	31041	(23)	10.6	(39)
Brazil	8745	(77)	5.4	(85)
Mexico	13025	(23)	6.2	(73)

Accumulated Energy related GHG Emissions in 1850-2005

(excludes land use change)
CO₂, CH₄, N₂O, PFCs, HFCs, SF₆

	Country emissions		
	MT CO₂e	Rank	% World
China	92998	3	8.29
United States	327977	1	29.23
European Union (27)	301631	2	26.28
Russian Federation	91467	4	8.15
India	26102	9	2.33
Japan	43288	7	4.19
Brazil	9102	22	0.81
Canada	24583	11	2.19

Energy Related GHG Emissions 2005

(excludes land use change)

CO₂, CH₄, N₂O, PFCs, HFCs, SF₆

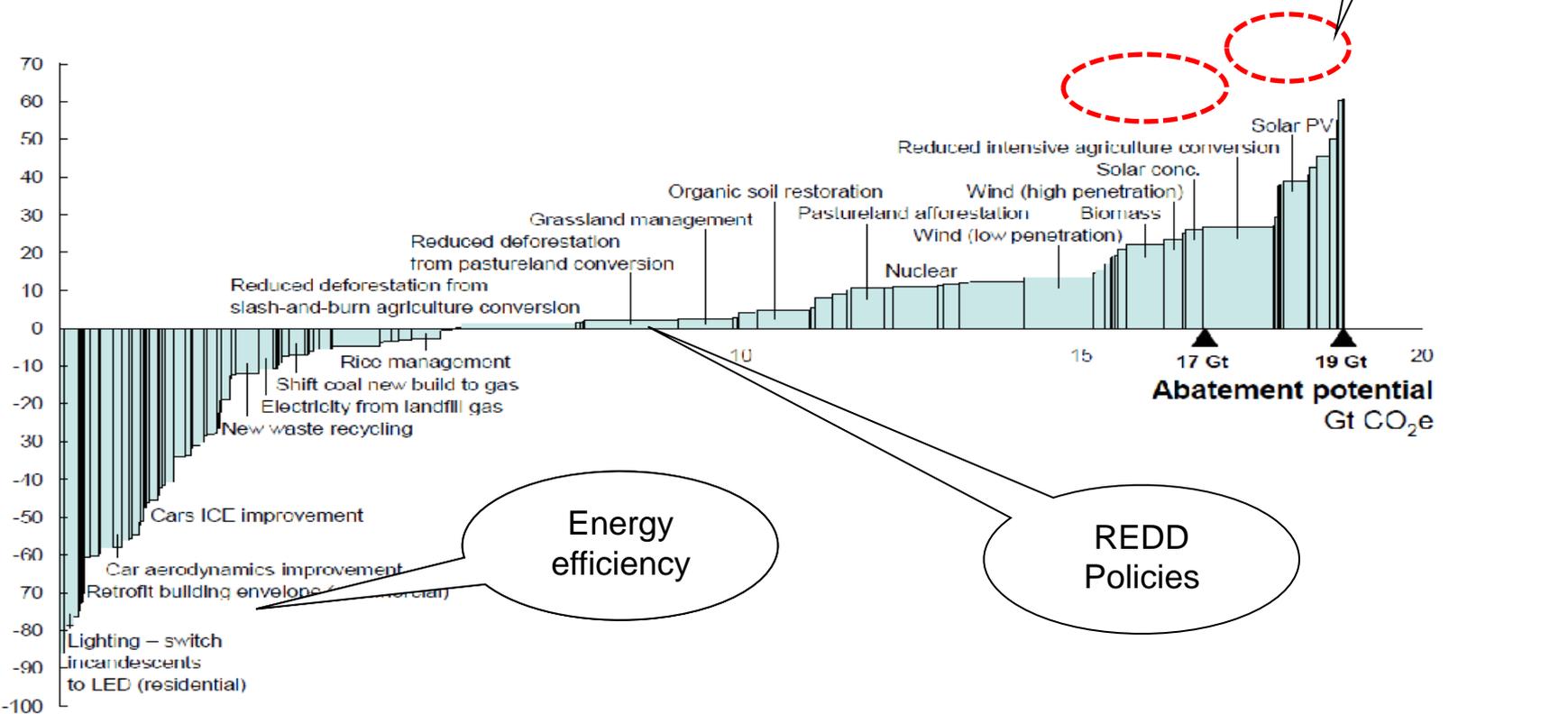
	CO ₂ e- emissions		
	MT CO ₂ e	Rank	% World
China	7,234.3	(1)	19.13%
United States	6,931.4	(2)	18.33%
European Union (27)	5,049.2	(3)	13.35%
Russian Federation	1,947.4	(4)	5.15%
India	1,866.1	(5)	4.94%
Japan	1,356.2	(6)	3.59%
Brazil	1,011.9	(7)	2.68%
Mexico	636.5	(11)	1.70%

Energy versus non-energy related emissions

Non-energy related emissions are important for strategies aiming to stabilize world emissions /1

- Low income regions are reluctant to accept commitments for reducing emissions that stop growth, but their commitment is necessary
 - Options to reduce emissions without jeopardizing growth must be offered
 - Policies for appropriate land use and forestry are the option agreed upon on Copenhagen
- The cost of reducing non-energy emissions is relatively low as compared with the costs of reducing other emissions
 - The costs of reducing one Tm CO₂ emissions through solar energy is 70 units
 - While the cost of reducing it avoiding deforestation and land degradation is 5 units

Cost of Reducing Emissions



Fuente: MCKINSEY.

Energy versus non-energy related emissions

Non-energy related emissions are important for strategies aiming to stabilize world emissions /2

- Emerging countries may accept long term commitment if
 - Industrial countries invest now in reducing non-energy emissions on emerging markets
 - Industrial countries invest now in low cost technologies for reducing energy emissions
 - Industrial countries offer green technologies to fair prices
- Copenhagen Agreement opens the door to these sort of strategies
 - Because the Agreement includes REDD Policies, Technology Transfers and Financial Funds
 - But it does not include proposals to go forward
 - Next meeting in Cancun is a new opportunity

Contents

- Introduction
- Global Public Good
- Energy versus non-energy emissions
- ***Copenhagen Agreement***
- EU Climate Change and Energy
- Integrating Relevant Issues
- Concluding Remarks

Copenhagen Agreement

- Reactions in Europe have been very negative
 - The Swedish presidency of the EU spoke of a disaster
- Beyond Europe, reactions were less harsh
 - The Indian environment minister referred to “*small steps*”
 - Barack Obama spoke of a “*breakthrough*”
 - Chinese Wen Jiabao described it as *an “agreement to be treasured”*
- The disappointment in Europe is understandable
 - EU had announced ambitious goals for cutting emissions
 - Europeans were excluded from the final deal
 - EU was marginalized - perhaps because the EU had 20 negotiators?
- Large emitters reached an agreement of principle and accepted monitoring mechanisms
 - Even if the emerging countries made no binding commitments on emission reductions

Copenhagen Agreement

Five Relevant Points of Consensus

- Limiting the increase of global temperature over 2 degrees Celsius
- Recognizing that deep cuts in global emissions across sectors and countries are required
- Commitment with policies for avoiding deforestation and land degradation
- Supporting the transfer of clean technologies to less developed countries
- Contributing sustainable financial resources for technology, capacity-building and implementation of actions for adaptation in developing countries

Copenhagen Agreement

Lights and shadows/ 1

- Temperature should be below 2 degrees Celsius
 - This temperature target is consistent with recent recommendations from the natural-science community
 - No measures or policies for doing so
- Deep cuts in global emissions
 - No commitment from developed or developing countries
 - All Annex 1 countries have already sent reduction commitments
 - The accumulated submissions of targets and actions will not, on their own, be sufficient to meet the goal

Copenhagen Agreement

Lights and shadows/ 2

- Acceptance that emission reductions will be measured, reported and verified
 - This was an exceptionally contentious issue in the Copenhagen negotiations
 - US delegation demanded “transparency”, while China resisted to protect its national sovereignty
 - It is difficult to say whether the compromises achieved in Copenhagen on this subject will lead to credible commitments
- Widening the range of Kyoto tools by including REDD policies and adaptation and mitigation
 - but it does not articulate how to use them

Copenhagen Agreement

Lights and shadows/3

- Includes the role of clean technology transfer to developing countries
 - No relationship between the financial Fund and the technology transfer
 - Lack of indicators for measuring effective transfer
- A collective commitment to provide new and additional, predictable and adequate funding
 - US\$30 billion for the period 2010-12
 - Balanced allocation between adaptation and mitigation
 - When will be de money there? Who will put the money?
- A developed country commitment to a goal of jointly mobilizing US\$100 billion annually by 2020 from both public and private sources
 - No commitment on each country's obligation

Copenhagen Agreement

Some pending challenges

- First, the goal of a single global price for carbon is not on the arena, which is
 - Needed to prevent distortions in the allocation of private investment
 - Essential for EU policies
- Second, the distributional dimension will have to be tackled seriously
 - A quid pro quo must be found between developed countries, responsible for past emissions, and emerging countries, the main source of future emissions
- Third, tools for implementing REDD policies are needed
 - Eligibility criteria must be elaborated
 - Monitoring capacities that would be necessary to support REDD policies, must be defined
 - Criteria for the application of Financial Fund to REDD policies
- Fourth, how to make commitments binding at some point
 - the question of enforcement
 - the reluctant to accept commitment

Decisions on origin and applications of financial funds should be integrated with the options for solving pending challenges

Contents

- Energy versus non-energy emissions
- Global Public Good
- Copenhagen Agreement
- ***EU Climate Change and Energy***
- Integrating Relevant Issues
- Concluding Remarks

EU Climate Change and Energy

- In March 2007, the EU leaders endorsed an integrated approach to climate and energy policy
 - to combat climate change and increase the EU's energy security
- They set climate and energy targets to be met by 2020, known as the 20-20-20 targets
 - Emissions reductions of at least 20% below 1990 level
 - 20% participation of renewable resources on energy consumption
 - 20% reduction in primary energy by improving energy efficiency
- The EU leaders also offered to increase the EU's emissions reduction to 30%
 - If other major emitting countries in the developed and developing worlds commit to do their fair share
- In January 2008, the European Commission proposed binding legislation to implement the 20-20-20 targets
 - This “climate and energy package” was agreed by the European Parliament and Council in December 2008 and became law in June 2009

EU Climate Change and Energy

Package: four main components /1

- A revision and strengthening of the Emission Trading System (EU ETS)
 - A single EU-wide cap on emission allowances will apply on 2013
 - A progressive reduction on the number of allowances available to businesses reaching a reduction of 21% in 2020 below the 2005 level
 - The free allocation of allowances will be progressively replaced by auctioning
- An Effort Sharing Decision governing emissions including sectors not covered by the EU ETS, such as transport, housing, agriculture and waste
 - Each Member State agreed to binding national emission limitation target for 2020 which reflects its relative wealth
 - The targets range from an emissions reduction of 20% by the richest Member States to an increase in emissions of 20% by the poorest
 - National targets will cut the EU's overall emissions from the non-ETS sectors by 10% by 2020 compared with 2005 levels

EU Climate Change and Energy

Package: four main components/ 2

- Binding national targets for renewable energy which will lift the average renewable share across the EU to 20% by 2020
 - More than double of the 2006 level of 9.2%
 - National targets range from a renewable share of 10% in Malta to 49% in Sweden
- A legal framework to promote the development and safe use of carbon capture and storage (CCS)
 - Network of CCS demonstration plants by 2015 to test its viability
 - Commercial update of CCS by around 2020
 - Revised EU guidelines on state aid for environmental protection that enable governments to provide financial support for CCS pilot plants

EU Climate Change and Energy

The implications of Copenhagen Agreement on CO2 Market/1

- The Agreement recognizes the emissions' markets as a tool for reducing emissions in an efficient manner
 - It does not establish the basis for a global carbon market
 - European carbon market will continue isolated
 - The European challenge is to integrate EU carbon markets with other regional markets
- The market integration could be difficult because
 - Regional markets will attend different goals of emission reductions
 - Lack of harmonization measures
- In the present situation, the best road toward a global carbon market seems
 - Linking regional markets
 - Goes further than establishing harmonizing measures

EU Climate Change and Energy

The implications of Copenhagen Agreement on CO2 Market/2

- Lack of mechanisms to link initiatives for reducing emissions in developing countries with carbon markets
 - the Copenhagen Agreement implicitly recognizes the failure of clean development mechanisms (CDM)
 - But it does not offer alternative mechanisms
- Linking carbon markets and projects to reduce emissions in developing countries should be a priority
 - In order to facilitate developing clean technologies
 - To make possible to transfer technology from industrial to developing countries
 - To apply policies to avoid deforestation and land degradation

EU Climate Change and Energy

The implications of Copenhagen Agreement on renewable energy

- Countries not included in Annex 1 may also start developing renewable energies
 - Annex 1 countries are committed to policies and to reduce emissions
 - Renewable energies are socially and politically attractive, because they promote local investment and employment
 - Provide visibility to climate change policies
- However, renewable energy may not be the most efficient option to reduce emissions in the short run
 - EU renewable industry will have more competitors
 - How to deal internal and external subsidies and trade

EU Climate Change and Energy

The implications of Copenhagen Agreement on R&D

- The goal is having available carbon capture and storage (CCS) at a commercial stage
 - Then non-Annex 1 countries may benefit from this technology for reducing emissions
- The issues are conditions for emerging markets to use such technology
 - The Copenhagen Agreement refers to technology transfers
 - R&D need incentives
 - Firms are not willing - neither they should - to gift their efforts
- The challenge is how to ensure a fair price to emerging markets so they accept such technology
 - while providing adequate remuneration to R&D efforts

EU Climate Change and Energy

Increasing target up to 30%?

The arguments for increasing the target are

- EU already cut its emissions from 7% to 10% below 1990 levels between 2005-2008 and the crisis brought further reductions
 - Verified emissions in the ETS in 2009 were 11.6% below 2008 emissions
 - This one-off reduction in emissions meant that in 2009, the EU emitted around 14 % less greenhouse gases than 1990
- The absolute costs of meeting the 20% target have fallen
 - In 2008, the costs of reaching the target were estimated as at least €70 billion per annum in the year 2020
 - Today, the analysis also takes account of the recession, the price tag is now estimated at €48 billion (0.32% of GDP in 2020)
 - This represents a 30% less than expected 2 years ago

EU Climate Change and Energy

Increasing target up to 30%?

- The development of energy-efficient and green technologies will be a major driver of growth
 - The new investment are is directed towards infrastructure for less polluting transport modes, such as public transport, intelligent traffic management systems
 - Low-carbon energy production as smart electricity grids and clean transport is expected to increase
- Signs of the transition towards a low carbon economy are emerging across the world
 - Countries are attracted to green options because of its potential to create large numbers of new jobs

EU Climate Change and Energy

Increasing target up to 30%?

Economic impacts of the 30% target are not clear

- Going beyond 20% would entail increasing the harder existing policies and introducing new one
 - That may have strong impact on competition
- The additional total costs for the EU to go from 20% to 30% target is estimated to be around €33 billion in the year 2020,
 - That means 0.54% of GDP to reach the 30% goal
- The greatest potential for emissions reduction comes from the electricity sector
 - Because a significant amount of electricity capacity needs to be replaced in the coming decade
- However, the emission reduction potential is proportionally higher in the poorer Member States
 - It will be necessary to mobilize the public and private financial resources to enhance emission reduction without jeopardizing economic growth

The relevant question is not how much is the cost , but to which extend the larger target facilitate advancing in Copenhagen Agreement?

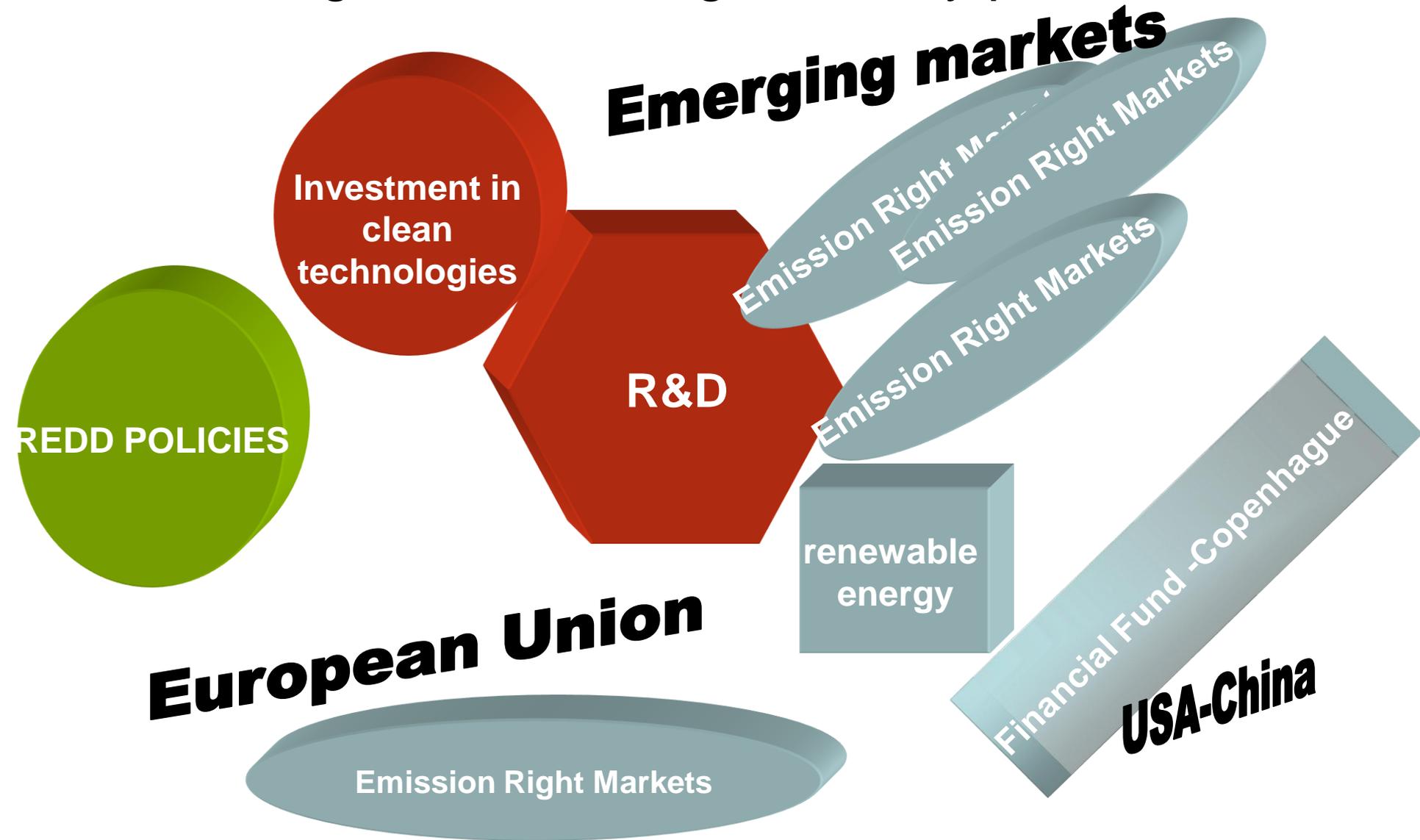
Contents

- Energy versus non-energy emissions
- Global Public Good
- Copenhagen Agreement
- EU Climate Change and Energy
- ***Integrating Relevant Issues***
- Concluding Remarks

Integrating Relevant Issues

- The Copenhagen Agreement introduces three elements to which the EU package gives little attention
 - Transfers and development of clean technologies
 - Fighting against deforestation and degradation (REDD Policies)
 - Financial Fund to support policies for climate change
- The Copenhagen Agreement does not give much attention to some elements that are important for EU policy
 - Clean Development Mechanisms CDM: the generation of emission rights through the implementation of clean technology projects in developing countries
 - Enhancement and integration of emission rights' markets
 - The participation of renewable energy is central in EU policy

Advancing post-Copenhagen means to define, organize and integrate many pieces



Integrating Relevant Issues

- The Copenhagen Agreement promises to finance new green technologies and to implement mechanisms to transfer them to emerging markets
 - It does not provide a structure for this
 - USA set the investigation in the forefront of the negotiation
- EU climate change package must advance in R&D to catch the negotiation process
 - Carbon capture and sequestration programs are an important step forward, but advances should be ensured
 - Linking R&D programs with the transfer of resulting technology would help advances

Integrating Relevant Issues

- If EU reinforces R&D programs to develop clean technologies
 - That are useful for emerging markets
 - With incentives for private companies to participate
 - That offer carbon credits for investing and transfer technology to emerging markets through the CDM mechanisms
- Going forward in Copenhagen Agreement would be easier because
 - Emerging markets would receive green technologies at a fair cost
 - R&D would be closer to the center of the negotiation as requested by USA
 - CDM mechanisms would be enhanced as required by EU
 - The liquidity and integration of carbon markets would increase which, in turn, would reduce market distortions and satisfy EU

Integrating Relevant Issues

Fighting forestry deforestation and degradation may play an important role after 2012

- REDD emissions are important in emerging markets and their reduction is cheaper than the reduction of energy ones
 - Some estimates show that a reduction of 6800 Million TCO₂ per year costs 30 MM US\$
 - 42% of costs to avoid forestry deforestation and degradation, but 58% come from forestry management
 - Such reduction is equivalent to 6-16% of 2007 emissions
- Some issues for applying REDD policies may be difficult to agree, but they may not be expensive
 - Taking care of indigene and local population
 - Measurement systems
 - Enabling financial funds
 - Establishing criteria for eligibility
 - Enforcement and supervision mechanisms

Integrating Relevant Issues

The integration of CO2 Markets and REDD policies/1

- Financing of REDD policies is more sustainable through market tools than exclusively through cooperation funds
 - Integrating REDD policy and CDM is an option
 - EU wishes to enhance CDM and integrate CO2 markets
 - Brazil demands long-term financing for REDD policies
- Effective measurement of emission reduction is difficult and expensive
 - Measuring actions versus measuring results
 - Actions are easier to measure than results
- Providing financial funds to emerging markets as a function of results does not seem advisable
 - Due to difficulties to obtain an effective measure

Integrating Relevant Issues

The integration of CO2 Markets and REDD policies/2

- A better option is choosing actions and investments for each eligible country that contribute to emission reduction
 - Each set of investment generate CO2 permits
 - The investment generates CO2 permits upon completion
 - An **ad hoc** financial fund may buy and sell the CO2 permits
- EU seems reluctant to integrate REDD policies and CO2 markets without quantitative measurement
 - They argue that it may increase the volatility of CO2 markets
 - However, market volatility is large without REDD policies
 - The CO2 market with and without REDD policy can be stabilized using other mechanisms

Integrating Relevant Issues

Funding of the Copenhagen Fund

- Voluntary contributions from countries and firms is an option
 - Such contributions would not be sufficient and may not be sustainable. Therefore, they must be completed
 - Contributions associated to the public good that the world is willing to have seems more sustainable
- Some options associated to the public good are
 - Revenues from auctioning emissions rights
 - Progressive taxes associated to emissions per capita

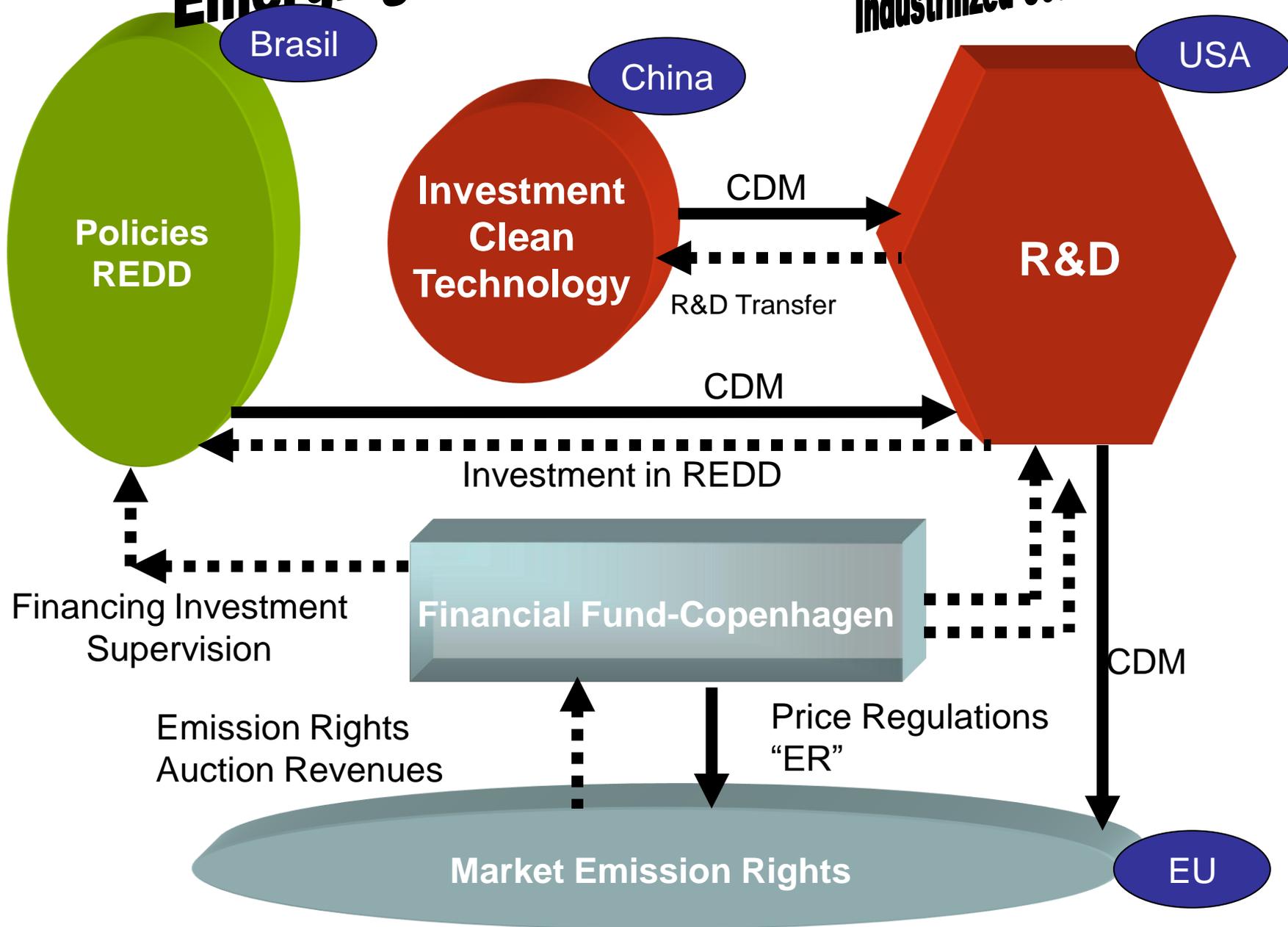
Integrating Relevant Issues

Application of the Copenhagen Fund

- The application of financial funds to attend climate change policies has problems
 - Problems that are well known under the public good theory
 - But which are not solved
- The problem is to find a mechanism that
 - Ensures minimum cost of policies for fighting climate change
 - Incentivizes true revelation of cost of policies
- Options for applying funds should be evaluated taking account the above goals. Some suggestions
 - Selling and buying rights to stabilize the CO2 right markets
 - Participation in equity of firms that make efforts in R&D
 - Supervision and measurement of REDD Policies that generate carbon emission rights
 - Subsidy investments in emerging markets so that cost of clean technologies equals the cost of large emission technologies

Emerging Countries

Industrialized Countries (Annex1)



Contents

- Energy versus non-energy emissions
- Global Public Good
- Copenhagen Agreement
- EU Climate Change and Energy
- Integrating Relevant Issues
- ***Concluding Remarks***

Concluding Remarks

The world must take insurance against climate change

- Science tells us that the probability of climate change being man-made is 90%
 - If someone told us that there was a nine in ten chance of our house being burned-down, most of us would take care to renew the fire insurance
- Doing something is difficult because climate is a global public good
 - Public goods usually need a government that imposes how to finance production
 - Lack of a global government means that only voluntary agreements are possible
- Copenhagen agreement may be the start of a long friendship among countries. Most countries
 - Are committed to avoid increases of temperature over 2 degree Celsius
 - Have set new tools: technology transfers, financing and REDD
 - Copenhagen agreement was not good on setting specific and concrete policies, but it can advance on it

Concluding Remarks

Stabilizing world emissions must focus on reducing energy-related emissions but other emissions and elements must go into the picture as proposed in the Copenhagen Agreement

- Energy related emissions are the core of EU policy for fighting climate change
 - Energy reductions through a cap and trade system
 - Renewable energy
- EU policy needs to advance on issues relevant in Copenhagen Agreement
 - The goal should be integrating large emitters
 - The goal should not be just to reduce emissions within the EU
- A new trade-off between R&D and renewable energy production in the EU seems advisable
 - Large emerging emitters will not use renewable energies at current prices
 - Does the EU have economic strength to support the cost of the 30-20-20 goal?
 - The EU should give answer to the following question: To which extend the larger target facilitate advancing in Copenhagen Agreement?

Concluding Remarks

The integration of carbon markets with REDD and technology policies through financial funds seems necessary to move forward

- Linking the EU ETS with the US cap-and-trade scheme
- Integrating REDD Policies with CDM
- Improving standards for monitoring, reporting and verification of REDD policies
- Applying financial funds taking into account country's efforts to reduce emissions, but also efforts on R&D and technology transfer

In summary

Market Emission Rights

Promoting low **emission** growth

Low emissions Investment

R&D

Financial Fund-Copenhagen

Through a balanced integration of the world's different interests

REDD Policies