
*Mitigation Options of Greenhouse Gas (GHG)
Emissions in Key Sectors in Brazil*



Overview: National Policy

- ✓ Implementing sector-specific Mitigation Plans
- ✓ Updating the National Plan on Climate Change (2008)
- ✓ Elaborating an Adaptation Strategy
- ✓ Monitoring and reporting: annual estimates, National Communication and BURs (new IT platform and institutional arrangements)
- ✓ Studies on carbon market and tax
- ✓ Articulating with federated states

Project Identification

- ✓ Implementing Agency: UNEP
- ✓ Funding: Global Environment Facility (GEF)
- ✓ Executing Agency: Ministry of Science, Technology and Innovation (MCTI)
- ✓ Starting date: April/2013



Project Goal

To assist the Government of Brazil to strengthen its technical capacity in supporting the implementation of its mitigation actions for greenhouse gas emissions in key economic sectors (industry, energy, transportation, household and services, LULUCF, waste management and other cross-sector alternatives).



Justification

- ✓ Estimating mitigation potentials and the associated costs => climate policy design and implementation.
- ✓ Recent studies:
 - "Brasil Low Carbon - Country Case Study 2010" - World Bank.
 - "Pathways to a Low-carbon Economy for Brazil" - McKinsey & Company (2009).
- ✓ More recent estimates for baseline emission projections, specific sector's mitigation potential and marginal cost of abatement curves, as well as providing innovative analyses.

Justification

- ✓ Assessing the impacts of different climate regulation options on the country's industrial sector and the repercussions they might have on the Brazilian economy (direct and indirect impacts);
- ✓ Envisaging the possibility of gains through innovation by:
 - reducing the costs of technologies, thus increasing their potential use for reducing emissions;
 - enabling the use of frontier and foreseeable technologies that are not yet used for either economic or technical reasons.
- ✓ Strengthening technical capacity for the implementation of mitigation actions.



Expected Results

- ✓ Sector specific baseline scenarios based on the newest available data (reference scenario) for the 2012-2035 and 2035-2050 periods; estimate technical and market potentials for GHG emissions abatement.
 - Three scenarios : a) Reference (or baseline) Scenario; b) Low Carbon Scenario; and c) Low Carbon Scenario with Innovation.
- ✓ To increase the availability of data and information on mitigation potential in the following sectors: industrial, energy, transport, household and services sectors; LULUCF; waste management; and cross-sectoral mitigation alternatives (CCS, smart grids, electric cars).
- ✓ Concerns: data quality and transparency, country ownership (strategic guidance and capacity-building), continuous updating and stakeholder engagement.

Outcome 1

Mitigation alternatives identified and their respective potentials and costs quantified for the periods 2012-2035 and 2035-2050

Outputs 1.1 – 1.7

Assessment of mitigation alternatives and estimation of abatement costs for: industry, energy production and transformation, transports; household and services; LULUCF; waste management, as well as specific cross-sector alternatives.

- ✓ Activities:
 - a) Definition of Best Available Technologies (BAT).
 - b) Definition of baseline;
 - c) Identifying discount rates.
 - d) Technical and economic evaluation of mitigation options
 - e) Evaluation of innovation potential and costs (learning curves modeling).
 - f) Identification of policy instruments to promote emissions reduction

* Assessment of mitigation alternatives and estimation of abatement costs for LULUCF

- ✓ Activities:
 - a) Description of methodologies for estimating GHG emissions from LULUCF:
 - b) Analysis of land use for food and energy purposes: interactions between energy and food crops; analysis of land use change and direct/indirect repercussions on the conversion of native forest into production areas. Evaluation of the net GHG emission abatement from biofuel use;
 - c) Definition of a baseline for GHG emissions from LULUCF;
 - d) Identification of mitigation potential and evaluation of mitigation alternatives feasibility in LULUCF in Brazil: evaluation of mitigation repercussions on agricultural and livestock sectors;
 - e) Identification of policy instruments to promote GHG abatement.

Outcome 2

- ✓ **Integrated analysis of the different mitigation alternatives in an integrated optimization framework (considering non-additivity and other economic considerations);**
- ✓ **Evaluation of the possible impacts of different climate policies on the Brazilian economy;**
- ✓ **Testing domestic measurement, reporting and verification (MRV) of proposed mitigation alternatives**

Output 2.1: Testing MRV and integrated analysis of GHG emission abatement alternatives in an optimization model comprising all energy chains and all GHG emitting sectors analyzed for Brazil.

- ✓ Activities:
 - a) Model development and description
 - b) Evaluation of sector specific low carbon policies (in an integrated framework)
 - c) Testing domestic MRV: evaluation of MRV for GHG emission alternatives.
 - d) Construction of integrated scenarios: considering the mitigation alternatives discussed in Outcome 1 and the non-additivity of measures.
 - e) Construction of integrated low carbon scenario with innovation and estimated learning curves
 - f) Integrated energy and LULUCF abatement scenarios: linking credits from reducing emissions from LULUCF to carbon markets and analysis of the effects on energy mitigation and technology innovation.

Output 2.2: Analysis of the impacts of low carbon policies on the Brazilian economy.

- ✓ Activities:
 - a) Description of Computable General Equilibrium Models (CGE) modeling framework;
 - b) Analysis of economic impacts on the competitiveness of Brazilian economy: industry, agriculture, energy and transport;
 - c) Analysis of intangible impacts of low carbon policies on selected economic sectors
 - d) Analysis of innovation costs and financing sources;
 - e) Analysis of the difference of economic impacts in item (b) above with distinct cap assignment criteria: considering grandfathering, cost-related and auction schemes and relative and absolute targets.

Outcome 3

Capacity building for federal and state governments, as well as host cities for the 2014 FIFA World Cup Brazil™ and civil society organizations, aiming at the implementation of mitigation actions for GHG emissions in key economic sectors



First steps

- Inception Workshop
- Establishing a Project Management Unit (hiring personnel – UNEP contracts)
- Updating work plan and budget
- Establishing partnerships with research institutions (Brazilian Network for Global Climate Change Research)
- Engaging stakeholders
- Establishing a governance structure – technical consultative committee (strategic guidance by federal bodies)
- Ensuring technical coordination (integration of different outputs).

Project Proposal - Technical Expertise

Roberto Schaeffer

- PhD. pela UPENN;
- CLA e LA do IPCC desde 1998;
- Coordenador do capítulo de transportes do AR5;
- Editor dos periódicos Energy e Climate Policy.



Alexandre Szklo

- Professor – Energy Planning Program – COPPE/UFRJ;
- Autor de inúmeros artigos em periódicos científicos indexados e orientador de teses de doutorado e dissertações de mestrado nos temas de eficiência energética, matriz energética, cogeração, biocombustíveis, refino de petróleo, mercado de petróleo e derivados e mudanças climáticas;
- Autor de livros como Climate Impacts on Energy Systems - Key Issues for Energy Sector Adaptation; Geopolítica e Gestão Ambiental do Petróleo; Country Profile on Sustainable Development, entre outros;
- Coordenador dos projetos de pesquisa e extensão citados anteriormente.

