Testing Sectoral Approaches in China

Project Information Booklet

Introduction

From January 2009, Ecofys/Azure International and the Energy Research Institute (ERI), China with funding from the UK Strategic Programme Fund, have been examining the feasibility of post-2012 sectoral approaches in China's electricity, cement and transport sectors. This booklet provides an introduction to the concept of sectoral approaches, the project activities, and summarises results to date.

The Concept

Sectoral crediting mechanisms, especially sector 'no lose' targets have attracted considerable interest in the discussions for international climate collaboration after 2012. In this approach, developing countries pledge to achieve voluntary sectoral targets for certain sectors (e.g. electricity, steel, cement, transport, pulp and paper) expressed as intensity targets (e.g. CO_2/ton of cement or CO_2/kWh). Tradable emission reduction credits are issued for emission reductions beyond the agreed sector baseline. No penalty applies however in case the country failed to meet the intensity target (therefore called *'no-lose'* target).

The sectoral crediting baseline (green line) can be set at an ambitious (low) level. Thus, the baseline includes not only the current deviation from past trends (the top red line), but also national contributions beyond the reference scenario, which are enabled by new external support (see Figure 1). It is the prospective revenue from the emission credits (yellow area) that helps mobilise the necessary financing for the countries and their entities, to make the climate friendly investments in technologies, systems, programmes and policies to overachieve the sector crediting baselines.
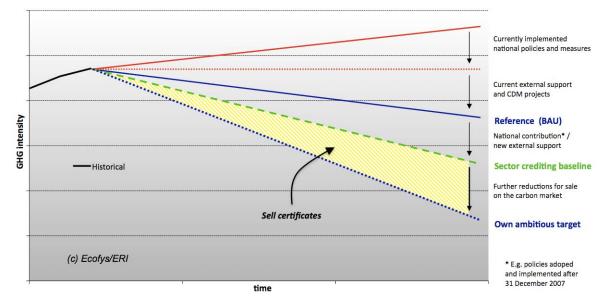

Figure 1.   Concept of the sector no-lose crediting mechanism.

While sector crediting mechanisms can provide significant advantages in terms of scaling up climate change mitigation, financing and technology support in developing countries, there are some obstacles to overcome.

Obstacles
▪ Setting and negotiating acceptable baselines – data availability and quality
▪ Developing country capacity to implement approach in government and industry – measure, report and verify (MRV) emission reductions
▪ Providing clarity (incentive) for companies to reduce carbon intensity / absolute emissions
Advantages
▪ Scale-up of emission reductions and carbon finance
▪ Enhances environmental integrity of carbon finance - beyond offsetting approach
▪ Recognition of nationally appropriate developing country mitigation actions (NAMAs)
▪ Framework for provision of technology, financing and capacity building support from developed countries
▪ Ease competitiveness and carbon leakage concerns

With the concept of sector no-lose targets in mind, how will developing countries prepare their proposals for sectoral crediting baselines so they

- can be understood by the other countries in the process?
- will be seen as a credible starting point with the right ambition level?
- provide a means to negotiate them through analysis of specific underlying elements and drivers?

The Sectoral Proposal Template Tool

The Sectoral Proposal Templates are a tool used to facilitate the negotiation of credible, transparent and systematic *sectoral crediting baselines*. The concept of these templates is to systematically step through all the elements that go into understanding what a reasonable crediting baseline can be for the sector in question. These elements obviously are of a technical, social and economic nature and are very sector and country-specific. The crediting baseline is essentially a projection for a future multi-year period, therefore it is important to understand the current trends of emissions and associated dynamic 'metrics' for the sector and future drivers for these trends.

The template combines qualitative and quantitative information on the sector and the relevant circumstances in the country in a structured way. In this way, it provides the maximum level of transparency necessary for the negotiation of a sectoral crediting baseline at the international level. For a given sector, these baselines are different for each country. Because they are *negotiated* with the country situation in mind, they are not the same as benchmarks or standards.

Although mainly directed towards the negotiation of sector crediting mechanisms, the templates can as well be used as an input to the discussion on sectoral CDM and multi-project baselines under the CDM.
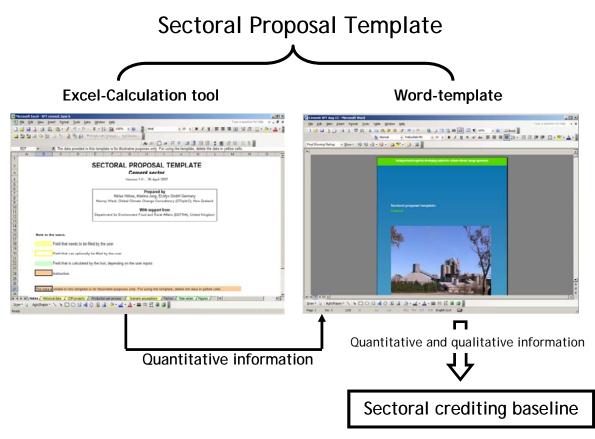
Sectoral Proposal Template

Excel-Calculation tool   **Word-template**

Quantitative information   **Quantitative and qualitative information**

Sectoral crediting baseline

Figure 2.   Structure of 'Sectoral Proposal Templates'.

In 2007 and 2008, Ecofys and GtripleC developed draft 'Sectoral Proposal Templates' for the electricity, cement and transport sectors and road-tested them in Mexico with support of the Instituto Nacional de Ecologiía. In 2009, with support from the Strategic Programme Fund, UK Government, Ecofys began to road-test the templates in China in partnership with the Energy Research Institute, NDRC. The goal of this road-testing is to improve the understanding of the concept of sectoral crediting baselines and to learn about data availability and data collection needs. A revision of the templates will take into account the lessons learned from the road-testing phase. Findings from the road-testing have been regularly presented at climate change talks in Bonn and other locations.

In China, the road-testing has focused on different geographical regions for different sectors, namely:

- Electricity Sector - nationally;
- Cement Sector – Shandong Province;
- Transport Sector – Beijing Municipality

Sectoral Analysis

Each sectoral proposal template focuses on developing carbon intensity projections under three different scenarios:

- Reference 'business-as-usual' scenario (BAU);
- Sector crediting baseline scenario (the no-lose target);
- 'Ambitious' emission abatement scenario.

The final setting of the sector crediting baseline has to be the outcome of a political process and cannot be the outcome of a road-testing or research project. This study simply aims to provide more detailed and transparent data on which BAU, no-lose target and ambitious emission abatement scenarios for the three sectors could ultimately be based. Based on the work of the ERI's IPAC modelling team, we link three IPAC scenarios – BAU, low carbon scenario and enhanced low carbon scenario – with the three scenarios used in the template. There is therefore still room for significant variation in the definition of the three scenarios. .

National Electricity Sector

Introduction

In the electricity sector study, the analysis helps to understand the meaning of a no-lose crediting target by identifying policy options. We consider technology cost and social cost – e.g. whether closing small electric power plants should be included in the no-lose target or not – together with national government targets, such as the long term and medium term energy conservation plan announced in 2004 by the NDRC. One issue for example is that the 20% energy efficiency target in China is already very tough and entails high cost.

Here we use a cost curve for power generation technologies, which is based only on technology cost, and the analysis covers the closing of small coal fired power plants. We decided for negative or zero cost technology to be above the no-lose crediting baseline (where other cost could be high for implementing diffusion of these technologies), and consider closing small coal fired power plants as a high cost option.
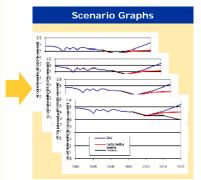
Methodology

Draft research results

Emission intensity

(c) Ecofys/ERI

Legend:
- Reference (BAU)
- Sector crediting baseline
- Low carbon scenario
- Ambitious target (enhanced low carbon scenario)
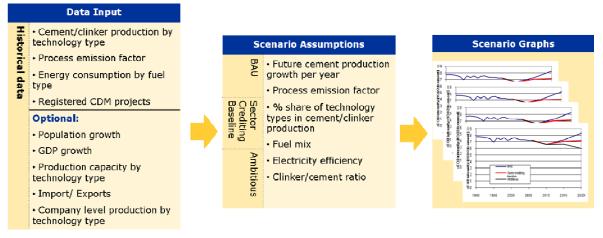
Key findings

- Data quality in power generation is quite good for implementing a sector-based approach.

- There is large potential for improving energy efficiency in China's electricity sector that is dominated by coal fired power plants.

- There is big uncertainty regarding the power generation of future power plants due to the uncertainty of electricity demand in China's economy development.

- Greenhouse gas intensity per kilowatt-hour is a suitable way to set up a sectoral target for the approach. It could be the intensity of overall power generation, or apply to specific technologies such as coal fired power generation.

- There is need for more work to provide the information necessary to propose a no-lose target, but the present analysis is a very promising starting point for this process.

- National targets for energy efficiency are already quite high and entail high cost, and recently the government has promulgated ambitious targets for renewable energy and nuclear. This recent effort has to be considered when setting the crediting baseline and its effects cannot fall completely under the business as usual scenario.
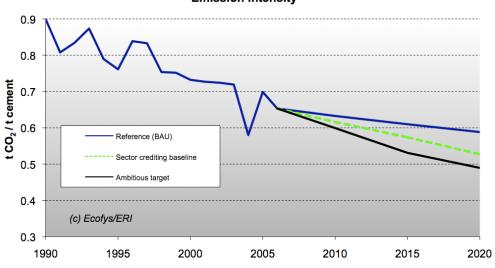
Shandong Cement Sector

Introduction

The analysis of the cement sector in Shandong province has benefited from the extensive data collection already in place through international, governmental and company-level actions. Shandong is home to some of the more energy efficient cement companies in China and the government has established a robust regulatory framework including technology penetration targets as well as efforts to phase-out inefficient production capacity. This leaves less room than in other provinces to achieve a significant deviation from business-as-usual and underlines the importance of setting a sector crediting baseline that does not result in perverse incentive for less ambitious domestic policies and actions. To overcome this, we have applied a policy baseline year of 2006 to separate business-as-usual and the sector crediting baseline.

Methodology

Draft research results

Key findings

- Data quality and availability in large cement companies is relatively high, although the presence of a large number of small companies may present challenges to the completeness of data needed for the implementation of a sectoral approach.

- There is large progress in the upgrading of kiln technologies. Emission reduction opportunities remain in the use of alternative fuels, raw materials and blended cement.

- Energy conservation policies and measures in the cement sector are currently ambitious including targets to improve energy intensity and close down inefficient plants. The level of ambition of these policies should be taken into account in developing the crediting baseline.
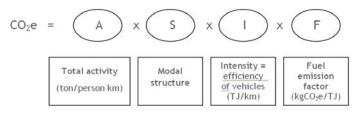
Beijing Transport Sector

Introduction:

The expansion of transport activity has been most pronounced in China's urban regions, resulting in a great increase in personal mobility as well as negative environmental impacts. Beijing's transport planning has received significant attention in the wake of the Olympic Games, as the national capital and as one of the largest Chinese cities. This focus on Beijing implies a number of choices regarding the boundary – i.e. what we mean when talking about the transport sector. Transport that goes beyond the geographical area of Beijing municipality has been excluded on the grounds that emissions would be difficult to attribute. This excludes aviation, railway transport, transport on waterways and inter-province/city highway transport apart from the portion that occurs in Beijing municipality. In effect, we chose to test a sector no-lose target for urban transport. The adapted template could then be applied in any given urban area.

In developing a proposal template, it is necessary to balance the need for detail and separate clearly distinguished transport modes with the general goal to reduce complexity and provide an overview that is easily understandable. Transport is therefore split into
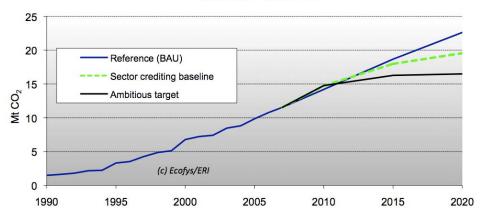
- road-based freight transport,
- private vehicle passenger transport,
- public (passenger) transport running on fossil fuels, and
- public (passenger) transport running on electricity.

Methodology

$$CO_2e = A \times S \times I \times F$$

Total activity (ton/person km)	Modal structure	Intensity = efficiency of vehicles (TJ/km)	Fuel emission factor (kgCO$_2$e/TJ)

Draft research results

Absolute emissions

(c) Ecofys/ERI

Legend: Reference (BAU); Sector crediting baseline; Ambitious target. Y-axis: Mt CO$_2$, 0 to 25. X-axis: 1990 to 2020.

Key findings:

- Data sources needed as a base to decide a no-lose target for Beijing's transport sector are very well reported. A lot of the data is however relies on research reports. There remain challenges with regard to data for implementing, especially for measuring, a sector-based approach.
- The metrics applied in this study to present the basis of the Beijing transport system have proven that it is possible to implement a sector-based approach.
- Many policies implemented in Beijing already bear a high cost, but there still remains a lot of room for Beijing to move to a lower carbon urban transport system.
- There is a big potential for CO2 emission mitigation in Beijing's urban transport system by 2020.

Implications for China

The road-testing of the proposal templates for a sector no-lose target in the three sectors electricity, cement and transport has shown that there are good grounds to possibly implement such an approach in China. In considering post-2012 sectoral crediting mechanisms for China it is important to identify key obstacles to their functioning at the international and national level.

Technical and institutional capacity: It has become clear that the capacity to provide and present the necessary data to a level that would withstand the scrutiny of an international measurement, reporting and verification (MRV) process is key to make a credible sector no-lose target proposal. This places significant technical responsibilities on governmental institutions, industry associations and companies.

Statistical systems in China at the governmental and company level would require adjustment to facilitate the MRV of emissions data. Capacity building would be required, particularly at provincial levels to ensure the integrity of this effort. Some of the necessary data is not collected at the moment. This is mostly due to currently lacking incentives – but it would generally be possible in a concerted effort to propose a sectoral no-lose target to be able to gain the associated benefits in the form of carbon credits.

Capacity building needs to focus on both technical capacity to master emission abatement technology as well as institutional capacity to address the issues raised above.

Domestic implementation models: In the event of China agreeing to a sectoral crediting mechanism at the UNFCCC level, the government would require an effective domestic model to implement the approach and pass on the crediting incentive to entities. In China, institutional frameworks have been established to support the country's efforts to improve energy conservation and control emissions. Domestic sectoral mitigation that will lead to the country achieving its possible sectoral no-lose targets could be built on these institutions. They include:

- *National energy intensity target:* Sectoral crediting targets could be broken down to different levels of local governments in a similar manner to the 20% national target to reduce energy consumption per unit of GDP under the 11th Five Year Plan. Governments at each level receive part of the projected income and are obligated to incentivise emission reductions, e.g. through subsidies, taxes, mandatory standards, etc.

- *Top 1000 enterprises model:* Sectoral mitigation efforts would be focused on the largest companies within a sector, coupled with targeted financial and capacity building support. Overall, the changes in the largest greenhouse gas emitters will lead to an over-achievement of the average greenhouse gas intensity set as the crediting baseline.

- *National CDM model:* Domestically, Chinese companies of a sector can (voluntarily) participate in a national mechanism that rewards them for achieving emission reductions. This way the Chinese government passes on the income generated by achieving a internationally monitored, reported and verified reduction of overall sectoral emissions compared to the crediting baseline.

Project Team

Ecofys/ Azure International:

Christian Ellermann

Padraig Oliver

Li Xingyu

Marion Vieweg

Dr. Niklas Hohne

Emiel van Sambeek

Energy Research Institute, PRC

Dr. Jiang Kejun

Assoc. Prof. Zhuang Xing

Assoc. Prof. Liu Hong

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For more information on the project and upcoming events please check www.sectoral.org