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NAMAs and the Carbon Market

Nationally Appropriate Mitigation Actions of developing countries

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Contents

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EXPLORING A SECTOR NO-LOSE TARGET IN THE TRANSPORT SECTOR:

Urban transport in Beijing, China

Abstract
Based on a case study of urban transport in Beijing, road-testing a Sectoral Proposal Template for sector no-lose targets, this paper concludes that this approach would work as a national appropriate mitigation action (NAMA) in China. As such, the paper presents a clear argument for the feasibility of sector no-lose targets for the transport sector. Even more, analysis suggests that this approach may be the best suitable approach for the sector. Experiences also show that sub-sectors, like urban transport, may be promising starting points for national action.

The negotiations over a follow-up agreement to the Kyoto Protocol have entered their final phase. Nationally appropriate mitigation actions (NAMAs) for developing countries have been a central topic in the debate. A multitude of policy-makers and stakeholders have responded to this challenge and have started putting forward suggestions for a general NAMA framework, as well as individual policy instruments that could be put forward by developing countries as a NAMA.

Sector no-lose targets (SNLTs) belong to the class of sector-crediting approaches that are being discussed as a NAMA option. They are seen as one way of scaling up mitigation efforts and one possible path of evolution from the current CDM. Sector no-lose targets are one possible mechanism that can be applied at the sectoral level, at least for some sectors and some (large) developing countries. They can be formulated in such a way that they can be assessed as NAMAs and facilitate matching with corresponding international support.

* This case study has been made possible through the UK FCO Strategic Program Fund. With contributions by Marion Vieweg, Niklas Höhne, Padraig Oliver and Xingyu Li, Ecofys

Geographically, a lot of attention has been focussed on NAMAs in China. This is not surprising given the importance of the country's contribution to future emission reduction efforts. China has been the major recipient of Annex I country financing through the Clean Development Mechanism, but huge opportunities to scale up mitigation still exist. The transport sector has so far not been able to attract much international support for mitigation efforts under the Kyoto Protocol, but new approaches that can be implemented and supported as NAMAs may be an appropriate solution to this problem. Sector no-lose targets may be a more promising option to direct international funding to the transport sector in China than other approaches such as Policy-CDM or Sustainable Development Policies and Measures (SD-PAMs) and are therefore explored further.

CDM has been successful in many sectors of the Chinese economy to reduce the domestic emissions of GHGs and improve energy efficiency. Of the roughly 600 projects registered in China, however not a single one is in the transport sector.

Ecofys and GTripleC developed 'Sectoral Proposal Templates' that aim at facilitating this concept in the proposal stage of a NAMA (Höhne et al. 2009). They combine qualitative and quantitative information on the sector in a structured manner. In this way, the developing country can provide a description of its circumstances at the level of transparency needed to negotiate a sectoral target, negotiate appropriate international support and scale up its mitigation actions to the sectoral level.

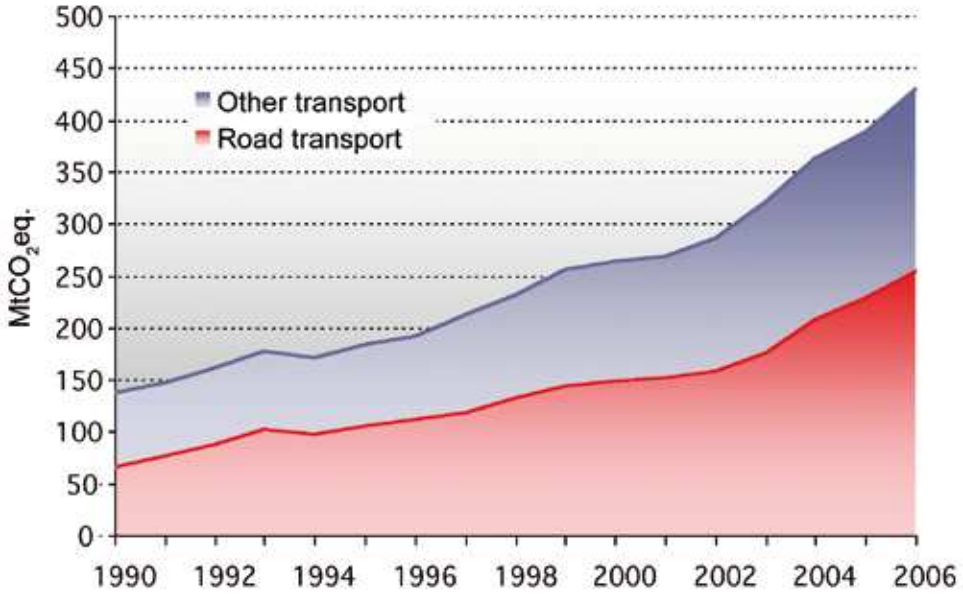
After a first stage in Mexico, we have chosen to test this set of Sectoral Proposal Templates in China. The issues and challenges encountered in this road-testing exercise are set out below, and we discuss the findings of a case study of the Beijing urban transport sector. This is done with a view to giving negotiators a sense of the viability of the policy instrument of SNLTs as a NAMA and its requirements at the domestic (developing country) and international (UNFCCC) levels.

This paper starts with an introduction to the Chinese transport sector, the challenges that it presents and how the Chinese government has been aiming to manage its sustainable development. We then discuss the concept of sector no-lose targets, explore how they fit within the current discussion on NAMAs, how they address the challenges encountered in the transport sector and what tools will be needed to make them work. Finally, urban transport in Beijing is examined as a case study to illuminate how this concept could actually work in practice. We close with some general lessons and conclusions that have emerged from Ecofys' road-testing exercise in the transport sector, carried out in cooperation with the Chinese Energy Research Institute.

Managed growth in the Chinese transport sector

The Chinese transport sector has grown tremendously in the past three decades. Following the opening up of China's economy, the transport of goods has exploded. Car ownership and air travel have become affordable to tens of millions of people in developed urban areas, and they symbolize economic success and a new freedom for

Figure 1.



Growth in the Chinese transport sector (source: adapted from IEA 2008).

hundreds of millions more. 1,200 cars are being added each day to the streets of Beijing alone, and the number of passengers on commercial planes grew more than tenfold from 1990 to 2007 (China Statistics Press 2008).

China has followed the industrialized world in the use of fossil fuel-based modes of transport. With the strong growth in the use of combustion engines come rises in emissions of greenhouse gases (GHGs), most importantly carbon dioxide. China is far behind the US when it comes to GHG emissions from the transport sector, but its share is growing quickly. Transport contributes 28% of total GHG emissions in the United States, and in China 5.4% of GHG emissions were already being emitted by transport activities as of 2006, more than triple the 1990 emissions (see Figure 1). This excludes the indirect emissions of electric-powered trains and urban transport, which use electricity generated mostly in coal-fired power stations.

Local emissions of SO_2 and particulates have become a significant problem for urban areas. Since many industrial installations that were traditionally located in or near cities have been moved to the countryside, the transport sector has become the largest contributor to urban smog. The drastic measures that the city of Beijing took to provide an acceptable environment for the Olympic Games in 2008 demonstrates the adverse health effects of the local pollution, which originates largely from cars, etc.

The Chinese government has adopted ambitious measures to improve energy efficiency and reduce local pollution from the transport sector.

Measures include provisions to expand high-speed railways greatly, as well as public transport in urban areas. Market-based mechanisms like fuel taxes are not yet widely applied, but China has adopted a strict timetable to phase in fuel efficiency standards for vehicles (NDRC 2008).

The Clean Development Mechanism (CDM) has been successful in many sectors of the Chinese economy in reducing the domestic emissions of GHGs and improving energy efficiency. Of the roughly 600 projects currently registered in China, however, not a single one is in the transport sector. One project under development in Chongqing focuses on an urban rapid-transfer bus system. Globally, only two projects have been registered in the transport sector so far (UNEP Risoe Centre 2009). The CDM generally favours large, single-point emission sources, where emissions can be clearly attributed and calculated. Consequently, one methodology has been approved for the transport sector so far. Whereas applying for a CDM project is already a tedious task, with high transaction costs in the case of renewable energy power generation or emission reductions in industrial installations, the challenges become close to insurmountable in the transport sector. The existing methodology so far only covers rapid-transport bus systems, and another small-scale methodology has been applied to motorbikes. Their wider application for private transport, air travel or the transport or shipping of goods is not proven, and few new methodologies for these areas are under development (UNFCCC 2009).

Sectoral approaches for emissions reduction have received considerable attention in recent years ….. They are seen as one way of scaling up mitigation efforts and one possible path of evolution from the current CDM.

Policy CDM could be one alternative to the current CDM for these cases. In this variant, emission reductions that result from the introduction of a new policy (e.g. a fuel economy standard or fuel taxes) are credited in the form of certified emission reductions (CERs) to the agency implementing the policy. However, as it is difficult to set an appropriate baseline and causally attribute observed emission reductions directly to any one explicit policy, the use of Policy CDM has so far not been permitted under the Kyoto Protocol.

The question is, then, how can further advances in the Chinese transport sector be recognized and supported internationally as nationally appropriate mitigation actions? Administrative measures have already moved carbon dioxide emissions in the transport sector away from what would have happened in their absence. And they are clearly nationally appropriate, as the Chinese government has undertaken them in the light of domestic energy constraints and to reduce local air pollution. As such, they could be framed as sustainable development policies and measures (SD-PAMs), a mechanism proposed internationally to acknowledge developing country efforts that have a large sustainable development dividend while at the same time reducing greenhouse gas emissions. However, in light of the pressure that may be placed on China to agree to measurable, reportable and verifiable (MRV) actions in Copenhagen, the use of SD-PAMs may be seen as too weak, as the quantification of and constraints on emissions are not major elements of this approach.

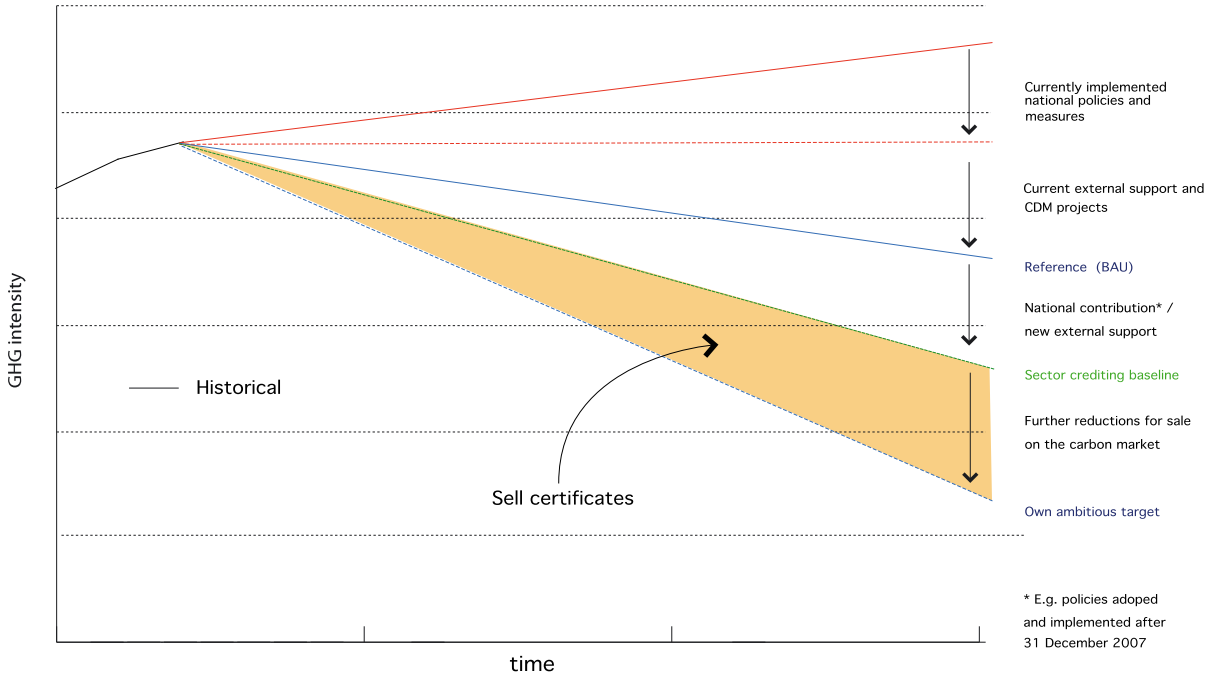
Sectoral no-lose targets as a solution?

Sectoral approaches for emission reductions have received considerable attention in recent years, and they are on the list of issues that have been discussed under the Bali Action Plan agreed in December 2007.

Sector no-lose targets are a form of non-binding emission target that encourage sector-wide emission reductions. Developing countries voluntarily propose a sector crediting baseline (most likely in the form of an emission intensity for the sector in question) which is negotiated at the international level. Reductions below the baseline generate credits issued to the government, but no penalties occur if the target is not met for the whole sector. Sector crediting baselines are negotiated and set separately for each major sector and country.

As depicted in Figure 2, the sector crediting baseline is an emission intensity level for the whole sector that is lower than the reference scenario (dark blue). The reference scenario is calculated to include currently implemented national policies and measures, as well as current external support and CDM projects that are already running. As an important element, this approach also includes a national contribution in the form of emission reductions, making it a real mitigation mechanism that goes beyond the offsetting of Annex I emissions. It may be supported by new international finance. The reductions between the sector crediting baseline (dashed green line) and the achieved emission intensity level, multiplied by units of output, can be sold as emission credits on the international carbon market.

Figure 2. Concept of sector no-lose targets (Ecofys/GtripleC).



The crediting baseline for a sector no-lose target is negotiated at UNFCCC level, ideally at the same time as developed country targets for post-2012 are being agreed. In this way, additionality could be ensured up-front by linking the demand for reductions from developed countries with the supply in credits by hosts of sector no-lose targets. The international community needs to create rules for linking this option and the emission certificates it creates in developing countries to the emissions trading systems in developed countries.

Sector no-lose targets are a form of non binding emission targets that encourage sector-wide emission reductions. Developing countries voluntarily propose a sector crediting baseline (most likely in the form of an emsission intensity of the sector in question) which is negotiated at the international level.

As the income from the sale of emission credits accrues to the government, it in turn has to pass on the incentive to the companies and/or emitters at the sector level, either directly or through its own choice of policy. This allows for an approach that is tailored to the country-specific situation, and in particular it qualifies it as a NAMA. Governments may chose to employ administrative measures, taxes, subsidies or locally limited emission trading schemes to facilitate emission intensity reductions.

To return to the Chinese transport sector, we identified above a number of measures that the country is already undertaking which have a greenhouse gas mitigating effect. The causal contribution of each individual measure is hard to determine, and the reductions are difficult to measure at each individual source – i.e. the effect of individual measures on emissions is not easily MRV-able. But if China voluntarily committed itself to a sector no-lose target in the transport sector, monitoring, verification and reporting at the international level could focus on the (over-) achievement of the target as a whole. The individual effects of domestic actions that have led to the reduction of the emissions (intensity) compared to the agreed sector no-lose target are then of no concern to the international community. Applying a sector no-lose target enabled by new additional finance and linked to the international carbon market could be considered a NAMA in itself.

For the transport sector, the basic sector no-lose target approach may be most viable where the income accrues to the government, which then incentivises reductions in the national transport sector. Another option for this approach in other (industry) sectors would be to move the incentive structure from the national to the company level and let companies profit directly if they beat the intensity baseline. It is, however, presently unclear how this option could be integrated into the current climate change regime under the UNFCCC (Ward et al. 2008; Baron et al. 2009; Schneider and Cames 2009).

One basic precondition for the implementation of a sector no-lose target is that the historical data used are detailed and credible and the observed situation of the sector can indeed be monitored, reported and verified. This is to ensure firstly that the assumptions on which the reference scenario and the crediting baseline are set are viable. Secondly, it is to warrant the correctness of the emission reductions claimed by the government during the commitment period.

The validity of the targets and the MRV process is the basis for the integrity of sector no-lose targets as a NAMA, and this in turn depends a lot on the availability and quality of data in the country and sector and their transparent presentation.

Starting this process in the first instance, a key issue becomes how developing countries will prepare their proposals for sectoral crediting baselines so that they

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

Ecofys and GTripleC have developed 'Sectoral Proposal Templates' that aim to facilitate this proposal stage (www.sectoral.org). The concept of these templates is systematically to step through all the elements that are necessary to understand what a reasonable crediting baseline might be for the sector in question. These elements are obviously of a technical, social and economic nature and are very sector- and country-specific. Moreover, given that a crediting baseline is essentially a projection for a future multi-year period, it will be important to understand the current trends in emissions and associated dynamic 'metrics' for the sector and drivers for these trends.

By combining qualitative and quantitative information on the sector and the relevant circumstances in the country in a structured way, the templates provide the maximum level of transparency necessary for the negotiation of a sectoral crediting baseline at the international level. This kind of assessment is the key to formulating sector no-lose targets as a country NAMA.

The templates have been road-tested in Mexico and more recently in China. 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. So far, three sectors have been covered: cement, electricity and transport. The transport template in particular has profited from the experience in Mexico and has been updated considerably for the second road-testing phase in China.

The yet to be developed MRV process of sector no-lose targets and NAMAs in general is likely to benefit from the experience gained by testing templates for the *proposal* stage of sector no-lose targets. Similar tools need to be developed for the later MRW stage to present information on sectoral mitigation achievements of a developing country and the adequacy of the funding it is receiving from developed countries. The advantage of the sector no-lose target concept with regard to MRV is that it is the achieved emission intensity of the sector compared to the crediting baseline that needs to be MRVed, not the individual measures (e.g. policies, standards, internal trading, subsidies etc.) that have led to the decrease in intensity.

Case study: Beijing's transport sector

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. Administrations in all large cities have made efforts to

Urban transport in Beijing, China

manage transport expansion in their administrative regions, and they enjoy considerable freedom to steer development in this sector in their preferred direction. Beijing's transport planning has received significant attention in the wake of the Olympic Games and as the capital and one of the largest Chinese cities. Instead of going to the national level directly and covering the transport sector of the whole country, for which less reliable detailed data are available, it was therefore a good choice to focus on the Beijing municipal region to road-test the transport sectoral template.

One basic precondition for the implementation of a sector no lose target is that the historical data used is detailed and credible and the observed situation can indeed by monitored, reported and verified.

This focus on Beijing implies a number of choices regarding the boundary, that is, what we mean when we talk 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 refers to 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.

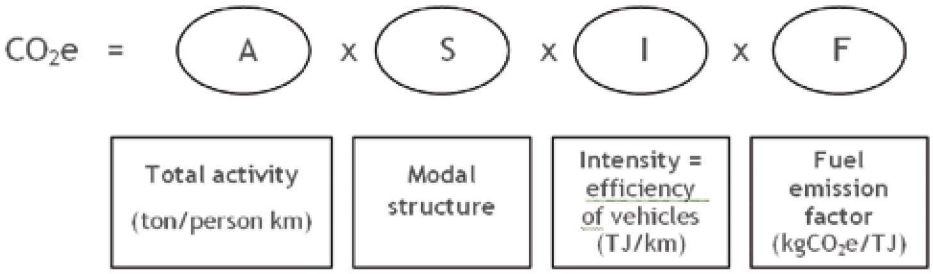
In developing a proposal template, it is necessary to balance the need for detail and separate clearly distinguished transport modes with the general goal of reducing complexity and providing an overview that is easily understandable. Transport is therefore split into

- road-based freight transport,
- private vehicle passenger transport,
- public (passenger) transport running on fossil fuels, and
- public (passenger) transport running on electricity.

Boundary issues still persist with respect to including certain new transport modes that exist already or that might become an important option in the future. Electric bikes are becoming more popular in China, and studies have shown that they are low on energy consumption and pollution. However, they are not included in the boundary because of the complexity of collecting data on the amount of electricity used to charge the batteries. Similarly, the scenario assumptions for the future do not yet consider electric cars. Eventually, these new modes of transport will have to be included so as to account for all mitigation efforts in the transport sector when proposing a no-lose target for the sector as a nationally appropriate mitigation action.

Data availability in Beijing can be considered good overall compared to other cities or provinces in China. This is a key prerequisite to be able to MRV the given approach as a NAMA. Most of the historical data can be taken directly from the Beijing Transport Development Annual Reports, Beijing Statistical Yearbooks and China Energy Statistical Yearbooks. Additionally, previous studies, projects and modelling exercises on Beijing's transport sector have proved to be constructive sources for providing supplementary data. However, data exist mostly in aggregate

Figure 3. ASIF methodology as implemented in the calculation tool.

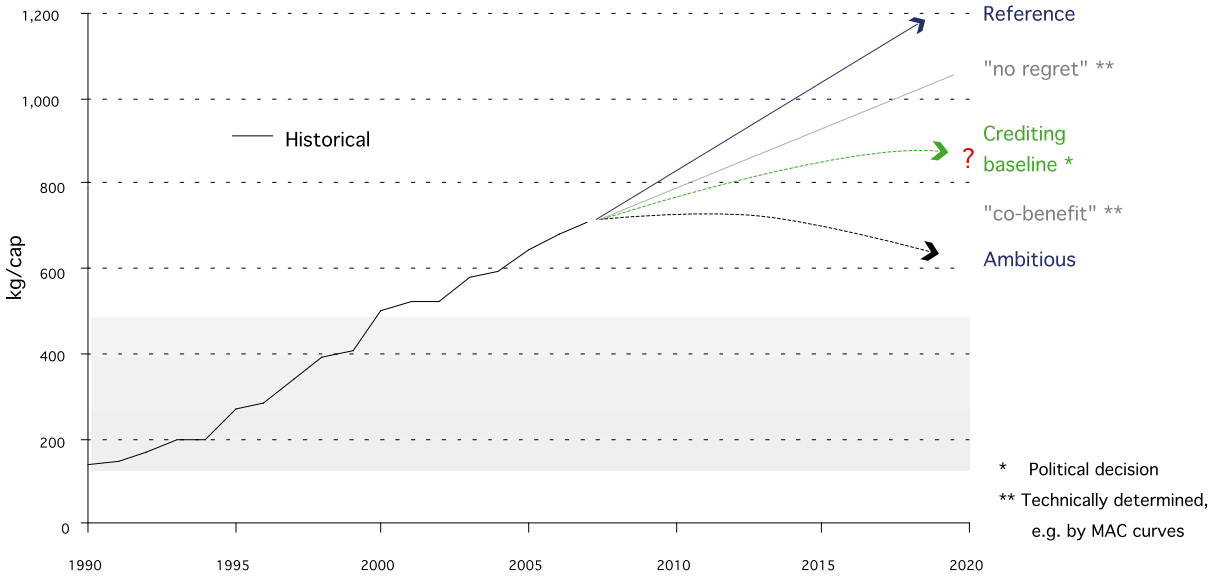


form only, and the energy use of specific large consumers, such as the departments operating the public bus system or taxi companies, is not monitored comprehensively or specifically identified. One particular further problem is that gasoline and diesel for use in commercial or government vehicles is often purchased in bulk and not distributed through regular gas stations. These are just a few of the issues surrounding data availability and integrity that would need to be adequately addressed before a sectoral target could be formulated capable of withstanding the scrutiny of an international MRV process.

One important point to note is that a lot more information is needed to develop a sector no-lose target proposal than merely information on total sectoral emissions. In order for the scenarios to be transparent, they are based on assumptions regarding transport activity, modal structure, the efficiency of vehicles and fuel emission factors. This allows for the scenarios to be different based on choices regarding these factors. For example, the reference (BAU) scenario might assume that 50% of all passenger transport (person km) happens on public transport, while a more ambitious scenario assumes that 70% public transport can be achieved. The actual target that is ultimately set through negotiations at the international level can then be easily compared to future performance as observed and expressed directly in terms of GHG emissions (intensity).

We assessed the trends in historical energy consumption and distance travelled for passengers and freight from 1990 to 2007. The data provide a basis for assumptions on travelling activity, transport modal structure and vehicle efficiency in the three scenarios underlying a sector no-lose target. Figure 3 shows the data that have to be taken into account, and that therefore needs to be provided as an input, to develop an understanding of the possible developments in the sector. The data used to calculate total activity for example, include statistics per transport mode on average travelling distance per passenger, total annual passenger numbers, average load per vehicle and so on. Data on vehicle efficiency are not available from direct sources but are derived from previous studies relating to Beijing municipality. The availability of such information or the ability to generate it is a prerequisite to develop a transparent, MRV-able proposal for sector no-lose targets as a NAMA.

Figure 4. Concept of political baseline setting based quantitative information.



Scenarios calculated using the IPAC-AIM/technology model, which was developed by the Energy Research Institute under the National Development and Reform Commission of China, are used to inform the assumptions needed to complete the proposal template. The IPAC model addresses energy consumption and pollution under the conditions of future population and economic development. It particularly focuses on the impact of transport policy on emission mitigating actions. Using a quantified methodology, the framework of the model looks at the following elements:

- Future trends in population and economic development;
- Estimated transport demand based on Beijing's economic development trend; derived future passenger and freight travelling distances and vehicle numbers;
- Factors that influence scenario settings under different policy conditions: efficiency changes in vehicles through technological advances, market share by type of vehicles and change in fuel mix;
- Quantified analysis of future energy demand and CO_2 emissions in Beijing;
- Policy advice based on model analysis.

An important issue in the scenario setting is which policies should be included in the reference scenario and which go beyond. The year

2007 was chosen as the policy base year, meaning that policies and measures that came into effect before the end of 2007 would be included in the business-as-usual scenario, while new policies and measures introduced after 2007 influence the scenario used as crediting baseline (see Figure 2).

This means that the following activities that the Chinese government has undertaken in the transport sector nationally and in Beijing before 2007 fall under the business-as-usual scenario:

- Fuel economy standards for small passenger vehicles;
- Energy development and conservation planning for Beijing in the 11th Five-Year Plan (FYP);
- Beijing transport development framework;
- Beijing infrastructure development for the 11th FYP;
- Limitation on inefficient small passenger vehicles;
- Future planning for rail transit in Beijing.

No external support in the form of CDM has been received in the transport sector.

New policies and measures after 2007, which can be considered China's national contribution and which should be supported with new external support, include:

- New vehicle emission standard;
- Wholesale oil price reform;
- Traffic restrictions indexed by weekday/licence plate numbers;
- Adjustment on car sales tax;
- Subsidy on efficient and new energy cars;
- Revitalisation plan for the automotive industry.

The question of what metric to use in the scenarios has come up during the road testing and in the consultations with stakeholders. In general, the idea of the no-lose target has been to use a calculation based on intensities, for example, CO_2eq. per ton of cement or kilowatt hour. As the road testing in Mexico showed, a metric like GHG emissions per person kilometre or similar is not viable because verifiable data in kilometres travelled is not available. So the Beijing exercise started out by exploring emission intensity from transport per capita and per GDP of Beijing municipality. Both options appear viable, but even an absolute no-lose target could be acceptable. This is due to the ambitious planning for sustainable transport in Beijing, and more generally because space constraints naturally limit the expansion of fossil fuel-based private transport in the urban region. Unlike other industries like cement and iron and steel, there is less concern that an absolute target will limit the expansion of the sector.

In the end, the exact absolute or intensity level at which to set the target, that is, the sectoral crediting baseline, is always a political decision. It needs to take into account how stringent and ambitious existing policies are, how much financing can be provided to implement them, what the maximum mitigation potential is, etc. If sectoral analyses regarding marginal abatement costs (MAC) exist, they may be used to inform this pro-

cess. It is likely that an argument can be made for the sectoral crediting baseline to be placed at some point in between a 'no regret' cost line, covering measures that have no or negative costs to implement, and a 'co-benefit' level, including measures which entail substantial other positive environmental or development benefits (see Figure 4). For the Beijing transport template road testing, an in-depth analysis based on a sectoral MAC curve has not been undertaken due to a lack of data. Using MAC curve information can be the key to presenting a convincing case for a specific sectoral target. In the transport sector this may nevertheless be difficult because a large part of the cost might be borne by individuals, and benefits are largely available to all of the public in the form of positive environmental externalities.

To present persuasive scenarios for the transport sector, stakeholders must be adequately involved and given the opportunity to provide input. At the current stage, the road testing has been carried out as a research project, with the information used coming mostly from a central government research organisation. Local government agencies have been consulted and have been involved in the collection of data as well as in planning the general direction of future scenarios.

City planners in Beijing have extensive experience of mapping out and implementing sustainable strategies for city transport. In the past this has been realized mostly with a view to solving the problems of congestion and localized pollution. Low carbon development has become a hot topic among politicians at all levels of government in China, but it is still a relatively new idea and has not been an independent goal for the urban transport strategy of Beijing. Taking up a sector no-lose target in Beijing's transport sector would mean that sustainable transport strategies that are being implemented or planned today (expansion of mass public transport, vehicle efficiency standards, fuel taxes, etc.) can continue to be used and made more stringent. In addition, each policy would be mainstreamed to concentrate on the most effective ways to mitigate carbon dioxide emissions and new measures be devised to further this overarching goal. To assess the success of the NAMA in the transport sector, it will then not be necessary to look at each measure individually, but at the overall deviation of transport emissions from the sectoral crediting target that has been agreed *a priori*.

Following this logic, the choice of an implementing and supervising organisation that promotes mainstreaming of the GHG mitigation goal in the transport sector becomes vital. Beijing city will need the capacity to

- present a compelling case for a crediting baseline using the proposal template;
- implement ambitious policies and measures that go beyond the status quo and have a GHG mitigation objective at their heart;
- ensure that the crediting baseline is actually crossed to generate income from the sale of emission credits on the international carbon market;
- ensure that data quality and presentation meet the requirements of the international MRV process; and
- use the projected income stream and other available international finance to incentivize mitigation measures adequately.

As becomes obvious from this list, the challenges for the actual realization of a no-lose target in the Beijing transport sector are considerable. Achieving the target will require the coordinated efforts of the Beijing Development and Reform Commission, the Statistical Bureau, the transport and urban planning agencies, research institutions, the National Development and Reform Commission, the Ministry of Transport and probably a number of other entities. It should be noted, however, that the challenges mostly concern the presentation and harmonization of sectoral efforts – the actual policies and measures that are needed can continue along the lines already practiced today, as only the sector no-lose target would be presented and evaluated internationally as a NAMA.

Conclusions

The road-testing of the proposal template for a sector no-lose target in the Beijing transport sector has shown that it would actually be possible to implement such an approach in China, at least within the boundaries chosen for this particular case study. It has become clear that the capacity to provide and present the necessary data still needs to be further enhanced to a level that can withstand the scrutiny of an international MRV process. Issues surrounding the coordination of efforts to reach the target, as well as the use of the possible income from the carbon market to incentivise emission reductions, deserve much more attention and should be the focus of future research efforts, for example, through a pilot study.

While in other sectors there have been doubts as to whether an approach is feasible that allocates income from the carbon market to a government (not private) actor, this research clearly demonstrates that this is the preferred and probably only option in the transport sector. The large number of dispersed emission sources is just what makes other approaches like the CDM, which rely on the incentivisation of reductions at each individual source, impractical. Furthermore, nearly all present reduction efforts in the transport sector in China today rely on administrative measures like the setting of standards and the expansion of mass public transport, etc., which can be further enhanced with additional financing.

What, then, does the case of urban transport in Beijing tell us about the applicability of sector no-lose targets for the transport sector in general in other big (Chinese) cities, and do they have a wider application beyond the metropolitan regions? Data on the transport sector in big Chinese cities exist in differing qualities. The argument has been made above that data availability and quality and the capacity to analyse and present them are indispensable for proposing a sector no-lose target. If the approach should be applied more widely, preparing cities' ability to cope with these challenges should therefore be one of the primary concerns of capacity-building efforts. Through the Chinese governance system, and provided sufficient funding is available, it should be possible to spread experience gained in pilot projects and more advanced cities to others, replicating institutions and incentive structures.

To present sectoral targets as a NAMA, it may be reasonable to consider transport by dividing it into distinguishable sub-sectors. Urban transport and the policies and measures for reducing GHG emissions are considerably different from the questions that arise when one thinks of intercity transport, including not only road transport, but also aviation and water-based transport of both passengers and freight.

One sub-sector could therefore be urban transport, for example, covering all the cities in China above a certain size, applying the transport mode boundary used in our case study. Although the sector no-lose target would in this case exist in cities spread out across China, concerns over leakage are unlikely to arise because urban transport cannot be replaced by inter-city transport. Policies in large cities with a target that supports the development of mass public transport are also unlikely to cause inhabitants to move to other, smaller cities that do not need such a target. Vehicle efficiency standards put into place to reach targets in the cities effectively also extend to inter-city road transport, as manufacturers will not offer separate models. The Chinese government could take up an absolute or intensity target for transport in all cities above a certain size, and one could even imagine the setting of a benchmark expressed in terms of per capita emissions in the transport sector, which makes the achievements of cities comparable and helps in reaching the overall national target.

The case study presented here allows few conclusions for the sub-sector of either inter-city (here especially freight) or rural transport. The discussions surrounding the former might, however, be partially informed by the debate surrounding international aviation and maritime emissions.

The transport sector as analysed here is quite distinct from other sectors such as cement, iron and steel production and power generation, where other case studies have been or will be carried out. However, one other sector with a major share in global emissions that may be able to apply the lessons learned through the transport case study is the building sector. This shares important characteristics with the transport sector: it has a large number of dispersed emission sources where individual emission reductions are impossible to incentivise directly, leakage and competitive concerns are minimal, and there is a reliance on administrative measures like standards and public spending to realize energy efficiency gains. Further research could therefore also be directed at developing a sectoral proposal template for the building sector and analysing more generally questions of the domestic implementation of sector no-lose targets as a NAMA in both these sectors.

Experience from the road testing exercise underlines once more that data analysis can only be a starting point in formulating a sector no-lose target as a NAMA. Data availability, information on cost, etc. are certainly important issues, but in the end the setting of the no-lose target, the sector crediting baseline, remains a political decision. It has to be taken with a view to the specific circumstances of the country and sector, and by matching the level of ambition of the NAMA with the level of international support provided.

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