ECN

Energy research Centre of the Netherlands

Transport and low-carbon development

Low-carbon development provides a framework for looking at transport in an integrated manner, which has proven essential for effective policy making. It seeks to identify and analyse transport solutions with development *and* climate benefits. Thereby it can be a basis for articulating international climate support needs on finance, technology and capacity building. For example through nationally appropriate mitigation actions (NAMAs). This may help the transport sector, which has so far not received sufficient attention in international climate policy, in its ambition to contribute to sustainable development goals.

1. What is low-carbon development?

Low-carbon development (LCD) generally refers to economic development with lower emissions, and as such covers the overlap between development and mitigation. There is no consensus on exactly what 'development' means in the context of low-carbon development: it is often taken to be equal to economic growth, while sometimes it is read in a broader sense, more like sustainable development. A low-carbon development strategy (LCDS) can provide a framework for countries to plan and implement policies to pursue national development priorities, while keep emissions lower than otherwise.

In order to support low-carbon development, and thereby advance global climate change mitigation efforts, Low-Carbon Development Strategies are introduced alongside Nationally Appropriate Mitigation Actions (NAMAs), as central elements for mitigation under a new international climate policy regime. Under the UNFCCC Cancún Agreements, Parties have agreed that developed countries *should*, and developing are *encouraged to*, make low-carbon development strategies or plans. An LCDS could have several objectives. On a national level, it can help aligning climate and development agendas across sectors, raise awareness among stakeholders, and attracting private finance. On an international level, LCDS can be used to identify needs and priorities, provide a framework for NAMAs, and reporting platform to international climate change community[1].

Evidence shows that countries differ significantly in terms of development context, possibilities and priorities, and therefore a generalised template approach for LCDS would be ineffective.

Bus rapid transport beats congestion (photo: K. Sakamoto)

Depending on the scope and purpose, a low-carbon development strategy could have different building blocks, including an assessment of the current situation; articulation of a long-term vision or goal; projections for emissions, mitigation potential and costs; a vulnerability assessment; an assessment of financing needs; and suggestions on institutional arrangements[2]. Which of the building blocks are included and emphasized depends on the specific (country) context.

As of 2011, several countries have already published studies that can be regarded as LCDSs or contain such elements (e.g. Guyana, Brazil, Indonesia, Mexico).

2. What can low-carbon development mean for transport?

The movement of people and goods (what we call 'transport') is a precondition for economic and social development, yet the current transport sector is not sustainable: it contributes significantly to air pollution, oil consumption and congestion, to name but a few impacts. In addition, with global emissions of over 13% (and rising in virtually all countries), transport is a sector with great significance to addressing climate change.

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Electric vehicles avoid urban air pollution (photo: RenewableEnergyWorld.com)

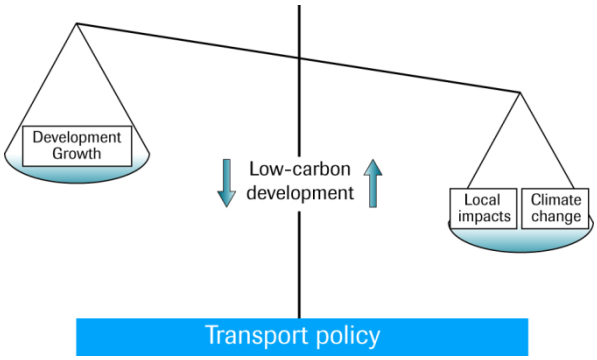
In low-carbon development planning, national development arguably has priority over emissions reduction, and some may view mitigation as a co-benefit rather than a goal in itself. Similarly in transport policy, climate change is often only a secondary policy consideration[3].

Using a low-carbon development approach to transport planning can yield surprising results, way beyond creating climate co-benefits only. For example, policies focusing on travel demand and modal shift (such as introducing bus rapid transit systems, or promoting cycling), reduce emissions and provide significant co-benefits for air quality, energy security and accessibility.

Mitigation options in the transport sector are often not realized to their full potential due to financial, technical, institutional, political or behavioural barriers[4]. The CDM has not been very successful in the transport sector, with less than 0.5% of the generated credits to date coming from transport. Reasons include above barriers as well as complexity in applying methods and monitoring of emission reductions on a per-project basis. New policy instruments such as NAMAs and LCDS are less project focused and could have more potential for the transport sector[5].

Box 1. Electric vehicles in China
China is one of the leading countries when it comes to production and use of electric vehicles (EVs), notably cars, buses and bicycles. Electric vehicles contribute to better air quality and energy security, and may have climate benefits for certain regional grids. There are subsidies for private consumers as well as demonstration programmes such as the 'Ten cities, thousand vehicles' project. *Source: Earley et al (2011) CSD background paper*

It has been acknowledged that to address barriers, the sector needs an integrated approach in order to make policies effective[6]. LCDS provides such an integrated approach where different stakeholder interests and barriers are considered and a long-term vision is developed.



LCD in transport maximises benefits and minimises negative externalities (Source: authors)

In addition, transport policy is often most effective if it considers a package of instruments instead of a single policy or measure. For example, in order to promote public transport, improved bus systems and parking and cycling policies are needed.

3. LCDS and NAMAs for transport

The discussion above shows that that the transport sector is particularly suitable for low-carbon development planning, and vice versa. In its most basic form, making a low-carbon development strategy could include the following three steps:

1) *Assessing the current situation*: GHG emissions, externalities, trends, capacity, stakeholders and institutional structure;
2) *Analysing of low-carbon alternatives*: what are possible actions, emission scenarios, costs, benefits, and barriers; prioritisation of options;
3) *Identification of policy interventions*: long-term vision among stakeholders, policies , private sector participation, financial structures, support needs (finance, technology, capacity building) and a plan for measurement, reporting and verification (MRV).

Moving to implementation, the next step would then be to develop transport NAMAs, to gain international recognition for the mitigation effort and potentially to tap into support for NAMA development.

Although climate change mitigation in the transport sector has received much less attention compared to the energy sector, there are recent developments to build on. Mitigation and the transport sector are key focus areas of international organisations such as the Multilateral Development Banks and national governments involved in international cooperation (e.g. the International Climate Initiative).

The Sustainable Transport Initiative of the Asian Development Bank (2010) for example, aims to shift from the current focus on road investments towards urban public transport and non-road modes such as rail and water, promoting mode shifts in passenger and freight transport. It also mentions the

knowledge exchange, behavioural aspects of transport, the possibility of supporting the uptake of more sustainable vehicles, development of sustainable transport plans and access to climate finance.

Green light for low-carbon urban transport (photo: ITDP)

To move further towards making transport-LCDS a reality, more research and capacity building efforts are necessary. According to the OECD[7], elements necessary for moving towards green growth include:

- Assessment of future challenges based on the current (business as usual) situation of the transport sector, highlighting the synergies and complementarities between economic and environmental policies;
- Facilitate transformational change through accelerating green innovation and promoting behavioural change
- Involve the private sector by introducing innovative financing mechanisms and guidelines for sound corporate practices;
- Develop a framework and principles for green growth measurements; build a small set of key headline indicators, and define the elements of a pro-poor "green growth" approach for developing countries.

Box 2. Low-carbon urban mobility in Brazil

A NAMA case study for the city of Belo Horizonte, Brazil, shows how low-carbon development in urban transport could work. The city government has developed a Comprehensive Mobility Plan, covering roadway improvements, bus rapid transit and metro expansion, bicycle infrastructure, pedestrian facilities, parking policies and land-use. This plan was developed using extensive data collection and modelling. In addition to 9 $MtCO_2$-eq or 36% of baseline emissions savings up to 2030, the plan is estimated to result in reductions of 25% in travel time, 19% of transport costs, and 39% of particulate matter. Source: Hidalgo (2010) CITS case study. www.slocat.net)

4. Tomorrow's policy questions

ECN Policy Studies expects that a low-carbon development approach to transport planning will raise a number of policy questions:

How can development, sustainability and climate objectives be integrated into transport policy planning at different government levels? A good starting point would be to set up a stakeholder-inclusive process, backed up by sound analyses, to develop a consistent vision as a guideline.

How are low-carbon transport alternatives now considered in existing plans and strategies? Avoid reinventing the wheel and start by performing a state-of-the-art comparative analysis across countries to gain insight and built on best practices

What could a transport LCDS look like? Although hard to predict, the elements and building blocks mentioned above could provide a good starting point. Note that currently the field is in its "infancy" stage and practical experiences with low-carbon development planning for transport will need to be analysed and shared to gain more insight.

How could the transport sector benefit from LCDS? Benefits could include institutional strengthening, improved access to finance and international support, and improved policies that are better aligned to different stakeholder interests and objectives.

What policy support tools are needed advance sustainable, low-carbon transport? Tools in use are mostly optimised for the current, non-sustainable transport approaches. The support toolkit will need to be broadened to include instruments such as new economic and behavioural analysis and transition management, and Marginal Abatement Cost Curves (MACC) specifically adapted for transport.

Cycling as low-carbon urban transport (photo: Embarq)

ECN Policy Studies and low-carbon transport

The Energy research Centre of the Netherlands is an independent research foundation where over 500 motivated people work towards a sustainable energy system. With 70 staff, ECN Policy Studies combines policy analysis and support with first-hand technological expertise. With two groups of researchers focussing on the transport sector and international climate policy respectively, we aim at advancing low-carbon development in the transport sector.

Recent work by ECN Policy Studies includes research on developing low-carbon development strategies (LCDS) and NAMAs, including capacity building, stakeholder participation processes, and modelling and scenario development (including LEAP and the in-house TEMPO model).
Over the years, the group has been involved in work specifically in transport-related NAMAs, looking at impacts, costs, finance options, MRV, aspects of institutional structure. ECN actively participates in the discussion on international technology transfer, and innovation centres and networks.

With over a decade of experience, ECN Policy Studies has in-depth knowledge on electric mobility: technical requirements, early-market strategies, innovation, and consumer behaviour. Similarly, the group is able to combine knowledge on urban mobility with long-standing experience from projects in infrastructure and the built environment.

Transitional change requires not only attention to technical and policy aspects, but behavioural change and public acceptance are key ingredients for transition. As a multidisciplinary research unit, ECN Policy Studies can draw on a social science group, with have in-depth knowledge on success factors relating to adoption of new technologies, behaviour changes, and social acceptance.

Box 3. **What ECN Policy Studies can offer:**

- Quick scan of benefits LCDS approach in transport sector for a country or region
- Quick scan for potential NAMAs and their impact indicators (including support for NAMA development)
- Background study on transport policy, costs, potentials and mitigation scenarios, including an assessment of emissions and identification of a business-as-usual (BAU) baselines.
- Support for low-carbon development planning and setting up an LCDS.
- Support for developing an MRV system for transport, in line with national and international requirements.
- Support for identification, prioritisation and selection of NAMAs, and development of concept notes and NAMA proposals.

Notes:

1. Tilburg, X. van, *et al.* (2011) *Paving the way for low-carbon development strategies*, ECN Policy Studies, Clapp et al. (2010*) Low Emission Development Strategies: Technical, institutional and policy lessons*. IEA/OECD, Paris
2. As put by late Berkeley professor Lee Schipper: 'transport matters for carbon, but carbon doesn't matter for transport'
3. IEA (2009) *Transport, energy and CO_2: moving towards sustainability*. Paris, 2009
4. Bakker & Huizenga (2010) *Making climate instruments work for sustainable transport in developing countries*. Natural Resources Forum, 34 (4)
5. UNEP (2011) *Technologies for climate change mitigation – transport sector*. TNA Guidebook series. Tech-action.org
6. OECD (2010) *The green growth strategy. How can we get to a greener economy?* www.oecd.org

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ECN is a founding member of the Coordinated Low Emission Assistance Network (CLEAN), and a member of the Partnership on Sustainable, Low-carbon Transport (SLoCaT)

CLEAN

Partnership on Sustainable Low Carbon Transport