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FACILITATION OF TRANSPORT AND TRADE IN LATIN AMERICA AND THE CARIBBEAN

Low-carbon transport infrastructure: experiences in Latin America

Introduction

The transport sector is one of the main sources of greenhouse gases and other pollutants that cause climate change. There is therefore a pressing need for change in the form of policies and actions that seek sustainable development by decreasing the environmental consequences and other negative externalities of transport systems. Any proposed solutions should be comprehensive and encompass the infrastructure framework and the operation of individual modes of transport, fostering low-carbon transport infrastructure that furthers sustainable development in Latin America and the Caribbean.

This issue of the *Bulletin* summarizes the main findings of the international seminar on sustainable transport policies in Ibero-America, which was held in Montevideo, Uruguay, from 26 to 29 October 2010, as part of the work being done by the Economic Commission for Latin America and the Caribbean (ECLAC) and the Spanish Agency for International Development Cooperation (AECID) under the project "Environmental innovation in urban services and infrastructure: towards a carbon-free economy". Senior transport and port sector officials from 15 Ibero-American countries met and analysed Latin American and European experiences with low-carbon transport and infrastructure policies, sustainability criteria and modern management tools for promoting sustainable infrastructure, transport and logistics policies. This study looks at the current state of low-carbon transport infrastructure development in Latin America and how it compares with the European Union and Spanish experience.

This issue of the *Bulletin* compiles and analyses the principal measures adopted by a group of countries in Latin America to reduce carbon emissions in the transport sector. These measures are the first steps towards a low-carbon transport infrastructure.

This study is part of the work being done by the Unit under the "Environmental innovation in urban services and infrastructure: towards a carbon-free economy" project funded by the Spanish Agency for International Development Cooperation (AECID).

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Introduction



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UNITED NATIONS

ECLAC

I. Definition and scope

As explained in *FAL Bulletin 286, Towards low-carbon infrastructures*, such infrastructures are those that generate less carbon (CO₂) emissions than the available alternatives for providing a specific transport service under specific national conditions. This concept is much broader in scope than just reducing CO₂ emissions because it encompasses improving the quality of life for inhabitants of urban and rural areas and achieving higher efficiency in the sector and greater overall sustainability—that is, economic, social, environmental and institutional sustainability.

A large part of emissions come from the energy used to produce and transport products. Transport policy should therefore favour a modal split that promotes less polluting and more energy-efficient modes and thus contributes to a more sustainable, competitive and productive economy. The same is true for passenger transport and urban mobility.

II. Good practices in low-carbon transport infrastructure

This section summarizes the main public policies (and their outcomes) adopted by some Latin American countries for reducing transport emissions and their negative externalities. This process, when properly backed by a comprehensive and multidisciplinary policy, would lead to progress towards low-carbon transport infrastructures. The information in this document comes from studies conducted under the ECLAC/AECID project and from materials provided by the countries attending the Montevideo seminar. Thirteen Latin American countries were included in the study: Argentina, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Panama, Paraguay, Peru and Uruguay. Spain and the European Union were covered as well.

The information collected refers to progress made in the transport sector to reduce both *direct* and *indirect* CO₂ emissions.¹ The information on each country is set out in three paragraphs: one on explicit policies (whether climate change has been addressed in basic policy statements); one that analyses comprehensive measures leading to change in the modal split in order to progress towards low-carbon infrastructures; and, last, one on initiatives to reduce transport sector emissions.

¹ *Direct* emissions are those caused by vehicles or transport services themselves. *Indirect* emissions are those that are generated by providing infrastructure, manufacturing and maintaining vehicles and producing and distributing fuel.

(a) Argentina

- Policies

Argentina has no formal policies or clear objectives for reducing carbon emissions in the transport sector. Nonetheless, the Transport Secretariat is interested in a systematic approach to addressing climate change issues.

- Integrality and modal shift

As for a modal shift towards low-carbon systems, the 2008 railway reorganization act was the starting point for improving the railway system, with an emphasis on infrastructure. It resulted in major projects such as the Circunvalar Ferroviario light rail system in Rosario, upgrading sections of the Belgrano-Cargas railway, and electrification and the opening of underground passenger lines in the metropolitan Buenos Aires area. This stimulus has not yet led to significant initiatives regarding railway transport service operation modes. The Buenos Aires Sustainable Transport Plan includes measures to promote non-motorized transport.

- Low-carbon transport infrastructure initiatives

Other initiatives for reducing transport carbon emissions under the Buenos Aires Sustainable Transport Plan refer to improving traffic signs to reduce travel times and to pilot programmes for developing more energy-efficient buses. The significant expansion of the subway system planned for the coming years will be combined with installing streetcars in the city center.

(b) Chile

- Policies

Chile has neither formal policies nor clear goals for reducing carbon emissions associated with the transport sector, nor are there measures encouraging the use of less-polluting transport methods although the possibility exists. There are no explicit reduction goals or targets for intercity transport, and some investments favour both public and private transport, as explained in *FAL Bulletin 289*. Environmental institutions will be strengthened by incorporating the Strategic Environmental Evaluation, which seeks to add an environmental dimension to public sector policies and plans in order to make them more sustainable and should be extended to national policies on energy, infrastructure and transport.

- Integrity and modal shift

Efforts have focused on promoting sustainable urban transport development, especially public mass transit. A National Logistics and Transport Plan (master plan) is being developed for cargo transport; it will optimize and integrate various transport modes and set out other proposals as well.

- Low-carbon transport infrastructure initiatives

Chile has recently drawn up a new normative framework that will phase in new, tougher emissions regulations for all motor vehicles (cars, motorcycles, buses and trucks). Starting January 2011, new motorcycles must comply with Euro III emissions standards. In April, Euro IV will go into effect for gasoline-powered vehicles. Starting in September 2011, light-duty diesel vehicles must comply with Euro V. From September 2012, new public transport buses must comply with Euro IV and have particulate filters, and trucks entering the country must meet Euro IV standards for particulates. Furthermore, there are tax incentives for the use of biofuels in transport. Further incentives will be announced in 2011 to encourage zero- and ultra-low emission vehicles in the country. Added to these measures will be stricter regulation of heavy-duty vehicles and stricter requirements for fuel refining.

(c) Colombia

- Policies

Colombia's strategic objectives set no specific environmental or sustainability goals, and there are no sustainability monitoring and oversight mechanisms for infrastructure and transport services. However, Colombia has been making an effort to counteract the negative effects of climate change with mitigation action, such as cutting greenhouse gas (GHG) emissions into the atmosphere and promoting GHG absorption by greenhouse gas sinks or sequestration. A 1995 decree established regulations to prevent and control atmospheric pollution caused by stationary and mobile sources, as well as to protect air quality throughout the country.

- Integrity and modal shift

Colombia has a National Logistics Policy, which provides the basis for a comprehensive infrastructure, transport and logistics system. Nevertheless, transport modes are not efficiently coordinated. In urban public transport, Colombia has developed a bus rapid transit

system in several cities patterned on the Transmilenio system in Bogota and tailored to local requirements and geography.

- Low-carbon transport infrastructure initiatives

Some action has been taken to reduce transport emissions, such as the programme for replacing fossil fuels by promoting vehicular natural gas and biofuels like alcohol and biodiesel. New regulations for mobile sources have changed air pollutant emission levels for vehicles and motorcycles, and there are other environmental initiatives to reduce CO₂ emissions in the transport sector.

(d) Costa Rica

- Policies

Costa Rica, with its National Strategy on Climate Change, Carbon Neutral 2021 commitment and other international and Central American commitments, stands out for its domestic environmental legislation.

- Integrity and modal shift

With respect to modal shift in Costa Rica, more and more emphasis is being placed on electric transport, through import tax incentives. There is also a policy to build bicycle paths.

- Low-carbon transport infrastructure initiatives

Some of the incentives put in place to reduce carbon emissions from transport and building infrastructure are laws for controlling vehicle emissions and requiring technical motor vehicle inspections; vehicle use restrictions based on license plates; encouraging the conversion of gasoline-powered vehicles to liquefied petroleum gas; distribution of gasoline-ethanol blends to the northern part of the country; and recycling road surfacing materials as a base for rebuilding roadways.

(e) Ecuador

- Policies

Ecuador does not have a comprehensive strategy for reducing transport carbon emissions. Nonetheless, it is considering the creation of economic development zones to promote modal convergence and logistics services in the country.

- Integrity and modal shift

Ecuador has mass transit systems with bus- and streetcar-only lanes, and it is considering incentives



for bicycle use in environmentally fragile areas like the Galapagos Islands. As for maritime transport, studies are being carried out to boost cabotage, regulate flows to the Galapagos and renew the fleet.

- Low-carbon transport infrastructure initiatives

There are isolated initiatives that mainly involve urban transport in Quito and Guayaquil. Examples are the public transport fleet renewal plan for scrapping older vehicles, and vehicle use restrictions based on license plate numbers.

(f) El Salvador

- Policies

One example of progress made in El Salvador in the area of sustainable low-carbon transport was the enactment of the General Maritime Port Law, which was developed in conjunction with the Ministry of Environment and introduces the concept of climate change in policies for this subsector.

- Integrality and modal shift

Regional and subregional organizations recognize the need to modernize transport infrastructure as part of a common platform for the entire Central American isthmus. This policy takes into consideration modal shifts and the promotion of railroads in each of the countries involved in the Mesoamerica Project, as well as an analysis of cabotage and its prospects.

- Low-carbon transport infrastructure initiatives

In land transport, El Salvador is working to reduce vehicle pollution and improve the technical inspection system.

(g) Guatemala

- Policies

Guatemala has a maritime-port policy with an integrated, intermodal approach to transport and foreign trade logistics. As happened with the maritime-port policy, the National Competitiveness Agenda

paved the way for developing a comprehensive transport and logistics policy.

- Integrality and modal shift

The Santo Tomás de Castilla Port improved port-railway connectivity. For passenger transport, bus-only routes for the Transmetro bus rapid transit system have displaced individual means of transport.

- Low-carbon transport infrastructure initiatives

Initiatives for upgrading the urban transport system in Guatemala City and replacing the bus fleet are under way. There are policies for controlling vehicle emissions, but there is no legislation in this regard and emissions are not monitored.

(h) Mexico

- Policies

Mexico has an incipient transport policy with room for improvement as far as integration, structure and scope are concerned. The policy aims to advance sustainable transport service, chiefly by reducing GHG emissions. The Inter-Ministerial Commission on Climate Change and the Advisory Council on Climate Change work together to coordinate at an institutional level and with civil society organizations to address climate change issues. The cross-cutting Special Climate Change Programme 2009-2012 lays out a multitude of specific carbon emission reduction goals in transport and infrastructure services. Mexico has committed to reducing greenhouse gases 50% by 2050.

- Integrality and modal shift

Mexico is developing proposals on cabotage and railway transport. A motorways of the sea programme is about to be announced for cabotage that will replace overland transport. Railway infrastructure is being considered to support the reduction of fossil fuel consumption through multimodal schemes. There is railway connectivity between the main Mexican ports and the other North American Free Trade Agreement (NAFTA) countries.

- Low-carbon transport infrastructure initiatives

There have been significant efforts made towards improving fuel quality, including for maritime transport. The strategy to encourage the adoption of international vehicle emissions standards has led to current regulations in Mexico: since 1 July 2008 new vehicles entering the population must have EPA 2004 or Euro IV technologies for reducing hydrocarbon emission levels. Vehicle population



renewal is also being encouraged to increase energy efficiency and bring GHG emissions below the trend scenario. In urban transport, mass transit projects are under way and highway connections with urban roadways are being upgraded, thus furthering urban reorganization and reducing emissions caused by traffic congestion.

(i) Nicaragua

- Policies

Nicaragua has a National Climate Change Action Plan, as well as international and Central American commitments and domestic legislation to protect the environment. While these commitments set clear emission control goals, there are no explicit reduction targets although emissions inventories are taken regularly.

- Integrality and modal shift

There is political will in the administration to promote railroads, although this is still in very early stages and financing is problematic. Domestic port developments have been built, and work on the international development is about to begin. There is also a policy to build bicycle paths.

- Low-carbon transport infrastructure initiatives

Initiatives for reducing carbon emissions in transport and in infrastructure construction include the vehicle emissions inspection act, restrictions on importing vehicles more than 10 years old and replacing the fleet of urban buses. Bus fleet replacement projects, which began in 2009, are making modal distribution shift possible. Thirteen per cent of the entire urban fleet of Managua has been replaced with vehicles that have Euro III engines. During roadway reconstruction, surface materials are recycled and used as a base for new roads.

(j) Panama

- Policies

Panama has no explicit carbon emission reduction policies for the transport and infrastructure sector. Nonetheless, the Panama Canal contributes a good deal to carbon emission reduction by allowing international maritime transport to grow. The widening of the Canal (slated for completion by 2015) could reduce global CO₂ emissions by more than 100 million tons over the course of 10 years.

- Integrality and modal shift

Panama has successfully integrated ports and railroads. Some United States railway and logistics companies hold concessions to operate both services there.

- Low-carbon transport infrastructure initiatives

Work is under way to modernize urban transport in Panama City.

(k) Paraguay

- Policies

Paraguay has no official policy for reducing carbon emissions in the transport and infrastructure sector. Nevertheless, a National Transport and Logistics Master Plan that could incorporate these elements is being developed.

- Integrality and modal shift

Studies are being conducted for railway connections within the framework of the bi-oceanic corridor (Initiative for the Integration of Regional Infrastructure in South America), as well as for building a commuter train line serving Asunción and five other cities. The metropolitan area of Asunción is working to implement a bus rapid transit system and on promoting individual electric vehicles and electric buses.

- Low-carbon transport infrastructure initiatives

There are initiatives related but not specifically linked to this goal. Among them is a new law establishing mandatory vehicle inspections.

(l) Peru

- Policies

Although Peru has some environmental standards, they do not link carbon emissions to infrastructure and transport services. Transport policy explicitly references environmental protection. It emphasizes bolstering socio-environmental management in the transport sector, focusing on applying environmental and social viability criteria throughout the infrastructure and transport services project cycle. But the standards do not include sustainability monitoring and controls or tangible criteria for reducing emissions associated with infrastructure and transport services.

- Integrality and modal shift

In regard to intermodality, studies are being carried out for port-railway connectivity in Callao and in Ilo

Port. Furthermore, there are private initiatives in the logistics arena, as well as logistics activities zones favouring intermodal transfer at airports and ports.

- Low-carbon transport infrastructure initiatives

Peru is focused on fighting environmental pollution through vehicle pollutant emissions controls. Maximum permissible emission limits have been established for vehicles on the road.

(m) Uruguay

- Policies

Uruguay has no official policies on low-carbon infrastructure and transport services.

- Integrality and modal shift

Uruguay is working on a strategic plan for intermodality and logistics, aiming to make the country a regional logistics centre by 2030. A partnership is being formed between the ports and railways, and logistics platforms are being built along the border with Brazil.

- Low-carbon transport infrastructure initiatives

Although there are no national initiatives for carbon emission reduction, there are many municipal initiatives in place. One example is reorganizing bus service in Montevideo, including fleet renewal and rate integration.

III. Advanced experiences: European Union and Spain

The following is an outline of European and Spanish experiences in sustainable transport, particularly in low-carbon transport infrastructure. This report is the result of two decades of advancements in the field; it is hoped that it will be a useful reference for policy development and implementation in Latin America.

(a) European Union

A cross-cutting study of low-carbon emission transport and mobility in Europe, with several long-term (2030-2050) scenarios, has been under way since 2009 under the European Union Common Transport Policy (CTP).

The European Office of Statistics (Eurostat) produces important indicators, including European sustainable development indicators (SDI) related to transport. The Transport and Environment Reporting Mechanism also provides sustainability indicators. Both are sources of useful, reliable information for tracking the performance

of measures aimed at improving transport sustainability and for evaluating energy efficiency and progress towards the efficient use of improved technologies. Many of the indicators are related to reducing GHG emissions and energy consumption. Some examples of those indicators are greenhouse gas emissions by transport mode and average CO₂/km of new light-duty vehicles sold per year.

Among recent advances in the European Union in reducing GHG in transport are proposed internalization charges for trucks, the new automobile CO₂ emission regulation, the inclusion of aviation in the European Union carbon credit exchange programme beginning in 2012, the maritime safety and strategy package for maritime transport by 2018, tire rolling noise limits, tire resistance standards and tire pressure warning systems.

Thus far the results indicate that although GHG emissions from transport have continued to grow too quickly, and CO₂ emissions from new vehicles continue to be far from the goal, emissions of particulates and tropospheric ozone precursors have decreased. Air and road transport account for the largest increase in CO₂ emissions.

The concept of the future is “efficient co-modality,” which is closely related to low carbon content and to economic and safety issues concerning transport. Efficient co-modality, in which transport modes complement each other instead of competing, should lead to optimum reassignment between different modes of transport and a shift towards those that are more sustainable, ensuring interoperability and promoting more sustainable transport and logistics chains.

The European Union has clear objectives for reducing all atmospheric emissions from transport: the gases that contribute to global climate change and the greenhouse effect, like CO₂; gases that have regional effects, like volatile compounds, nitrogen oxides and sulphur oxides that contribute to acid rain and the creation of tropospheric ozone; and others that mainly effect the local environment, like carbon monoxide, lead and particulate emissions that cause respiratory disease, allergies and cancer.

In 2008, the European Union adopted a plan calling for a 20% reduction in CO₂ emissions by 2020. The Commission proposes aiming to keep the average global temperature from rising more than 2° C by 2050.

Infrastructure construction initiatives launched to reduce carbon emissions involve fostering research, development and innovation as an engine for developing new technologies that pollute less. Thus, projects are under way to improve roadway pavement in the European Union, such as the development of active nanomaterials

for reducing vehicle emissions; new, more energy-efficient production technologies in asphalt plants; new bituminous mixtures that are safer and derived from more environmentally friendly processes; harvesting energy from solar radiation absorbed by asphalt pavement surfaces; and sustainable urban drainage systems based on porous pavement.

Other requirements include improving information on fuel consumption and CO₂ emissions made available to consumers, through mandatory automobile energy efficiency labels.

The European Union's 20/20/20 plan calls for cutting CO₂ emissions by 20%, improving energy efficiency by 20% and having 20% of energy consumption come from renewable sources by the year 2020.

Economic instruments intended to encourage carbon emission reduction in the European Union include the introduction of tax incentives for buying less polluting vehicles, with sliding rates depending on CO₂ emissions; and European Community greenhouse gas credit trading, which is the largest regulated carbon market in the world. In addition, the European Union has eliminated oil-based fuel subsidies and is subsidizing low-carbon cargo and passenger transport.

(b) Spain

Several climate change strategies for the transport and infrastructure sector have been developed in Spain:

- The Spanish Sustainable Development Strategy falls within the framework of the European Union strategy and is the result of transparent and open participation. Spain has developed indicators to evaluate the strategy, including some of the strategy's transport-related aspects.
- The Spanish Climate Change and Clean Energy Strategy. Horizon 2007-2012-2020 has infrastructure and land-use provisions calling for development of a high-performance railway network; a modal shift with investment in railway infrastructure that accounts for 48% of the Strategic Infrastructure and Transport Plan (SITP); sea motorways and non-motorized urban transport; energy efficiency, with more clean vehicles in public transport and concessioned services; environmental quality, with the reduction of GHG emissions and other pollutants; and demand management that encourages rational automobile use.
- The Spanish Strategy for Sustainable Mobility, promoted by the Environment, Rural and Marine

Environment and Public Works Ministries, provides guidance for and ensures consistency in sector-based policies that facilitate sustainable, low-carbon mobility.

- Annual sustainability reports from the Spanish Observatory on Sustainability, which has tailored the European sustainable development indicators list to Spain. Among the 165 indicators, 11 assess transport sustainability and refer to modal distribution, energy consumption, polluting emissions, GHG emissions and accessibility.

SITP 2005-2020 is expected to reduce CO₂ by 30 million tons by 2020. It sets specific goals to foster sustainability: reduce CO₂ emissions to 1998 levels by 2012; reduce emissions by 15% of 2005 levels by 2020. As of 2010, all gas pumps must dispense blends with a biofuel (biodiesel or bioethanol) content of at least 5.83%. There is a new sliding-scale vehicle registration tax based on each automobile's carbon dioxide emissions.

The following are some incentives that have been implemented to reduce carbon emissions in vehicle production and transport infrastructure construction: Project VERDE, for research in key areas for manufacturing and marketing ecological vehicles in Spain; and research on better, safer and more sustainable highways. These highways will have porous pavements, and their noise pollution absorption capacity will increase thanks to rubber tire powder. Recycled materials will be used in roadbuilding, and GHG emissions in the manufacturing of paving mixtures will be reduced.

CO₂ emissions have continued to increase in Spain, although cleaner-burning fuels and more technologically sustainable vehicles have been introduced due to growing demand for more sustainable methods, fed in part by investment in new highway infrastructures. The Spanish Strategy for Sustainable Mobility seeks to change the transport model in Spain, reducing energy consumption and carbon emissions and promoting public transport, especially railroads, rather than private transport.

IV. In closing

All of the Latin American countries included in this report are concerned about the negative effects associated with traditional types of infrastructure development and transport operations. There has also been concrete action to mitigate these negative externalities and respond appropriately to citizens' demands for better quality of life. Nonetheless, the lack of explicit government policy in this area that would ensure consistent economic and

regulatory measures that are followed up over time is cause for concern. In the vast majority of cases, emissions reduction in the transport sector happens because of other policy goals (such as more efficient transport systems providing better service; less local atmospheric pollution or less urban congestion). None of the countries analysed have comprehensive policies on low-carbon transport infrastructure that promote modal complementarity. Nor do they possess tools with objective indicators for monitoring the measures that are put in place.

The concept of low-carbon transport infrastructure must therefore be included in the development of national policies and in planning for infrastructure and related transport services. The early adoption of these concepts while planning new infrastructure would significantly reduce emissions and negative externalities at a reasonable cost.

International forums on climate change and sustainable transport provide the countries with an opportunity

to adopt the commitments made at such events, to learn about international best practices and translate them into policies, strategies, plans and programmes that address country-specific issues. Coordinating these measures at a regional level would also be essential for generating effective solutions that promote sustainable development.

Addressing climate change and its consequences is a national responsibility involving all economic sectors. It therefore requires national objectives and cross-cutting policies supported by the citizens. The institutional framework should be adapted by creating at least one specialized department and coordinating across sectors to lay out strategies and plans that clearly define each sector's role. Developing integrated infrastructure, transport and logistics policies is an effective way to move ahead in this direction, as the ECLAC Infrastructure Services Unit has explained in previous editions of the *FAL Bulletin*.