

# GREEN FREIGHT IN THE GREATER MEKONG SUBREGION



## IMPROVING ROAD FREIGHT FUEL EFFICIENCY

In the Greater Mekong Subregion (GMS),<sup>1</sup> freight transport plays a crucial role in the expansion of trade and economic development. Within transport, freight transport is also a major emitter of greenhouse gases (GHG) that cause climate change.

More than 80% of goods are transported by roads in the GMS, mostly by truck fleets run by small and medium-sized enterprises (SMEs). Fuel costs are the major operating cost for these enterprises and contribute to logistics costs in the GMS being much higher than in other parts of the world.

The economic competitiveness and environmental performance of road freight SMEs is constrained by a number of issues. These include the predominance of truck fleets that are aged and fuel inefficient, inadequate logistics management capacity, low safety standards and weak driver training, and a lack of access to financial capital.

Green freight programs in the GMS can help address many of these issues, helping SMEs to become more competitive, and in doing so aiding the transport sector to increase its contribution to economic development in the subregion as well as reduce its carbon footprint.

This brief summarizes lessons learned from green freight feasibility analyses conducted under the GMS Core Environment Program between 2010 and 2014. It presents five key messages that policymakers and practitioners need to be aware of while developing strategies and projects to improve road freight fuel efficiency in the GMS. It also provides an overview of the GMS Core Environment Program's Green Freight Initiative.

### Key Messages

1. Reducing the cost of logistics and transport will improve economic performance in the GMS.
2. Efficient road freight offers a major opportunity to reduce GHG emissions from the transport sector in the GMS.
3. Three key target areas to improve fuel efficiency of road freight are technology, logistics management, and driver capacity.
4. Freight fuel efficiency actions in the GMS should target SME truck companies.
5. Green freight programs could successfully reduce fuel consumption, increase logistics efficiency, and reduce transport sector GHG emissions in the GMS.

<sup>1</sup> The GMS countries are Cambodia, the People's Republic of China (specifically Yunnan and Guangxi provinces), the Lao People's Democratic Republic, Myanmar, Thailand, and Viet Nam.

# 1 Reducing the cost of logistics and transport will improve economic performance in the GMS.

Improving logistics has become an increasing focus of transport policy in the subregion due to the strong link between logistics and economic performance. For example, the GMS Economic Cooperation Program has driven the development of cross border road infrastructure in the subregion. Between 1992 and 2012, more than \$15 billion was invested in enhancing regional economic cooperation, of which 78% was dedicated to improving connectivity and development of road infrastructure. In spite of these

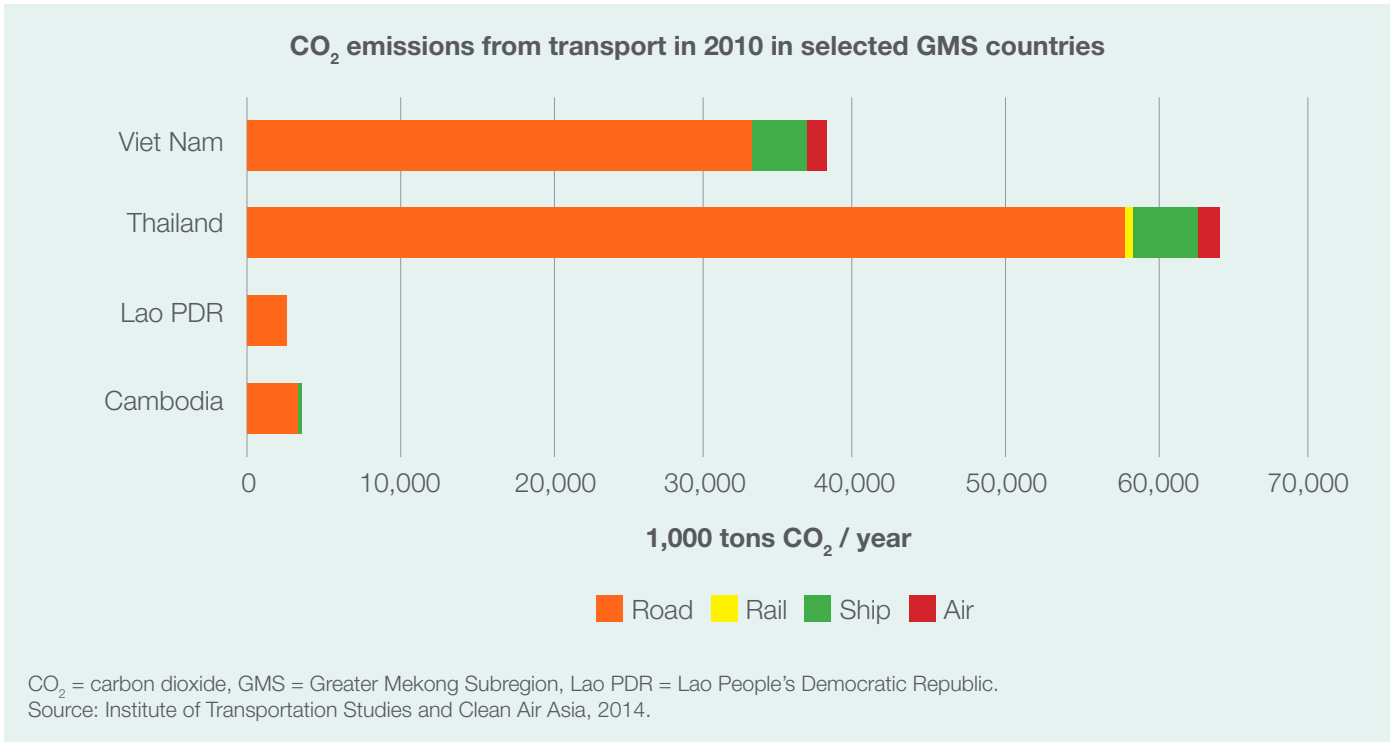
investments in infrastructure, logistics costs in the GMS continue to be higher than other areas of the world—about 17% of the gross domestic product (GDP) in Thailand and 25% of GDP in Viet Nam in 2010, in contrast to less than 10% in most Organisation for Economic Co-operation and Development countries.<sup>2</sup> In order to maximize the economic return on infrastructure investments in the GMS, supplementary investments on improving logistics and freight efficiency, including reducing fuel costs, are needed.

# 2 Efficient road freight offers a major opportunity to reduce greenhouse gas emissions from the transport sector in the GMS.

Improvements in transport infrastructure in the GMS have spurred an increase in transport and traffic and a corresponding increase in GHG emissions. The number of vehicles registered in the last 5 years has almost doubled and transport is responsible for 22% of energy related GHG emissions in the subregion (excluding the People's Republic of China [PRC]). As shown in Figure 1, within the transport sector, roads are responsible for most GHGs emitted per kilometer in the GMS, making up over 90% of transport related emissions in 2010. This is largely because roads are the favoured mode of transport for freight and passengers, while the carbon footprint of cars and trucks is higher than for trains or ships.

Among the different users of road transport, freight vehicles are responsible for a major share of GHG emissions despite accounting for fewer vehicles. An analysis of the GMS East–West Economic Corridor—traversing the Lao People's Democratic Republic (Lao PDR), Thailand, and Viet Nam—showed that emissions from freight traffic account for more than 60% of total transport emissions. This is despite freight traffic making up less than 30% of traffic along the road.<sup>3</sup> As a result, road freight fuel efficiency has the potential to support significant reductions in GHG emissions (see Box 1).

Figure 1: Transport Related Greenhouse Gas Emissions by Mode of Transport in 2010

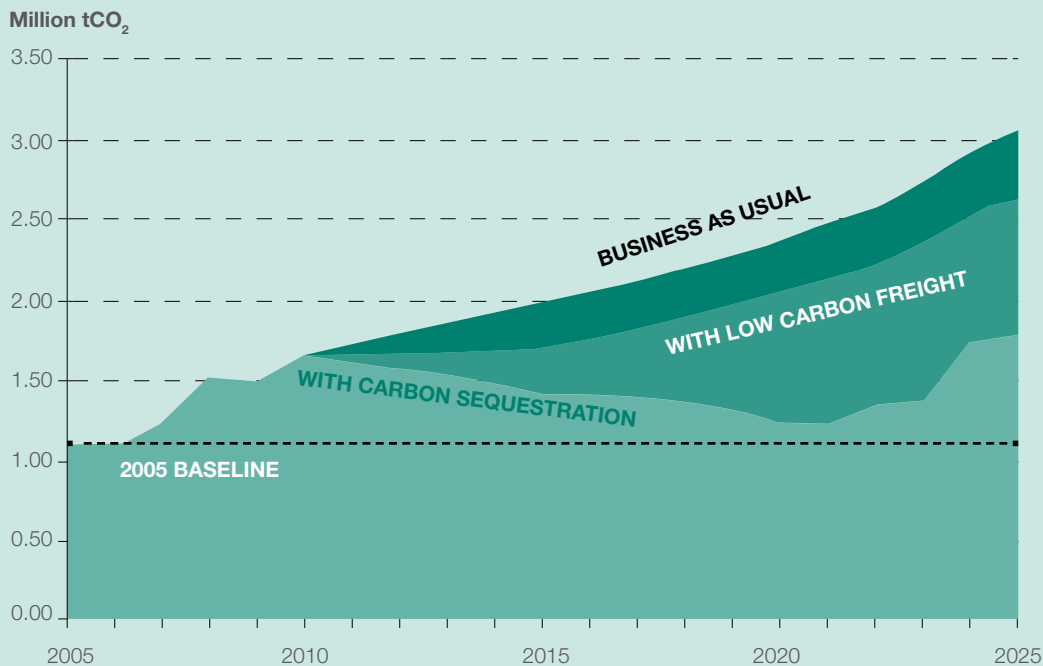


<sup>2</sup> Smart Freight Center. 2014. State of Play: Green Freight in Asia. Smart Freight Center: Amsterdam, Netherlands.  
<sup>3</sup> Crishna Morgado, N., Aniwattkulchai, P., and Fraser, A. 2011. Carbon Neutral Transport Corridors: Reducing emissions from freight and forestry in the EWE. Feasibility study report. Greater Mekong Subregion Environment Operations Center: Bangkok, Thailand.

**Box 1: Reducing the Carbon Footprint of the GMS East–West Economic Corridor**

A carbon footprint analysis was conducted of the GMS East–West Economic Corridor as part of the Core Environment Program’s green freight feasibility studies. The analysis found that green freight interventions have the potential to reduce 23% of emissions expected from the corridor over a 20-year period. The analysis compared approaches such as implementation of fuel standards, vehicle fleet upgrades, use of cleaner fuels, use of green technologies in trucks, and improving driver behavior and logistics management capacity. Figure 2 below shows the CO<sub>2</sub> emissions expected from the corridor under a business-as-usual scenario and compares this with low carbon freight and forestry scenarios.

**Figure 2: Projected Transport Emissions from the GMS East–West Economic Corridor**



tCO<sub>2</sub> = tons of carbon dioxide.  
Source: GMS Environment Operations Center, 2012.

**3 Key target areas to improve road freight fuel efficiency are technology, logistics management, and driver capacity**

Fuel costs often account for 40% to 60% of the overall operating costs for road freight transport companies in the GMS. A number of factors affect road freight fuel consumption. For one, the sector is burdened by ageing truck fleets. Overall in the GMS these fleets average more than 10 years, while in Cambodia and the Lao PDR, the average fleet age is between 15 and 20 years. Another issue is that road freight management and movement is often inefficient. Companies surveyed during the green freight feasibility studies of the GMS Core Environment Program found that 25% to 50% of trips were run with

empty loads, illustrating a clear mismatch of fleet and load carrying capacities. The situation is exacerbated by the overloading of vehicles, a common practice that increases fuel consumption and has implications for road safety and the quality of road infrastructure. Fuel use is further increased by the prevalence of poor driving patterns such as speeding, idling, and disregarding safe driving practices. Therefore, the key target areas to increase road freight fuel efficiency are efficient truck technologies, logistics management solutions, and driver capacity building.





## 4 Freight fuel efficiency actions in the GMS should target small and medium truck companies

Successful fuel efficiency interventions in the subregion need to consider the unique environment of stakeholders that dominate the sector. The transport industry is highly fragmented. The majority of truck operators are classed as SMEs and operate fleets of less than 10 trucks. Transportation costs have increased, due largely to successive hikes in fuel costs, lower trading volumes, increased competition, and system inefficiencies (such as poor infrastructure and customs-related inefficiencies). SME road freight operators are finding it difficult to realize sustainable profits. A large proportion of the operators in the subregion continue to be fuel inefficient, lack logistics management skills and techniques, have low safety standards, and are capital deficient.

Institutionally, there are strong associations for industry and goods transport in each country which play an important

role in setting the policy agenda, particularly on regulations affecting the road freight industry, fiscal incentives and taxes, and on issues related to access to finance. These include national associations that represent the interests for companies to the government and local-level goods associations that manage freight forwarding services for many smaller transport companies or owner/drivers. In the public sector, the responsibility for policy making regarding road freight is dispersed across multiple agencies. Cross-sector coordination is particularly important when implementing fuel efficiency actions for road freight. There are a number of policy challenges to be faced, including a lack of policies on fuel efficiency that target freight transport, and weak implementation and enforcement of existing regulations. Compounding this are a lack of driver training facilities, particularly for truck drivers, which impedes improvements in driver behavior.





## 5 Green freight programs could successfully reduce fuel consumption, increase logistics efficiency, and reduce transport sector GHG emissions in the GMS

In their simplest form, green freight programs offer a way to simultaneously reduce fuel costs and GHG emissions. GMS countries are increasingly realizing the importance of programs such as green freight to support capacity development and technology improvements in SME road freight companies, in order to increase transport efficiency and thereby reduce the overall cost of logistics.

There are some key lessons to be learned from existing green freight programs across the world and in Asia. First, successful green freight programs emphasize multistakeholder approaches, either within the private sector or by bringing the public and private sector together. Second, testing of technologies in a local context

is important to build private sector confidence. Third, changing driver behavior is an important focus for green freight projects.

Financing support is an essential element to improve road freight fuel efficiency and competitiveness. Limited and costly access to finance is an issue faced by many SME freight transport companies in the subregion and is one of the main barriers for investments in fuel efficiency technologies and new vehicles. Financing solutions should be explored to bridge this gap, and can learn from models for energy efficiency financing used in other sectors, such as energy service companies (ESCOs). A suggested ESCO model for green freight is shown in Box 2.



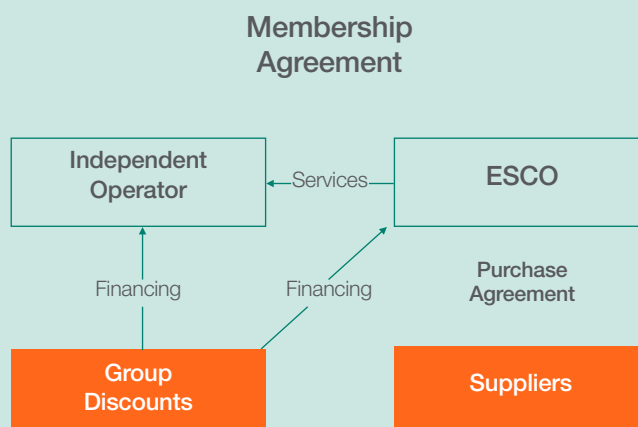


## Box 2: A Modified Energy Service Company for Green Freight

An Energy Service Company (ESCO) is usually an entity set up with the purpose of improving energy efficiency in a company, area, or building. Services offered by ESCOs often include energy analysis and audits, energy management, monitoring of energy savings and equipment supply. ESCO earnings can be tied to the energy savings they deliver. The ESCO model has been applied successfully to the industrial and building sectors in the PRC, Thailand, and Viet Nam in the GMS.

A study of SME financing options for green freight was conducted as part of the Core Environment Program's green freight feasibility studies. The study proposed a modified ESCO model for the freight sector (see diagram). The ESCO model proposed is a not-for-profit entity that would incentivize freight SMEs to invest in energy efficient technologies and provide technical support for energy efficiency. ESCO members would benefit from 'cooperative purchasing' i.e., discounts negotiated by the ESCO on a range of items purchased

by companies from suppliers. The ESCO could be financed from a portion of the discounts. The feasibility of such a model will be further explored through the GMS Green Freight Initiative in 2015.



# THE CORE ENVIRONMENT PROGRAM'S GREEN FREIGHT INITIATIVE

Economic corridors are being established across the GMS to improve transport connectivity, facilitate trade and economic development, and boost regional cooperation. Under the GMS Core Environment Program, interventions to increase fuel efficiency and reduce GHG from freight transport are being implemented along the East–West Economic Corridor in the Lao PDR, Thailand, and Viet Nam.

Background studies on the freight sector	
<b>Countries:</b> Cambodia, the Lao PDR, Thailand, and Viet Nam	<b>Timeline:</b> 2012 and 2014
Several background studies have analyzed the factors affecting fuel efficiency in Cambodia, the Lao PDR, Thailand, and Viet Nam.	
Pilot projects on green freight	
<b>Countries:</b> The Lao PDR, Thailand, and Viet Nam	<b>Timeline:</b> 2014 to 2016
These pilot projects are testing the use of financial incentives to support the uptake of fuel efficiency technologies such as aerodynamic equipment, the use of truck Global Positioning Systems, and tire pressure monitoring. In addition, curriculum and standards for driver training are being developed and logistics solutions to reduce empty backhauls tested.	
<b>Government partners:</b> Ministry of Public Works and Transport, the Lao PDR; Ministry of Transport, Thailand; Ministry of Transport, Viet Nam.	
<b>Industry partners:</b> GMS Freight Transport Association, Viet Nam Transport Association, Federation of Thai Industries.	
Study to identify SME financing models to upgrade freight fleets	
<b>Countries:</b> The Lao PDR, Thailand, and Viet Nam	<b>Timeline:</b> 2014
This study analyzed the potential of financial models for upgrading SME freight fleets and encouraging the uptake of efficient technologies, driver training, and logistics solutions. These include guarantee mechanisms and ESCO financing.	
Feasibility study to identify Nationally Appropriate Mitigation Actions (NAMAs) on freight	
<b>Countries:</b> The Lao PDR, Thailand, and Viet Nam	<b>Timeline:</b> 2015 to 2016
This study will analyze how carbon financing, particularly NAMAs, could be harnessed to encourage green freight actions and programs nationally. The study will quantify the carbon reduction potential of freight fuel efficiency interventions and identify potential synergies with emerging carbon finance mechanisms.	





## About the Core Environment Program

The Core Environment Program (CEP) supports the Greater Mekong Subregion (GMS) in delivering environmentally friendly economic growth. Anchored on the Asian Development Bank's (ADB) GMS Economic Cooperation Program, CEP promotes regional cooperation to improve development planning, safeguards, biodiversity conservation, and resilience to climate change—all of which are underpinned by building capacity. CEP is overseen by the environment ministries of the six GMS countries and implemented by the ADB-administered Environment Operations Center.

Cofinancing is provided by ADB, the governments of Finland and Sweden, the Global Environment Facility, the People's Republic of China Regional Cooperation and Poverty Reduction Fund, and the Nordic Development Fund.

Find out more: [www.gms-eoc.org](http://www.gms-eoc.org)

Photo credits: Duncan McLeod (cover), Steven Schipani (bamboo photo), and Gao Jialiang (Kunming city photo).



**GREATER MEKONG  
SUBREGION  
CORE ENVIRONMENT  
PROGRAM**

### GMS Environment Operations Center

Asian Development Bank, 23rd Floor, The Offices at Central World 999/9 Rama 1 Road  
Pathumwan, Bangkok 10330 Thailand  
Tel: +66 2 207 4444, Fax: +66 2 207 4400  
E-mail: [info@gms-eoc.org](mailto:info@gms-eoc.org)



Creative Commons Attribution 3.0 IGO license (CC BY 3.0 IGO)

© 2015 ADB. The CC license does not apply to non-ADB copyright materials in this publication.

Publication Stock No. ARM157169-2

The views expressed in this publication are those of the authors and do not necessarily reflect the views and policies of the Asian Development Bank or its Board of Governors or the governments they represent.