On behalf of:

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

of the Federal Republic of Germany

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# VIET NAM'S LOW CARBON BUS NAMA

## October 2016

### Context: Transport in Viet Nam's INDC

Viet Nam is committed to reducing its GHG emissions by 8% by 2030 compared to BAU, and by 25% with international support. The transformation of passenger transport is identified as a key mitigation option in Viet Nam's INDC: By 2030, 15% of motorbike users should switch to public transport in urban areas[1], while the Transport Development Strategy includes a modal share target of 25-30% by 2020[2], up from less than 10% at present.

*Bus in Ha Noi* *(Photo: NAMA Project)*

### NAMA Objective

The Low Carbon Bus NAMA aims to contribute to the sustainable development of the transport sector and to Viet Nam's GHG emission reduction goals by

- Applying more efficient, low-carbon bus technologies
- Operational improvements
- Shifting from private to public transport

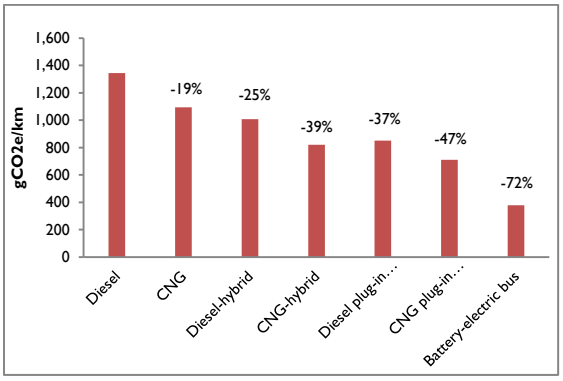
[1] Viet Nam's Intended Nationally Determined Contribution. Technical Report, 2015

[2] Decision No. 355/QD-TTg dated 25/2/2013

### NAMA Components

#### Low Carbon Bus (LCB) Technologies

The NAMA focuses on a swift and thorough market penetration of near-to commercial bus technologies. Hybrid buses have a proven fuel and emission savings impact of 25% compared to diesel units, and are as reliable as conventional units. The total cost of ownership is comparable to conventional units at diesel prices of more than 0.8 USD/litre. Plug-in hybrids can reduce fuel consumption and emissions by 40% or more and can be combined with opportunity charge systems, thus allowing for the creation of zero-emission zones. The total cost of ownership is comparable to conventional units at diesel prices of more than 0.9 USD/litre.




*GHG Reduction of LCB Bus Viet Nam (WTW incl. BC with GWP100); Based on Euro IV 12m bus for 60-80 passengers with AC; Data for Viet Nam (carbon factor of electricity production); WTW data including Black Carbon with GWP 100. Source: Grütter, 2016*

At present, motorcycles are somewhat more efficient in terms of GHG emissions per person-km than conventional buses; however, with LCB and operational efficiency measures, urban buses will be more efficient than motorcycles. This highlights the importance of implementing these measures if the GHG emission reductions are to be made through a modal share shift.


Department of Environment
MINISTRY OF TRANSPORT

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## Operational efficiency improvements

Impact of Operational Measures

| Measure | Fuel Savings and GHG Mitigation Impact |
|---|---|
| LRR Tires | 3.5% |
| Optimal Tire Pressure | 1.5% |
| Idling Stop Devices | 2.5% |
| Eco Drive | 2% |
| **Combined Measures** | **9%** |

*Based on 12m conventional diesel urban bus Viet Nam*
*Source: Grütter, 2016*

The 2nd NAMA component focuses on improving the fuel efficiency of existing buses by introducing proven measures, such as efficient tyres, ecologically sound driving or modern telematics in buses, as well as planning improvements, such as route optimisation. In principle, vehicle measures are financially attractive through their fuel savings but face implementation barriers, which the NAMA will address through financial and technical assistance. Buses will be equipped with state-of-the art communication technology, allowing for real-time monitoring of fuel consumption, distance driven and passenger numbers on the bus, thus delivering data that improves operational fleet management. Operational efficiency measures include optimising the bus network by increasing frequency on high demand routes or reducing service on low patronage routes, thereby enabling buses to be re-deployed to new areas and thus increasing overall network coverage. Bus network optimisation also includes shortening or prolonging routes and changing route structures to adapt to passenger demand.

## Bus system efficiency

In order to contribute to increased public transport use and the modal share targets, the 3rd NAMA component will contribute to the improved system efficiency of public transport through mode integration, smart ticketing and public transport planning, including GHG emission measurement and mitigation modelling. The NAMA's robust MRV system will help obtain quality data for transport planning. With various international organisations already working on these measures, the NAMA helps to coordinate and continue these efforts, as well as providing direct technical support where gaps exist. A key policy measure in this component is the development of a national urban transport support programme. This includes technical and financial assistance from the national level to cities and other policies to promote urban public transport.

## Technical and Financial Assistance in the NAMA

The NAMA will be implemented in two phase. Phase I covers (2017-2020) focuses on three cities selected among potential cities: Ha Noi, Hue, Can Tho City, Danang and Ho Chi Minh City. Phase 2 (2021-2030) focuses on scaling up to all cities in Viet Nam.

The NAMA will deploy a mix of technical and financial assistance to achieve the objectives of the three components.

Technical assistance measures in Phase I include:

- Review of global best practices for e-buses and opportunity charge systems;
- Monitoring the performance of LCBs with ICT equipment to track passenger numbers, fuel consumption and distance driven;
- Training and capacity building measures for public transport planning, integrated ticketing, public transport authorities, eco-driving, etc;
- Policy development and facilitation for the national urban transport support programme;
- Support for the establishment of a model/tool to determine GHG urban transport baselines and mitigation potentials for each measure;
- Support for the establishment and operation of a monitoring/MRV system for urban transport;
- NAMA management and administration, and design of the financial structure and proposal for Phase 2.

Financial assistance in Phase I includes:

- Grant-based incentive fund for the acquisition of hybrid buses (in the order of USD 50,000 per hybrid and USD 80,000 per plug-in hybrid) which covers the incremental costs and compensates bus operators for additional costs, based on life-time costs plus increased subjective risk exposure. By implementing at scale (eg. 200 buses in Ha Noi and 50 in Can Tho) in Phase I, from 2020 onwards the additional costs decline and may be based on incremental costs alone.[3] Approximately 70% of the investment costs for the hybrid buses will come from regular credit facilities;
- Financial incentives include low rolling resistance tyres, idling stop devices, ICT equipment and eco-driving training for a limited number of buses and drivers.

By utilising this approach, the NAMA achieves transformational change in the following areas:

- High potential for scaling up and replication;
- Good knowledge and learning potential;
- Contribution to regulatory framework and policies.

The NAMA is expected to result in emission reductions of 18.4 $MtCO_2$ up to 2030, or 2% of annual transport emissions in 2030. Sustainable Development benefits include:

- Air quality improvements;
- Travel time and congestion reduction;
- Equity: accessibility for all social groups;
- Traffic safety;
- Energy security;
- Resource efficiency;
- Quality of life in urban areas.

A NAMA Support Project for Phase I has been submitted to the NAMA Facility.

[3]This approach, realised successfully by leading public transport providers such as TfL in London or TransMilenio in Bogota, is financially more attractive and less risky than pilot trials with a small number of buses, which lack statistical credibility and result in high maintenance and operation costs.

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