



## NAMA Seeking Support for Implementation

### A Overview

A.1 Party Republic of Moldova

A.2 Title of Mitigation Action Hybrid and electric buses and minibuses in the city of Chisinau

A.3 Description of mitigation action General objective – the promotion and implementation of cleaner technologies in urban transport such as electric and hybrid vehicles and reducing the environmental (less GHG emissions), economic (lower expenditures on fossil fuels) and social impacts (health benefits) impacts of conventional technologies used in the passenger transport sector. This NAMA is intended to be implemented in the city of Chisinau. Besides the general objective, NAMA will also contribute to achieving other related objectives, including reducing the dependence on imported fuels, which will lead to greater energy security of the country; creation of new skilled jobs; new ways of clean technologies transfer and opening opportunities for collaboration, knowledge transfer and development of local clean industries; achieving additional sustainable development benefits, such as improved air quality and capacity-building.

Hybrid Electric Vehicles - see  
<<http://www.climatetechwiki.org/technology/hev>>, Electric  
vehicles – see  
<<http://www.climatetechwiki.org/technology/electric-vehicles>>.

A.4 Sector ☐ Energy supply ☒ Transport and its Infrastructure  
☐ Residential and Commercial buildings ☐ Industry  
☐ Agriculture ☐ Forestry  
☐ Waste management ☐ Other <Pls enter Other text here>

A.5 Technology ☐ Bioenergy ☐ Cleaner Fuels  
☒ Energy Efficiency ☐ Geothermal energy  
☐ Hydropower ☐ Solar energy  
☐ Wind energy ☐ Ocean energy  
☐ Carbon Capture and Storage ☐ Low till / No till  
☐ Land fill gas collection ☐ Other <Pls enter Other text here>

A.6 Type of action ☒ National/ Sectorial goal  
☐ Strategy  
☐ National/Sectorial policy or program  
☒ Project: Investment in machinery



- ☒ Project: Investment in infrastructure  
☐ Project: Other  
☐ Other: <Pls enter Other text here>

A.7 Greenhouse gases covered by the action

- ☒ CO<sub>2</sub>                      ☒ CH<sub>4</sub>  
☒ N<sub>2</sub>O                      ☐ HFCs  
☐ PFCs                      ☐ SF<sub>6</sub>  
☐ Other <Pls add in text here>

B National Implementing Entity

B.1.0 Name Ministry of Agriculture, Regional Development and Environment  
B.1.1 Address 156" A", Mitropolit Dosoftei str., of. 37,  
MD-2004 Chisinau, Republic of Moldova  
B.1.2 Contact Person Vasile Scorpan  
Alternative Contact Person Marius Taranu  
B.1.3 Phone +373 22 232247  
Alternative Phone +373 69217004  
B.1.4 Email clima@clima.md  
Alternative Email v.scorpan@yahoo.com  
[+ Add Additional entity](#)

C. Expected timeframe for the implementation of the mitigation action

C.1 Number of years for completion 12  
C.2 Expected start year of implementation 2019

D.1 Used Currency USD  
Conversion to USD <to be filled automatically>

E Cost

E.1.1 Estimated full cost of implementation 344,292,865.00  
Conversion to USD <to be filled automatically>

E.1.2 Comments on full cost of implementation

The sources of financing for this NAMA are local budgets, private investors and donors' support. Buses and minibuses equipped with Diesel engines need to be periodically replaced with others. High investment costs of new technologies (electric and hybrid), limited budgets of local public authorities and unavailability of private micro-bus operators to bear a higher cost for new technologies under the same income conditions are the main drivers that determine procurement of classic technologies with Diesel engines. To change this practice support schemes are required. An electric bus requires twice as high investments as the Diesel one, additional cost for a charging station and battery replacement.

The total number of vehicles considered within this NAMA is 130 buses and 1842 minibuses. This NAMA is proposed to be implemented in 5 years – 26 electric buses and 370 hybrid minibuses annually. Replacing the Diesel buses and minibuses with other electric buses and hybrid minibuses



involves a total cost of \$ 344.3 million, including the difference between technologies (electric/hybrid and Diesel) of \$ 60.1 million.

The total cost of operating an electric bus over a 12 years life span is \$ 777 thousand, including purchase of the vehicle - \$ 539 thousand, a charging station - \$ 10 thousand, an additional battery of \$ 86 thousand, electricity costs - \$ 74 thousand and maintenance expenses - \$ 68 thousand. While in the case of a Diesel bus these costs amount to \$ 644 thousand, including vehicle – \$ 270 thousand, fuel costs - \$ 262 thousand and maintenance expenses - \$ 113 thousand. Direct comparison of these costs indicates that an electric bus is more expensive by 21%.

The same situation is observed when comparing the total costs of hybrid (\$ 132 thousand, vehicle – 96, fuel – 25 and maintenance - 11) and diesel minibus (\$ 109 thousand, vehicle – 60, fuel – 36, maintenance - 13), the first being more expensive by 21%.

E.2.1 Estimated incremental cost of implementation 60,130,000.00

Conversion to USD <to be filled automatically>

E.2.2 Comments on estimated incremental cost of implementation

This cost was determined by comparing the total cost of electric and hybrid technologies with conventional technologies equipped with Diesel engines.

F Support required for the implementation of the mitigation action

F.1.1 Amount of financial support 80,718,000.00

Conversion to USD <to be filled automatically>

F.1.2 Type of required financial support

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> Grant  | <input type="checkbox"/> Carbon finance                    |
| <input type="checkbox"/> Loan (sovereign)  | <input type="checkbox"/> Other <Pls enter Other text here> |
| <input type="checkbox"/> Loan (Private)    |  |
| <input type="checkbox"/> Concessional loan |  |
| <input type="checkbox"/> Guarantee         |  |
| <input type="checkbox"/> Equity            |  |

F.1.3 Comments on Financial Support As Financial Support for this NAMA implementation it is planned to attract a grant. Based on the financial analysis performed using the NPV and PB indicators (3-5 years required), there is a need to apply for a \$ 80.7 million grant, including \$ 27.3 million for electric buses and \$ 53.4 million for hybrid minibuses.

F.2.1 Amount of Technological Support 80,718,000.00

Conversion to USD <to be filled automatically>

F.2.2 Comments on Technological Support <Pls enter Comments here>

F.3.1 Amount of capacity building support 80,000.00 \$ (Dollars)

Conversion to USD <to be filled automatically>



F.3.2 Type of required capacity building support ☒ Individual level  
☒ Institutional level  
☐ Systemic level  
☐ Other <Pls enter Other text here>

F.3.3 Comments on Capacity Building Support This NAMA capacity building program will provide a series of trainings and workshops (To inform about environmental, health and social benefits and to enhance the local skills that are required to operate the new technology) for a range of commercially-focused business people, including those with little or no previous engineering transport industry background, from among: transport investors; bus transport developers; project management firms; equipment & service suppliers; law firms and contract managers; the Chisinau City Hall subdivisions responsible for the development of road transport in the municipality; Government energy policymakers and planners (Energy Efficiency Agency, Energy Efficiency Fund, Ministry of Economy and Infrastructure - General Energy Security and Efficiency Directorate); utilities & transport companies; research and design institutions and any others with an interest in understanding the key factors in successful Hybrid and electric buses and minibuses development and planning.

F.4 Financial support for implementation required ☒  
F.5 Technological support for implementation required ☒  
F.6 Capacity building support for implementation required ☒

#### G Estimated emission reductions

G.1 Amount 0.1716

G.2 Unit MtCO<sub>2</sub>e

G.3 Additional information (e.g. if available, information on the methodological approach followed):  
GHG emission reductions were calculated on the basis of the 2006 IPCC Guidelines for National Greenhouse Inventories. The baseline scenario for this NAMA corresponds to the emissions of the existing fleet of buses and Diesel minibuses. The annual mileage of a vehicle is about 56 thousand km, and the specific fuel consumption of 47 liters/10 km for a bus and a 13 liters/100 km for a minibus.

#### H.1 Other indicators of implementation

- Number of replaced vehicles;
- Fuel and electricity consumption;
- Investments made in Hybrid and electric buses and minibuses, including in the form of grant, loan, budget support and beneficiary equity.

I.1 Other relevant information including co-benefits for local sustainable development  
Implementation of NAMA will contribute to reducing the dependence on imported petroleum fuels, which will lead to greater energy security of the country; increasing opportunities for skilled labor through the development of multiple ancillary industries

#### J Relevant National Policies strategies, plans and programmes and/or other mitigation action



**J.1 Relevant National Policies** In 2010, the Republic of Moldova joined the Copenhagen Accord and submitted an emission reduction target to the UNFCCC Secretariat, which states that “a reduction of no less than 25% of the 1990 level total national GHG emissions has to be achieved by 2020 through implementation of global economic mechanisms focused on climate change mitigation, in accordance with the Convention’s principles and provisions.” In support of these technologies the Tax Code has been amended to allow reduction of the VAT by ½ for imported hybrid vehicles starting with 01.01.2017 . In the Low Emissions Development Strategy of the Republic of Moldova until 2030 it is mentioned that the mitigation actions to be supported by donors include the use of hybrid electric vehicles and hybrid electric vehicles connected to the grid. The priority action specified in the Environmental Strategy for 2014-2023 include the promotion of European standards for vehicles in order to align with EU requirements and standards, as well as the development of a mechanism to stimulate and promote the renewal of the national vehicle fleet.

**J.2 Links to other mitigation actions** <Pls enter/select NAMA ID>

#### K Attachments

**K.1 Attachment description** The NAMA on Promotion of hybrid and electric buses and minibuses in the city of Chisinau, 37 pages. The report describes in detail the NAMA promotion in the Republic of Moldova and may be submitted at the request.

**K.2 File** Browse

#### L Support received

**L.1 From outside the Registry** <Please enter text here>

**L.2 From within the Registry**

Source	Amount	Date