



## NAMA Seeking Support for Implementation

### A Overview

A.1 Party The Republic of Moldova

A.2 Title of Mitigation Action Promotion of heat pumps in the Republic of Moldova

A.3 Description of mitigation action The objective of this NAMA is to implement small, medium and large capacity heat pumps that will meet about 4 % of heating and hot water supply demand in the Republic of Moldova. Electricity driven heat pumps is a mature technology that can be used to provide thermal energy to meet heating, hot water, as well as cooling demands. It is expected that about 13160 heat pumps of different capacities will be installed in residential detached buildings, industrial and commercial enterprises, schools, hotels, restaurants and other premises. Most heat pumps (12654) will be of small capacity ranging from 12 kW to 19 kW and will be installed by the owners of the existing or newly built detached buildings. About 500 heat pumps of medium capacity of 50 kW will be installed at different enterprises, schools, hotels, restaurants and other premises to meet the heating and hot water supply demands. A limited number (about 6) of large heat pumps of 1 MW capacity will be installed at waste water treatment plants and other enterprises where low grade energy sources are available. Implementation of heat pumps will result in annual production of about 1.743 PJ of heat. The heat produced by the heat pumps will substitute the heat produced by natural gas and coal fired boilers. The implementation of this NAMA project has a timeline of 12 years. It is estimated that this NAMA implementation will lead to approximately 37% reduction in annual fuel consumption compared to baseline scenario, and greenhouse gas (GHG) emissions reduction of at least 66741 tones of CO<sub>2</sub> eq per year.

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/ Sectoral goal
  - Strategy
  - National/Sectoral 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 Agricultur, 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  
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B.1.4 Email      clima@clima.md  
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[+ 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      2018

- D.1 Used Currency      <Pls enter used currency here>  
Conversion to USD      <to be filled automatically>

## E Cost

- E.1.1 Estimated full cost of implementation      180,139,150.00  
Conversion to USD      <to be filled automatically>

### E.1.2 Comments on full cost of implementation

The sources of financing for this NAMA are national or local budgets, beneficiaries or ESCO budgets and donors' support. Due to budget constraints, a limited contribution from national and local budgets of about USD 0.3 million (0.17 % of total investments) is expected to be received for the implementation of heat pumps during the years 2018 and 2019. This amount will be used for capacity building and heat pumps promotion. Capacity building is



considered to be one of the most effective measures to promote energy efficiency in the Republic of Moldova, including heat pumps.

Beneficiaries and ESCOs are expected to contribute with about USD 35.968 million (19.97 % of the total investments) for NAMA heat pumps implementation. International support for NAMA implementation is USD 143.871 million (about 79.87 % of the total investments).

The Heat pumps NAMA will be implemented in two phases: Inception Phase (Phase I, Year 1-Year 2) and Scale-up Phase (Phase II, Year 3-Year 12).

The goal of the Inception Phase is to install a limited number of heat pumps at different sites and of various capacity across the country, to more exactly identify the heat pumps operation parameters in order to ensure optimal conditions for heat pumps installation and to develop and implement the activities needed to promote and facilitate the construction of heat pumps mainly using ground as low grade energy source. The implementation of Phase I require investments of USD 3.727 million, including USD 0.3 million for capacity building.

Implementation of Phase II of this NAMA will require USD 176.412 million.

The financial analysis of investments has been done using two financial indicators: 1. Net present value (NPV); and 2. Payback period (PbP) of investments.

E.2.1 Estimated incremental cost of implementation 0.00  
Conversion to USD <to be filled automatically>

E.2.2 Comments on estimated incremental cost of implementation  
<Pls enter Comments here>

#### F Support required for the implementation of the mitigation action

F.1.1 Amount of financial support 143,871,320.00  
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 checked="" type="checkbox"/> Concessional loan |  |
| <input type="checkbox"/> Guarantee                    |  |
| <input checked="" type="checkbox"/> Equity            |  |

F.1.3 Comments on Financial Support Donors' contribution is considered to be the primary funding source to support the heat pumps implementation NAMA. Donors' support is requested as a USD 89.92 million grant and USD 53.952 million concessional loan.

Total donors' support of USD 143.871 million will be invested in heat pumps of small, medium and large capacity, a mature technology available on the market and widely used in developed countries to satisfy the demand for heat. The amount of the needed donors' support may be reconsidered based on investments review and refinement of the operation parameters of the heat pumps installed during the Inception Phase.



F.2.1 Amount of Technological Support	143,871,320.00	
Conversion to USD <u>&lt;to be filled automatically&gt;</u>		
F.2.2 Comments on Technological Support	Heat pumps equipment is not produced in the R. of Moldova. It will be bought from abroad.	
F.3.1 Amount of capacity building support	300,000	\$ (Dollars)
Conversion to USD <u>&lt;to be filled automatically&gt;</u>		
F.3.2 Type of required capacity building support	<input checked="" type="checkbox"/> Individual level <input checked="" type="checkbox"/> Institutional level <input type="checkbox"/> Systemic level <input type="checkbox"/> Other <Pls enter Other text here>	
F.3.3 Comments on Capacity Building Support	Capacity building will be provided in the form of trainings, workshops and demonstration tools, and by informing the potential beneficiaries and stakeholders about the financial and environmental benefits of heat pumps implementation, as well as by enhancing local staffs' skills needed to scale up implementation of heat pumps. The capacity building activities are planned for the first two years of project implementation and later on as needed. Trainings will cover technical, economical, financial, regulatory and operational aspects of heat pumps deployment and will target different stakeholder groups of residential owners, educational institutions, hotels, campuses, industry and ESCOs staff, public authorities in energy efficiency, designers focused on climate change related issues. Promotional information and data about the heat pumps will be developed and disseminated.	
F.4 Financial support for implementation required		<input checked="" type="checkbox"/>
F.5 Technological support for implementation required		<input checked="" type="checkbox"/>
F.6 Capacity building support for implementation required		<input checked="" type="checkbox"/>

## G Estimated emission reductions

G.1 Amount 1.6685

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

G.3 Additional information (e.g. if available, information on the methodological approach followed):

Additional information (e.g. if available, information on the methodological approach followed): The most plausible baseline scenario for this NAMA is the use of natural gas fired boilers as well as coal fired boilers to meet the for space heating and hot water supply needs in different types of buildings and heat usage (existing detached houses, schools, hotels, commercial buildings and offices, industrial processes, swimming pools etc.) as system status-quo or Business as Usual scenario.

Greenhouse gas emissions reduction per NAMA is equal to the difference between the emissions resulting from burning of natural gas and coal in the Business as Usual Scenario and the emissions resulting from electricity used by heat pumps under the mitigation scenario.

Greenhouse gas emissions from burning natural gas and coal in boilers are calculated based on emission factor for combustion of natural gas and coal according to the 2006 IPCC



Guidelines for National Greenhouse Inventories. It is assumed that in 75 % of cases heat pumps will substitute natural gas fired boilers and in 25 % of cases - coal fired boilers.

CO<sub>2</sub> emissions in the mitigation scenario are created as a result of electricity consumption for operation of heat pumps. The grid emissions factor for electricity consumed by heat pumps is equal to 0.5821 kgCO<sub>2</sub>/kWh. This indicator takes into consideration the average electricity losses in the electric networks of 10.5 %.

H.1 Other indicators of implementation The implementation evaluation and monitoring indicators of this NAMA are:

- natural gas and/or coal savings per each site where the heat pump is installed;
- number of jobs created by companies selling heat pumps as well as by companies providing services for heat pumps installation, operation and maintenance;
- number of implemented heat pumps and their capacity;
- electricity consumed by heat pumps;
- investments made in heat pumps, including in the form of grant, loan, budget support and beneficiary equity.

I.1 Other relevant information including co-benefits for local sustainable development

The implementation of this NAMA will enhance international cooperation to facilitate access to clean energy research and technology, promote investment in energy efficient technologies and increase the comfort level of the people living in the detached houses where heat pumps are installed. Socio-economic benefits include an increase of employment opportunities for local people in selling, installation and operation and maintenance of heat pumps, thus encouraging entrepreneurship, creativity, innovation and growth of micro-, small- and medium sized enterprises.

Co-benefit indicators for sustainable development are:

**Better living and working conditions:** Habitants of detached houses and the staff working at enterprises and other sites where heat pumps are implemented will benefit from better and secure conditions resulting installation of heat pumps as this technology does not use open fire. Also there is no need to remove the coal ash resulting from burning coal.

**Energy security:** Since less imported fossil fuels is used, the country energy security will be improved.

**Capacity building:** Capacity building is considered to be one of the most effective measures to promote energy efficiency in the Republic of Moldova. Experience and knowledge gained by local staff in successful implementation of this NAMA will be further used for planning and implementation of other NAMAs related to the deployment of renewables and energy efficiency projects.

**Income generation:** implementation of this NAMA will create new job opportunities for companies importing and selling heat pumps and other needed materials as well as for staff involved in



installation, operation and maintenance of heat pumps, thus increasing income generation by employees' remuneration.

Attraction of local investments in economic activity: Beneficiaries of heat pumps will invest their financial resources in technology that provides benefits during a long time period. Positive experience gained will foster local investors in new heat pumps construction.

Jobs creation: The number of jobs and the qualification of staff involved in heat pumps installation, maintenance and operation will grow.

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

J.1 Relevant National Policies                      The Energy Strategy of the Republic of Moldova until 2030 approved by the GD no. 102 of 05.02. 2013 provides for improving energy security and energy efficiency. This NAMA enhances national efforts to improve energy efficiency and increase energy security of the country due to the decrease of the amount of fossil fuel used to meet the heat demand.

The Low Emission Development Strategy (LEDS) of the Republic of Moldova until 2030 and the Action Plan for its implementation, GD no. 1470 of 30.12.2016.

<http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=369528> . According to the conditional NDC, 82% of GHG emission reduction should be reached in Energy sector by 2030 compared to 1990. Implementation of this NAMA is listed in the LEDS among other measures to reach this target.

The Law on energy performance in buildings, no. 128 of 11.07.2014 stipulates that technical, economic and environmental feasibility of using alternative energy sources, including heat pumps, if available, should be considered at the time of new buildings design phase.

The National Energy Efficiency Program for 2011-2020, approved by the GD no. 833 of 10.11.2011, the National Renewable Energy Action Plan for 2013-2020 approved by the GD no. 1073 of 27.12.2013, and the draft Action Plan on Energy Efficiency for 2016-2018 provide for promotion of efficient technologies, including heat pumps, to meet the heat demands.

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

#### K Attachments

K.1 Attachment description              NAMA "Promotion of heat pumps in the Republic of Moldova" report on 20 pages, in Romanian. It can be presented on 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