Ministry of Energy, Development, and Environmental Protection (MEDEP)
The Republic of Serbia

Capacity Development Project on Nationally Appropriate Mitigation Actions (NAMAs) in the Republic of Serbia

Project Activity Completion Report

February 2013

Japan International Cooperation Agency

Oriental Consultants Co., Ltd.

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Chapter 1 OVERVIEW

1.1 Background

The Republic of Serbia ratified the United Nations Framework Convention on Climate Change (UNFCCC) as a successor state of the Federal Republic of Yugoslavia and ratified the Kyoto Protocol in October 2007 (as a Non-Annex I Party) to tackle with global warming. The Republic of Serbia (hereinafter referred to as "Serbia") also joined Japan's Cool Earth Partnership in September 2009.

Since greenhouse gas (GHG) emissions from developing countries account for about half of the global GHG emissions, even if a significant emission reduction is achieved in developed countries, without effective GHG mitigations in developing countries, stabilization of GHG concentrations in the atmosphere will not be accomplished. And therefore, UNFCCC has been stipulating developing countries to take measures to minimize the adverse effects of climate change. Formulation of Nationally Appropriate Mitigation Actions (NAMAs) is an immediate priority in Serbia and developing countries.

However, Serbia was facing barriers that prevented formulation of NAMAs. One of such barriers was considered to be the limited human resources in Serbia who have sufficient skills and experiences to develop and formulate effective NAMAs.

To solve such problems and also to achieve GHG emission reduction at a national level by the year 2020, the Government of Serbia requested the Government of Japan in August 2009 for technical assistance for formulation of climate change mitigation measures and NAMAs.

Upon this request, Japan International Cooperation Agency (JICA) conducted a preparatory study in June and July, 2010, which identified the background and contents of the technical assistance. Cooperation program was then established and agreed between two governments.

Record of Discussions (R/D) on the project was agreed on August 20, 2010, which was instituted with the Ministry of Energy, Development and Environmental Protection (MEDEP)* of Serbia as a counterpart agency (C/P) of this project.

Oriental Consultants Co., Ltd. was entrusted by JICA and JICA Expert Team was dispatched to Serbia to conduct the "Capacity Development Project on Nationally Appropriate Mitigation Actions (NAMAs) in the Republic of Serbia" (herein after called the "Project").

* The name of the counterpart agency, Ministry of Environment and Spatial Planning (MESP) has been changed to Ministry of Environment, Mining and Spatial Planning (MEMSP) in March, 2011, which has been changed to Ministry of Energy, Development and Environmental Protection (MEDEP) in July, 2012.

1.2 Objectives and Outputs

Main objective of the Project is to enhance the capacity of staff and organization of **Ministry of Energy, Development and Environmental Protection (MEDEP)** and **NAMA-related agencies** in Serbia, so that MEDEP and NAMA-related agencies will be able to formulate and promote nationally appropriate mitigation actions (NAMAs) in an efficient and effective manner.

Overall goal and purpose of the Project have been agreed through the preparatory study as the followings:

Overall Goal

Serbian Government becomes capable of defining its contribution to climate change.

Purpose

Capacity to formulate and promote NAMAs is developed.

Verifiable Indicators

a) At least 3 people in Climate Change Division of MEDEP sufficiently understand process of NAMAs planning.

b) At least 1 person in each organization participating in working group sufficiently understands process of NAMAs planning.

c) Document containing NAMAs and descriptions necessary for their implementation is developed.

Outputs

1. General understanding on NAMAs and measurement, reporting and verification (MRV) is enhanced.
2. Capacity to shortlist NAMAs which are measurable, reportable and verifiable is developed.
3. Capacity to produce documents to promote implementation of NAMAs is developed.
4. Capacity to promote recognition of NAMAs is enhanced.

Project Design Matrix (PDM) and Plan of Operation (PO) of the Project have been modified after discussions with C/P, JICA and Joint Coordinating Committee (JCC) members. See Annex 1 for the latest version of PDM and PO.

Major modification points on PDM are as follows.

- Change in the name of C/P

- Modification of Objectively Verifiable Indicators
- Addition of activities on development of the guideline related to developing NAMA Short Descriptions

These modifications were approved by JCC in March 2012. (See Annex 4 of this Report for Minutes of JCC meetings)

Chapter 2 PROJECT ACTIVITIES

Activities in Phase I (December 2010 - March 2011) and Phase II (April 2011- March 2012) were conducted in accordance with the "Work Plan (Phase I and Phase II)," which was agreed and approved by C/P and JCC in January 2011. Activities in Phase III (May 2012- February 2013) were conducted in accordance with the "Work Plan (Phase III)", which was agreed and approved by C/P and JCC in May 2012.

General steps taken in the Project, collection of information, development and evaluation of NAMA long list, NAMA Shortlist and NAMA Short Descriptions, are described in the figure below. Detailed process and outcome from each step is described in the later sections of this Report.

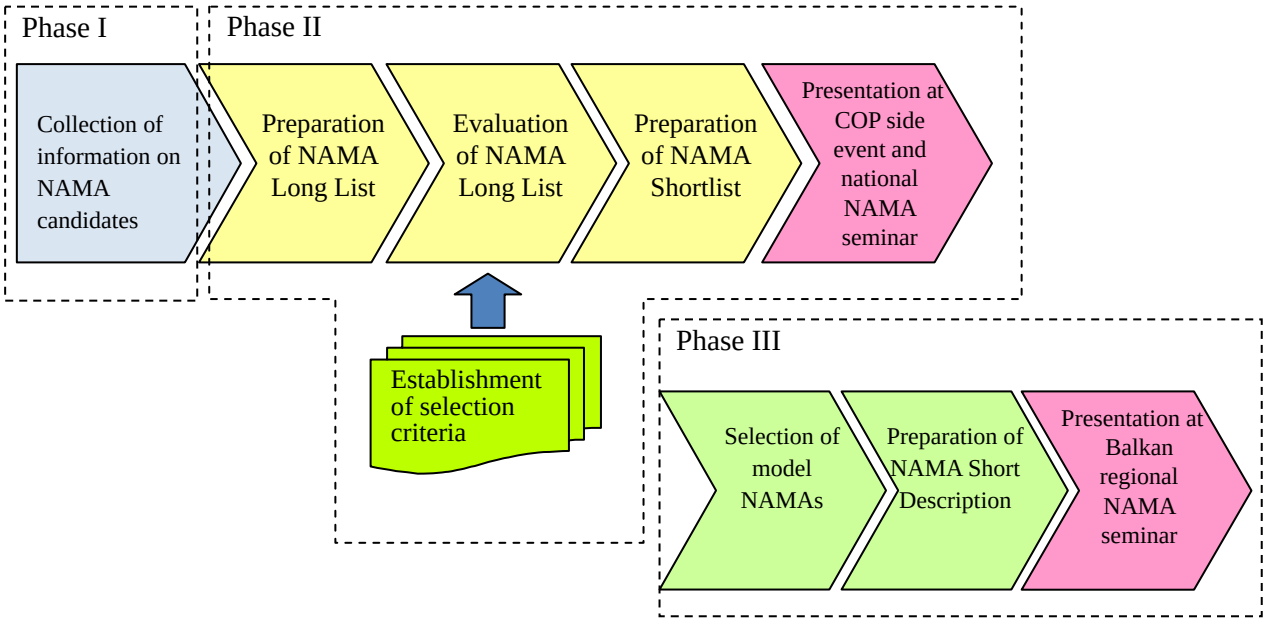


Figure 1 Project Activity cycle

All the activities in the Project were conducted by C/P, Climate Change Division of MEDEP as well as NAMA-related agencies. Working Group whose members consist of the staff of C/P and NAMA-related agencies was established and technology transfer was conducted through a series of Working Group meetings. NAMA- related agencies which participated into Working Group are: Renewable Energy division of MEDEP (former Ministry of Infrastructure and Energy: MIE), Energy Efficiency division in MEDEP (former MIE), former Serbian Energy Efficiency Agency (SEEA), Ministry of Construction and Urbanism (MCU), Ministry of Transport (MOT), Electric Power Industry of Serbia (EPS), Roads of Serbia, and Belgrade District Heating Company. JICA Expert Team provided technical assistance to C/P and Working Group member institutions.

Working Group members who participated into the meetings during the Project are listed in the table below.

Table 1 Working Group participants

Institution		Name	Title and Department
MEDEP	(Former MEMSP)	Danijela Bozanic	Head of Climate Change Division
		Sandra Lazic	Mid-level Advisor in Climate Change Division
		Ana Repac	Junior Advisor in Climate Change Division
		Dragana Radulovic	Junior Advisor in Climate Change Division
		Dragisa Nikolic	Climate Change Division
	(Former MIE)	Jelena Simovic	Advisor in Department for Sustainable Development
		Milena Djakonovic	Junior Advisor in Department for Sustainable Development
		Predrag Milanovic	Advisor in the Section of Renewable Energy Sources
		Aleksandar Puljevic	Advisor in the Section of Renewable Energy Sources
	(Former SEEA)	Vesna Rodic	Energy Efficiency in Industry Advisor
		Dimitrije Lilic	Energy Efficiency in Building Stock Advisor
		Gordana Stojanovic	Monitoring, Communication and Evaluation Expert for Serbian Energy Efficiency Project
MCU	(Former MEMSP)	Jasminka Pavlovic	Head of Building Department
		Nina Vukosavljevic	Building Department
MOT	(Former MIE)	Aleksandar Kokic	Transport sector
		Aleksandar Pavlovic	Advisor in International Public Transport Department
EPS	-	Miroslav Spasojevic	Advisor
		Mihajlo Gavric	Environmental Protection Manager
		Dragan Vukotic	Senior Engineer
Roads of Serbia	-	Velimir Kopanja	Project Manager
		Igor Radovic	Chief Engineer
Belgrade District Heating Company	-	Peter Vasiljevic	Assistant General Manager

Working Group meetings were held eight times during Project as summarized below.

Table 2 Working Group meeting

	Date	Participants	Main Topics
1	31 Jan, 2011	14	- Introduction of Working group Members
2	10 June, 2011	12	- NAMA benefit and conditions - NAMA formulation steps, example - GHG emission reduction method - Assignment for each long-listed NAMA
3	5 July, 2011	12	- Update of Long List and information collection - GHG emission reduction method

	Date	Participants	Main Topics
			- Discussion on potential NAMAs
4	2 Aug, 2011	13	- Presentation and discussion on sample NAMAs and calculation - Overview of financial analysis
5	15 Sept, 2011	12	- Discussion on Shortlist selection criteria - Evaluation result of Long List - Presentation by Japan's MRV Survey Team
6	6 June, 2012	18	- Work plan of Phase III - Introduction of NAMA Registry (prototype) - NAMA Short Description - Monitoring and MRV - Selection of Pilot NAMAs and Assignment for development of NAMA Short Description of each pilot NAMAs
7	5 July, 2012	15	- Presentation of NAMA short descriptions by NAMA implementation agencies - Discussion on development of NAMA Short Description (Methodology for calculation of GHG emission reduction)
8	10 Dec, 2012	14	- Presentation, evaluation and discussion on NAMA Short Descriptions - Presentation of outcomes of technical training in Japan - Explanation of NAMA Development Guideline

In addition to the above Working Group meetings, C/P and JICA Expert Team visited Working Group members' office and provided technical advice about various technical issues related to NAMA development, including writing tips of NAMA Short Description, how to apply a methodology to calculate GHG emission reductions, how to set business-as-usual (BAU) scenario, monitoring activities and MRV etc.

Outline of these activities are provided in the later section of this Report.

2.1 Activity 1: Enhancement of general understanding on NAMAs and MRV

2.1.1 Collection and sharing of information on NAMAs and MRV

1) Collect and share the latest decision for NAMA/MRV in COP16

Information regarding NAMAs submitted by non-Annex I countries under the Copenhagen Accord was shared and discussed at the Working Group meeting in order to further enhance the understanding on NAMAs by C/P and NAMA-related agencies.

The latest decisions on NAMA and MRV issues and some of the key topics from COP16 which were shared with Serbian stakeholders are summarized below.

GHG emission reduction targets and mitigation actions by developed countries

Conference of the Parties has decided:

- To take note of qualified economy-wide emission reduction targets to be implemented to UNFCCC by developed countries;
- To urge developed countries to increase the ambition of their economy-wide emission reduction targets;
- To decide that developed countries should submit the biennial reports on their progress in achieving emission reductions;
- To decide that developed countries should develop low-carbon development strategies or plans;
- To decide that developed countries should provide enhanced financial, technological and capacity-building support for the preparation and implementation of nationally appropriate mitigation actions of developing countries and for enhanced reporting by these countries.

GHG mitigation actions (NAMAs) by developing nations

Conference of the Parties has decided:

- To agree that developing nations will take nationally appropriate mitigation actions ("NAMAs") aimed at reducing GHG emissions compared to "business as usual" emissions in 2020,
- To take note of NAMAs to be implemented by developing nations to UNFCCC;
- To decide to set up a registry to record NAMAs seeking international support and to

facilitate matching of support to these NAMAs;

- To decide that developing nations should submit the national communications to UNFCCC every four years and biennial update report containing updates of national GHG inventories including a national inventory report and information on mitigation actions and support received;
- To encourage developing nations to develop low-carbon development strategies or plans.

MRV (Measurement, Reporting, Verification)

Conference of the Parties has decided:

- To decide that internationally supported mitigation actions will be measured, reported, verified domestically and will be subject to international measurement, reporting, verification in accordance with guidelines to be developed under UNFCCC;
- To decide that domestically supported mitigation actions will be measured, reported, verified domestically in accordance with guidelines to be developed under UNFCCC;
- To decide to conduct a process for international consultations and analysis (ICA) on mitigation actions, domestic MRV, and support received (including Biennial Update Reports).

2.1.2 Development of Matrix of other countries' NAMAs

1) Development of matrix of other countries' NAMAs

Information of each NAMA submitted by developing countries for the energy efficiency improvement, which is the target sector of this Project, was compiled in a matrix so that Serbian stakeholders can enhance their understanding on what kind of mitigation actions can possibly be NAMAs and how to categorize such actions.

Format of the matrix was developed in a way that C/P and NAMA-related agencies can use in analyzing NAMAs Shortlist and developing NAMA Short Description.

In the matrix of other countries' NAMA, following points are taken into account;

- Sector / sub-sector
- Submitting Party
- Contents of NAMA
- Category
- Sub-category (policy/ program/ law and regulation/ project)
- Boundary (country level/ local)
- Reference scenario
- NAMA target
- Conditions

Example of other countries' NAMA matrix is shown in Table 3.

Table 3 Matrix of other countries' NAMAs (extract)

No	Sector	Sub-sector	Party	NAMA	Categor	Sub-categ	Bounda
E-1	Energy	Biofuel	Ethiopia	Bio-fuel Development for Road Transport and for household use: Project to produce 63.36 million L of ethanol, produce 621.6 million L of biodiesel	Measures	Project	National
E-2	Energy	Biofuel	Ghana	Land preparation:incentive use of bio-fuels for mechanized agriculture	Measures	Program	National
E-3	Energy	Biofuel	Chad	Promotion of renewable energy: use of biofuels	Measures	Program	National
E-112	Energy	Renewable /New energy	Peru	Increase newable energy up to 33% of total energy consumption by 2020	Measures	Policy	National
E-113	Energy	Renewable /New energy	Mongolia	Installation of large scale PV systems in the Gobi region	Measures	Program	National
I-4	Industry	Energy efficiency	Ghana	Improve on resource efficiency in industries to promote sustainable production and consumption	Measures	Program	National
I-5	Industry	Energy efficiency	Tunisia	Develop energy efficiency program in industrial sector	Measures	Program	National
I-6	Industry	Standard	Macedonia	Improve standards for building construction and insulation and quality of materials used	Measures	Law/ regulation	National
T-4	Transportation	Biofuel	Macedonia	Promote use of biodiesel	Measures	Program	National
T-5	Transportation	Biofuel	Macedonia	Introduce biofuels	Measures	Program	National
T-6	Transportation	Biofuel	Togo	Promote biofuels	Measures	Program	National
T-7	Transportation	Biofuel	Chad	Promoting the exploitation and use of biofuels	Measures	Program	National
T-8	Transportation	Financial measure	Mongolia	Introduce vehicle registration tax	Measures	Law/ regulation	National
M-4	Misc./cross-cutting	Study	Republic of Congo	Creation of a national observatory on the environment	Measures	Project	National
M-5	Misc./cross-cutting	Study	Republic of Congo	Installation of a control station on atmospheric pollution, water and soil quality	Measures	Project	National
M-6	Misc./cross-cutting	Study	Republic of Congo	Installation of a relay station for the reception of satellite imagery	Measures	Project	National

Among the 101 Non-annex I parties associating with the Copenhagen Accord, 43 countries submitted NAMAs, while remaining 58 countries submitted only a communication letter and have not submitted NAMAs (as of January 6th, 2011).

Other countries' NAMAs were categorized into 4 categories. Table 4 shows general descriptions of 4 categories and number of countries for each category.

Table 4 General descriptions of NAMAs' category

Category (Category name)	General description of category	Number of country submitted NAMA
Category 1 (Measures)	List activities in the promotion and implementation of various mitigation measures (policies, legislation, programs, projects, etc.)	23
Category 2 (Conditions)	List activities in the preparation of various mitigation measures and essential conditions (preparation of national communication and GHG inventory, and identification of baseline, etc.)	3
Category 3 (Carbon neutral)	Refer to achievement of zero GHG emission as a nation	3
Category 4 (Target)	Set quantitative emission reduction target as a nation (absolute target or intensity target/ GDP)	14*

*Papua New Guinea's NAMAs contain both absolute target by 2030 and carbon neutral by 2050. This table categorizes it into the Target category.

Analysis on the submitted NAMAs found the following points:

- NAMAs categorized in "Measures" and "Conditions" describe only mitigation measures, and specific information such as reference scenario and reduction target are not described.
- NAMAs categorized in "Carbon neutral" category does not describe any specific mitigation measure. Therefore, these NAMAs are considered as a national basic policy on climate control.
- NAMAs in "Target" category describe specific contents such as reduction target compared to the reference scenario in target year.
- Any specific MRV information, such as MRV method, implementation structure and condition for implementation of NAMA is not described in any NAMA.

2) Sharing the matrix of other countries' NAMA with C/P

By using the matrix of other countries' NAMAs and relevant materials, information on the latest situation of NAMA was shared with NAMA-related agencies in Serbia at the Working Group meeting.

2.2 Activity 2: Development of capacity to shortlist MRV-able NAMAs

2.2.1 Collection of Information on NAMA candidates

As a first step to develop a NAMA Shortlist, information on climate change mitigation measures in Serbia that can be NAMA was collected. Information provided by Working Group members were collected and analyzed by C/P, Climate Change Division of MEDEP and JICA Expert Team. A local consultant from Faculty of Mechanical Engineering of Belgrade University was hired by the Project in order to assist data collection and to conduct technical analysis on energy efficiency-related technologies.

Collected information includes any information that can be a NAMA candidate from the target sub-sectors (energy generation, transport, and building), including Serbia's national policy and strategy, laws and regulations, action plans, programs and projects, etc.

NAMAs submitted by other non-Annex I countries under the Copenhagen Accord contain many measures such as development plan, policy or strategy that do not contain any concrete mitigation "actions"; however, the Project focuses only on such detailed actions that have turned into a concrete project or program and can promote investment into Serbia, as per request from the Serbian side.

Various sources of information were obtained and analyzed in order to find NAMA candidates. Information sources that were referred to are listed in the following table.

Table 5 Sources of NAMA candidates

Type of source	Title	Publisher/ Author	Issued year
Laws	Energy Law	Ministry of Infrastructure and Energy	Official Gazette No 57/11
	Law on Air protection	Ministry of Environment, Mining and Spatial Planning	Official Gazette No 36/09
	Law on Planning and Building construction	Ministry of Environment, Mining and Spatial Planning	Official Gazette No 72/09 and 81/09, November 2011
Policy and strategy	Initial National Communication of the Republic of Serbia under the United Nations Framework Convention on Climate Change	Ministry of Environment, Mining and Spatial Planning	November 2010
	Energy sector development strategy of the Republic of Serbia by 2015	Ministry of Infrastructure and Energy	Official Gazette No 40/05
	Strategy of Railway, Road, Inland Waterway, Air and Intermodal Transport Development 2008-2015	Ministry of Infrastructure and Energy	"Official Gazette RS", No. 55/05, 71/05 – rectification and 101/07
Policy and	The national Waste management	Ministry of Environment,	2010

Type of source	Title	Publisher/ Author	Issued year
strategy	strategy for the period 2010-2019	Mining and Spatial Planning	
	National Strategy for incorporation of Republic of Serbia into the Clean Development Mechanism – Waste management, Agriculture and Forestry sector	Ministry of Environment, Mining and Spatial Planning	2010
	Energy Development Strategy for the City of Belgrade	City of Belgrade, City Administration, Secretariat for Utilities and Housing Services	November 2008
Action plan	Biomass Action Plan for the Republic of Serbia 2010-2012	Ministry of Infrastructure and Energy	2010
	The first Energy efficiency plan of the Republic of Serbia for the period from 2010 to 2012	Ministry of Infrastructure and Energy	July 2010
Regulation	Regulation on establishing the program for realizing the power supply development strategy for the Republic of Serbia up to year 2015 for the period from 2007 to 2012,	Ministry of Infrastructure and Energy	Official Gazette No. 11/2007, 11/2007, 99/2009 and 27/2010
	Regulation on energy efficiency in buildings	Ministry of Environment, Mining and Spatial Planning	December 2011
	Regulation on the conditions, content and manner of issuance of certificates of energy performance of buildings	Ministry of Environment, Mining and Spatial Planning	December 2011
Other literatures	The White Book of the Electric Power Industry of Serbia	PE EPS – available at website: www.eps.rs	May 2011
	Wood energy – definition, objectives and challenges in South-East Europe	Prof. Branko Glavonjic, Workshop on Policy options for wood energy, Dubrovnik	2009
	various internal documents	Belgrade district heating company and Serbian association of district heating companies	2010, 2011
	Feasibility Study: The possibility of Solar energy utilization for domestic hot water production in Heating plant Cerak	Institute of Nuclear Sciences “Vinca”, Laboratory for thermal engineering and energy, Belgrade	2008
	Program Analyses of State Road Network and Transport Rehabilitation Project Performance Indicators	World Bank Project, Contract No. WBC/ICS-PA/2010-05	2010
	Reducing Transport Greenhouse Gas Emissions, TrendsData	International Transport Forum - OECD/ITF	2010
	Greenhouse Gas Reduction Strategies in Transport Sector	International Transport Forum - OECD/ITF	2008
	Statistical Yearbook of Serbia	Statistical Bureau of Serbia	2010
Other	Project of the Energy Efficiency	Serbian Energy Efficiency	2011

Type of source	Title	Publisher/ Author	Issued year
literatures	in Serbia –IDA credit 3870 YF – Part B: Public Buildings – Schools and Hospitals – Final Results of the Project	Agency	
	Feasibility Study and Preliminary design for revitalization and modernization of TPP Nikola Tesla unit B1 (620 MW)	Public Enterprise Electric Power Industry of Serbia	2010
	Feasibility Study and Preliminary design for revitalization and modernization of TPP Nikola Tesla unit A3 (305 MW)	Public Enterprise Electric Power Industry of Serbia	2008
	Prefeasibility Study and General design for CHP Novi Sad	Public Enterprise Electric Power Industry of Serbia	2008
	Prefeasibility study of building new block B3 at TPP Kostolac B	Public Enterprise Electric Power Industry of Serbia	2011

Information on all mitigation actions that can be NAMA was extracted from the above sources, and detailed information on each action was collected by contacting the author and a prospective implementing entity of the action.

In collecting relevant information, an original format was developed titled NAMA information sheet, which is designed to collect as complete information as possible on details of each mitigation action. Through fulfilling NAMA information sheet, JICA Expert Team provided technical advice to Serbian side on how to prepare the sheet, including important points and necessary information to develop NAMA.

The information collected for the NAMA information sheet was used as the basis not only for the analysis of long list and short list as well as for preparation of NAMA promotion materials titled NAMA Portfolio, but also for the development of NAMA Short Description. Information collected for NAMA information sheet includes;

- NAMA title
- Sector’s policy and target achievement status
- Description of the action
- Expected operational entity
- Location of the action
- Implementation schedule and current status
- Cost, financial source, result of financial analysis
- Mitigation target
- Identified barrier and countermeasures
- Reference scenario (BAU scenario)

- GHG emission reduction estimation (including applicable methodology)
- Reference

MEDEP Climate Change Division and JICA Expert Team had a series of meetings with various entities in order to fill the NAMA information sheet of possible NAMA candidates, where basic information such as the concept and benefit of NAMA, concept of GHG emission reduction/ limitation, importance of identifying BAU scenario, general information on financial analysis were provided to the entities.

Since many of these entities did not have much experience in planning and implementing a project from a perspective of climate change mitigation, and many of them did not have sufficient background knowledge on NAMA or climate change mitigation, it is considered that this activity contributed to increase their general knowledge and understanding on the subject.

A list below shows the names of entities with which meetings, interviews, or site visits were conducted.

Table 6 List of interviews and site visits conducted
(Institution names are as of the time of the visit)

Name of Institution	Location	Type of NAMA information collected
Belgrade District Heating Company	Belgrade	Heat metering, rehabilitation of boilers, fuel change in heat distribution system
Belgrade Land Development Public Agency	Belgrade	Sustainable public urban transport
Business Association of Serbian District Heating Companies	Kokin Brod	Heat meters for district heating, fuel switch to biomass in heat plants, rehabilitation of district heating
District Heating Company Valjevo	Belgrade	Expansion of district heating network
Heat plant in Kragujevac	Kragujevac	Fuel switch from coal to natural gas
Josanicka Spa, Mataruska Spa	Josanicka, Mataruska	Geothermal for heating public buildings
Municipality of Cajetina	Cajetina	Biomass/ geothermal for heating
Municipal Supprot Program Project	Belgrade	Energy efficiency for municipality
Ministry of Infrastructure and Energy	Belgrade	Energy projects, transport projects
Pribojska	Pribojska Spa	Geothermal energy for heating
Public Enterprise Electric Power Industry	Belgrade	Power generation projects
Public Enterprise Roads of Serbia	Belgrade	Road rehabilitation, bypass road construction, road material recycling
Secondary Agricultural School	Vrsac	Energy efficiency for public buildings
Serbian Energy Efficiency Agency	Belgrade	Energy efficiency improvement in public buildings
Serbian Wind Energy Association	Belgrade	Wind power generation and CDM application
Town of Cacak	Cacak	Geothermal, biomass, solar energy
Vinca Institute of Nuclear Sciences	Belgrade	Priority energy infrastructure projects in Initial National Communication

- Pubic call for NAMA candidates through C/P website

In addition to the above information sources, a public call for a new NAMA was put through C/P website (website of former Ministry of Environment, Mining and Spatial Planning at that time). The call was made to gather as many NAMA candidates as possible in the field of energy efficiency improvement especially from local communities.

Figure 2 Public call of potential NAMA at MEMSP website (English and Serbian)

2.2.2 Preparation of NAMA Long List

As a result of the information collection activity, 69 NAMA candidates were identified.

The candidates are consisted of 38 from energy sub-sector, 18 from transport and 13 from building sub-sector as shown in the figure.

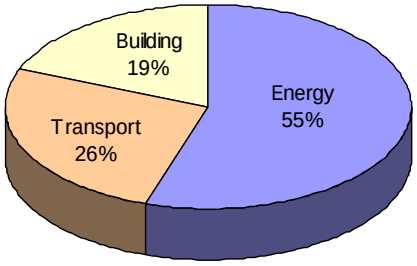


Figure 3 NAMA Long List summary

80% of all candidates are infrastructure projects or programs that involve construction or installation of plant, facility, or equipment, while the remaining 20% involve such soft measures as establishment of financial incentive or fund, and awareness raising activity.

General characteristics of Long List for each sub-sector are summarized below.

- Energy sub-sector

  Large-scale infrastructure projects, such construction of a new coal-fired power plant or rehabilitation of an existing coal-fired power plants, and rehabilitation of a natural gas cogeneration plant, are contained. At the same time, activities that involve introduction of renewable energy sources are also found, including small-scale hydro power, wind power, photovoltaic and solar heat, geothermal energy, and biogas use at municipal waste landfill sites. Also, several activities regarding heat generation, such as district heating system and

using different energy source for heating, are included. In addition, measures from the industry field contain fuel switch activity at a factory, and various soft measures such as introduction of energy audit and management system, and establishment of energy fund.

- Transport sub-sector

  Rehabilitation of deteriorated roads, construction of bypass roads, introduction of high-efficient vehicles and buses, biofuels, and some modal shift measures such as improvement of railway system and waterway system are contained.

- Building sub-sector

  Installation of thermal insulation and windows, improvement of heating system, replacement of inefficient house appliances and light bulbs, as well as energy efficiency improvement at public buildings such as schools and hospitals are contained in the list.

2.2.3 Evaluation of NAMA Long List

Each of the identified 69 NAMA candidates was evaluated whether the activity is an appropriate mitigation action for Serbia. Evaluation was performed mainly by C/P while JICA Expert Team provided technical advice and assistance. Opinions from the Working Group members were also collected in the process of the evaluation.

- Establishment of NAMA Shortlist selection criteria

A set of selection criteria was developed that is applied to evaluate NAMA candidates, where candidates that can only satisfy certain criteria are selected as NAMAs in Short List. The criteria were developed jointly by C/P and JICA Expert Team.

Criteria are divided into 2 steps; the 1st set of criteria is designed to check whether a NAMA candidate can fulfill basic conditions of NAMA, while the 2nd set of criteria is to check the activity's sustainability and MRV-ability. Moreover, only those that meet all 1st criteria are evaluated further, using the 2nd set of criteria.

The evaluation criteria were uniquely developed by the Project because there is no guideline or reference available by UNFCCC regarding NAMA development process or condition. The criteria may be improved and modified in light of the forthcoming discussions and decisions by UNFCCC and Serbian government.

NAMA Shortlist selection criteria are shown in the table below.

Table 7 NAMA Shortlist selection criteria

Step	Category	Criterion	Rationale
1st screening	Basic condition	**Distinctiveness**	A mitigation action is a clearly defined project, which provides information on expected or identified location and type of activities.
		Information availability	Sufficient data and information on the action is available for mitigation potential related assessments.
		No double-counting	A mitigation action has not applied or been registered into any market mechanism such as CDM in order to avoid double counting of emission reduction.
		Timeline	A mitigation action has not been realized yet and will ensure emission reduction by 2020.
		Voluntary participation	Operating entity is willing to implement the mitigation action under NAMA scheme, and voluntarily take a role of implementing the action.
	General condition	**Compliance**	A mitigation action is in line with Serbia's national/ sectoral development policy, plan or strategy.
		GHG reduction potential	A mitigation action will lead to the reduction or limitation of GHGs emissions in Serbia.
2nd screening	Sustainability	**Financial Feasibility**	A mitigation action ensures certain level of financial performance that is considered appropriate for operating entity.
		Technical Viability	A mitigation action will use already-proven technology.
	MRV	**MRVability** *(subject to international negotiation)*	A mitigation action will be able to be measured, reported, and verified under expected NAMA scheme. • Emission reduction can be calculated using the internationally approved methodologies such as CDM or IPCC, or methods based on such methodologies. • Sufficient and transparent data to estimate emission reduction will be available. • A NAMA implementing entity will be able to monitor and report all parameters specified in the methodology.

- Evaluation of Long List

Developed criteria were applied to each of the 69 NAMA candidates in the Long List to evaluate whether each action is appropriate to be a Serbian NAMA. Evaluation was principally conducted by C/P.

The result of Long List evaluation is shown below. Among 69 candidates, 17 actions were evaluated to meet all 1st criteria, and 16 of these were evaluated to satisfy all 2nd criteria. (Analysis of NAMA long list is attached in Annex 6)

Table 8 Result of Long List evaluation

Sub-sector	Number of candidates in **Long List**	Number of candidates that **satisfied 1st criteria**	Number of candidates that **satisfied 2nd criteria**
Energy	38	10	10
Transport	18	3	2
Building	13	4	4
Total	**69**	**17**	**16**

Evaluation of candidates revealed the following characteristics;

- 70% of the candidates in the Long List do not satisfy the “Distinctiveness” criterion, indicating many are still at a preliminary stage of the project and not developed into a concrete activity.
- Similarly, over 70% of the NAMA candidates do not satisfy the “Information availability” criterion, and thus sufficient information is not available and evaluation itself cannot be conducted for many candidates.
- Almost all candidates fulfill the “Compliance” criterion. Although this is expected since information of NAMA candidates were taken from such sources as national strategy, action plans, etc., it is still very important to evaluate each candidate using this criterion in order to ensure the action is “nationally appropriate” for Serbia.
- Over 90% of candidates were evaluated to fulfill the “GHG reduction potential” criterion even though the detail of the action is not available. However, this evaluation was not based on thorough analysis of baseline emissions, project emissions, and leakage emissions of each activity, which will require sufficient data availability.

Among those that did not satisfy the 1st and 2nd screening criteria, some of them were evaluated by C/P that there is a possibility the candidate will be developed into a more concrete activity in the near future. Such candidates will be monitored continuously by C/P and once a concrete plan or activity is identified, the candidate will be evaluated once again to be included in the Shortlist.

It was also decided that those candidates that clearly failed to satisfy all criteria are not analyzed further, such as the activity that has a plan to apply to CDM, or the one whose GHG emission reduction estimation and robust MRV is difficult, or the activities that do not have a clear scope of the activity at all.

2.2.4 Preparation of NAMA Shortlist

16 Shortlisted NAMAs consist of 10 from energy sub-sector, 4 from building sub-sector and 2 from transport sub-sector as shown in the figure.

Overview of the each Shortlisted NAMA is shown in the following table.

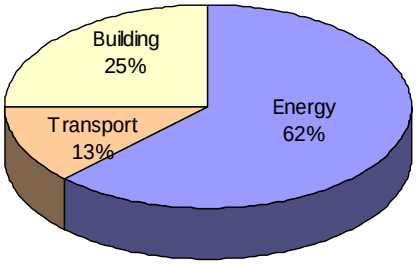


Figure 4 NAMA Shortlist summary

Table 9 Overview of Shortlisted NAMAs

Sub-Sector	No.	NAMA Title	Description	Mitigation Potential (t-CO_{2e}/yr)	Investment Cost and Financial Source	Current Status and Schedule	NAMA Implementing Entity	Domestic/ Supported NAMA
Energy	1	Construction of a 790 MW Ultra Supercritical Lignite Power Plant TPP Nikola Tesla -Unit B3	Construction of a new lignite-fired thermal power plant. The new unit, called Unit B3, will have an installed capacity of 790MW_e with net efficiency at least 43%, which is significantly higher than efficiency of a conventional lignite power plant in Serbia. The project will introduce a ultra-supercritical steam power generation technology. (The efficiency of existing facility is approximately 35%)	1,337,728	EUR 1,200 million	Pre-Feasibility Study ongoing . Construction starts in 2017; operation starts in 2020.	Public Enterprise Electric Power of Serbia (EPS)	Supported
Energy	2	Thermal Power Project with Capacity and Efficiency Increase I TTP Nikola Tesla – Unit B2	Restoration and modernization of a lignite thermal power plant with capacity increase of 47 MW. Adopted technologies include rehabilitation and modernization of the steam turbine, condensing plant and cooling system unit, boiler and auxiliary equipment (e.g., low/high pressure feed water heaters), as well as revitalization and improvement of the firing system and the combustion process by introducing "Low NOx" burners and increasing the efficiency of the old thermal units.	355,142	EUR 22,716,750 Serbian implementing entity and commercial credit	Commissioning of the unit planned for 2013	Public Enterprise Electric Power Industry of Serbia (EPS)	Supported
Energy	3	Thermal Power Project with Capacity and Efficiency Increase II TTP Nikola Tesla – Unit A3	Restoration and modernization of a lignite thermal power plant with capacity increase of 30 MW. Adopted technologies are rehabilitation and modernization of the steam turbine, condensing plant and cooling system unit, boiler and auxiliary equipment (e.g., low/high pressure feed water heaters), as well as revitalization and improvement of the firing system and the combustion process by introducing "Low NOx" burners and increasing the efficiency of the old thermal units.	91,796	EUR 30.5 million Serbian implementing entity (loan or equity; to be decided)	Commissioning of the unit planned for 2013	Public Enterprise Electric Power Industry of Serbia (EPS)	Supported

Sub-Sector	No.	NAMA Title	Description	Mitigation Potential (t-CO_{2e}/yr)	Investment Cost and Financial Source	Current Status and Schedule	NAMA Implementing Entity	Domestic/ Supported NAMA
Energy	4	Replacement and Construction of a New Natural Gas Cogeneration Plant CHP Novi Sad	Construction of a new, energy efficient natural gas-fired cogeneration plant that will entirely replace the existing inefficient cogeneration plant, which is also fueled by natural gas and heavy oil. The existing cogeneration plant will be decommissioned when the new plant starts operation. The new cogeneration plant will generate 450MWe of electricity, which will be supplied to the national grid of Serbia, while the plant will also generate 300MWth of heat, which will be supplied to district heating plants of Novi Sad municipality through a pumping station.	1,019,380	EUR 250 million 51% by strategic partner, 49% by Serbian implementing entity	Commissioning planned for 2015.	Public Enterprise Electric Power Industry of Serbia (EPS)	Supported
Energy	5	Construction of a Super-critical Lignite Power Plant TTP Kostolac B	Construction of a new lignite fired thermal power plant in TPP Kostolac B. The new unit, called block B3, will have an installed capacity of 600 MWe with net efficiency of 40.8%, which is significantly higher than 33.5% efficiency of a conventional lignite power plant in Serbia. The project will introduce a super-critical steam power generation technology.	1,390,533	EUR 954 million N/A	Prefeasibility study and General Design completed Construction starts in 2015; operation starts in 2020	Public Enterprise Electric Power Industry of Serbia (EPS)	Supported
Energy	6	Construction of 9 New Small Hydropower Plants (SHPPs)	The NAMA involves construction of new small scale HPPs (9 units with total installed capacity 30.4 MW and generation over 108 GWh/ year). The NAMA will contribute to climate change mitigation as the hydro power plants do not emit any GHG emissions, and reduce GHG that would otherwise be emitted from grid-connected power plants in the absence of the mitigation action.	102,343	EUR 54.6 million	Construction starts in 2013 and operation starts from 2014 to 2016	Public Enterprise Electric Power Industry of Serbia (EPS)	Supported

Sub-Sector	No.	NAMA Title	Description	Mitigation Potential (t-CO_{2e}/yr)	Investment Cost and Financial Source	Current Status and Schedule	NAMA Implementing Entity	Domestic/ Supported NAMA
Energy	7	Introduction of Metering System and Billing on the Basis of Measured Consumption in District Heating Systems in Serbia	Almost all residential consumers connected to the district heating network in Serbia are paying their bill based on the floor size, instead of the actual amount of heat consumption. This billing system has prevented consumers from having energy saving mindset. The NAMA involves installation of devices that allow metering of heat consumption by each consumer, which is a necessary prerequisite for billing on the basis of actual heat consumption. Measures to be introduced include heat allocators with radio modem, thermostatic radiator valves as well as rehabilitation of 50% of existing substations in Serbia (approximately 12,500 substations) and installation of heat meters, automatic control, pumps with integrated frequency converters, plate heat exchangers, valves, etc. The NAMA will contribute to climate change mitigation through reducing the consumption of heat at residential sector, which is generated by fossil fuels.	329,117	EUR 212 million N/A	Several pilot projects ongoing Installation complete by 2016	Belgrade District Heating Company, Serbian Association of District Heating Companies	Supported
Energy	8	Introduction of Small Biomass Boilers in Serbia	Serbia has abundant biomass resources throughout the country, which is estimated to be more than 100,000 TJ/ year (40,000 TJ/ year for wood waste and 68,000 TJ/ year for agricultural waste); however, only 10% of this resource is currently used. This NAMA aims to install 1000 MW of new biomass boilers for all residential, commercial, and industrial sectors throughout the country that will be fueled by either wood waste (pellets or wood chips) or agricultural waste. Climate change mitigation will be achieved through replacing the existing small inefficient boilers that are fuelled mainly by carbon-intensive coal, oil, and grid electricity.	414,501	EUR 250 million N/A	Location of boilers to be replaced will be identified. Pilot projects ongoing. Installation will start in 2015 and operation will start continuously. The installation can be finished in 2019	Ministry of Energy, Development and Environmental Protection (MEDEP)	Supported

Sub-Sector	No.	NAMA Title	Description	Mitigation Potential (t-CO_{2e}/yr)	Investment Cost and Financial Source	Current Status and Schedule	NAMA Implementing Entity	Domestic/ Supported NAMA
Energy	9	Use of Solar Energy for Domestic Hot Water Production in Heat Plant Cerak in Belgrade	Heating plant Cerak currently uses natural gas to produce and deliver heat for space heating and domestic hot water to residential and non-residential customers in Belgrade municipalities, Cukarica and Rakovica. The NAMA involves installation of solar collectors to replace a part of the hot water generation, amounting for around 2,700 MWh which is supplied to 7,000 households. The action will introduce approximately 5,000 m^2 of solar collectors, hot water storage tank, heat exchanger, expansion vessel, pumps, valves, automatic control, and connect a new solar plant with the existing heat plant.	611	EUR 1.05 million N/A	The Feasibility study completed in 2008 Installation starts in 2013 and operation starts in 2015	Belgrade District Heating Company	Supported
Energy	10	Construction of a new Heat Pipeline from Thermal Power Plant Nikola Tesla A to Heat Plant New Belgrade	The NAMA involves construction of a pipeline from thermal power plant Nikola Tesla A (TENT A). The pipeline will supply Heat Plant New Belgrade with hot water from the power plant. Waste heat from Nikola Tesla TENT A will cover the basic load at the Heat Plant. The total heat capacity of heat source and pipeline will be 570 MW. With operating time of 3500 hours/ year, the pipeline will supply approximately 2,000 GWh of heat to district heating system in Belgrade, thus achieving energy savings of 194 million Nm3 of natural gas and 34,000 tons of heavy oil consumption.	161,875	EUR 200 million for basic investment for finishing construction work N/A	The Project has been suspended. (As of Feb 2013) . Construction planned for 2013 and commissioning of the unit planned for 2016.	Ministry of Energy, Development and Environmental Protection (MEDEP), Public Enterprise Electric Power Industry of Serbia (EPS), Belgrade district heating company, City of Belgrade	Supported

Sub-Sector	No.	NAMA Title	Description	Mitigation Potential (t-CO_{2e}/yr)	Investment Cost and Financial Source	Current Status and Schedule	NAMA Implementing Entity	Domestic/ Supported NAMA
Transport	11	Rehabilitation of Arterial Roads in Serbia	Although approximately 3,500 km of roads have been rehabilitated in the past 10 years, a significant part of Serbian arterial roads has not been maintained sufficiently due to the lack of funds and are so deteriorated that caused congestion as well as traffic accidents. The NAMA involves rehabilitation of 19 arterial road sections, whose total length is 324 km. Climate change mitigation will be achieved by improving road surface that will prevent excessive slow mobility of vehicles and accompanied fuel saving of gasoline and diesel.	2,138	EUR 139 million N/A	Road database prepared as a so Preparation from 2013 to 2015 and rehabilitation works from 2016 to 2020.	Ministry of Transportation (MOT), Public Enterprise "Roads of Serbia"	Supported
Transport	12	Rehabilitation of Regional Roads in Serbia	Although approximately 3,500 km of roads have been rehabilitated in the past 10 years, a significant part of Serbian regional roads has not been maintained sufficiently due to the lack of funds and are so deteriorated that caused congestion as well as traffic accidents. The NAMA involves rehabilitation of 129 regional road sections, whose total length is 2,768 km. Climate change mitigation will be achieved by improving road surface that will prevent excessive slow mobility of vehicles and accompanied fuel saving of gasoline and diesel.	6,476	EUR 500 million N/A	Rehabilitation works will start in 2013 and be completed by 2017.	Ministry of Transportation (MOT), Public Enterprise "Roads of Serbia"	Supported
Building	13	Expansion of Existing Heating Network in Valjevo	The NAMA is the expansion of the existing district heating network to the city areas of Valjevo with the aim of energy efficiency improvement and air pollution reduction. Total heat capacity to be connected to the district heating system under the project will be 47.6 MW. The mitigation action involves installation of a hot water network in the	12,141	EUR 9.1 million (hot water network EUR 6.4 million and	Technical documentation prepared for new heating substations and network	City of Valjevo, District Heating Company Valjevo	Supported

Sub-Sector	No.	NAMA Title	Description	Mitigation Potential (t-CO_{2e}/yr)	Investment Cost and Financial Source	Current Status and Schedule	NAMA Implementing Entity	Domestic/ Supported NAMA
			length of 17.7km (φ125 mm) and closure of 49 existing inefficient heating stations (boiler rooms) and a large number of individual furnaces. 147 new heating substations will also be constructed in order to supply heat to the total surface area of 356,742 m2. NAMA will lead to climate change mitigation through reducing fuel consumption at outdated inefficient boilers for heating.		substations EUR 2.7 million). N/A	Design and construction will start in 2012 and completed by 2016		
Building	14	Improvement or Replacement of Existing Residential Buildings Envelope (exterior doors, windows and thermal insulation)	Residential buildings in Serbia that were built between 1950's and 1980's do not have effective thermal insulation, and thus consume tremendous amount of energy for space heating. Objective of the NAMA is the rehabilitation of about 10% of the existing residential buildings throughout Serbia that were built in the said period. Detailed measures to be applied to the buildings include rehabilitation of buildings' envelope (thermal insulation of non-transparent elements: external walls, partitions to unheated spaces, roofs, ceilings, etc.), and replacement of windows with new five-chamber PVC frames, double glazing, low-emissivity glass, filled with argon gas. With the application of all above measures, specific annual energy consumption for heating will decrease from 160 kWh/m^2y to around 70 kWh/m^2y and GHGs emission reduction will be achieved.	503,929	EUR 723.5 million N/A (House owner bears a part of the expense)	Pilot projects ongoing Rehabilitation of buildings will start in 2013 and will be completed in 2020	Ministry of Construction and Urbanism (MCU)	Supported

Sub-Sector	No.	NAMA Title	Description	Mitigation Potential (t-CO_{2e}/yr)	Investment Cost and Financial Source	Current Status and Schedule	NAMA Implementing Entity	Domestic/ Supported NAMA
Building	15	Construction of New Energy Efficient Buildings Based on New Energy Efficiency Regulation in Serbia	Although Serbia has introduced a regulation in the 1970's that requires minimum energy efficiency for new residential and non-residential buildings, and has continuously improved the regulation, the country is taking one further step to make the regulation even much stricter than the previous standard. Under the new regulation, "Regulations on Energy Efficiency in Buildings," all new buildings will be installed with better thermal insulation of non-transparent elements, including external walls, partitions to unheated space, roofs, ceilings, etc., and with better windows quality. This allows specific annual heat energy consumption for new residential buildings will decrease from 100 to 60 kWh/ m^2y, and that for new non-residential buildings from 110 to 70 kWh/ m^2y and GHGs emission reduction will be achieved.	275,282	EUR 285.5 million N/A	Construction will start in 2013 and operation will start continuously.	Ministry of Construction and Urbanism (MCU)	Domestic
Building	16	Energy Efficiency Improvements in Public Buildings: Serbian Energy Efficiency Project (SEEP)	Most of the old public buildings in Serbia do not have any energy saving measures applied and they are consuming significant amount of energy, which is contributing to GHG emissions in Serbia. The NAMA involves application of energy efficiency measures to public buildings such as schools and hospitals. Detailed site portfolio and locations will be identified by line ministries. Tentative number of potential sites for NAMA project is 49 public buildings (23 schools and 26 hospitals). Potential energy efficiency measures include façade insulation, roof, ceiling, wall insulation, window replacement, lighting retrofit etc.	8,326	EUR 10.9 million. N/A	Target buildings are tentatively selected. Construction will start in 2013.	Ministry of Energy, Development and Environmental Protection (MEDEP)	Supported

2.2.5 Identification of Needs for implementation of MRV

Although the Project specifically focuses on capacity development related to NAMA development and promotion, taking into account the importance of MRV, i.e. NAMA can be internationally accepted only when appropriate MRV is applied to that NAMA, capacity development related to M (measurement) and R (reporting) elements of MRV was carried out in the Project.

Through such activities, following capacity development needs for appropriate implementation of MRV have been identified.

1. Current capacity of MRV for NAMA in Serbia

Since many details and procedures of MRV for NAMA are still under discussion at international level, it is expected that Serbia will start its procedure to determine its official national MRV process for NAMA once UNFCCC issues formal decisions on the issue.

On the other hand, as an official candidate country for EU, Serbia is currently eagerly preparing MRV systems in accordance with EU standards, especially in industrial sector of the country. It is expected that parts of the MRV systems that will be developed in accordance with EU standards can be applied to Serbia's MRV system for NAMA scheme.

2. M (measurement) and R (reporting)

It is expected the measurement (M) and reporting (R) activities for NAMA will be the responsibility of a NAMA implementing entity of Serbia. It was observed that capacity regarding measurement and reporting for NAMA significantly varies depending on a NAMA implementing entity.

As an example, Public Enterprise Electric Power Industry of Serbia (EPS) has not only abundant human capital compared with other entities in Serbia, but also has extensive experience in measuring and reporting (e.g. data of the amount of electricity generated from their power plants), and therefore, EPS has a strong basic capacity in general measurement and reporting activities and thus has less capacity development needs.

However, EPS is one of few exceptions and most of the other NAMA implementing entities in Serbia do not have such abundant resources or experience of developing projects from the viewpoint of climate change mitigation. Since these entities do not have sufficient experience in measurement and reporting activities of GHGs, MRV capacity development needs for most of the prospective NAMA implementing entities are considered to be large.

It is expected that data and information measured in the NAMA's MRV procedure will be compiled by the NAMA implementing entity of Serbia in a report, which will be submitted to a NAMA focal point of the government of Serbia. Although a focal point of Serbia has not been officially determined yet, C/P of the Project, Climate Change Division of MEDEP, has abundant experience as Designated National Authority of CDM and also has acquired experience in coordination and supervision of NAMAs through the Project activities.

In addition, in order for Serbian NAMA focal point to receive reports in an effective manner, capacity development should be provided to prospective NAMA implementing entities regarding the significance and importance of Reporting activities in NAMA as well as technical points in preparing a report.

3. V (verification)

Although verification activity under NAMA is similarly under discussion at international level, NAMAs which will receive support from abroad (called supported NAMA) may have to go through international review. However, verification of Serbian NAMAs will take place in Serbia since it was also decided that "internationally supported NAMAs will be MRV-ed domestically."

Although Serbia does not have its own Designated Operation Entity, which conducts validation and verification of CDM projects, there are a number of potential verification entities for NAMA in Serbia, such as research institutions and universities who have experience in climate change mitigation activities. Capacity development for such prospective verification entities can also be effective.

It is also important to note that since the Project covered the field of energy efficiency related to energy production, transport, and building sectors, MRV capacity development is also necessary for other sectors such as waste and wastewater management, agriculture, forestry, etc.

2.3 Activity 3: Development of capacity to produce documents for promoting NAMA implementation

2.3.1 Development of NAMA Short Descriptions

1) Development of the format of NAMA Short Description

NAMA Short Descriptions were developed in order to further enhance the development of the NAMA-related agencies' capacity to produce documents for NAMA promotion and implementation.

Based on discussions with C/P, format and contents of NAMA Short Description was decided, which cover necessary information for UNFCCC NAMA registry and biennial update report (BUR).

The format of NAMA Short Description was designed to be not so complex for prospective Serbian NAMA implementing entities so that they can develop the document by themselves even after the completion of the Project; it was also designed to include necessary information for prospective investors and donors who may have interest in investing in Serbian NAMAs in the future. NAMA Short Description consists of the following five parts.

- General information
- Financial information
- Information on support required
- Expected GHG emission reductions and MRV
- Other information (e.g. information on contribution to sustainable development. etc)

Contents of NAMA Short Description were presented and shared with Working Group members through a series of Working Group meetings, and comments from members on the contents and format were collected.

It is expected that one of main roles of Climate Change Division regarding NAMA will be to promote and coordinate NAMA implementation in Serbia, rather than developing NAMA Short Description of actual mitigation actions. It is expected that the Division will modify the format of NAMA Short Description in accordance with future UNFCCC and domestic decisions. Another important role of C/P will be to provide guidance and instructions to NAMA implementing entities in developing NAMA-related documents properly.

2) Selection of pilot NAMAs for development of NAMA Short Description

Climate Change Division selected 7 pilot NAMAs from 16 NAMAs in the shortlist. JICA Expert Team provided technical advice for selection of pilot NAMAs.

In selecting pilot NAMAs, taken into consideration was not only the intention of Working Group institutions but also the versatility of selected NAMAs; NAMAs that contain mitigation actions which are expected to be widely developed and promoted in Serbia in the future were selected by priority.

Selected pilot NAMAs are shown in the following table.

Table 10 Selected pilot NAMAs and Assignment

No.	Sub-Sector	NAMA Title	Short Description Assignment
1	Energy	Construction of a 790 MW Ultra Supercritical Lignite Power Plant TPP Nikola Tesla -Unit B3	EPS
2	Energy	Construction of 9 New Small Hydropower Plants (HPPs) in Serbia	MEDEP
3	Energy	Introduction 1000 MW of Small Biomass Boilers in Serbia	MEDEP
4	Energy	Using of Waste Heat from Thermal Power Plant for Heating the City of Belgrade, Serbia	MEDEP
5	Transport	Rehabilitation of Arterial Roads in Serbia	MOT, Roads of Serbia
6	Building	Improvement of Old Residential Buildings Envelope (Exterior Doors, Windows and Thermal Insulation) in Serbia	MCU
7	Building	Energy Efficiency Improvements in Public Buildings: Serbian Energy Efficiency Project (SEEP)	MEDEP

3) Development of NAMA Short Description

NAMA Short Descriptions of selected pilot NAMAs were developed by C/P and respective NAMA implementing entities, with technical support from JICA Expert Team.

As shown in the above table, Working Group members, who are from NAMA implementing entities were assigned for development of NAMA Short Description of their own NAMA. Assigned members first made a draft NAMA Short Description based on their experience of preparation of previously prepared document, NAMA Information Sheet, and then they updated the NAMA Short Description through a series of discussions with C/P, other Working Group members, and JICA Expert Team.

reduction, monitoring plan and MRV, and financial/ economic analysis, C/P and JICA Expert Team held individual meetings, in addition to general Working Group meetings, with assigned personnel of NAMA implementing entities

By taking above-mentioned procedures, it is considered technical understanding and overall capacity of NAMA development was further enhanced by NAMA implementing entities, as well as the capacity of C/P's to provide technical advice effectively for newly proposed NAMAs in the future.

One of the most frequently asked questions raised by NAMA implementing entities in the course of NAMA Short Description development, was regarding a methodology for estimation of GHG emission reductions.

Being directly related to future MRV of a NAMA action, selection of an appropriate methodology for estimation of GHG emission reductions is very important. While there are several methodologies exist for calculation of GHG emission reductions, it was decided that methodologies applied in the NAMA Short Descriptions were chosen either from approved CDM methodology or the one that is based on a methodology internationally applied, such as IPCC guidelines and J-MRV, based on consultations with C/P and Working Group members. By applying these internationally recognized methodologies, it was considered to secure a certain level of accuracy, which may be required by UNFCCC or investors of a proposed Serbian NAMA.

Developed NAMA Short Descriptions are found in Annex 8. (NAMA Short Description "Using of Waste Heat from Thermal Power Plant for Heating the City of Belgrade, Serbia" was not prepared because the NAMA implementing entities had decided to temporarily cease the proposed mitigation action.)

As previously mentioned, development of NAMA Short Descriptions and technical transfer were carried out through a series of Working Group meetings, as well as additional individual meetings between C/P, NAMA implementing entities and JICA Expert Team. Key topics on these individual meetings were shown in the table below.

Table 11 Discussion and Technical assistance to NAMA-related entities

(Institution names are as of the time of the meeting)

1st meeting	2012/06/13
Participants	Total: 8 (MEMSP: 2, SEEA: 1, Energoprojekt Entel: 1, JICA Expert Team: 4)
Theme/Topics	Information for NAMA Short Description of financial analysis (SEEP project)
Points of discussion	・ Discussed financial analysis of SEEP project such as cash flow, IRR ・ Exchanged opinions on the feed-in tariff ・ Discussed the status of 23 schools and 26 hospitals of SEEP project
2nd meeting	2012/06/20
Participants	Total: 10 (MIE : 1, Road of Serbia: 4, JICA Expert Team: 5)
Theme/Topics	Preparation of draft of NAMA Short Description for Rehabilitation of Arterial Roads in Serbia and information of financial analysis
Points of discussion	・ Discussed preparation schedule of draft NAMA Short Description and information of required financial analysis ・ Exchanged opinions on cash flow of road rehabilitation project
3rd meeting	2012/06/21
Participants	Total: 8 (MIE: 1, EPS2, JICA Expert Team: 5)
Theme/Topics	Preparation of draft of NAMA Short Description and required information of financial analysis
Points of discussion	・ Discussed preparation of draft of NAMA Short Description and required information of financial analysis ・ Exchanged opinions on the relationship between BOCM and NAMA project ・ Discussed key points for preparation of NAMA Short Description and results of F/S held by EPS
4th meeting	2012/06/26
Participants	Total: 6 (MIE: 2, JICA Expert Team: 4)
Theme/Topics	Preparation of draft of NAMA Short Description and explanation of the JICA project
Points of discussion	・ Discussed the outline of both MIE projects, Introduction of Small Biomass Boilers in Serbia and Construction of a new Heat Pipeline from Thermal Power Plant Nikola Tesla A to Heat Plant New Belgrade ・ Discussed the purpose of JICA project and preparation of NAMA Short Description ・ Discussed key points of technical information on NAMA Short Description especially on the points of the calculation of GHG emission reduction and methodologies on CDM and other GHG emission reduction
5th meeting	2012/07/02
Participants	Total: 10 (MIE: 2, MEMSP: 1, City of Belgrade: 1, EPS: 1, Belgrade District Heating Company: 2, JICA Expert Team: 3)
Theme/Topics	Preparation of draft of NAMA Short Description of Construction of a new Heat Pipeline from Thermal Power Plant Nikola Tesla A to Heat Plant New Belgrade
Points of discussion	・ Discussed the source of information, accuracy and key points for the preparation of NAMA Short Description ・ Participants confirmed that MIE is main project proponent and EPS, Belgrade District Heating Company support for the management of the project. ・ Discussed that the responsibility of MIE for the preparation of NAMA Short Description
6th meeting	2012/07/17
Participants	Total: 7 (MIE: 2, MEMSP: 1, JICA Expert Team: 4)
Theme/Topics	Discussion for preparation of NAMA Short Description of projects of Introduction of Small Biomass Boilers in Serbia, targets of installation of new biomass boilers
Points of discussion	・ Discussed the targets of installation of new biomass boilers and exchange opinions on the project ・ Discussed the particular CDM methodology which requires defining potential barriers and applicability and requirement of these barriers for

	NAMA project ・ Exchanged opinions on the situation of heat plant with biomass boiler and existing biomass market ・ Discussed the sources of biomass and distance and cost for transportation ・ Participants confirmed that six companies in Serbia even produce pellets and sell or exports wood pellets. Participants confirmed that target of this project is for the boilers using wood residue. ・ Participants decided to discuss the financial framework and requirement of subsidies for this NAMA project later on. ・ Participants confirmed that this project is cost effective project.
7th meeting	2012/07/18
Participants	Total: 8 (MIE: 1, MEMSP: 1, EPS: 3, JICA Expert Team: 3)
Theme/Topics	Applicable methodology of GHG emission reduction calculation for the Construction of a Super-critical Lignite Power Plant TPP Nikola Tesla-Unit B3
Points of discussion	・ Discussed applicable methodology of GHG emission reduction calculation and METI F/S for the Construction of a Super-critical Lignite Power Plant TPP Nikola Tesla-Unit B3. ・ Participants shared the latest information of discussion of related methodology in Executive Board of CDM and discussed. ・ Exchanged opinions on METI F/S for ultra supercritical power plant in Serbia ・ Participants confirmed that that this project is a huge project and CO_2 reduction is high, the investment is high, the results will be strictly checked. ・ Participants confirmed that EPS and MIE would wait for the revised and approved CDM methodology before conducting calculation.
8th meeting	2012/07/24
Participants	Total: 6 (MEMSP: 1, SEEA: 2, JICA Expert Team: 3)
Theme/Topics	Applicable methodology of GHG emission reduction calculation for the Energy Efficiency Improvements in Public Buildings (SEEP)
Points of discussion	・ Discussed applicable CDM methodology for GHG emission reduction calculation ・ Exchanged opinions on calculation methodology prepared by JICA Expert Team
9th meeting	2012/07/24
Participants	Total: 10 (MEMSP: 3, JICA Expert Team: 3)
Theme/Topics	Applicable methodology of GHG emission reduction calculation for the Improvement or Replacement of Existing Residential Buildings Envelope
Points of discussion	・ Discussed applicable methodology of GHG emission reduction calculation ・ Exchanged opinions on calculation methodology prepared by JICA Expert Team ・ Exchanged opinions on preparation of financial analysis part of NAMA Short Description
10th meeting	2012/09/11
Participants	Total: 7 (MEMSP: 1, MCU: 2, JICA Expert Team: 4)
Theme/Topics	Preparation of UNFCCC Seeking Support document for the Improvement or Replacement of Existing Residential Buildings Envelope
Points of discussion	・ Discussed Preparation of UNFCCC Seeking Support document for NAMA Registry ・ Participants confirmed NAMA Seeking Support for Preparation and NAMA Seeking Support for Implementation will be prepared respectively. ・ JICA Expert Team proposed that F/S of each building (10,000) should be prepared and a feasibility study for all buildings as well to estimate energy saving and costs. ・ Participants confirmed MCU will prepare NAMA Seeking Support for Preparation and NAMA Seeking Support for Implementation.
11th meeting	2012/09/14
Participants	Total: 8 (MEDEP: 4, JICA Expert Team: 4)
Theme/Topics	Preparation of UNFCCC Seeking Support document for Introduction of Small Biomass Boilers in Serbia, targets of installation of new biomass boilers and Construction of a new Heat Pipeline from Thermal Power Plant Nikola Tesla A to

	Heat Plant New Belgrade
Points of discussion	・ Participants discussed the preparation of UNFCCC Seeking Support document and NAMA Short Description. ・ Participants confirmed NAMA Seeking Support for Preparation and NAMA Seeking Support for Implementation will be prepared respectively. ・ Discussed preparation of both UNFCCC Seeking Support Document ・ Discussed the detailed information in NAMA Short Description such as location maps, implementing entity and support for feasibility study ・ Discussed development of biomass market and calculation for GHG emission reduction for biomass project
12th meeting	2012/09/14
Participants	Total: 6 (MEMSP: 1, SEEA: 1, JICA Expert Team: 4)
Theme/Topics	Preparation of NAMA Short Description and UNFCCC Seeking Support form for implementation
Points of discussion	・ Discussed preparation of NAMA Short Description and UNFCCC Seeking Support form for implementation ・ Exchanged opinions on SEEP2 framework and development of SEEP3 ・ Participants confirmed NAMA Seeking Support for Preparation and NAMA Seeking Support for Implementation will be prepared respectively. ・ Discussed the calculation methodology for GHG emission reduction
13th meeting	2012/09/20
Participants	Total: 7 (MEDEP: 1, Road of Serbia: 2, JICA Expert Team: 4)
Theme/Topics	Preparation of draft of NAMA Short Description for Rehabilitation of Arterial Roads in Serbia and information of financial analysis
Points of discussion	・ Discussed preparation schedule of draft NAMA Short Description for Rehabilitation of Arterial Roads in Serbia and information of required financial analysis ・ Participants confirmed that NAMA Seeking Support for Preparation and NAMA Seeking Support for Implementation will be prepared respectively and it is important for capacity building and finding the investors. ・ Discussed and exchanged opinions on the options of methodology for road rehabilitation project
14th meeting	2012/09/21
Participants	Total: 7 (MEDEP: 1, EPS: 2, JICA Expert Team: 4)
Theme/Topics	Preparation of NAMA Seeking Support document of Revitalization of the Existing Small Hydropower Plants and Construction of New Small Hydropower Plants (SHPPs)
Points of discussion	・ Discussed and shared the latest information of NAMA Seeking Support Document ・ Participants confirmed that EPS will prepare only NAMA Seeking Support Form for Implementation. ・ Participants confirmed that the most important item in the NAMA Short Description is the information on support required.
15th meeting	2012/09/21
Participants	Total: 10 (MEDEP: 2, JICA Expert Team: 4)
Theme/Topics	Discussion for revision and key points of NAMA Short Description of projects of Introduction of Small Biomass Boilers in Serbia
Points of discussion	・ Participants confirmed that the estimation for the number of biomass boilers and that the source of information of type of biomass source is based on the research held in Serbia. ・ Discussed description of the role and responsibilities of the MIE, other entities and boiler owners on NAMA Short Description
16th meeting	2012/09/21
Participants	Total: 7 (MEMSP: 1, SEEA: 2, JICA Expert Team: 4)
Theme/Topics	Discussion for revision and key points of NAMA Short Description for the Energy Efficiency Improvements in Public Buildings (SEEP)
Points of discussion	・ Discussed and shared the latest information about the distinction between preparation and implementation phases related to obtaining relevant documentation such as licenses, permits and general designs necessary to start construction

	・ Participants confirmed that SEEA will prepare both NAMA Seeking Support for preparation and implementation. ・ Discussed on the information of NAMA Short Description of financial analysis, current status and role and responsibilities of the Ministry and other municipalities and World Bank
17th meeting	2012/09/27
Participants	Total: 8 (MEMSP: 1, EPS: 2, JICA Expert Team: 5)
Theme/Topics	Discussion for revision of draft of NAMA Short Description for Construction of a Super-critical Lignite Power Plant TPP Nikola Tesla-Unit B3
Points of discussion	・ Participants confirmed that EPS will prepare both NAMA Seeking Support form for Preparation and Implementation ・ Discussed the revised draft NAMA Short Description such as data source, revision of map, project lifetime and financial analysis ・ Discussed and shared information for options of methodologies of GHG emission reduction calculation ・ Participants confirmed that EPS will decide the methodology for calculation after the internal discussion. ・ Exchanged opinions on project emissions.
18th meeting	2012/10/09
Participants	Total: 9 (MEMSP: 1, MOT: 1, Road of Serbia: 2, JICA Expert Team: 5)
Theme/Topics	Discussion for revision of draft NAMA Short Description for Rehabilitation of Arterial Roads in Serbia
Points of discussion	・ Participants confirmed that the number of target arterial roads will be 19 and the number will be discussed and changed if necessary. ・ Participants confirmed that the same methodologies should be applied to baseline emissions and project emissions. ・ Participants confirmed that the most appropriate methodology for measuring emissions was IRI parameter for the sake of simplicity and transparency.
19th meeting	2012/10/12
Participants	Total: 8 (MEDEP: 3, JICA Expert Team: 5)
Theme/Topics	Discussion for revision of NAMA Short Description for the Energy Efficiency Improvements in Public Buildings (SEEP)
Points of discussion	・ Participants confirmed that recalculation of GHG emission reduction will be required with using a new energy efficiency standard with latest technologies. (The information will be checked with MCU officers) ・ Discussed preparation NAMA Seeking Support form to add many options for financing in support for implementation part and to revise the cost with using new prices ・ Discussed monitoring for the entire lifetime of the project which is 25 years and at least every two years ・ Discussed preparation of NAMA Short Description to add other elements to contribution to sustainable development
20th meeting	2012/10/22
Participants	Total: 8 (MEDEP: 2, GIZ: 1, JICA Balkan office: 2, JICA Expert Team: 4)
Theme/Topics	Discussion for information sharing between NAMA project of Introduction of Small Biomass Boilers in Serbia and GIZ biomass project in Serbia
Points of discussion	・ Discussed and explained both of NAMA project and GIZ biomass project ・ Participants confirmed that main goals of GIZ biomass project were consultation and capacity development and included the support to building biomass market. ・ Exchanged opinions on the location of biomass boiler, distance from biomass source and transport cost ・ Participants confirmed that information from GIZ project is very helpful to prepare NAMA Short Description.
21st meeting	2012/10/12
Participants	Total: 10 (MEDEP: 1, MCU: 2, GIZ: 2, JICA Expert Team: 5)
Theme/Topics	Discussion between NAMA project for the Improvement or Replacement of Existing Residential Buildings Envelope and GIZ activities related to classification of building stock in Serbia
Points of discussion	・ Discussed and explained both of NAMA project and GIZ classification of

	building stock project ・ Discussed the process in GIZ project that has already classified 47 types of buildings and selected a representative type of building for each of 47 building type ・ Discussed the process for issuing the energy passport that contains the information about current energy consumption and a recommendation for improvement and ways to reduce energy consumption. ・ Participants confirmed that energy consumption of GIZ project was not determined yet and probably by direct measuring systems.
22nd meeting	2012/10/24
Participants	Total: 8 (MEDEP: 1, TPP Nikola Tesla Unit B3: 2, JICA Expert Team: 5)
Theme/Topics	Discussion for the draft of NAMA Short Description for Construction of a Super-critical Lignite Power Plant TPP Nikola Tesla-Unit B3 and site visit
Points of discussion	・ Discussed based on presentation of TPP Nikola Tesla Unit B3 and presentation of NAMA project ・ Participants visited the control room and exchanged opinions on monitoring system.
23rd meeting	2012/10/29
Participants	Total: 10 (MEDEP: 2, SIEPA: 2, JICA Expert Team: 3)
Theme/Topics	Discussion for NAMA project with Serbia Investment and Export Promotion Agency (SIEPA)
Points of discussion	・ Discussed and explained the 16 shortlisted NAMA projects ・ Participants confirmed that SIEPA was not active in the energy field and has an incentive program for manufacturing and service oriented program. ・ Discussed on the incentives for projects from the NAMA short list in case some people would be employed ・ Exchanged opinions on Serbian company that could lead a 700 million euro and availability for long pay-back period
24th meeting	2012/10/31
Participants	Total: 5 (Road of Serbia: 1, JICA Expert Team: 3)
Theme/Topics	Preparation of draft of NAMA Short Description for Rehabilitation of Arterial Roads in Serbia and measurement and estimation methodologies
Points of discussion	・ Discussed on the methodology for GHG emission reduction recommended by JICA Expert Team ・ Exchanged opinions on the available data such as length of each road section, average vehicle speed and annual vehicle number that is counted by digital traffic counters which provide very reliable data ・ Discussed the methodology for calculation of fuel consumption analyzing COPERT model and the relationship between IRI parameter and vehicle speed ・ Participants confirmed that Tier 3 methodology will be used to calculate fuel consumption for each road and vehicle speed and division of vehicles in 5 main categories. ・ Participants confirmed to select Option 1 related to GHG emission reduction which will be estimated by the improvement of IRI.
25th meeting	2012/11/27
Participants	Total: 7 (MEDEP: 3, JICA Expert Team: 4)
Theme/Topics	Discussion for revision of NAMA Short Description for the Energy Efficiency Improvements in Public Buildings (SEEP)
Points of discussion	・ Discussed GHG reduction part on NAMA Short Description and different results of GHG emission reduction ・ Exchanged opinions on the input data and usage of existing data for estimation ・ Exchanged opinions on Energy Manager System which was going to be introduced after adoption the law on rational use of energy. ・ Discussed the explanation of Energy Passport System on NAMA Short Description
26th meeting	2012/11/29

Participants	Total: 9 (MEDEP: 1, MCU: 2, GIZ: 2, JICA Expert Team: 4)
Theme/Topics	Discussion for revision of NAMA Short Description for the Improvement or Replacement of Existing Residential Buildings Envelope
Points of discussion	・ Discussed the explanation of the incentive program on NAMA Short Description ・ Participants confirmed that the information about the established fund was very important for the potential investors and should be mentioned. ・ Participants confirmed that the software can be improved by adding GHG emission reduction parameter to suite the needs of NAMA project and the software was planned to be introduced in July 2013. ・ Discussed the GHG emission reduction part and co-benefit part ・ Exchanged opinions on financial options that can be sought with user participation, subsidy and loan
27th meeting	2012/12/13
Participants	Total: 6 (MEDEP: 1, MCU: 2, JICA Expert Team: 3)
Theme/Topics	Discussion for revision of NAMA Short Description for the Improvement or Replacement of Existing Residential Buildings Envelope
Points of discussion	・ Discussed the monitoring plan and monitoring parameters on NAMA Short Description ・ Discussed options for financial source on NAMA Seeking Support form

Picture 1 Working Group meeting 1

Picture 2 Working Group meeting 2

Picture 3 Meeting with NAMA implementing entity 1

Picture 4 Meeting with NAMA implementing entity 2

2.3.2 Development of NAMA Guideline

In order to enhance understanding by Serbian stakeholders regarding NAMA and MRV as well as to promote NAMA implementation, "NAMA Development Guideline of the Republic of Serbia" (hereafter "NAMA Guideline") was developed.

NAMA guideline was developed by C/P and JICA Expert Team and comments from Working Group members were collected.

Main contents in the NAMA Guideline were selected for prospective Serbian NAMA implementing entities, which include NAMA development cycle, such as developing Shortlist and NAMA Short Description, MRV, and financial analysis and financial options for NAMA development. .

Contents of the Guideline are the followings:

- History, current situation and benefits of NAMA
- NAMA development cycle
  - NAMA Selection criteria
  - NAMA Short Description (format and writing tips)
  - Methodologies for GHG emission reduction estimation
  - Financial analysis, funding options
- MRV for NAMA
- Appendix
  - NAMA Shortlist of Serbia
  - Example of NAMA Short Description

The Guideline was designed for NAMA-related stakeholders in Serbia who may plan and implement NAMA in the near future. Moreover, in order to share information on Serbian NAMA with concerned people such as donor agencies and investors from abroad, NAMA Guideline was developed both in Serbian and English.

Developed NAMA Guideline was distributed to stakeholders in Serbia and neighboring countries as well as donor agencies and international organization who participated in Balkan Regional NAMA seminar held in Phase III of the Project,.

Developed NAMA Guideline is attached in Annex 9 (Serbian) and in Annex 10 (English) of this Report.

2.3.3 Implementation of financial workshop

A financial workshop was held in order to further improve the capacity of Serbian stakeholders to conduct financial/ economic analysis of NAMA.

In the course of the NAMA development, it was observed that many NAMA candidates do not have sufficient financial or economic analysis completed or they were not conducted at all.

Taking into account the importance of financial/ economic analysis in developing NAMAs and also in finding appropriate investors for the action, a workshop was held where Working Group members as well as other representatives from NAMA implementing entities were invited.

The first workshop was held on December 13, 2011 and 24 people participated. The second one was held on June 28, 2012 and 22 people participated. Participants are the representatives of Working Group member institutions and the staff of finance division of NAMA implementing entities. Participants list is provided below.

Table 12 Participants to Financial Workshop

(Institution names are as of the date of workshop)

Institution	Name	Title and Department
Ministry of Environment, Mining and Spatial Planning (MEMSP)	Danijela Bozanic	Head of Climate Change Division
	Jasminka Pavlovic	Head of Building Department
	Ana Repac	Junior Advisor in Climate Change Division
	Dragana Radulovic	Junior Advisor in Climate Change Division
	Dragisa Nikolic	Advisor in Climate Change Division
Ministry of Infrastructure and Energy (MIE)	Aleksandar Pavlovic	Advisor in International Public Transport Department
	Milena Djakonovic	Junior Advisor in Department for Sustainable Development
Serbian Energy Efficiency Agency (SEEA)	Bojan Kovacic	Deputy Director
	Dimitrije Lilic	Advisor in Energy Efficiency in Building Stock
	Vesna Rodic	Advisor in Energy Efficiency in Industry
	Natasa Cakarmis	-
Electric Power Industry of Serbia (EPS)	Mihajlo Gavric	Environmental Protection Sector Manager
	Miroslav Spasojevic	Advisor in Environmental Protection Sector
	Dragan Vukotic	Senior Engineer in Head Department for Strategy and Investment
	Zdravko Milinovic	Chief Economist in Head Department for Strategy and Investment
Beogradske District Heating Company	Petar Vasiljevic	General Manager Assistant
	Dusanka Prodanovic	Independent Project Designer in Group for Environmental Protection Management
	Vesna Koncar	Project designer in Group for Environmental Protection Management

Institution	Name	Title and Department
Roads of Serbia	Mimoza Jelic	Expert Assistant in Department for Environmental Protection
	Igor Radovic	Chief Engineer in Sector for Investments
	Ivana Kostic	Chief Engineer for Strategic Planning in Sector for Strategy, Designing and Development
	Djordje Mitrovic	-
District Heating Company Valjevo	Dragana Nesic	Chief Accountant
	Katarina Munjic	Engineer
JICA Balkan Office	Yumiko Saito	Project Formulation Officer

In addition to the above workshop meetings, JICA Expert Team visited Working Group members' offices and provided technical advice and assistance on financial and economic analysis, how to evaluate these result, and several options regarding financial resource for NAMA implementation.

Outline of financial workshops are shown below.

1) 1st Financial Workshop

Basic topics as well as advanced topics were covered during the workshop as shown below taking into account the participants include those who are not usually engaged in this field.

1. Overview: Evaluation of an Investment Project
   (a) Commercial Profitability and National Profitability (Financial Analysis & Economic Analysis)
   (b) Introduction of Economic Analysis, Price Adjustment and Economic benefit
2. Basic Concepts in Financial Analysis
   (a) Break-even point of project cost structure
   (b) Interest rate, compounding and discounting of cash flow
3. Methods for Financial Analysis
   (a) Investment Profitability Analysis and Financial Statement Analysis
   (b) Simple Method and Discount Cash Flow Method
   (c) Cash flow model and industrial sub-sector
   (d) Net Present Value (NPV)
   (e) Internal Rate of Return (IRR)

Through this workshop, it is considered those who did not have much experience in performing financial/ economic analysis were able to obtain basic knowledge and information, while those who had much experience were able to further deepen their understanding on the analysis itself and key points in analyzing NAMAs from financial perspective.

After the workshop, each NAMA implementing entity was encouraged to start or re-evaluate the financial or economic analysis of their NAMAs using the knowledge obtained at the workshop.

2) 2nd Financial Workshop

Contents of the second workshop were review of the first workshop, explanation of cash flow, cost and benefit of NAMAs listed in NAMA Shortlist and exercise of financial analysis/ economic analysis by using PC and MS Excel file. Topics covered during the workshop are shown below.

1. Review of the first workshop: Evaluation of an Investment Project
   (a) Commercial Profitability and National Profitability (Financial Analysis & Economic Analysis)
   (b) Introduction of Economic Analysis, Price Adjustment and Economic benefit
   (c) Simple Method and Discount Cash Flow Method
2. Example of Financial Analysis
3. Exercise of Financial Analysis

The second workshop was conducted taking into account that participants can understand why cash flow helps decision of investors, by using proposed NAMAs and showing its Internal Rate of Return (IRR) in cash flow affected by conditions such as increase of construction cost and decrease of revenue. In order to enhance understanding, participants tried a sample exercise by using their computer. Participants not only received explanation, but also tried an exercise of financial analysis by themselves. Through this exercise, they raised many questions and JICA Expert Team provided technical advice to them.

Through these two financial workshops, the capacity of C/P and NAMA implementing entities has been enhanced up to a level that they are able to conduct basic financial analysis by themselves with MS excel file and this knowledge was utilized in development of NAMA Short Description.

Picture 5 Financial workshop1

Picture 6 Financial workshop 2

2.4 Activity 4: Enhancement of capacity to promote NAMA recognition

Following activities were conducted in order to further enhance capacity of C/P to disseminate information on NAMAs to stakeholders in Serbia and abroad in an efficient and effective way.

2.4.1 Development of web contents

Web contents were developed in order to enhance recognition and understanding by stakeholders regarding NAMA and MRV as well as to disseminate information on the Project. These contents were published through website of former MEMSP, to which C/P Climate Change Division belonged at that time.

Newly developed web contents include overview and benefit of NAMA and MRV, NAMA events such as seminars and workshop, as well as the introduction of the Project. C/P selected topics and developed contents, while JICA Expert Team provided technical advice. Since the expected website viewers are not only stakeholders in Serbia but also concerned people from abroad, the entire web contents were developed both in Serbian and English.

Figure 5 Former MEMSP website

As mentioned in the earlier section, Ministry that C/P Climate Change Division belongs to has changed from MEMSP to MEDEP in July 2012, and then its website has reformed. As of February 2013, some of the web contents in the MEDEP website are not uploaded including those developed for the Project.

At present, it is not certain when web contents regarding NAMA and MRV will be uploaded to the MEDEP website; however, once the website reconstruction completes, some of the outcomes of the Project including “NAMA Development Guideline of the Republic of Serbia” and other promotion materials such as NAMA Short Descriptions, will be uploaded to the website and will be open to the public s in Serbia and abroad.

In addition, C/P has an intention to upload the NAMA Development Guideline of the Republic of Serbia to the UNFCCC website (http://maindb.unfccc.int/public/country.pl?country=YU).

2.4.2 Implementation of COP side event

1) COP 17 side event

In order to disseminate information on Serbian NAMAs and the Project to the international world, a side event seminar was held during the COP 17 period, which took place in November and December 2011 in Durban, South Africa.

The side event was held at a conference room in Climate Change & Response Expo (CCR) and the total number of participants to the side event was 32. The program of the side event is shown below.

Table 13 COP 17 side event program

(name of institution as of the date of the event)_

Opening Remarks	
13:00 – 13:05	**Ms. Danijela Bozanic** Head of Climate Change Division Ministry of Environment, Mining and Spatial Planning, Republic of Serbia **Mr. Hideaki Matsuoka** Deputy Director of Environmental Management Division 2 Environmental Management Group, Global Environmental Department Japan International Cooperation Agency (JICA)
Presentations	
Facilitator: Ms. Ana Repac Junior Advisor, Climate Change Division Ministry of Environment, Mining and Spatial Planning, Republic of Serbia	
13:05 – 13:15	Introduction and Outcome of JICA Technical Cooperation Project "Capacity Development Project on Nationally Appropriate Mitigation Actions (NAMAs) in the Republic of Serbia" **Mr. Masahiko Fujimoto** Chief Advisor of JICA Expert Team
13:15 – 13:35	"Advantages and barriers in developing NAMAs in an MRV manner – Republic of Serbia" **Ms. Danijela Bozanic** Head of Climate Change Division Ministry of Environment, Mining and Spatial Planning, Republic of Serbia
13:35 – 13:55	"Example of Serbian NAMAs" **Mr. Miroslav Spasojevic** Public Enterprise Electric Power Industry of Serbia (EPS)
13:55 – 14:35	**Q&A**
14:35 – 14:40	**Closing Remarks**

At the side event, objective and overview of the Project was first presented to the participants, then Climate Change Division introduced the NAMA development cycle in Serbia and overview of Shortlisted NAMAs. Also presented was the overview of NAMAs from the energy sub-sector in the Shortlist by one of the Serbian NAMA implementing entities, Electric Power Industry of Serbia (EPS).

Participants were provided with promotion materials such as NAMA long list and NAMA Portfolio.

Picture 7 Presentation by Climate Change Division

Picture 8 COP 17 side event

2) COP 18 side event

For COP 18 held in November – December 2012 in Doha, Qatar, although C/P applied to the COP secretariat for a side event, the request was rejected.

Although C/P and JICA Expert Team sought for various options, both sides decided not to hold a side event at COP 18 partly because it may be difficult to invite sufficient number of participants to the event and thus, difficult to meet the objective of a side event.

Therefore, instead of holding a side event, both sides decided to hold a Balkan Regional NAMA Seminar, which can be considered as an expanded national NAMA seminar.

Contents and result of the Balkan Regional NAMA Seminar is shown in next section.

2.4.3 Implementation of NAMA seminar

1) National NAMA Seminar

With the objective to enhance recognition and understanding on NAMA among Serbian stakeholders, a national NAMA seminar was held in Belgrade on February 6, 2012. The seminar was co-organized by former MEMSP, JICA, and Serbian Chamber of Commerce, who provided the venue for the event.

Seminar program was established through discussions with C/P by identifying objective of the seminar and target audience. The presentations during the seminar were made by Climate Change Division, JICA Expert Team, as well as Working Group members who are the NAMA implementing entities of some of the Shortlisted NAMAs. Seminar program is shown below.

Table 14 NAMA seminar program

(Name of institution is as of the date of the event)

Time	Topic	Speaker
Part I: Implementation of the project of NAMA development in Serbia – Ms. Vera Raznatovic, Association for Energy Mining, Chamber of Commerce of Serbia		
10:00 – 10:20	Introductory remarks	- Mr. Bojan Djuric State Secretary, Ministry of Environment, Mining and Spatial Planning - His Excellency Mr. Toshio Tsunozaki Ambassador of Japan - Mr. Satoru Kurosawa Resident Representative, Japan International Cooperation Agency Balkan Office - Mr. Aleksandar Peric, Advisor to the President of Serbian Chamber of Commerce
10:20 – 10:50	Overview and update of NAMA/ MRV	Mr. Fujimoto Masahiko Chief Advisor of JICA Expert Team
10:50 – 11:20	Activities related to the implementation of the NAMA Project	Ms. Danijela Bozanic Head of Climate Change Division, Ministry of Environment, Mining and Spatial Planning
11:20 – 12:00	NAMA development process in Serbia and outcome	Mr. Tetsuya Yoshida Deputy Chief Advisor of JICA Expert Team
12:15 – 13:30	**Lunch break**	
Part II: Identified NAMAs in Serbia – Ms. Ana Repac, Climate Change Division, Ministry of Environment, Mining and Spatial Planning		
13:30 – 14:00	Identified NAMAs in energy sector	Mr. Miroslav Spasojevic Public Enterprise Electric Power Industry of Serbia (EPS)
14:30 – 15:00	Identified NAMAs in building sector	Ms. Jasminka Pavlovic, Ministry of Environment, Mining and Spatial Planning
15:00 – 15:30	Identified NAMAs in transport sector	Mr. Igor Radovic Public Enterprise Roads of Serbia

Total of 62 stakeholders participated to the seminar, including representatives from NAMA-related ministries and institutions in Serbia, donor countries and international organizations, universities, private sector and NGO as well as media.

Presentations at the seminar include the overview and the latest international discussions on NAMA/ MRV, activities and outcomes of the Project, NAMA development cycle of Serbia and overview of Shortlisted NAMAs. In addition, detailed information on some of the Shortlisted NAMAs from all three sub-sectors including background information and objective, GHG emission reduction calculation, current status and assistance needs was provided by three NAMA implementing entities.

Picture 9 Opening remark

Picture 10 Presentation by Climate Change Division

Picture 11 Presentations by NAMA implementing entities

Picture 12 NAMA seminar

2) Balkan Regional NAMA seminar

As mentioned in previous section, instead of holding a side event at COP 18, the second national NAMA seminar was expanded and conducted as Balkan Regional NAMA Seminar in which officers from NAMA-related ministries in four neighboring countries were invited.

The objectives of this regional seminar were:

1) dissemination of the outcomes of the Project,
2) introduction of Serbian NAMAs to donor agencies and international organizations,
3) capacity development of C/P and stakeholders in Serbia, and,
4) support for development of regional cooperation among Balkan countries to develop and

promote NAMAs

Balkan regional seminar was held for 2 days in February 4 and 5 at National Assembly house in Belgrade.

Seminar program was established through discussions with C/P. The presentations during the seminar were made by Climate Change Division, JICA Expert Team, as well as Working Group members who are the NAMA implementing entities. In addition, the representatives from neighboring countries also presented current situation of mitigation actions and NAMA development in their countries.

The seminar program is shown below.

Table 15 Balkan Regional NAMA Seminar program

Time	Topic	Speaker
Day1: Presentation of Serbian NAMAs to the stakeholders		
9:30 – 10:00	Registration	
10:00 – 10:30	Opening remarks	- Mr Dejan Trifunovic, Assistant Minister, Ministry of Energy, Development and Environmental Protection - His Excellency Mr Toshio Tsunozaki Ambassador of Japan - Mr Toshiya Abe, Resident Representative of Japan International Cooperation Agency Balkan Office
10:30 – 11:00	Coffee break	
	Part I: Results of NAMA Projects	
11:00 – 11:15	Introduction of JICA Technical Cooperation Project	- Mr Masahiko Fujimoto, Chief Advisor JICA Expert Team
11:15-11:45	Importance of NAMAs Projects	- Ms Ana Repac, Climate Change Division, Ministry of Energy, Development and Environmental Protection
11:45 – 12:15	Importance of financial analysis and finance options for Serbian NAMAs	- Mr Hiroshi Matsuoka, JICA Expert Team
12:15 – 12:45	Experience in development of NAMAs in Energy sector	- Mr Miroslav Spasojevic, Public Enterprise Electric Power Industry of Serbia (EPS)
12:45 – 13:15	Q & A session	
13:15 – 14:30	**Lunch break**	
Part II: Introduction of Serbian NAMAs		

Time	Topic	Speaker
14:30 – 15:00	Experience in development of NAMAs in Energy Sector	Mr Predrag Milanovic Ministry of Energy, Development and Environmental Protection
15:00 – 15:30	Experience in development of NAMAs in Building Sector	Ms. Nina Vukosavljević Ministry of Construction and Urbanism
15:30 – 16:00	Experience in development of NAMAs in Building Sector	Mr Dimitrije Lilic Ministry of Energy, Development and Environmental Protection
16:00 – 16:30	Experience in development of NAMAs in Transport sector	Mr Igor Radovic Public Enterprise Roads of Serbia
16:30 – 17:00	Q & A session	
Day2: Experience and presentation of NAMAs from the Region Countries		
09:00 – 09:30	Introductory remarks	- Ms Danijela Bozanic, Head of Climate Change Division, Ministry of Energy, Development and Environmental Protection
09:30 – 10:00	Republic of Serbia Ms Danijela Bozanic Ministry of Energy, Development and Environmental Protection	
10:00 – 10:30	Republic of Albania Ms Enkelejda Malaj, Mr Rrezart Fshazi Ministry of Environment, Forests and Water Administration	
10:30 – 11:00	Bosnia and Herzegovina Ms Almira Kapetanovic, Federal Ministry of Environment and Tourism Mr Ozren Laganin, Ministry of Spatial Planning, Civil Engineering and Ecology of the Republic of Srpska	
11:00 – 11:30	Republic of Montenegro Mr Djordjije Vulikic, Mr Andrej Lakic Ministry of Sustainable Development and Tourism	
11:30 – 12:00	Republic of Macedonia Ms Daniela Rendevska, Ms Saska Brblic Ministry of Environment and Physical Planning	
12:00 – 13:30	**Working lunch – exchange of ideas for possible future regional cooperation**	

Total of 110 stakeholders participated to this two-day seminar (day 1: 73 participants, day 2: 37 participants), including representatives from NAMA-related ministries and institutions in Serbia such as MEDEP, Ministry of Foreign Affairs, Ministry of Construction and Urbanism, Ministry of Justice, and from donor countries and international organizations such as UNDP, EU, GIZ, KfW and Embassy of Sweden, as well as universities, private sector and NGO. (See Annex 11 for participants list).

Picture 13 Opening speech

Picture 14 Presentation of MEDEP Climate Change Devision

Picture 15 Presentation by neighboring counties

Picture 16 Seminar venue

Presentations on the first day include the overview of the Project presented by JICA Expert Team, activities and outcomes of the Project presented by Climate Change Division. And then, detailed information on 6 pilot NAMAs contained in respective NAMA Short Description, including project description, GHG emission reduction calculation, monitoring plan and MRV, and future assistance needs was provided by NAMA implementing entities (See annex 11 for presentation materials of the seminar). Some of the questions raised from the floor include GHG emission reduction calculation method, data collection, and MRV structure.

Presentations on the second day focused on 4 neighbor countries, including current status of climate change related policies and measures, current status of NAMA development and MRV, and information on future support required. The participants from neighboring counties are shown as follows.

Table 16 Participants from neighboring countries

County	Name	Organization	Position
Albania	Enkelejda Malaj	Ministry of Environment, Forests and Water Administration	Director of Integration and Projects Directory
	Rrezart Fshazi	Ministry of Environment, Forests and Water Administration	Head of Integration Unit
Bosnia and Herzegovina	Ozren Laganin	Ministry of spatial Planning, Civil Engineering and Ecology	Senior Professional Associate for Climate Change and Ozone
	Almira Kapetanović	Federal Ministry of Environment and Tourism	Professional Associate, Environment Department
	Senad Oprasic	Ministry of Foreign Trade and Economic Relations	Head of Environmental Protection Department
Macedonia	Saška Brblic	Ministry of Environment and Physical Planning	Advisor for investments
	Elena Gavrilova	Ministry of Environment and Physical Planning,	-
Montenegro	Djordjije Vulikic	Ministry of Sustainable Development and Tourism	Advisor in International Cooperation and Climate Change Department
	Andrej Lakic	Ministry of Sustainable Development and Tourism	Advisor in International Cooperation and Climate Change Department

According to the presentation of neighboring counties, climate change policies and measures have been promoted in each country. On the other hand, every country is facing an issue of lacking financial source and human resources, and lacking capacity of institutional and personnel necessary for the development of NAMAs. Some countries expressed their needs to receive capacity development support like this Project.

Through the seminar, climate change related officers were able to share information, knowledge, experience and lessons learnt from Serbia's experience in NAMA development. It is expected to develop and maintain regional cooperation between Serbia and the neighboring countries for NAMA development in the future.

Outlines of presentation by the neighboring countries are shown in table 17.

Table 17 Balkan Regional NAMA Seminar: Overview of presentations by neighboring countries

County	Current status on Climate Change related policies	Current status on NAMA and MRV	Issues and Assistance Required
Republic of Albania	- SNC has been submitted to UNFCCC in 2009. - TNC is being prepared since 2012. - In line with NC findings, climate change was addressed into various policy papers.	- As yet no identified NAMAs, but there are detailed GHG abatement measures (in energy/transport, land use change and forestry, agriculture and waste sectors). - Efforts in the frame of regional EU RENA initiative to train and preparations for the MRV system, both at the level of legislation and capacity building. - Several NAMAS will have to be identified and 1 or 2 will get implemented with UNDP support.	- Assistance needed to promote mitigation actions: financial, technical support, capacity building, etc. - Capacity building activities to enable mitigation analysis and NAMA identification. Financial support to implement NAMAs after their screening/identification. -JICA could help transfer experience.
Bosnia and Herzegovina	- INC has been submitted to UNFCCC in 2009, and SNC is prepared with financial support from GEF/administered by UNDP. - In parallel with developing SNC, joint low-carbon development (LEDS) and adaptation (NAS) strategy has drafted.	- Build the institutional and professional capacity for implementation, MRV of the strategy, the mitigation actions and for managing the process of EU accession and change of status under UNFCCC (to Annex I) by 2025. - Transpose and implement the EU Acquis Communautaire in the fields of climate change, energy efficiency and environment by 2020. - Implement at least 10 supported and/or credited NAMAs by 2025. - Largest potential for qualitative mitigation actions are electricity production, energy efficiency in buildings, heating and transport, and to the certain extent waste management, forestry and agriculture.	- It is necessary to establish a working system of monitoring emissions and mitigation actions, as well as of evaluating and adjusting mitigation measures. - Key challenges encountered in the NC are: a) institutional/capacity related challenges, b) GHG data and projections, c) a roadmap to EU
Republic of Montenegro	-There are some national strategies which already have targets. (e.g. Renewable energy target) - Criteria for NAMAs selection was set up. - SNC is prepared to submit UNFCCC. It includes capacity building of NAMA, MRV. There is at lest two high priority NAMA (most probably in the RES sector) NAMA in building sector will be promoted.		- N/A
Republic of Macedonia	- Macedonian Green Growth and Climate Change Analytic and Advisory Support Program is prepared Note INC: Initial National Communication SNC: Second National Communication TNC: Third National Communication	- There is no legal definition on NAMAs and no project implemented as NAMA. NAMAs listed in the SNC are in five sectors (i.e. the electric power sector, the industrial, energy transformations and heating sector, the transport sector, the waste sector, the agriculture and forestry sector). - TNC and roadmap for introduction of MRV of GHG emission under EU ETS are prepared. - BUR is in application phase. In TNC, NAMAs in energy sector and waste sector will be described. - Legal aspects on MRV of GHG will be prepared. MRV mechanisms will be developed from TNC.	- Capacity building for identification of NAMA potentials - International support and good proactive guidance for developing of NAMA proposals - Source for NAMA financing - Technical support for development of MRV mechanisms of the identified NAMAs

3) Follow-up of NAMA seminar

A questionnaire was distributed to the seminar participants in order to check whether their understanding on NAMAs had been improved and to evaluate the seminar contents. Results of both National NAMA Seminar and Balkan Regional NAMA Seminar are shown in the table below (5 being the most positive answer and 1 the most negative answer). (See Annex 11 for the questionnaire)

Table 18 Result of National NAMA seminar follow-up

No.	Questions	Scores					
		1	2	3	4	5	Ave
1	Has your knowledge level of NAMA/ MRV increased by participating in this seminar?						
		0	0	2	9	8	4.32
2	Were the individual time slots allocated to each presentation appropriate?						
		0	1	3	7	8	4.16
3	Were the presentation materials appropriate and correctly presented?						
		0	0	2	7	10	4.42
4	Can the knowledge gained during the seminar be utilized in your organization?						
		0	0	6	4	8	4.11
5	Overall evaluation of the seminar						
		0	0	0	9	10	4.53

Table 19 Result of Balkan Regional NAMA seminar follow-up

No.	Questions	Scores					
		1	2	3	4	5	Ave
1	Has your knowledge level of NAMA/ MRV increased by participating in this seminar?						
		0	1	3	6	10	4.25
2	Were the individual time slots allocated to each presentation appropriate?						
		0	0	1	9	10	4.45
3	Were the presentation materials appropriate and correctly presented?						
		0	0	2	8	10	4.40
4	Can the knowledge gained during the seminar be utilized in your organization?						
		0	0	3	8	9	4.30
5	Overall evaluation of the seminar						
		0	0	1	8	10	4.47

Analysis on the collected questionnaires indicates that many participants thought their understanding on NAMAs had improved (more than 80% of the respondents answered as 5 or 4

for the question). It is considered that both seminars contributed to the increase of knowledge level about NAMA for many stakeholders in Serbia and the seminar itself was appropriately operated as indicated in the questionnaire answer. It is also noteworthy to mention that many respondents consider that the knowledge they gained during the seminar can be utilized for their work.

The questionnaire also includes a question asking participants about which topics they want MEDSP to cover in the upcoming seminars. Respondents from National NAMA Seminar participants answered project realization method, and MRV, GHG emission reduction calculation method and monitoring method should be covered. On the other hand, respondents from Balkan Regional NAMA Seminar answered MRV methodology, such as monitoring and verification method should be covered.

2.4.4 Preparation of NAMA promotion materials

The following materials to promote NAMA implementation were developed and distributed to use as a handout for such external events as COP side event and NAMA seminars.

- NAMA long list
- NAMA Shortlist
- NAMA Portfolios
- NAMA Short Descriptions
- NAMA Development Guideline of the Republic of Serbia

Among above-mentioned materials, NAMA Portfolio is a one-page concise summary of Shortlisted NAMAs. It contains not only the information that interests investors, such as expected cost and financial sources, result of preliminary financial analysis, and expected GHG emission reduction amount, but also information for stakeholders other than investors are interested in, such as BAU scenario and MRV, contribution to sustainable development. See Annex 7 for the NAMA Portfolio of the Shortlisted NAMAs.

2.5 Implementation of Technical Training in Japan

A technical training in Japan was conducted in order to further enhance the capacity of Serbian stakeholders to effectively promote, plan and implement mitigation actions in Serbia.

A program for technical training course in Japan was established based on discussions with C/P and comments from the trainees who are officers of Climate Change Division and NAMA-related agencies. The training was held for two weeks from 28th October, 2012 to 10th November, 2012.

The technical training course covered such topics as GHG mitigation policy at national and municipality levels in Japan, and advanced technology for energy efficiency improvement in private companies. Trainers were selected from Japan's national and municipality government officers and private companies.

The program provided participants an opportunity to enhance their knowledge on mitigation actions, MRV system, energy conservation and related policy through visiting and having a series of discussions with relevant institutions related to GHG mitigation, and to obtain ideas for the direction that Serbia should aim at in the future regarding climate change mitigation.

2.5.1 Training participants

The list of participants to the technical training program in Japan is shown below.

Table 20 List of training participants in Japan

	Name	Organization
1	Ms. Ana Repac	Minister of Energy, Development and Environmental Protection (MEDEP) Junior Advisor in Climate Change Division
2	Mr. Predrag Milanovic	Minister of Energy, Development and Environmental Protection (MEDEP) Advisor in the Department for Renewable Energy Source
3	Mr. Aleksandar Pavlovic	Ministry of Transport (MOT) Republic Transport Inspector in Road Transport Sector, Inspection Department
4	Dr. Dimitrije Lilic	Minister of Energy, Development and Environmental Protection (MEDEP) Senior Advisor on Energy Efficiency in Building Stock

2.5.2 Training Program

Training program and outline of each destination is shown below. The presentation materials for the program are attached in Annex 12.

Table 21 Training schedule and Outline of activity

Date	Destination	Objectives	Outline of activity
Oct. 30 (Tue)	JICA Briefing/ Orientation	-	-
Oct. 30 (Tue)	JICA	To lean JICA's programs and projects on climate change	Presentation and Discussion - Japan's Official Development Assistance on climate change field - Fast-Start financing program - Example of JICA activities on climate change
Oct. 31 (Wed)	Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry (METI)	To analyze Japan's policies and measures on climate change mitigation, promotion of energy efficiency and renewable energy, including international cooperation activities.	Presentation and Discussion 1. Current policies and measures towards climate change mitigation - General policy - Promotion of renewable energy - Measures and actions for energy efficiency improvement in transportation and residential/ commercial sector - International cooperation in energy development and energy efficiency improvement
Nov. 1 (Thur)	Energy Conservation Center Japan (ECCJ)	To learn the policy and measures for energy conservation in Japan	Presentation and Discussion 1. Outline of activities by ECCJ 2. Policy and measures by Government of Japan for energy efficiency improvement - Energy Conservation Act - Top Runner Standard program 3. Technologies for energy efficiency improvement in factories and buildings
Nov. 1 (Thur)	Ministry of Land, Infrastructure and Transport and Tourism (MLIT)	To analyze Japan's policies and measures towards low-carbon society establishment and climate change mitigation in transportation/ residential/ commercial sector.	Presentation and Discussion 1. Measures and actions for GHG emission reduction in transportation sector - Mitigation of traffic jam - Development and management of public transportation system - Promotion of eco-friendly vehicles 2. Policy and measures of MILT to support low-carbon city development - Promotion of Low Carbon City Development Guidance 3. Policy and measures for energy efficiency improvement at buildings
Nov. 2 (Fri)	Panasonic Corporation	To learn advanced technologies for energy efficiency improvement in residential, commercial, and industrial sectors.	Site visit - Panasonic Center Tokyo (smart city concept) - Eco Idea House (environment-friendly housing) Presentation and Discussion - Introduction of Panasonic Electric Works Vossloh-Schwabe Serbia d.o.o.
Nov. 2 (Fri)	Sony Corporation	To learn advanced technologies for energy efficient buildings	Presentation and Discussion - Environmental policy of Sony Group - Advanced technologies for energy efficiency improvement in the commercial

Date	Destination	Objectives	Outline of activity
			buildings Site visit - Sony City Osaki - Introduction of high-efficient heat source system for improved energy efficiency at building level - Use of renewable energy (solar heat panels, solar power generation) - Ambient heat utilization with water heating and supply systems powered by electric heat pumps with natural refrigerant - LED lighting - Building walls incorporated with an evaporative cooling system (“bio skin”) for air-conditioning load reduction
Nov. 3 Nov. 4	-	-	Preparation of Training Report
Nov. 5 (Mon)	Yokohama-city government	To analyze the policies and measures taken by municipal government for low-carbon society development, including district heating and cooling network system.	Presentation and Discussion 1.Current policies and measures toward low-carbon society development - Yokohama Smart City Project (e.g. energy management system) - Yokohama Mobility Project ZERO (e.g. eco-drive, traffic flow improvement, EV) - CASBEE Yokohama (Yokohama City Comprehensive Assessment System for Building Environmental Efficiency) Site visit - Area of Minato-mirai 21(e.g. district heating and cooling system)
Nov. 6 (Tue)	Toshiba Corporation	To learn advanced technologies for improvement of energy efficiency in residential, commercial and industrial sectors	Presentation and discussion -Initiatives taken by Toshiba Corporation toward smart community development Site visit - Toshiba Fuchu Factory - Solar power generation facilities - Energy management system and Advanced metering infrastructure, etc.
Nov. 7 (Wed)	Ministry of Environment (MOEJ)	To analyze Japan's policies and measures on climate change mitigation and MRV including international cooperation activities	Presentation and Discussion 1. Current policies and measures towards mitigation of climate change - General policy - Measures and actions for energy efficiency improvement in transportation and residential/ commercial sector - MRV (Calculating, Reporting and Announcing) System of GHG emissions 2. Current policies and measures on NAMA-MRV and Bilateral Offsetting Crediting Mechanism (BOCM) - Discussion on design of MRV for NAMA - Feasibility study of prospective projects for BOCM

Date	Destination	Objectives	Outline of activity
			- MRV methodologies for BOCM - Capacity Development on MRV for BOCM
Nov. 7 (Wed)	Electric Power Development Co., Ltd. (J-Power)	To learn advanced technologies for coal fired power generation	Presentation and discussion - Advanced technologies for coal fired power generation (clean coal ultra-super critical technology) Site visit - Isogo coal fired power plant (ultra-super critical system), new No. 1 Unit
Nov. 8 (Thur)	East Nippon Expressway Company Limited (NEXCO East)	To learn advanced technologies for construction and operation of expressways and climate change mitigation measures taken along expressways	Presentation and discussion - Activities by NEXCO East - Technologies for climate change mitigation and resource-recycling society (high technologies for construction of bridges and tunnels, ETC, smart interchange, maintenance technologies, traffic management system, heat island mitigation, energy saving lighting, and biomass power generation) Site visit - Hanyu resting area and environmental facilities - Iwatsuki Control Center
Nov. 9 (Fri)	Reporting and Evaluation	To share lessons learned by participants with JICA	Presentation by Serbian Officers - Each participant makes a presentation in Serbian - Each participant is requested to develop PowerPoint presentation in English - Overall evaluation by JICA HQ - Discussion and opinion exchange between participants and JICA officers

2.5.3 Knowledge and Experience Gained from the Training

At the end of the training program, each participant made a presentation to show which knowledge and experience they gained from the training program and how to use gained knowledge/ experience to their respective duties in the Ministry in Serbia. Comments are summarized below. (See Annex 12 for the presentation materials made by the training participants.)

- It is valuable experience to hear what Japan had done and what Japan will do against Climate Change from the person in charge directly. It may be difficult to apply all GHG mitigation measures and related policies promoted in Japan to Serbia, but knowledge and experience gained from the training is very useful to develop and evaluate the future direction of Serbia, GHG mitigation policies. It is important to promote GHG mitigation policies and measure in not only national level, but also municipal government level, so that knowledge and experience obtained from the training is very useful.

- It is important to introduce renewable energy in Serbia as well. In order to promote such energy sources, the feed in tariff (FIT) system for renewable energy has been developed in Serbia, and Japanese FIT system and related policies learnt in this training will be very

useful to promote Serbian system. For promotion of renewable energy use, stable supply of energy is one of big challenges, and Japan's advanced technology related to energy management system including stable supply of renewable energy was presented during the training. It is also necessary to evaluate financial and economic aspects in detail, when Serbia will import advanced technology from Japan.

- It is important to promote comprehensive approach for improvement of energy efficiency, renewable energy use, and energy conservation, because they can not separate. Through the training course, it is enhanced the capacity to promote mitigation actions, energy conservation and related policy. Moreover, Serbia could enhance the knowledge and expertise on MRV system which should be developed for NAMAs in Serbia.

- The training course enhanced the knowledge on mitigation actions and MRV system in the transport sector, and this knowledge and experience gained from the training will be shared in the Serbian ministry. Gained knowledge includes the importance to produce and use high efficiency vehicle as well as Japan's policies and measures related to energy efficiency improvement in the transport sector. What should be promoted in Serbia is GHG mitigation policies and measure which can be introduced with small invest but large effect. Some promotion measures may be imposed under the policies of "obligation" rather than "recommendation".

Chapter 3 ACHIEVEMENT OF PROJECT

Level of achievement of the Project Purpose and Overall Goal, as well as each Project output is analyzed as shown below.

3.1 Project Purpose

Purpose

Capacity to formulate and promote NAMAs is developed.

Verifiable Indicators

a) At least 3 people in Climate Change Division of MEDEP sufficiently understand process of NAMAs planning.

b) At least 1 person in each organization participating in working group sufficiently understands process of NAMAs planning.

c) Document containing NAMAs and descriptions necessary for their implementation is developed.

Referring to the above-mentioned Verifiable Indicators, level of achievement of the Project Purpose is analyzed as below.

Achievement level of the Project Purpose is considered to be very high, because the capacity of the C/P agency and NAMA related agencies in Serbia to formulate and promote NAMAs has been developed by the Project.

- Through the Project, Climate Change Division of MEDEP, established a cooperation structure with NAMA implementing entities such as Renewable Energy Resource division of MEDEP (former MIE), Energy Efficiency division of MEDEP (former SEEA), MCU, MOT, EPS and Roads of Serbia. Climate Change Division, as a focal entity to promote and supervise Serbian NAMAs, can share the latest information regarding international discussions on NAMA and MRV with NAMA implementing entities by using the cooperation structure developed by the Project. At the same time, it is very important that a basis has been established, in which Climate Change Division provides support to NAMA implementing entities who have questions or problems in planning and implementing their NAMAs.

- Key personnel have been identified and participated in the Project activities as Working Group members, who are prospective NAMA implementing entities such as Energy Efficiency division of MEDEP (former SEEA), Renewable Energy Resource division of MEDEP (former MIE), MCU, MOT, EPS and Roads of Serbia. These entities have

experienced the development of necessary documents for NAMA formulation and implementation such as NAMA Short Description in their responsible sector. It is expected such documents will be utilized when promoting other NAMAs in the NAMA long list and newly proposed NAMAs. It is also expected that all officers who participated in the Project activities will be a key personnel to formulate and implement NAMAs in respective agency.

The achievement status with regard to the Verifiable Indicators in PDM is as below:

Verifiable Indicator: a) At least 3 people in Climate Change Division of MEDEP sufficiently understand process of NAMAs planning

Climate Change Division of MEDEP has conducted the following activities related to the NAMA planning process in cooperation with JICA Expert Team.

1. Developed and evaluated NAMA long list
2. Developed criteria for NAMA shortlist and carried out screening of candidate NAMAs
3. Supported development of NAMA Short Description and submission templates for UNFCCC NAMA Registry
4. Developed NAMA guideline
5. Participated into the financial workshops

All officers of Climate Change Division were involved in all or parts of the NAMA planning activities in the Project. It is expected that knowledge and skills related to NAMA planning will be shared after the Project among all officers of Climate Change Division.

Verifiable Indicator: b) At least 1 person in each organization participating in working groups sufficiently understands process of NAMAs planning.

Working Group members have conducted the following NAMA planning activities with the support from C/P and JICA Expert Team. Working Group member institutions include MEDEP (former MIE and former SEEA), MCU, EPS and Roads of Serbia.

1. Developed and evaluated NAMA long list
2. Developed NAMA Short Description
3. Developed submission templates for UNFCCC NAMA Registry
4. Participated into financial workshops

It is considered that at least 1 person in each organization mentioned above has acquired sufficient knowledge of NAMA planning through a series of Working Group meetings and a number of

individual meetings.

NAMA Short Descriptions, which can be one of the most important documents in NAMA planning process, were developed by NAMA implementing entities in cooperation with C/P and JICA Expert Team. Working Group members were given with assignment to complete a draft NAMA Short Description and then they improved the documents based on technical advice and assistance from C/P and JICA Expert Team. Technical knowledge and overall capacity of NAMA implementing entities was significantly enhanced through this process.

Verifiable Indicator: c) Document containing NAMAs and descriptions necessary for their implementation is developed.

Through a series of Working Group meetings and individual meetings with NAMA implementing entities, 6 NAMA Short Descriptions for pilot NAMAs have been developed. Activities for development of NAMA Short Description covered all target sub-sectors (energy, transport and building), and more importantly, versatile documents have been prepared which can be referred to in the near future for similar NAMAs.

Beside NAMA Short Description, such promotion materials and presentation materials as NAMA long list, NAMA shortlist, NAMA Portfolios were developed by Climate Change Division and NAMA implementing entities. In addition, submission templates for the registration of UNFCCC NAMA Registry were also developed.

Based on these outcomes of the Project as stated above, it is considered that the capacity on NAMA promotion and formulation in Serbia has been enhanced.

3.2 Toward Overall Goal

Overall Goal:
Serbian Government becomes capable of defining its contribution to climate change.

Verifiable Indicators
1. NAMAs are finalized
2. NAMAs are submitted to United Nations Framework Convention on Climate Change (UNFCCC) Secretariat

Referring to the above-mentioned Verifiable Indicators, steps toward achieving Overall Goal of the Project, which is expected to be met after 3 to 5 years of the Project completion, are shown below.

Registration documents for UNFCCC NAMA Registry (prototype) were prepared for NAMAs in the shortlist, and it is expected the prepared documents including NAMA Short Descriptions will be submitted to UNFCCC NAMA Registry secretariat.

Using the knowledge and experience Serbia has gained through the Project, and using the coordination and cooperation structure between C/P and NAMA implementing entities established by the Project, further NAMA formulation is expected, especially for NAMAs contained in the long list but also in other sectors than energy efficiency.

Once the Government of Serbia submits developed NAMAs to the UNFCCC secretariat, it is considered that the Overall Goal, "NAMAs are finalized" and "NAMAs are submitted to UNFCCC Secretariat," will be achieved.

3.3 Project Outputs

As mentioned earlier, the Project aims to achieve four Outputs. Achievement level of each of the Output is analyzed as below.

Output 1

General understanding on NAMAs and measurement, reporting and verification (MRV) is enhanced.

Verifiable Indicators

1. Matrix containing categorized NAMAs submitted by developing country parties is properly formulated.
2. At least 70% of workshop participants understand content of above matrix and general concept of MRV.

Referring to the above-mentioned Verifiable Indicators, level of achievement for Output 1 is analyzed as below.

Through activities related to Output 1, such as a series of Working Group meetings and individual meetings, C/P and NAMA related agencies are able to understand general concept of NAMA and MRV and also other countries'' NAMAs.

According to the result of questionnaires prepared and collected at the national and regional NAMA seminars, more than 70% of participants understand the general concept of NAMA and MRV.

Therefore, it is considered the Output 1 "General understanding on NAMAs and measurement, reporting and verification (MRV) is enhanced" has been successfully achieved.

Output 2
Capacity to shortlist NAMAs which are measurable, reportable and verifiable is developed.
Verifiable Indicators
1. Shortlist of NAMAs created for pilot sectors/sub-sectors.
2. Capacity development needs on MRV are identified.

Level of achievement for Output 2 is analyzed referring to the above-mentioned Verifiable Indicators, as shown below.

Through activities related to Output 2, C/P has enhanced its capacity to evaluate potential NAMAs and to develop NAMA shortlist from various viewpoints such as compliance with Serbia's policy and strategy, MRV-ability, sustainability, and GHG emission reduction potential.

NAMA related agencies which participated into Working Group have also enhanced their capacity to formulate, analyze and select NAMAs that can be MRV-ed in their responsible sector.

Therefore, it is considered the Output 2 "Capacity to shortlist NAMAs which are measurable, reportable and verifiable is developed" has been achieved sufficiently.

Output 3
Capacity to produce documents to promote implementation of NAMAs is developed.
Verifiable Indicators
1. Short descriptions on selected NAMAs are developed.
2. Procedures for short-listing NAMAs developing short descriptions are documented.

Level of achievement for Output 3 is analyzed referring to the above-mentioned Verifiable Indicators, as shown below.

Through activities related to Output 3, C/P and NAMA implementing entities developed 6 NAMA Short Descriptions and their capacity to develop NAMA related documents and knowledge and experience on NAMA and MRV, including GHG emission reduction calculation and financial analysis methods, have been enhanced. At the same time, C/P has coordinated with and supervised NAMA implementing entities and C/P has enhanced their capacity to provide effective advice and assistance to NAMA implementing entities.

NAMA Development Guideline, which contains information on the NAMA process such as development of NAMA shortlist and NAMA Short Description, has been prepared both in Serbian and English.

Therefore, it is considered the Output 3 "Capacity to produce documents to promote implementation of NAMAs is developed" has been properly achieved.

Output 4

Capacity to promote recognition of NAMAs is enhanced.

Verifiable Indicators

1. Webpage containing sufficient information is established and maintained.
2. At least 3 promotion materials on NAMAs are developed
3. Short-listed NAMAs are presented to relevant stakeholders at least twice.

Level of achievement for Output 4 is analyzed referring to the above-mentioned Verifiable Indicators, as shown below.

Through activities related to Output 4, C/P developed the contents of website on NAMA and MRV.

Various NAMA promotion materials have been developed and distributed, including NAMA Portfolios, NAMA Short Descriptions, NAMA long list and NAMA Development Guideline.

NAMAs in the shortlist were presented at National NAMA Seminar held, COP 17 side event and Balkan Regional NAMA Seminar.

According to the above results, Output 4 “Capacity to promote recognition of NAMAs is enhanced” has been sufficiently achieved.

Annex

1. PDM (Project Design Matrix) and PO (Plan of Operation)
2. Project Activity Flow
3. Implemented Expert Dispatch
4. Memo of Joint Coordinating Committee meetings
5. Matrix of Other Countries' NAMA
6. NAMA Long List evaluation result
7. NAMA Portfolio
8. NAMA Short Description
9. NAMA Development Guideline (English)
10. NAMA Development Guideline (Serbia)
11. Balkan Regional NAMA seminar participants list and presentation materials
12. Presentation Materials for Technical Training in Japan

Annex 1 PDM (Project Design Matrix) and PO (Plan of Operation)

Project Design Matrix (Version 3.0)

Project Title: Capacity Development Project on Nationally Appropriate Mitigation Actions (NAMAs) in the Republic of Serbia
Project Period: November 2010 – February 2013
Target Group: Ministry of Energy, Development and Environmental Protection (MEDEP), and organizations concerned in planning of NAMAs

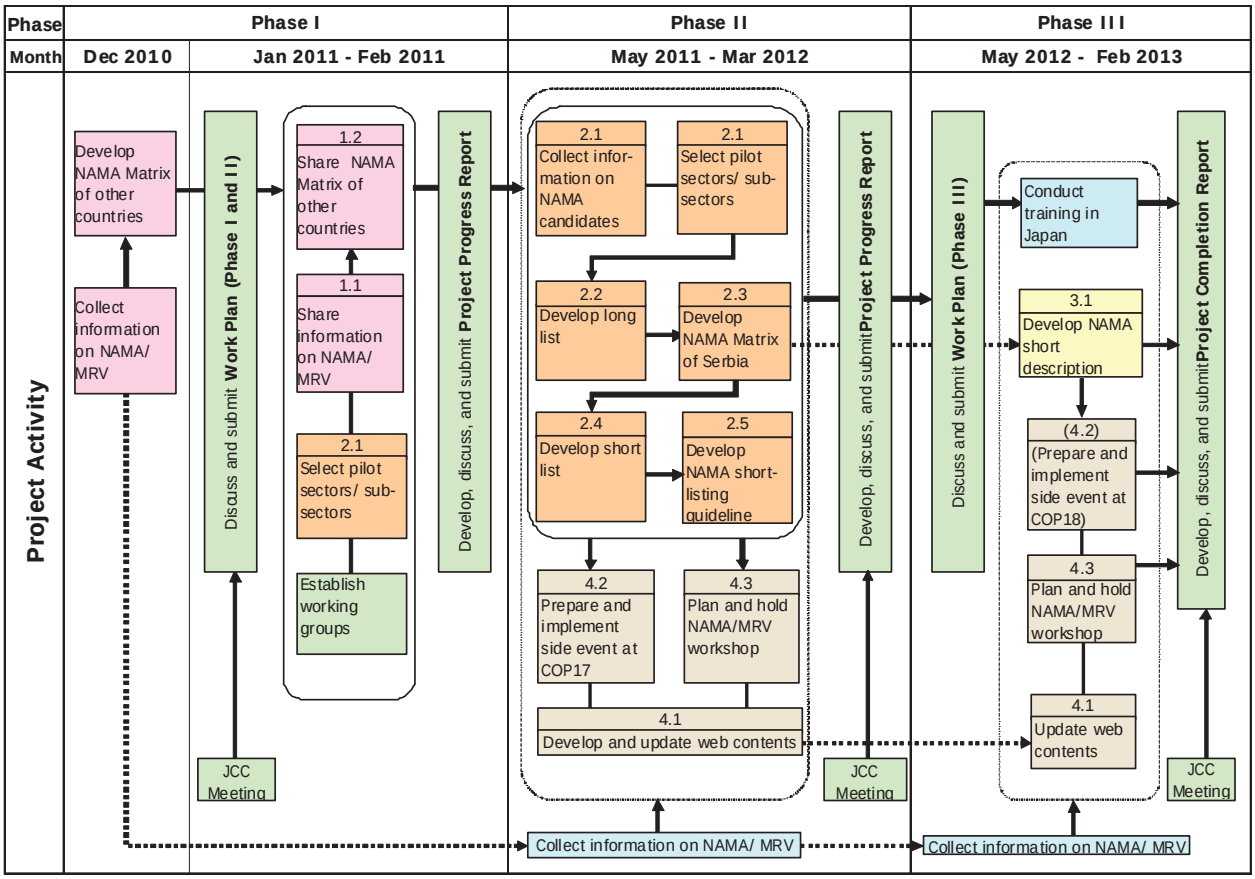
Narrative Summary	Objectively Verifiable Indications	Means of Verification	Important Assumptions
Overall Goal Serbian Government becomes capable of defining its contribution to climate change	1. NAMAs are finalized 2. NAMAs are submitted to United Nations Framework Convention on Climate Change (UNFCCC) Secretariat	1. Document with finalized NAMAs 2. Communication to UNFCCC Secretariat	
Project Purpose Capacity to formulate and promote NAMAs is developed	1. At least 3 people in Climate Change Division of MEDEP sufficiently understand process of NAMAs planning 2. At least 1 person in each organization participating in working groups sufficiently understands process of NAMAs planning. 3. Document containing NAMAs and descriptions necessary for their implementation is developed.	1. Joint evaluation by MEDEP and Project experts 2. Joint evaluation by MEDEP and Project experts 3. Strategic document for NAMAs	- Serbian Government retains its positions regarding UNFCCC and NAMAs - Relevant organizations cooperate in formation of NAMAs for sectors / sub-sectors not covered by project
Outputs 1. General understanding on NAMAs and measurement, reporting and verification (MRV) is enhanced.	1.1 Matrix containing categorized NAMAs submitted by developing country parties is properly formulated. 1.2 At least 70% of workshop participants understand content of above matrix and general concept of MRV.	1. Joint evaluation by MEDEP and Project experts 2. Questionnaire conducted during workshop	- Majority of counterparts and relevant personnel remain in organizations concerned with NAMAs
2. Capacity to shortlist NAMAs which are measurable, reporting and verification is developed.	2.1 Shortlist of NAMAs created for pilot sectors / sub-sectors. 2.2 Capacity developing needs on MRV are identified 2.3 Procedures for short-listing NAMAs are documented.	1. Shortlist 2. Report on lessons learned	
3. Capacity to produce documents to promote implementation of NAMAs is developed.	3.1 Short descriptions on selected NAMAs are developed. 3.2 Procedures for developing short descriptions are documented.	1. Short descriptions developed 2. Guideline developed	
4. Capacity to promote recognition of NAMAs is enhanced.	4.1 Webpage containing sufficient information is established and maintained. 4.2 At least 3 promotion materials on NAMAs are developed. 4.3 Short-listed NAMAs are presented to relevant stakeholders at least 2 times.	1. Joint evaluation by MEDEP and Project experts 2. Promotion materials developed 3. Presentation materials	

Activities	Inputs		Preconditions
	Japanese side	**Serbian side**	
1-1 Collect information on international discussions related to NAMAs and MRV. And share with relevant organizations. 1-2 Collect NAMAs submitted by developing country parties to UNFCCC Secretariat and categorize NAMAs by type (e.g., policy or project, national or local, unilateral or supported) 1-3 Consider methodologies and assumptions of MRV of NAMAs categorized above and develop matrix 1-4 Share matrix developed above with relevant organizations. 2-1 Select sectors / sub-sectors to plan NAMAs related to energy efficiency (e.g., building, transportation, new energy and power production, etc.). 2-2 Establish working groups for NAMAs planning for pilot sector / sub-sector. 2-3 Review existing policies, strategies and strategies and plans related to climate change mitigation in pilot sector / sub-sector. 2-4 Create long list of NAMAs for pilot sectors / sub-sectors. 2-5 Categorize long-listed NAMAs by type (e.g., policy/ project, national/ local, unilateral/ supported). 2-6 Consider methodologies and assumptions of MRV of long-listed NAMAs categorized above and formulate matrix (Fill in matrix which is described in 1-3). 2-7 Present above-mentioned matrix at workshop and scrutinize long-listed NAMAs mainly considering feasibility of associated MRV. 2-8 Create shortlist of NAMAs that are measurable, reportable and verifiable for pilot sectors / sub-sectors. 2-9 Compile lessons learned including capacity development needs on implementation of MRV. 2-10 Produce a guideline for short-listing NAMAs. 3-1 Select NAMAs from shortlist to develop short description. 3-2 Develop draft short descriptions for selected NAMAs, including title, background, purpose, summary, timeframe, responsible organizations, preliminary assessment of technical and economic feasibility, contribution to GHG limitation and reduction, MRV, possible financing means (e.g., national / EU / international funds, public-private partnership (PPP) and Japanese yen loan) and barriers. 3-3 Present above-mentioned draft short descriptions, obtain feedbacks and finalize 3-4 Produce a guideline for developing NAMA short description. 4-1 Establish webpage on Serbian NAMAs and MRV. 4-2 Develop promotion materials on project for presentations. 4-3 Present progress and outcome of project at international conference. 4-4 Present outcome of project to national stakeholders.	1. International experts 2. National experts Technical experts on energy efficiency and other fields 3. One (1) local assistant 4. Training in Japan Three (3) persons for 2 weeks	1. Personnel 1) Counterparts and relevant personnel 2) National experts (as required) 2. Project office and facilities necessary for project implementation 3. Others Running cost of office	1. Relevant organizations cooperate in formulation of NAMAs 2. NAMAs continue to be relevant under UNFCCC

Plan of Operation (PO)

		2010		2011												2012												2013	
		11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2
	JCC			1					2					3				4		5										6
1. General understanding on NAMAs and measurement, reporting and verification (MRV) is enhanced.																													
1-1	Collect information on international discussions related to NAMAs and MRV. And share with relevant organizations.																												
1-2	Collect NAMAs submitted by developing country parties to UNFCCC Secretariat and categorize NAMAs by type (e.g., policy or project, national or local, unilateral or supported)																												
1-3	Consider methodologies and assumptions of MRV of NAMAs categorized above and develop matrix																												
1-4	Share matrix developed above with relevant organizations.																												
2. Capacity to shortlist NAMAs which are measurable, reportable and verifiable is developed.																													
2-1	Select sectors / sub-sectors to plan NAMAs related to energy efficiency (e.g., building, transportation, new energy and power production, etc.).																												
2-2	Establish working groups for NAMAs planning for pilot sector / sub-sector.																												
2-3	Review existing policies, strategies and strategies and plans related to climate change mitigation in pilot sector / sub-sector.																												
2-4	Create long list of NAMAs for pilot sectors / sub-sectors.																												
2-5	Categorize long-listed NAMAs by type (e.g., policy/ project, national/ local, unilateral/ supported).																												
2-6	Consider methodologies and assumptions of MRV of long-listed NAMAs categorized above and formulate matrix.																												
2-7	Present above-mentioned matrix at workshop and scrutinize long-listed NAMAs mainly considering feasibility of associated MRV.																												
2-8	Create shortlist of NAMAs that are measurable, reportable and verifiable for pilot sectors / sub-sectors.																												
2-9	Compile lessons learned including capacity development needs on implementation of MRV.																												
2-10	Produce a guideline for short-listing NAMAs.																												
		2010		**2011**												**2012**												**2013**	
		11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2
3. Capacity to produce documents to promote implementation of NAMAs is developed.																													
3-1	Select NAMAs from shortlist to develop short description.																												
3-2	Develop draft short descriptions for selected NAMAs, including title, background, purpose, summary, timeframe, responsible organizations, preliminary assessment of technical and economic feasibility, contribution to GHG limitation and reduction, MRV, possible financing means (e.g., national / EU / international funds, public-private partnership (PPP) and Japanese yen loan) and barriers																												
3-3	Present above-mentioned draft short descriptions, obtain feedbacks and finalize																												
3-4	Produce a guideline for developing NAMA short description.																												
4. Capacity to promote recognition of NAMAs is enhanced.																													
4-1	Establish webpage on Serbian NAMAs and MRV.																												
4-2	Develop promotion materials on project for presentations.																												
4-3	Present progress and outcome of project at international conference.																												
4-4	Present outcome of project to national stakeholders.																												

Annex 2 Project Activity Flow



Legend:

- Activities related to Output 1) **Enhancement of general understanding on NAMAs and MRV**
- Activities related to Output 2) **Development of capacity to shortlist MRV-able NAMAs**
- Activity related to Output 3) **Development of capacity to produce documents for promoting NAMA implementation**
- Activities related to Output 4) **Enhancement of capacity to promote NAMA recognition**
- Activity in Japan
- Submission of reports

Project Activity Flow

Annex 3 Implemented Expert Dispatch

Assignment	Name	Phase I			Phase II								
		2011											
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Chief Advisor/ Climate Change Policy 1	M. FUJIMOTO	24(0.80)					42(1.40)					22(0.73)	
Climate Change Policy 2	K. YAMADA							9(0.30)					
Economic Evaluation of Energy Efficiency Measures	H. MATSUOKA								47(1.57)			33(1.10)	
Dupty Chief Adviser/ GHG Limitation/ Reduction Quantification in Energy 1	T. YOSHIDA						36(1.20)			70(2.33)			
GHG Limitation/ Reduction Quantification in Energy 2	Y. MORITA	21(0.70)				43(1.43)		42(1.40)					
GHG Limitation/ Reduction Quantification in Energy 3	W. MORIMOITO						30(1.00)			29(0.97)	24(0.80)		

Assignment	Name	Phase II			Phase III										
		2012												2013	
		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.
Chief Advisor/ Climate Change Policy 1	M. FUJIMOTO		10(0.33)			25(0.83)		21(0.70)			21(0.70)			26(0.87)	
Economic Evaluation of Energy Efficiency Measures	H. MATSUOKA	25(0.83)					38(1.27)			51(1.70)				16(0.53)	
Dupty Chief Adviser/ GHG Limitation/ Reduction Quantification in Energy 1	T. YOSHIDA	56(1.90)				21(0.7)				40(1.33)		31(1.03)		42(1.40)	
GHG Limitation/ Reduction Quantification in Energy 3	W. MORIMOITO							40(1.33)		24(0.80)					
GHG Limitation/ Reduction Quantification in Energy 4	E. WATATSU					39(1.30)				33(1.10)		23(0.76)		39(1.30)	

Annex 4 Memo of Joint Coordinating Committee meetings

MINUTES OF MEETING

ON
THE WORK PLAN
FOR
THE PROJECT FOR CAPACITY DEVELOPMENT PROJECT
ON
NATIONALLY APPROPRIATE MITIGATION ACTIONS (NAMAs)
IN THE REPUBLIC OF SERBIA

Agreed upon between

MINISTRY OF ENVIRONMENT AND SPATIAL PLANNING

and

JICA EXPERT TEAM

Belgrade, 31, January, 2011

Mr. Nebojsa Pokimica
Assistant Minister
Ministry of Environment and
Spatial Planning

藤本雅彦

Mr. Masahiko Fujimoto
Team Leader
JICA Expert Team

Based on the Record of Discussions between Japan International Cooperation Agency (hereinafter referred to as "JICA") and the Authorities concerned of the Government of the Republic of Serbia signed in Belgrade on August 20, 2010 (hereinafter referred to as "R/D"), JICA dispatched the Expert Team, headed by Mr. Masahiko Fujimoto, to Belgrade, Serbia to commence the "Project for Capacity Development Project on Nationally Appropriate Mitigation Actions (NAMAs) in the Republic of Serbia" (hereinafter referred to as "the Project") on January 12, 2011.

In order to build a consensus about the details of implementation plan and schedule of the Project, the JICA Expert Team exchanged views and had a series of discussions with Ministry of Environment and Spatial Planning (hereinafter referred to as "MESP") based on the draft Work Plan submitted by the JICA Expert Team. As a result of the discussions, MESP agreed on the following principles described in the Work Plan.

1) Basic policy and implementation approach of the Project
2) Project activities
3) Assignment for each project activity
4) Project schedule framework

1st Joint Coordinating Committee (hereinafter referred to as "JCC") Meeting was held on January 28, 2011 to officially inform the relevant stakeholders (JCC members) of the Project about the Project's background, contents, activities, expected outputs and implementation schedule in order to reach common understanding among stakeholders and thus contribute to successful implementation of the Project. JCC members accepted the contents of the Project.

The JICA Expert Team submitted the Serbian side one (1) copy of the Work Plan of the Project. MESP officially received the Work Plan.

Through meetings between MESP and the JICA Expert Team, the followings were confirmed and/or agreed:

1. Request for change work items to the Work Plan
   Based on the request of MESP, the following items were added to the Work Plan.

   a) NAMA guideline
   - Contents related to methods in developing NAMA short description should be added to the NAMA guideline. NAMA guideline will include not only contents related to NAMA short-listing but also NAMA Short Description development.

   b) Technical training in Japan
   - MESP requested to revise the number of participants from 2 to 3 persons because C/P agencies of the Project are MESP, Ministry of Mining and Energy (MME) and Serbian Energy Efficiency Agency (SEEA). Also MESP requested to change the schedule of the technical training in Japan from August 2012 to May or June 2012. This issue will be settled by the beginning of 2012 through continuous discussions between MESP and JICA Headquarters.

2. Selection of pilot sub-sector and Working Group organization
   - A general Working Group will be established that takes a role of collecting and analyzing Serbia's relevant policies, plans, laws/ regulations and projects from the prospective 3 sub-sectors that are building sector, transportation sector and power generation sector. Through this analysis, potential NAMAs of each sub-sector is identified, and the sub-sectors that have much potential for NAMAs development will be selected as pilot sub-sectors.
   - Specific Working Groups will be established for each of the pilot sub-sectors selected based on their NAMA potential.
   - The wok of Working Groups will be supported by local consultant(s).
3. Number of model NAMAs for NAMA Short Description development
   - NAMA Short Description will be produced on around 10 model NAMAs, which will be selected through applying some criteria for screening, such as whether a prospective NAMA has high spin-off effects and whether it is closely related to the activities of Serbian C/P, etc..

4. Approach for Serbian NAMAs Selection
   - In selecting NAMAs for shortlist, MESP prefers to select NAMAs that involve introduction of energy efficiency equipment and facilities that can attract international investment as a higher priority than NAMAs that involve soft measures such as awareness raising and education regarding energy efficiency.

5. The work under the Project, including the work of JCC and Working Group administratively will be supported by a local assistant.

Minutes of the Second Joint Coordinating Committee Meeting on the "Capacity Development Project on Nationally Appropriate Mitigation Actions (NAMAs)"

Meeting Memorandum for 2nd Joint Coordinating Committee

Date and time: 21 June, 2011 10:00-11:30

Venue: MEMSP Conference room 204

Participants:

Organization	Name	Title
Ministry of Environment, Mining and Spatial Planning (MEMSP)	Mr. Miroslav Tadic	Head of Department for International Cooperation and European Integrations
	Ms. Danijela Bozanic	Head of Climate Change Division
	Ms. Ana Repac	Junior Advisor in Climate Change Division (CCD)
	Ms. Dragana Radulovic	Junior Advisor in Climate Change Division
Ministry of Infrastructure and Energy (MIE)	Mr. Miroslav Spasojevic	Head of Department for Sustainable Development
Serbian Energy Efficiency Agency (SEEA)	Ms. Miomira Lazovic	Training and Education Advisor
JICA Balkan Office	Mr. Satoru Kurosawa	Resident Representative
	Ms. Saito Yumiko	Project Formulation Officer
JICA Expert Team	Mr. Masahiko Fujimoto	Chief Advisor
	Mr. Tetsuya Yoshida	Deputy Chief Advisor
	Mr. Branislav Zivkovic	Local Consultant
	Ms. Svetlana Batricevic	Project Assistant

1. Overall progress of the Project

JICA Expert Team opened the 2nd Joint Coordinating Committee meeting by giving introductory remarks on the progress of JICA Technical Cooperation Project and also presented the work schedule and milestones from May 2011 to March 2012.

The progress of activities, general process of NAMA long list formulation and steps which are being undertaken were also presented.

2. Long list preparation activity: coordination issue with other agencies

JICA Expert Team presented the progress of long list preparation. Current long list contains 62 NAMA candidates from three target sectors: energy generation, transport, and housing/ building. Working Group is currently trying to obtain detailed data and information on each

of NAMA candidates. Certain issues were raised during this meeting, i.e. insufficient participation and involvement of agencies responsible for transport and building sectors. Despite frequent requests from MEMSP Climate Change Division, the Sector for Construction, Investment and Construction land of MEMSP and the Transportation sector of MIE have not nominated responsible persons for the Working Group. It was agreed that the Working Group will continuously request these responsible agencies for further and more profound involvement.

Concerning the energy sector, a meeting with the Electric Power Industry of Serbia (EPS) has been confirmed, once gain, by Mr. Spasojevic and is to be agreed on in the next period.

Another meeting with the representatives of the City of Belgrade is to be agreed upon, on proposal by Mr. Spasojevic, specifically Secretariat for Energy, in order to identify projects on the city level, potentially to be included into NAMA long list.

Further cooperation with the Climate Change Division of MEMPS and the Energy Sector of MIE was highly recommended at the meeting. Also, SEEA suggested the Working Group should directly contact municipalities who have first-hand data and information that may be included in the long list.

3. Others

MIE suggested to start consideration of MRV and MRV institution in the course of the Project activity. Special attention needs to be paid to sectoral differences in MRV requirements.

Prepared by Svetlana Batricevic

NAMAs Project Assistant

Minutes of the Third Joint Coordinating Committee Meeting on the "Capacity Development Project on Nationally Appropriate Mitigation Actions (NAMAs)"

Meeting Memorandum for 3rd Joint Coordinating Committee

Date and time: 17 November, 2011 12:00-13:30

Venue: MEMSP Conference room 125

Participants:

Organization	Name	Title
Ministry of Environment, Mining and Spatial Planning (MEMSP)	Ms. Danijela Bozanic	Head of Climate Change Division
	Ms. Ana Repac	Junior Advisor in Climate Change Division
Ministry of Infrastructure and Energy (MIE)	Mr. Miroslav Spasojevic	Head of Department for Sustainable Development
Serbian Energy Efficiency Agency (SEEA)	Mr. Bojan Kovacic	Deputy Director
JICA Balkan Office	Mr. Satoru Kurosawa	Resident Representative
	Mr. Nobuo Sugiura	Assistant Resident Representative
	Ms. Natasa Bogojevic	Programme Officer
JICA Expert Team	Mr. Tetsuya Yoshida	Deputy Chief Advisor
	Mr. Wataru Morimoto	JICA Expert Team
	Mr. Hiroshi Matsuoka	JICA Expert Team
	Mr. Branislav Zivkovic	Local Consultant
	Ms. Svetlana Batricevic	Project Assistant

1. Progress and outcome of the project

JICA Expert Team opened the 3rd Joint Coordinating Committee meeting by presenting the progress and outcome of JICA Technical Cooperation Project and the NAMA formulation.

2. Result of long list evaluation

JICA Expert Team presented the long list of NAMAs, which contains 69 NAMA candidates. Also presented was the list of interviews with prospective NAMA entities and site visits in Belgrade and throughout Serbia which were aimed at providing detailed information about the potential projects. Overview of Working Group meetings held since the last JCC meeting was also presented.

JICA Expert Team further presented evaluation criteria which were jointly developed by MEMSP and JICA Expert Team and agreed with Working Group members. The criteria may

have to be revised upon outcomes from forthcoming international negotiations on NAMA and MRV. The Team presented the stages in the process of evaluating the NAMA candidates which include the categories of basic and general conditions for the first screening and sustainability, MRVability (measuring, reporting and verification) for the second screening. The final result of long list evaluation was presented and the reasons why certain proposed NAMAs did not pass the screenings, such as non-existence of a concrete project, insufficient data or financial feasibility.

Mr. Yoshida presented a summary of 16 shortlisted NAMAs belonging to three sub-sectors, energy, transport and building sub-sectors. One quarter of the proposed projects has passed the screening and they were shortlisted. All NAMAs will be an international/ supported NAMA, except for the project number 15 which is expected to be a domestic NAMA and will not seek international support.

Mr. Yoshida also mentioned the Shortlist contains NAMAs with large GHG emission reduction and rather small reduction, but the Project will not consider the size of the reduction as a decisive factor to be an appropriate NAMA or not. In this sense, projects with small amount of emission reduction can still be a NAMA of Serbia as long as they satisfy all selection criteria.

3. Overview of shortlisted NAMAs

Ms Ana Repac gave a presentation on 16 shortlisted NAMAs and provided basic information about each project/ program. She presented every project separately and informed the members of the JCC how they would contribute to climate change mitigation, and specified implementing entities for each project as well as the expected annual GHG reduction. Ms Repac also provided the information on financial feasibility, technical viability and MRVability for all the mentioned projects.

Mr. Yoshida informed the participants that most of the shortlisted NAMAs have only preliminary financial analysis and that many implementing entities had not established methods of financial analysis because they are not sure what the requirements are and announced that the Project will hold a Financial Workshop on 13 December and invite working group members and NAMA implementing entities to participate. Mr Matsuoka, a financial expert of JICA Expert Team, will present what kinds of financial analysis options exist and what information is necessary.

Mr Spasojevic proposed that Capital Investment Fund should be informed about the NAMAs project because this institution is not aware of its existence. Mr Kovacic suggested that the Ministry of Finance should be invited to the workshop as they also participate in projects related to energy efficiency.

4. Overview of the COP17 side event presentation

Ms Bozanic briefly informed the participants about the COP 17 side event and the intention of the Ministry of Environment, Mining and Spatial Planning and JICA to present current results of the projects, future plans and the problems encountered during the process of preparation of

potential projects. NAMAs project is the first of its kind in the world and the intention is to share the information about the project. She said that apart from Mr Fujimoto as a JICA representative, the representatives of the ministry will make a presentation on the shortlisted projects.

Mr Yoshida added that the handouts at the side event will include NAMA portfolios of the shortlisted projects. He informed the participants that the venue is Climate Change Response Expo adjacent to the COP main venue called ICC. Ms Bozanic explained that it had been the first time that Serbia was declined a side event by the UNFCCC secretariat and that no explanation was offered.

JICA Expert Team concluded the meeting by mentioning the Project schedule after COP side event, including the NAMA capacity building seminar in February. Also mentioned was whether a next JCC meeting will be held before the start of the Phase 3 of the Project in May 2012 is still unknown and the date of next meeting will be announced to participants early.

Prepared by Svetlana Batricevic

NAMAs Project Assistant

Fourth Joint Coordinating Committee Meeting on the
"Capacity Development Project on Nationally Appropriate Mitigation Actions (NAMAs)"

Meeting Memorandum for 4th Joint Coordinating Committee

Date and time: 6 March, 2012 14:00-15:40

Venue: MEMSP Conference room 204

Participants:

Organization	Name	Title
Ministry of Environment, Mining and Spatial Planning (MEMSP)	Ms. Danijela Bozanic	Head of Climate Change Division
	Ms. Ana Repac	Junior Advisor in Climate Change Division
Ministry of Infrastructure and Energy (MIE)	Mr. Miroslav Spasojevic	Head of Department for Sustainable Development
	Ms. Jelena Simovic	Advisor in Department for Sustainable Development
Serbian Energy Efficiency Agency (SEEA)	Mr. Bojan Kovacic	Deputy Director
JICA Balkan Office	Mr. Satoru Kurosawa	Resident Representative
	Ms. Yumiko Saito	Project Formulation Officer
JICA Expert Team	Mr. Tetsuya Yoshida	Deputy Chief Advisor
	Mr. Branislav Zivkovic	Local Consultant
	Ms. Svetlana Batricevic	Project Assistant

1. Project Activities

JICA Expert Team opened the 4th Joint Coordinating Committee meeting by presenting the activities which were conducted in accordance with phases I and II of the Work Plan from May 2011 to March 2012 and agreed by the JCC in January 2011.

Those activities include the enhancement of general understanding of NAMAs and MRV (Activity 1), developing capacities to shortlist NAMAs which could be measured, reported and verified (Activity 2) and collecting information on NAMA candidates. JICA Expert Team presented the list of analysed documents used as sources of information in the process of finding prospective NAMA candidates, such as laws, policies, strategies, action plans and regulations.

Mr Yoshida explained the process of preparing NAMA information sheet which is designed to collect detailed information on each mitigation action and what type of data a NAMA information sheet includes. It was also pointed out that recent review of the data contained in the developed NAMA information sheets includes certain errors in calculation such as the use

of inaccurate or wrong default values and miscalculation, which cause both higher and lower emission reductions. Mr Sapsojevic enquired which default values should be used in calculations, whether IPCC, CDM methodology or some other country specific emission factor default values. Since default values have not yet been agreed, working group members would discuss and determine which methodology would be proposed for implementing entities to use during Phase 3 of the Project.

Mr Yoshida mentioned that MEMSP Climate Change Division and JICA Expert Team had a series of meetings with a number of entities in order to assist them to fill in NAMA information sheets and provide basic information about the NAMA project. He then pointed to the list of interviews and site visits. In addition to this, a public call for a new NAMA was announced on the ministry's website.

Mr Spasojevic raised a concern about certain entities from the list of site visits from smaller Serbian towns regarding their understanding of the benefits of NAMA project. He proposed that institutions participating to this JCC should assist those communities in performing necessary activities if potential projects are identified, given that those communities probably do not have sufficient capacities.

Mr Yoshida further explained the process of NAMA Long List preparation. The long list consists of 69 NAMA candidates from 3 target sub-sectors including energy, transport and building sub-sectors. The largest portion of candidates (80%) involves construction or installation of plant, facility or equipment.

Each of 69 NAMA candidates was evaluated according to NAMA shortlist selection criteria established by the Climate Change Division and JICA Expert Team as well as the Working Group members. The evaluation criteria were developed by the Project because there is no guideline available by UNFCCC regarding NAMA development yet, and therefore the criteria are subject to change. The criteria are divided in two steps and only those projects which met all the first and second criteria were listed in the Shortlist. The result of the long list evaluation is seventeen actions that met all the first criteria, and sixteen satisfied all the second criteria. When the UNFCCC prepares its guideline, it will have to be integrated into NAMA evaluation criteria, and especially those regarding MRV.

Mr Spasojevic mentioned EU Emission Trading Scheme and enquired if we could use this scheme since it is similar to MRV. Ms Bozanic replied that it was not possible at the moment until the EU Parliament adopted two relevant documents. But it will be used and referred in analyzing MRV in more detail in Phase 3.

The list of 16 shortlisted candidates is provided. Mr Yoshida asked Mr Spasojevic if there were any updates on the current status of the projects prepared by the MIE. Mr Spasojevic replied there were no updates for the time being.

Mr Spasojevic raised a question how Japan can provide further assistance to these shortlisted NAMAs and whether Japan's Bilateral Offset Crediting Mechanism can be applied. Mr

Yoshida mentioned that Japan will be willing to assist mitigation activities from financial, technical, or capacity building perspectives, and Bilateral mechanism could be one option.

Mr Yoshida presented the draft contents of the NAMA guideline. It is designed for climate change mitigation-related stakeholders in Serbia who may implement NAMA in the future. And therefore, the guideline will be prepared in Serbian but it is still necessary to discuss whether the English version should be prepared as well.

A financial workshop was held in order to improve the capacity of Serbian stakeholders to conduct financial analysis of NAMA. The purpose of this workshop was to increase understanding of these stakeholders on general information about financial analysis as well as what types of financial analysis could be applied to mitigation actions. This activity shall be continued in Phase III in preparing NAMA short description.

Another activity involves the development of capacity to produce documents for promoting NAMA implementation (Activity 3). Short description will be developed in Phase III for several NAMAs from the Short list as pilot NAMAs for Short Description.

Fourth activity involves the capacity enhancement to promote NAMA recognition. For this activity, web contents for MEMSP website were developed and uploaded both in Serbian and English in order to enhance recognition and understanding by stakeholders on NAMA and MRV. It was pointed out that it is not easy for web viewers to find the NAMA contents from the MEMSP web top page and it needs to be improved.

Also, a side event seminar was held during the COP 17 period in December 2011 in Durban, South Africa. It was pointed out that the number of participants to the seminar, 32, is sufficient considering the fact that the event was held outside of the main venue.

NAMA seminar was held on February 6, 2012 with the objective to enhance recognition and understanding on NAMA among the Serbian stakeholders. 62 stakeholders participated in the seminar including the representatives of NAMA-related ministries and institutions in Serbia, donor countries and international organizations, universities, private sector and NGO as well as the media. A questionnaire was distributed to seminar participants and answers were collected and analyzed. The result shows that the seminar was generally highly evaluated and the objective of the seminar, which is to increase the understanding and recognition of NAMA by stakeholders, was fulfilled.

2. Schedule from May 2012 to February 2013

Mr Yoshida presented the plan of project activities for each work item during Phase III including the development of capacities to shortlist NAMAs which can be measured, reported and verified (Activity 2), the development of capacities to produce documents for promoting NAMA implementation (Activity 3), the enhancement of capacities to promote NAMA recognition (Activity 4) and the training in Japan. He presented a tentative program of training in Japan and informed the participants that it had not yet been decided if two or three persons would be sent to Japan. He asked the participants if they had any suggestions regarding the organizations they would wish to visit during their stay in Japan.

3. Project Design Matrix and Plan of Operation

Mr Yoshida presented the Project Design Matrix (PDM) and Plan of Operation (PO) which was agreed before the start of the project. He proposed some modifications and after a discussion the modifications were defined and agreed on. Modifications were applied to Objectively Verifiable Indicators for Output 1 and Output 3, Means of Verification for Output 3, and Activities parts.

Mr Yoshida closed the meeting by consulting the JCC members on the issue of holding additional JCC meetings before making important decisions. The JCC members agreed to convene for additional JCC meetings when necessary.

Prepared by Svetlana Batricevic

NAMAs Project Assistant

Fifth Joint Coordinating Committee Meeting on the
"Capacity Development Project on Nationally Appropriate Mitigation Actions (NAMAs)"

Meeting Memorandum for 5th Joint Coordinating Committee

Date and time: 31 May, 2012 10:00-11:00

Venue: MEMSP Conference room 125

Participants:

Organization	Name	Title
Ministry of Environment, Mining and Spatial Planning (MEMSP)	Ms. Danijela Bozanic	Head of Climate Change Division
	Ms. Ana Repac	Junior Advisor in Climate Change Division
Ministry of Infrastructure and Energy (MIE)	Ms. Jelena Simovic	Head of Department for Sustainable Development and Climate Change in Energy Sector
Serbian Energy Efficiency Agency (SEEA)	Mr. Bojan Kovacic	Deputy Director
Electric Power Industry of Serbia (EPS)	Mr. Miroslav Spasojevic	
JICA Balkan Office	Mr. Ken Yamada	Resident Representative
	Ms. Yumiko Saito	Project Formulation Officer
JICA Expert Team	Mr. Masahiko Fujimoto	Chief Advisor
	Mr. Tetsuya Yoshida	Deputy Chief Advisor
	Mr. Hiroshi Matsuoka	JICA Expert
	Ms. Eiko Watatsu	JICA Expert
	Mr. Branislav Zivkovic	Local Consultant
	Ms. Svetlana Batricevic	Project Assistant

Mr. Fujimoto opened the meeting by giving introductory remarks. He then presented the outcomes achieved during Phase 2 of the project and also the work plan of Phase 3, which will last from May 2012 to February 2013. General schedule during Phase 3 was also presented to the participants including the terminal evaluation of the technical cooperation project, which is tentatively set for January 2013.

Mr Yoshida went on to present the work plan of phase III of the project. He informed the participants about project implementation method which consists of three activities including development of capacity to produce documents for promoting NAMA implementation, enhancement of capacity to promote NAMA recognition and technical training in Japan.

1. Short Description

The document to be developed is NAMA short description. Working group members will select pilot NAMAs from the short list, whereas MEMSP, NAMA related agencies and JICA expert team will develop short description of the selected pilot NAMAs through study sessions. Format and contents of NAMA short description will be in line with biennial updated report which Serbia should submit, and also in line with the recently developed NAMA registry prototype. In the course of developing NAMA short description, finance procurement options will be analyzed. Pilot NAMAs will be submitted to UNFCCC Secretariat and the NAMA registry.

Mr Yoshida announced the next working group session for the following Wednesday (June 6) and informed the JCC participants that working group members would be assigned to develop NAMA short description for each selected pilot NAMA through a series of discussions at working group sessions, and JICA expert team will provide support to working group members. He then referred to NAMA short list and named the specific projects confirmed by each entity.

Ms Simovic raised a question of responsible entity in relation to project number 8, ("Introduction of Small Biomass Boilers in Serbia"). That issue is to be further discussed whether the implementing entity is MEMSP and/or MIE.

Mr Yoshida introduced UNFCCC NAMA registry which serves for matching NAMAs of Non-Annex I countries that are seeking support regarding financial and technical support as well as support for capacity building, with Annex-I countries that will provide support.

2. NAMA Guideline

A guideline for short-listing NAMAs and developing NAMA short description will be developed by Climate Change Division and JICA expert team. NAMA guideline will contain background information, NAMA development cycle and MRV capacity development needs for NAMA. Ms Bozanic suggested that working group members should be asked for comments before finalizing the guideline. Mr Yoshida then raised the subject of the language in which the guideline should originally be prepared. The JCC members agreed that the English language version was more appropriate since it would be used internationally and presented at COP 18.

3. NAMA promotion

In order to enhance the capacity to promote NAMA recognition, web contents for MEMSP website have been developed and will be updated continuously. Promotion materials about the project and outcomes will be developed and used at COP side event and the national seminar in Serbia. Project's progress and outcome will be presented at COP 18 and the information is going to be shared with other developing countries. Japanese side intends to send one JICA expert as a Serbian delegate to COP 18 and will ask Serbian side for approval.

The second national NAMA-MRV seminar/workshop will be held in Serbia where stakeholders related to climate change mitigation would be invited, as well as government agencies, private companies, donors and international organizations. Ms Bozanic remarked that it would be important and beneficial to invite and attract some other institutions which are not related to energy efficiency. Mr Spasojevic suggested that stakeholders should be explained in advance about the background of NAMA and contents of the second seminar/workshop. He also recommended that separate meetings should be organized with the representatives of financial institutions and banks in order to explain the background of the project and why it is important to participate in such projects.

4. Training in Japan

Mr Yoshida presented a tentative program of training in Japan for technical officers from the Serbian side in order to further enhance their understanding on climate change mitigation related issues. He reminded the participants that officers should be selected as soon as possible because of the application procedure of JICA. The number of officers is three and they should be very involved in this project from the beginning.

5. PDM

Mr Yoshida presented the Project Design Matrix (PDM) and JCC members discussed and agreed to the following modifications to “Means of Verification and Inputs”.

1) Means of Verification
In order to verify the achievement of the Project purpose and outputs, Joint evaluation by MEMSP and Project experts will be conducted at the end of the Project.

2) Inputs
Three persons will participate the training in Japan for two weeks.

Mr. Yamada explained that the procedure and schedule of terminal evaluation of the Project will be set, and Mr. Ito, Assistant Resident Representative of JICA Balkan office, would be in charge of the evaluation. He reminded that the Project should contribute to capacity development of staff as well as organizations.

6. Operation

Mr. Kovacic requested JICA Expert Team to share the materials for the meeting in advance so that participants can prepare for the meeting. JICA Expert Team agreed to his request.

Ms Bozanic thanked the participants for their time and effort. Mr Fujimoto closed the meeting by requesting the JCC members to confirm their approval of the presented work plan by the end of the following week.

Prepared by Svetlana Batricevic

NAMAs Project Assistant

Sixth Joint Coordinating Committee Meeting on the
"Capacity Development Project on Nationally Appropriate Mitigation Actions (NAMAs)"

Meeting Memorandum for 6th Joint Coordinating Committee

Date and time: 7 February 2013 10:00-11:30

Venue: MEMSP Conference room 125

Participants:

Organization	Name	Title
Ministry of Energy, Development and Environmental Protection (MEDEP)	Mr. Vladan Zdravkovic	State Secretary
	Ms. Danijela Bozanic	Head of Climate Change Division
	Ms. Ana Repac	Junior Advisor in Climate Change Division
	Ms. Jelena Simovic	Head of Department for Sustainable Development and Climate Change in Energy Sector
Ministry of Construction and Urbanism (MCU)	Ms. Jasminka Pavlovic	Head of Department for Energy Efficiency and Construction Products
	Ms. Nina Vukosavljevic	Department for Energy Efficiency and Construction Products
Electric Power Industry of Serbia (EPS)	Mr. Dragan Vukotic	Senior Engineer
JICA H.Q.	Mr. Ichiro Adachi	Director – Environmental Management Division 2
	Mr. Ken Okumura	Deputy Assistant Director - Environmental Management Division 2
JICA Evaluation Team	Ms. Rie Kawahara	Evaluation Expert
JICA Balkan Office	Mr. Toshiya Abe	Resident Representative
	Ms. Yumiko Saito	Project Formulation Officer
	Ms. Natasa Bogojevic	-
JICA Expert Team	Mr. Masahiko Fujimoto	Chief Advisor
	Mr. Tetsuya Yoshida	Deputy Chief Advisor
	Mr. Hiroshi Matsuoka	JICA Expert
	Ms. Eiko Watatsu	JICA Expert
	Mr. Branislav Zivkovic	Local Consultant
	Ms. Svetlana Batricevic	Project Assistant

Mr Zdravkovic opened the meeting by expressing his gratitude to the Japanese side for implementing NAMA project and for every project implemented since the year 2000. The ministry emphasized the importance of emission reductions as the levels were dangerously high in Serbia and the need for sustainable solution increases. He expressed hope that the joint project would help Serbia improve its current situation in accordance with international regulations.

Mr Adachi greeted the participants of the meeting and introduced himself. He expressed his gratitude to the Climate Change Division of MEDEP and project team members.

Ms Kawahara presented the results of joint terminal evaluation of the Project and concluded the capacity to formulate and promote NAMA by Serbian side has been developed successfully. The achievement includes at least three persons in Climate Change Division of MEDEP and at least one person in each organization participating in working group who sufficiently understand the process of NAMA planning, as well as the development of documents in planning NAMAs. It is expected that the overall goal will be carried out within 3-5 years from February 2013.

Ms Kawahara proceeded with evaluation results related to five criteria. The first criterion was **relevance** and it was evaluated by the highest rate very high. The purpose of the project is consistent with Serbian government's environmental policy. Serbia is a member country of UNFCCC and an EU candidate, and has to comply with EU directives in the field of climate change. The project also meets the needs of targeted beneficiaries. The project is in line with the Japanese government's foreign policy on contributing to global measures against climate change.

The second criterion **effectiveness** is rated as high. The planned four outputs are mostly achieved as a result of project activities. The importance of NAMA in the framework of UNFCCC did not decrease and it became more increasing. Two reorganizations of government ministries and agencies caused a slight delay of the project. Working group members are very satisfied with the opportunities for exchanging information and sharing knowledge through a series of seminars, workshops and working group meetings.

The third criterion is **efficiency** and is rated as high. The inputs from both Serbian and Japanese sides are rated as appropriate and used efficiently to produce the expected outputs. However, there were some difficulties in time allocation and concentration on project activities by Serbian side due to the limited number of employees.

The fourth criterion **impact** is rated as prospected to be fair to high. Series of documents and templates for NAMA planning and development were produced under the project and they are the first attempts to generate those documents in the world. Capacity and awareness increased among the counterparts and working group members will be useful assets for planning the implementation of NAMAs in the future.

The fifth criterion **sustainability** is rated as prospected to be fair to high. There is no doubt that the Project Purpose to build capacities and awareness on NAMA will indirectly

contribute to great socioeconomic benefits by reducing GHG emissions through increasing energy efficiency. It is anticipated that national policies and political support in Serbia on supporting NAMA and UNFCCC will not be changed. The counterparts and working group members have good knowledge and technical capacity. The working group members are expected to be key persons to transfer their knowledge and increased awareness within their agencies/entities after the Project. However, the limited number of employees is one of major concerns and the question remains how sustainability can be assured in this situation.

Ms Kawahara concluded her report by saying that the Project had successfully completed most of the planned tasks for the anticipated outputs.

Ms Bozanic briefly presented the recommendations, good practices and lessons learnt. She stated that the most important task at the moment was to submit NAMA Short Descriptions to NAMA Registry of UNFCCC Secretariat. It is necessary to establish a responsible institution which is going to be a focal point in order to provide support to different institutions in various sectors of NAMA planning. Ms Bozanic emphasized the importance of the availability and quality of data for GHG emission calculation. She referred to the engagement of local consultant and assistant and said that it contributed to more efficient capacity building. The local consultant provided support in identification of appropriate NAMAs and checking data quality, while the project assistant performed time-consuming administrative and technical tasks. She also explained that it is important to establish cooperation with different stakeholders from the beginning of the project in order to clearly define the role and importance of stakeholders and establish relations with them. Finally, she mentioned the Project products including the NAMA Development Guideline of the Republic of Serbia, series of documents and templates of NAMA planning which are produced as one of the first cases in the world and they could be valuable national assets.

Mr Fujimoto expressed his appreciation of the State Secretary, Climate Change Division of MEDEP and Working Group members. He expects that NAMA projects will be promoted and new NAMAs will be prepared using the knowledge and tools established in this project. He also expressed his gratitude to local staff and JICA Balkan and JICA Headquarters. He stated that two more weeks remain to finish the remaining tasks, including the finalization of NAMA related documents and the preparation of the Project Activity Completion Report.

Ms Saito expressed her gratitude to Ms Bozanic for her assessment report and contribution to the Project. Ms Saito wanted to know how the Ministry of Energy, Development and Environmental Protection would overcome the problem related to the limited number of staff, since the achievement was weakened due to insufficient number of employees in the past three years.

Mr Zdravkovic replied that he was aware of all these issues and the Ministry would request the Government to allow another position within the Climate Change Division in order to make a better internal organization.

Mr Adachi added that the results of the Project are significant and he referred to the preparation of the guideline and short description documents as very important.

Mr Zdravkovic expressed his gratitude to everyone for their hard work, commitment and his hope that the project would help reduce CO_2 emissions in Serbia.

Mr Zdravkovic and Mr Adachi signed the minutes of meeting between the Japanese Terminal Evaluation Team and the Ministry of Energy, Development and Environmental Protection on Capacity Development Project on Nationally Appropriate Mitigation Actions in the Republic of Serbia.

Prepared by Svetlana Batricevic

NAMA Project Assistant

Annex 5 Matrix of Other Countries' NAMA

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
E-1	Energy	Biofuel	Ethiopia	Bio-fuel Development for Road Transport and for household use: Project to produce 63.36 million L of ethanol, produce 621.6 million L of biodiesel	Measures	Project	National			
E-2	Energy	Biofuel	Ghana	Land preparation:incentive use of bio-fuels for mechanized agriculture	Measures	Program	National			
E-3	Energy	Biofuel	Chad	Promotion of renewable energy: use of biofuels	Measures	Program	National			
E-4	Energy	Biofuel	Colombia	Mandatory 20% biofuel blend by 2020: Stimulate the growth of biofuel production such as ethanol and biodiesel without threatening the natural forest, or any Colombian food security, strengthening the participation of these fuels in the domestic market until 2020 at the mandatory blending of at least 20 % of total volume of fuel used.	Measures	Policy	National			Action with financial support
E-5	Energy	Boiler upgrade	Mongolia	Improve efficiency of existing heating boilers/ introduce new high-efficient heating boilers	Measures	Program	National			
E-6	Energy	Boiler upgrade	Mongolia	Convert steam boilers into small capacity thermal power plants	Measures	Program	National			
E-7	Energy	Boiler upgrade	Macedonia	Improve boiler efficiency	Measures	Program	National			
E-8	Energy	Boiler upgrade	Macedonia	Replace old boilers	Measures	Program	National			
E-9	Energy	Cogeneration	Republic of Congo	Energy production through cogeneration in enhanced forestry concessions	Measures	Program	National			
E-10	Energy	Cogeneration	Mongolia	Improve efficiency at cogeneration plants	Measures	Program	National			
E-11	Energy	Cogeneration	Macedonia	Build CHP plants	Measures	Program	local			
E-12	Energy	Cogeneration	Tunisia	Develop cogeneration	Measures	Program	National			
E-13	Energy	Cogeneration	Tunisia	Develop trigeneration	Measures	Program	National			
E-14	Energy	Cooking stove	Central African Republic	Utilization of improved cooking stoves	Measures	Program	National			
E-15	Energy	Cooking stove	Republic of Congo	Promotion of improved cooking stoves for better combustion	Measures	Program	National			
E-16	Energy	Cooking stove	Cote d'Ivoire	Take actions to economize firewood by promoting better combustion techniques through the promotion of improved cooking stoves	Measures	Program	National			
E-17	Energy	Cooking stove	Ghana	Residential cooking: promote the use of energy efficiency cooking devices and clean carbonization technologies	Measures	Program	National			
E-18	Energy	Cooking stove	Mauritania	Control of conventional energy source in Mauritania: use improved cooking stoves	Measures	Program	National			
E-19	Energy	Cooking stove	Madagascar	Take actions to economize firewood by promoting better combustion techniques through the promotion of improved cooking stoves	Measures	Program	National			

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
E-20	Energy	Cooking stove	Togo	Introduce more efficient cooking stoves	Measures	Program	National			
E-21	Energy	Electricity Grid	Ghana	Improvement of reliability of electricity supply (improvement of maintenance, timely expansion and upgrading)	Measures	Program	National			
E-22	Energy	Electricity Grid	Ghana	Expand grid access to discourage the need for off-grid generation	Measures	Program	National			
E-23	Energy	Electricity Grid	Ghana	Reinforce transmission systems to reduce transmission loses to 3%	Measures	project	National			
E-24	Energy	Electricity Grid	Ghana	Balance the generation and transmission systems	Measures	Program	National			
E-25	Energy	Electricity Grid	Ghana	Standardize of transformers	Measures	Program	National			
E-26	Energy	Electricity Grid	Ghana	Expand and maintain electricity distribution systems timely bases	Measures	Program	National			
E-27	Energy	Electricity Grid	Ghana	Increase rate of rural electrification	Measures	Program	National			
E-28	Energy	Electricity Grid	Macedonia	Reduce losses in electricity transmission and distribution lines	Measures	Project	National			
E-29	Energy	Energy efficiency	Central African Republic	Control of conventional energy sources	Measures	Program	National			
E-30	Energy	Energy efficiency	Eritrea	Develop and implement energy conservation and efficiency projects	Measures	Program	National			
E-31	Energy	Energy efficiency	Jordan	Energy efficiency programs	Measures	Program	National			
E-32	Energy	Energy efficiency	Armenia	improvement of energy efficiency in all sectors of the economy;	Measures	Program	National			
E-33	Energy	Energy efficiency	Central African Republic	Program on the creation of new urban zones, integration of principles of optimization in energy consumption and limitation in the spread of urban constructions	Measures	program	Local			
E-34	Energy	Energy efficiency	Central African Republic	Implementation of a new Energy/Industry program on rural habitats aiming for the construction of ecological villages integrating energy efficiency and renewable energy	Measures	program	Local			
E-35	Energy	Energy efficiency	Republic of Congo	Control of energy efficiency	Measures	Program	National			
E-36	Energy	Energy efficiency	San Marino	Rationalize and modernize energy transport and supply networks, relevant plants	Measures	Program	National			
E-37	Energy	Energy efficiency	San Marino	Promote energy saving and rational energy use at transport, production, housing and tertiary sectors	Measures	Program	National			services supplied being equal
E-38	Energy	Energy efficiency	Tunisia	Develop energy efficiency program in tertiary sector	Measures	Program	National			

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
E-39	Energy	Energy efficiency	Morocco	Improve power plant efficiency by optimizing a maintenance plan	Measures	Program	National			
E-40	Energy	Financial measure	Jordan	Remove of customs and taxes on energy saving technologies, such as: energy saving lightning fixtures, hybrid cars, etc.	Measures	Policy	National			
E-41	Energy	Financial measure	Macedonia	Establish legal regulations and tax relieve system for energy efficiency	Measures	Law/ regulation	National			
E-42	Energy	General policy and measure	Colombia	At least 77% of the total installed capacity will be generated by renewable electricity sources by 2020, within the energy matrix.	Measures	Policy	National			Unilateral action
E-43	Energy	Heating	Mongolia	Use electricity for local heating at Ulaanbaatar city	Measures	Project	Local			
E-44	Energy	Heating	Mongolia	Reduce heat distribution loss through minimizing leakage, replacing valves and compensators	Measures	Program	National			
E-45	Energy	Heating	Macedonia	Maintain clean heat exchange surfaces to achieve better insulation	Measures	Program	National			
E-46	Energy	Heating	Macedonia	Introduce solar heating system in hotels, hospitals, school, public buildings, health resorts, etc.)	Measures	Program	National			
E-47	Energy	Heating	Tunisia	Intensify solar water heating	Measures	Program	National			
E-48	Energy	House and building	Gabon	Enhancing energy efficiency in public buildings and industrial units: construction of buildings and industrial units with low energy consumption	Measures	Program	National			
E-49	Energy	House and building	Armenia	improvement of energy efficiency in buildings and constructions;	Measures	Program	National			
E-50	Energy	House and building	Mongolia	Regulate room temperature at residential houses for heating	Measures	Law/ regulation	National			
E-51	Energy	House and building	Mongolia	Improve insulation at houses and buildings	Measures	Program	National			
E-52	Energy	House and building	Tunisia	Construct energy efficient buildings and houses	Measures	Program	National			
E-53	Energy	House and building	Tunisia	Construct solar-energy houses	Measures	Program	National			
E-54	Energy	House and building	Tunisia	Improve energy efficiency in buildings	Measures	Program	National			
E-55	Energy	House and building	Chad	Energy efficiency in urban and rural areas: Extension of energy efficient wooden houses	Measures	Program	National			
E-56	Energy	Lighting	Madagascar	Popularize low energy-consumption lamps	Measures	Program	National			
E-57	Energy	Lighting	Mauritania	Energy efficiency in urban and rural settings - reduction of energy consumption: replacement of high consumption lamps with energy efficient lamps	Measures	Program	National			

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
E-58	Energy	Lighting	Cote d'Ivoire	Promote low energy consumption lamps	Measures	Program	National			
E-59	Energy	Lighting	Mongolia	Switch to CFL from incandescent light bulbs at houses and commerical buildings	Measures	Program	National			
E-60	Energy	Lighting	Macedonia	Introducing more efficient lamps and electric appliances	Measures	Program	National			
E-61	Energy	Lighting	Togo	Replace high consumption lamps with energy efficient lamps	Measures	Program	National			
E-62	Energy	Lighting	Tunisia	Introduce energy-saving light bulbs	Measures	Program	National			
E-63	Energy	Lighting	Tunisia	Promote tension switchers for public lighting	Measures	Program	National			
E-64	Energy	Lighting	Ghana	Promote and support solar PV lighting	Measures	Program	National			
E-65	Energy	Lighting	Morocco	Public lighting optimization, launch in 2009	Measures	Program	National			
E-66	Energy	Lighting	Morocco	Distribution of 22.7 million light bulbs (LBC) for homes and buildings by 2012, potential mitigation: 490 Kt CO2 per year.	Measures	Program	National			
E-67	Energy	Lighting	Chad	Energy efficiency in urban and rural areas: Extension of energy-saving lamps	Measures	Program	National			
E-68	Energy	Natural gas use/ fuel switch	Ghana	Electricity supply: switch to natural gas (combined cycle)	Measures	Program	National			
E-69	Energy	Natural gas use/ fuel switch	Ghana	Residential cooking: promote the use of LPG	Measures	Program	National			
E-70	Energy	Natural gas use/ fuel switch	Jordan	Fuel switch: growing natural gas supply and distribution; increase the contribution of the natural gas to the national energy system	Measures	Program	National			
E-71	Energy	Natural gas use/ fuel switch	Mauritania	Energy efficiency in urban and rural settings - reduction of energy consumption: use of butane gas as a substitute for firewood;	Measures	Program	National			
E-72	Energy	Natural gas use/ fuel switch	Mongolia	Fuel switch at household stoves from coal to LPG and coal briquette	Measures	Program	National			
E-73	Energy	Natural gas use/ fuel switch	Macedonia	Swtich from coal to liquid to gaseous fuels	Measures	Program	National			
E-74	Energy	Natural gas use/ fuel switch	Central African Republic	Program for the import of natural gas (Butane), targeting consumption by 80% of households	Measures	Program	National			
E-75	Energy	Natural gas use/ fuel switch	Togo	Introduce the use of gas as a substitute	Measures	Program	National			
E-76	Energy	Natural gas use/ fuel switch	Tunisia	Develop natural gas use in industrial sector	Measures	Program	National			

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
E-77	Energy	Natural gas use/ fuel switch	Tunisia	Develop natural gas use in tertiary sector	Measures	Program	National			
E-78	Energy	Natural gas use/ fuel switch	Tunisia	Develop natural gas use in residential sector	Measures	Program	National			
E-79	Energy	Natural gas use/ fuel switch	Macedonia	Develop new gas thermal power plants (CHP Skopje 230MW, CC gas 200-300MW)	Measures	Project	local			
E-80	Energy	Natural gas use/ fuel switch	Morocco	Increase import of natural gas, target 20% of natural gas for domestic consumption in 2020, potential mitigation: 6,421 kt CO2 per year	Measures	Policy	National			
E-81	Energy	Public information	Ghana	End-use: intensify public education on energy conservation	Measures	Program	National			
E-82	Energy	Public information	Central African Republic	National awareness-raising campaign on energy-saving and the use of energy-saving lamps	Measures	Program	National			
E-83	Energy	Public information	San Marino	Promote energy saving and rational energy use through information campaign	Measures	Project	National			
E-84	Energy	Public information	Sierra Leone	Develop energy efficiency Programrammes through awareness raising campaigns	Measures	Project	National			
E-85	Energy	Public information	Macedonia	Raise awareness to reduce energy consumption at households (electricity and heat)	Measures	Program	National			
E-86	Energy	Public information	Morocco	Awareness campaign for energy economics and economic equipment, launched in 2009	Measures	Program	National			
E-87	Energy	Renewable /New energy	Jordan	Waste water and water sector: emission reduction from waste water treatment plants by utilizing local solar and wind energy (Aqaba, As-Sarma, Baqa'a, Madaba, Ramtha, Salt and Wadi Arab)	Measures	Project	Local			
E-88	Energy	Renewable /New energy	Ethiopia	Electricity generation from renewable energy for the grid system 1-1Hydropower (on-going): Beles Project (460 MW); Gibe III Project (1870 MW); Fan Project (100 MW); Halele Werabesa Project (422 MW); Chemoga-Yeda Project (278 MW); Gibe IV Project (1472 MW)	Measures	Project	Local			
E-89	Energy	Renewable /New energy	Macedonia	Rehabilitate geothermal power system Geoterma-Kochani and others	Measures	Project	local			

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
E-90	Energy	Renewable /New energy	Armenia	Implementation of “The National Program on Energy Saving and Renewable Energy of the Republic of Armenia (2007)”: Increase in energy production based on renewable energy sources;	Measures	Program	National			
E-91	Energy	Renewable /New energy	Central African Republic	Implementation of a new Energy/Industry program on rural habitats aiming for the construction of ecological villages integrating energy efficiency and renewable energy	Measures	Program	Local			
E-92	Energy	Renewable /New energy	Central African Republic	Rehabilitation of hydroelectric dams in Bouali I, II and III	Measures	Project	Local			
E-93	Energy	Renewable /New energy	Central African Republic	Installation of micro-hydroelectric plants of 4MW and a total of 35 MW until 2030 on the various waterfalls of the country: Toutoubou, Baidou, Nakombo-Soso, Kembé and la-Mbi.	Measures	Project	Local			
E-94	Energy	Renewable /New energy	Central African Republic	Development of a wind farm of 4000 MW : 1000 MW in 2012 with a strong mitigation potential	Measures	Project	National			
E-95	Energy	Renewable /New energy	Republic of Congo	Enhancement of the hydroelectric potential	Measures	Program	National			
E-96	Energy	Renewable /New energy	Republic of Congo	Energy production through rehabilitation of hydroelectric dams of Djoué and Moukoukoulou	Measures	Project	Local			
E-97	Energy	Renewable /New energy	Cote d'Ivoire	Elaborate and carry out an action plan on the development of renewable energy such as micro-hydraulic, photovoltaic and biomass power generation for decentralized electrification	Measures	Program	National			
E-98	Energy	Renewable /New energy	Ethiopia	Electricity Generation from Renewable Energy for Off-grid Use and Direct Use of Renewable Energy Projects to install: 150,000 solar home systems; construct 65,000 small hydro electric power generation facilities; 300 wind pumps; 300 solar pumps; 3,000 in	Measures	Project	National			
E-99	Energy	Renewable /New energy	Gabon	Development of new energies: construction of hydroelectric dams and solar panel	Measures	Program	National			
E-100	Energy	Renewable /New energy	Ghana	Retrofit existing hydro dams and construction more hydro dams	Measures	Program	National			
E-101	Energy	Renewable /New energy	Ghana	Promote electricity generation from renewable energy sources (share of renewable energy: 10-20% by 2020)	Measures	Program	National			
E-102	Energy	Renewable /New energy	Ghana	Support waste-to-energy initiatives (sawdust, oil palm waste and other agricultural waste / residue)	Measures	Program	National			

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
E-103	Energy	Renewable /New energy	Ghana	Capture and utilize methane gas from landfill sites	Measures	Program	National			
E-104	Energy	Renewable /New energy	Jordan	Enhancement of renewable energy law (wind, solar, etc.)	Measures	Law/ regulation	National			
E-105	Energy	Renewable /New energy	Jordan	Biogas to become part of the sources for Jordanian electricity system	Measures	Program	National			
E-106	Energy	Renewable /New energy	Jordan	Use of methane emitted from livestock and chicken farming production and slaughter houses	Measures	Program	National			
E-107	Energy	Renewable /New energy	Madagascar	Elaborate and carry out an action plan on the development of renewable energy (micro hydraulic, photovoltaic and biomass power generation for decentralized electrification)	Measures	Program	National			
E-108	Energy	Renewable /New energy	Madagascar	Installation of hydroelectric power plants for the large cities	Measures	Program	National			
E-109	Energy	Renewable /New energy	Madagascar	Valuation of household waste (solid and liquid) of large cities in Madagascar through the production of fertilizers and energy (biogas, electricity)	Measures	Program	National			
E-110	Energy	Renewable /New energy	Mauritania	Control of conventional energy source in Mauritania: rationalize the use of conventional energy sources (biomass)	Measures	Program	National			
E-111	Energy	Renewable /New energy	Mauritania	Promotion of renewable energy: focus research on the techniques for efficient production and use of renewable energy	Measures	Program	National			
E-112	Energy	Renewable /New energy	Peru	Increase newable energy up to 33% of total energy consumption by 2020	Measures	Policy	National			
E-113	Energy	Renewable /New energy	Mongolia	Installation of large scale PV systems in the Gobi region	Measures	Program	National			
E-114	Energy	Renewable /New energy	Mongolia	Installation of small, portable wind generation systems to supply electricity to nomadic herders and farmers in rural areas	Measures	Program	National			
E-115	Energy	Renewable /New energy	Mongolia	Continue development of hydropower plants	Measures	Program	National			
E-116	Energy	Renewable /New energy	San Marino	Promote and develop renewable energy sources	Measures	Program	National			

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
E-117	Energy	Renewable /New energy	Sierra Leone	Expand clean energy utilization (solar, mini-hydro, LPG, biomass stoves etc.)	Measures	Project	National			
E-118	Energy	Renewable /New energy	Sierra Leone	Develop waste to energy Programrams for urban and agricultural wastes	Measures	Program	National			
E-119	Energy	Renewable /New energy	Macedonia	Develop new large hydro power plants (HPP Boskov Most, HPP Galiste, HPP Cebren)	Measures	Project	local			
E-120	Energy	Renewable /New energy	Macedonia	Develop renewable energies (small-hydro, wind, biomass, and PV)	Measures	Program	local			
E-121	Energy	Renewable /New energy	Macedonia	Introduce biomass energy using waste biomass	Measures	Program	local			
E-122	Energy	Renewable /New energy	Togo	Promote solar energy, wind energy, and biogas	Measures	Program	National			
E-123	Energy	Renewable /New energy	Tunisia	Introduce concentrated solar power (CSP), PV at building, wind energy, and biomass energy	Measures	Program	National			
E-124	Energy	Renewable /New energy	Togo	Focus research on solar and wind energy, biogas and biofuels	Measures	Program	National			
E-125	Energy	Renewable /New energy	Morocco	Install micro hydroelectric unit capacity of 3 MW and total 300 MW, launching in 2009, 100 plants by 2030, potential mitigation: 715 kt CO2 per year	Measures	Project	Local			
E-126	Energy	Renewable /New energy	Morocco	Install hydroelectric power stations of 40 MW (tanafnit, El Borj) launch in 2009-running 2013, potential mitigation: 171 kt CO2 per year	Measures	Project	Local			
E-127	Energy	Renewable /New energy	Morocco	Develop solar energy to power 2,000 MW in 5 sites, start operation in years 2015-2020, potential mitigation: 3,700 kt CO2 per year.	Measures	Project	Local			
E-128	Energy	Renewable /New energy	Morocco	Promote solar energy, 40,000 m2 and 440,000 m2 by 2012 with water heater, 1,700,000 m2 by 2020, potential for mitigation: 232 KT CO2 per year.	Measures	Program	National			
E-129	Energy	Renewable /New energy	Morocco	Develop national wind farm (Energipro program), 1,000MW by 2012, 5,000MW by 2030; potential mitigation: 9250 KT per year	Measures	Program	National			
E-130	Energy	Renewable /New energy	Morocco	Morocco Cement; wind energy park of 20 MW; potential mitigation: 55 Kt CO2 per year.	Measures	Project	Local			

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
E-131	Energy	Renewable /New energy	Morocco	Regional Office of agricultural value-Energia wind park of 20 MW	Measures	Project	Local			
E-132	Energy	Renewable /New energy	Morocco	Development of energy efficiency in industry by association with focal development of renewable energy; launch in 2009, potential mitigation: 581 kt CO2 per year.	Measures	Project	National			
E-133	Energy	Renewable /New energy	Morocco	Lafarge Maroc Wind Energy: realize 10MW and expand to 32MW by 201-2012	Measures	Project	Local			
E-134	Energy	Renewable /New energy	Chad	Promotion of renewable energy: development of solar and wind energy, use of biogas energy and biofuels	Measures	Program	National			
E-135	Energy	Standard	Mongolia	Establish energy efficiency standard for buildings	Measures	Law/ regulation	National			
E-136	Energy	Standard	Ghana	Develop and enforce standards and labels for electric appliances	Measures	Program	National			
E-137	Energy	Standard	Togo	Control the use of conventional energy sources	Measures	Program	National			
E-138	Energy	Standard	Tunisia	Certify electrical appliances at households	Measures	Program	National			
E-139	Energy	Standard	Macedonia	Install equipment to measure/ regulate/ automatic control systems	Measures	Program	National			
E-140	Energy	Standard	Morocco	Introduce Ecolabelling of household appliances (particularly refrigerators and air conditioners), potential mitigation: 779 KT CO2 per year.	Measures	Program	National			
E-141	Energy	Standard	Morocco	Oblige energy sellers save energy, for certification	Measures	Law/ regulation	National			
E-142	Energy	Tariff	Tunisia	Valorize energy price from solar and wind energy for water desalinization and pumping	Measures	Law/ regulation	National			
E-143	Energy	Tariff	Mongolia	Introduction of metered tariff for heat use at apartments	Measures	Program	local			
E-144	Energy	Tariff	Macedonia	Introduce energy consumption meter and metered tariff	Measures	Law/ regulation	National			
E-145	Energy	Tariff	Tunisia	Valorize energy price generated from solid and liquid wastes (both electricity generation and biofuels)	Measures	Law/ regulation	National			
E-146	Energy	Tariff	Tunisia	Valorize energy price generated from methane gas from controlled landfills and wastewater	Measures	Law/ regulation	National			
E-147	Energy	Tariff	Morocco	Improve metered energy billing system	Measures	Law/ regulation	National			
E-148	Energy	Technological innovation	Jordan	Upgrade of the Jordan refinery to improve quality of diesel and further emissions reduction	Measures	Program	National			

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
E-149	Energy	Technological innovation	Armenia	Modernization of thermal power plants;	Measures	Program	National			
E-150	Energy	Technological innovation	Mongolia	Introduce the coal briquetting technology, coal beneficiation	Measures	Program	National			
E-151	Energy	Technological innovation	Macedonia	Use of flue gases	Measures	Program	National			
E-152	Energy	Technological innovation	Macedonia	Improve fluid transportation system	Measures	Program	National			
E-153	Energy	Technological innovation	Macedonia	Improve heat insulation of tranport pipelines for water, steam, fuels, etc.	Measures	Program	National			
E-154	Energy	Technological innovation	Tunisia	Recover and use petroleum associated gases	Measures	Program	National			
E-155	Energy	Technological innovation	Republic of Congo	Valuation of gas flare during petrol production stages	Measures	Program	National			
E-156	Energy	Technological innovation	Morocco	Install combined cycle plants Ain Beni Mathar 870 MW commissioned in 2010, potential mitigation: 4,038 Kt CO2 per year	Measures	Program	Local			
E-157	Energy	Technological innovation	Morocco	Install clean coal plants Jorf Lasfar and Safi	Measures	Project	Local			
E-158	Energy	Technological innovation	Morocco	2x1,000 MW nuclear power plants planned for 2020-2030, potential mitigation: 14,968 Kt CO2 per year.	Measures	Project	National			
E-159	Energy	Wood production and use	Mauritania	Control of conventional energy source in Mauritania: improve the efficiency of wood combustion for the production of charcoal	Measures	Program	National			
E-160	Energy	Wood production and use	Sierra Leone	Sustainable production of charcoal and reduce dependence on firewood	Measures	Program	National			
E-161	Energy	Wood production and use	Ghana	Residential cooking: establish more woodlods	Measures	Program	National			
E-162	Energy	Wood production and use	Ghana	Residential cooking: promote the re-use of wood residues	Measures	Program	National			
E-163	Energy	Wood production and use	Togo	Improve efficiency of wood combustion for the production of charcoal	Measures	Program	National			

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
E-164	Energy	Wood production and use	Chad	Energy efficiency in urban and rural areas: rational use of traditional energy sources such as biomass	Measures	Program	National			
I-1	Industry	CCS	Ghana	Improvement of oil and gas production:assess, promote and incorporate carbon capture and storage (CCS) in oil and gas production and utilization	Measures	Program	National			
I-2	Industry	Energy efficiency	Macedonia	Install biomass boiler in agro-industry, industry sector, and houesholds	Measures	Program	National			
I-3	Industry	Energy efficiency	Ghana	Improve power factor correction across industrial and institute energy efficient measures in industrial operations	Measures	Program	National			
I-4	Industry	Energy efficiency	Ghana	Improve on resource efficiency in industries to promote sustainable production and consumption	Measures	Program	National			
I-5	Industry	Energy efficiency	Tunisia	Develop energy efficiency program in industrial sector	Measures	Program	National			
I-6	Industry	Standard	Macedonia	Improve standards for building construction and insulation and quality of materials used	Measures	Law/ regulation	National			
I-7	Industry	Standard	Tunisia	Reinforce national program for environmental upgrading of industrial companies	Measures	Program	National			
I-8	Industry	Technological innovation	Gabon	Banning of burning of gas flare and petroleum	Measures	Program	National			
I-9	Industry	Technological innovation	Ghana	Improvement of oil and gas production: promote zero fugitive emissions	Measures	Program	National			
I-10	Industry	Technological innovation	Ghana	Improvement of metal production (aluminum): reduce carbon dioxide emissions from anode reactions	Measures	Program	National			
I-11	Industry	Technological innovation	Armenia	Decrease of loss in methane flow in gas transportation and gas delivery systems	Measures	Program	National			
I-12	Industry	Technological innovation	Morocco	Phosphate purification system in 4 sites in OCP, potential mitigation: 343 Kt CO2 per year	Measures	Project	Local			

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
I-13	Industry	Technological innovation	Mongolia	Motor efficiency improvement through, energy-efficient motors; variable speed drives; improved operation and maintenance; correction of previous over-sizing; improved mechanical power transmission, efficiency of driven equipment	Measures	Program	National			
I-14	Industry	Technological innovation	Mongolia	Introduce dry-processing in cement industry	Measures	Project	local			
I-15	Industry	Technological innovation	Macedonia	Introduce up-to-date technologies and processes	Measures	Program	National			
I-16	Industry	Technological innovation	Macedonia	Improve performace of thermal cycle	Measures	Program	National			
I-17	Industry	Technological innovation	Tunisia	Reduce N2O emissions from phosphate industry	Measures	Program	National			
T-1	Transportation	Biofuel	Ghana	Promote the production and use of bio-fuels as transport fuel	Measures	Program	National			
T-2	Transportation	Biofuel	Madagascar	Promote the exploitation and use of biofuels	Measures	Program	National			
T-3	Transportation	Biofuel	Sierra Leone	Develop biofuels from sugarcane, corn, rice husk etc	Measures	Program	National			
T-4	Transportation	Biofuel	Macedonia	Promote use of biodiesel	Measures	Program	National			
T-5	Transportation	Biofuel	Macedonia	Introduce biofuels	Measures	Program	National			
T-6	Transportation	Biofuel	Togo	Promote biofuels	Measures	Program	National			
T-7	Transportation	Biofuel	Chad	Promoting the exploitation and use of biofuels	Measures	Program	National			
T-8	Transportation	Financial measure	Mongolia	Introduce vehicle registration tax	Measures	Law/ regulation	National			
T-9	Transportation	General policy and measure	Tunisia	Develop energy efficiency program in tranport sector	Measures	Program	National			
T-10	Transportation	General policy and measure	Gabon	Promotion of clean transport: import and sale of used vehicles less than 5-years old	Measures	Program	National			
T-11	Transportation	General policy and measure	Ghana	Vehicle technology: promote the use of Euro III and above as well as use Flexi Vehicles;	Measures	Program	National			
T-12	Transportation	General policy and measure	Macedonia	Modernize vehicle fleet	Measures	Program	National			
T-13	Transportation	General policy and measure	Macedonia	Promote use of hybrid vehicles	Measures	Program	National			
T-14	Transportation	General policy and measure	Macedonia	Improve traffic planning	Measures	Program	National			
T-15	Transportation	General policy and measure	Macedonia	Improve traffic control and organization	Measures	Program	National			
T-16	Transportation	General policy and measure	Macedonia	Synchronize road signals in urban areas	Measures	Program	Local			
T-17	Transportation	General policy and measure	Macedonia	Introduce electric toll collection system	Measures	Program	National			
T-18	Transportation	General policy and measure	Tunisia	Create logistic center	Measures	Program	National			
T-19	Transportation	General policy and measure	Tunisia	Establish engine diagnostic plants in transport sector	Measures	Program	National			

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
T-20	Transportation	Natural gas use/ fuel switch	Gabon	Promotion of clean transport: development of quality public transportation with natural gas vehicle (bus)	Measures	Program	National			
T-21	Transportation	Natural gas use/ fuel switch	Ghana	Fuel use: substitute the use of gasoline with CNG, LPG and electricity for public transport	Measures	Program	National			
T-22	Transportation	Natural gas use/ fuel switch	Ghana	Vehicle technology: institute measures to promote and switch from the use of gasoline and diesel fuels to use of CNG, LPG and electricity for public transport	Measures	Program	National			
T-23	Transportation	Natural gas use/ fuel switch	Armenia	Expansion of electrical transport	Measures	Program	National			
T-24	Transportation	Natural gas use/ fuel switch	Armenia	Increase of the natural gas share in motor transports fuel	Measures	Program	National			
T-25	Transportation	Natural gas use/ fuel switch	Macedonia	Promote use of LPG, CNG	Measures	Program	National			
T-26	Transportation	Natural gas use/ fuel switch	Tunisia	Promote CNG in transport sector	Measures	Program	National			
T-27	Transportation	Public information	Cote d'Ivoire	Conduct awareness-raising campaigns to encourage the transport and industrial sectors to adopt clean means of production and consumption	Measures	Program	National			
T-28	Transportation	Public transport	Mauritania	Energy efficiency in urban and rural settings - reduction of energy consumption: promotion of public transport	Measures	Program	National			
T-29	Transportation	Public transport	Benin	Development of public transport in Cotonou city and its agglomeration in order to reduce GHG emissions	Measures	Project	Local			
T-30	Transportation	Public transport	Ethiopia	Railway Projects with Trains to Run with Electricity Generated from Renewable Energy: Route 1 :(Addis Ababa-Modjo-Awash, 656 Km); Route 2 :(Modjo-Shashemene-Awassa–Konso–Woyito – including Konso–Moyale, 903 km), Route 3: (Addis Ababa–Ejaji–Jimma–Guraferda)	Measures	Project	Local			
T-31	Transportation	Public transport	Sierra Leone	Improve the use of mass transport (eg. Road and water) for passengers and cargo	Measures	Program	National			
T-32	Transportation	Public transport	Macedonia	Modernize public transport	Measures	Program	National			
T-33	Transportation	Public transport	Macedonia	Introduce electric tramway	Measures	Program	National			
T-34	Transportation	Public transport	Togo	Improve public transport	Measures	Program	National			
T-35	Transportation	Public transport	Tunisia	Introduce and promote subway	Measures	Program	National			
T-36	Transportation	Public transport	Tunisia	Introduce and promote train	Measures	Program	National			
T-37	Transportation	Public transport	Tunisia	Introduce and promote bus in dedicated lanes	Measures	Program	National			

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
T-38	Transportation	Public transport	Ghana	Service; incentive the use of public transport and promote car pooling	Measures	Program	National			
T-39	Transportation	Public transport	Ghana	Services: develop and improve facilities for public transport system	Measures	Program	National			
T-40	Transportation	Public transport	Morocco	Urban transport development: Regional Express Casablanca in 2009-2014; potential mitigation: 880 Kt CO2 per year	Measures	Project	Local			
T-41	Transportation	Public transport	Morocco	Tramway service in Rabat 2010; potential mitigation: 119 kt CO2 per year.	Measures	Program	Local			
T-42	Transportation	Standard	Ghana	Fuel use: enforced road worthiness certification requirements	Measures	Program	National			
T-43	Transportation	Standard	Mongolia	Introduce import standards for import vehicles	Measures	Law/ regulation	National			
T-44	Transportation	Standard	Sierra Leone	Develop and enforce regulations on regular maintenance of vehicles	Measures	Law/ regulation	National			
T-45	Transportation	Standard	Macedonia	Regulate traffic in central urban areas	Measures	Program	Local			
T-46	Transportation	Standard	Macedonia	Regulate transport fuel quality in accordance with EU norms	Measures	Law/ regulation	National			
T-47	Transportation	Standard	Central African Republic	Control of emissions from motor vehicles	Measures	Law/ regulation	National			
T-48	Transportation	Standard	Republic of Congo	Control of vehicle emissions	Measures	Law/ regulation	National			
T-49	Transportation	Standard	Morocco	Strengthening technical inspections of vehicles in the technical centers 2008-2012; potential mitigation: 54 Kt CO2 per year	Measures	Law/ regulation	National			
T-50	Transportation	Technological innovation	Jordan	Jordan armed forces and air force environment strategy and action plans: including the upgrade of engines and old vehicles; by developing environment best practices and energy saving technologies in there facilities and bases	Measures	Program	National			
T-51	Transportation	Transportation infrastructure	Republic of Congo	Rehabilitation of transport infrastructure and electrical energy and drinking water distribution	Measures	Project	National			
T-52	Transportation	Transportation infrastructure	Ghana	Infrastructure / modes: expand road, and developed infrastructure for and promote rail, maritime, air and inland water transportation systems	Measures	Program	National			

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
T-53	Transportation	Transportation infrastructure	Ghana	Infrastructure / modes: improve road conditions by increasing the percent of paved road	Measures	Program	National			
T-54	Transportation	Transportation infrastructure	Ghana	Infrastructure / modes: expand infrastructure for non-motorized transport	Measures	Program	National			
T-55	Transportation	Transportation infrastructure	Madagascar	Introduce and develop less polluting means of transport: intermediate means of transport, railed urban public transport, improvement of transport vectors	Measures	Program	National			
T-56	Transportation	Transportation infrastructure	Jordan	Aqaba port project: by moving the port south to the Saudi border, thus cutting back significantly the distance for the ships to travel in Jordan water and congestion in the city of Aqaba	Measures	Project	Local			
T-57	Transportation	Transportation infrastructure	Ghana	Fuel use: retrofit existing refinery infrastructure and ensure that new refinery produce non-metallic based gasoline	Measures	Program	National			
T-58	Transportation	Transportation infrastructure	Tunisia	Develop urban transport plans in main cities	Measures	Program	National			
T-59	Transportation	Transportation infrastructure	Tunisia	Develop transport of trucks by railways	Measures	Program	National			

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
T-60	Transportation	Transportation infrastructure	Jordan	Jordan railway project: start design and feasibility study	Measures	Project	National			
T-61	Transportation	Transportation infrastructure	Jordan	Amman-Zarqa light rail project: to improve urban transport standards in greater Amman-Zarqa metropolitan area; reduce pollution and cut back vehicles emission; by introducing an environmentally friendly transport system	Measures	Project	Local			
T-62	Transportation	Transportation infrastructure	Jordan	Build and develop the Amman dry port south of the city on an 80m new ring road to create a new corridor which aims to reduce congestion of trucks and pollution	Measures	Project	Local			
T-63	Transportation	Transportation infrastructure	Jordan	Modernize the freight transport fleet operating in Jordan: stop importing old trucks and transform gradually into a modern efficient fleet	Measures	Program	National			
T-64	Transportation	Transportation infrastructure	Macedonia	Revitalize of road and railways	Measures	Program	National			
T-65	Transportation	Transportation infrastructure	Macedonia	Improve maintenance of road and railways	Measures	Program	National			
T-66	Transportation	Transportation infrastructure	Macedonia	Extend electrification of the railway network	Measures	Program	National			
T-67	Transportation	Transportation infrastructure	Tunisia	Develop multi-modal transport	Measures	Program	National			
T-68	Transportation	Transportation infrastructure	Morocco	Remodeling of vehicle transport by trucks and taxis by introducing new vehicles in the year 2008-2012; potential mitigation: 501 kt CO2 per year	Measures	Program	National			
T-69	Transportation	Transportation infrastructure	Morocco	Promotion of rail development for the TGV routes and electrification of Casablanca Tanger-Fes - Oujda	Measures	Project	Local			
T-70	Transportation	Transportation infrastructure	Morocco	Implementation of plans for urban and long distance displacement, ensuring consistency with the planning of land use	Measures	Program	National			
T-71	Transportation	Transportation infrastructure	Chad	Development of less polluting transport modes	Measures	Program	National			
M-1	Misc./cross-cutting	General policy and measure	Eritrea	Formulate, implement, publish and regularly update national and, where appropriate, regional programs containing measures to mitigate climate change	Measures	Program	National			
M-2	Misc./cross-cutting	General policy and measure	Colombia	Take advantage of existing flexibility mechanisms, particularly the Clean Development Mechanism CDM, for which Colombia has a portfolio of projects that have an estimated annual reduction potential of 17.4 million tonnes of CO2.	Measures	Policy	National			

NAMA Matrix of Other Parties

No.	Sector	Sub-sector	Party	NAMA	Category	Sub-category	Boundary	Reference Scenario	NAMA Target	Condition
M-3	Misc./cross-cutting	Public information	Eritrea	Promote and cooperate in education, training and public awareness related to climate and encourage the wildest participation in this process, including that of non-governmental organizations	Measures	Program	National			
M-4	Misc./cross-cutting	Study	Republic of Congo	Creation of a national observatory on the environment	Measures	Project	National			
M-5	Misc./cross-cutting	Study	Republic of Congo	Installation of a control station on atmospheric pollution, water and soil quality	Measures	Project	National			
M-6	Misc./cross-cutting	Study	Republic of Congo	Installation of a relay station for the reception of satellite imagery	Measures	Project	National			
M-7	Misc./cross-cutting	Study	Eritrea	Research, develop, demonstrate, apply, diffuse and transfer of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases not controlled by the Montreal Protocol in the energy, transport, industry, agiculture	Measures	Program	National			
M-8	Misc./cross-cutting	Study	Eritrea	Mainstream climate change considerations in Eritrea's relevant social, economic and environmental policies and actions to mitigate or adapt to climate change	Measures	Policy	National			
M-9	Misc./cross-cutting	Study	Eritrea	Promote and cooperate in scientific, technological, socio-economic and other research, systematic observation related to the climate system	Measures	Program	National			
M-10	Misc./cross-cutting	Study	Eritrea	Develop data archives related to the climate system and intended to further the understanding and to contribute to reduction of the remaining uncertainties regarding the cause, effects, magnitude and timing of climate change and the economic and social consequences of various response strategies	Measures	Program	National			
M-11	Misc./cross-cutting	Study	Eritrea	Promote and cooperate in the exchange of relevant scientific, technological, socio-economic, and legal information related to the climate system and climate change, and to the economic and social consequences of various response strategies	Measures	Program	National			

No.	Category	Sub-sector	Party	NAMA
C-1	Condition	Baseline/ reference scenario	Botswana	To establish the baseline through capacity building activities
C-2	Condition	Baseline/ reference scenario	Georgia	To establish baseline or reference case against which the action be measured, reported, verified.
C-3	Condition	General	Afghanistan	Preparation of the Initial National Communication (INC) including specific mitigation strategies and activities appropriate for the national context
C-4	Condition	General	Afghanistan	Completion of national GHG inventory
C-5	Condition	General	Central African Republic	Installation of a relay station for the reception of satellite imagery
C-6	Condition	General	Central African Republic	Creation of a national observatory on the environment
C-7	Condition	General	Cote d'Ivoire	Implement an environmental surveillance system to control air, water and soil quality
C-8	Condition	General	Cote d'Ivoire	Elaborate and carry out a national strategy to reduce the risks of hazards
C-9	Condition	General	Georgia	To develop a low carbon growth plan and low carbon strategy, in particular through the use of renewable energy investments and global cooperation.
C-10	Condition	NAMA	Botswana	To conduct analysis of mitigation options
C-11	Condition	NAMA	Botswana	To develop a long term mitigation and adaptation strategy (LTMAS) to assess mitigation potential
C-12	Condition	NAMA	Georgia	To establish NAMAs in the context of sustainable development, supported and enabled by technology and capacity-building, in a MRV-able manner.
C-13	Condition	NAMA	Georgia	To achieve a MRV-able deviation from the baseline (below BAU levels) supported and enabled by technology and capacity-building.

No.	Category	Sub-sector	Party	NAMA
N-1	Carbon neutral	-	Bhutan	To remain carbon neutral being pursuant to "the Declaration of the Kingdom of Bhutan – Land of Gross Happiness to save our Planet"
N-2	Carbon neutral	-	Costa Rica	To achieve carbon neutral (transport, energy, forestry, waste management): estimation and incremental costs for implementation currently underway
N-3	Carbon Neutral	-	Maldives	Achieve carbon neutrality as a country by 2020
N-4	Carbon Neutral	-	Papua New Guinea	Achieve carbon neutrality as a country by 2050

No.	Sector	Sub-sector	Party	NAMA Target (by 2020)	NAMA	Reference Scenario	Condition
T-1	Target	All	China	40-45%: Intensity Target (Per unit of GDP)	Achieve NAMA target through increasing the share of non-fossil fuels in primary energy consumption to around 15% by 2020	2005	
T-2	Target	All	India	20-25%: Intensity Target (Per unit of GDP)	Achieve NAMA target	2005	excluding the emissions from agricultural sector
T-3	Target	All	Antigua Barbuda	25%: Absolute target	Achieve NAMA target through 1) Pursuing low carbon, green growth development strategy (2010-2015), and 2) Development and implementation of nationally appropriate adaptation plans, programs and projects, and capacity building communication through national communication	1990	
T-4	Target	All	Brazil	36.1% to 38.9%: Absolute target	Achieve NAMA target through; energy efficiency, increase the use of biofuels, increase un energy supply by hydroelectric power plants, alternative energy sources and improvement of iron /steel manufacture (application of coal from planted forests) (and reduction in amazon deforestation, reduction in "Cerrado" deforestation, restoration of grazing land, integrated crop-livestock system, no-till farming, biological N_2 fixation)	BAU	
T-5	Target	All	Chile	20% by 2020: Absolute target	Achieve NAMA target mainly such sectors as energy efficiency, renewable energy, land use change and forestry	BAU	
T-6	Target	All	Indonesia	26% by 2021: Absolute target	Achieve NAMA target through; promotion of energy efficiency, development and alternative and renewable energy sources, and shifting to low-emission transportation mode (and sustainable peat land management, reduction in rate of deforestation and land degradation, development of carbon sequestration projects in forestry and agriculture, reduction in solid and liquid waste)	BAU	
T-7	Target	All	Israel	20% by 2022: Absolute target	Reduction of 20% by 2020 (reference: BAU): main actions for achieving reduction target include; 10% renewable energy for electricity generation by 2020 and 20% reduction of electricity consumption by 2020	BAU	
T-8	Target	All	Korea	30%: Absolute target	Achieve NAMA target	BAU	
T-9	Target	All	Marshall Islands	40%: Absolute target	Achieve NAMA target	2009	Pursuant to the 2009 National energy Policy and Energy Action Plan
T-10	Target	All	Mexico	Up to 30% by 2020: Absolute target	Achieve NAMA target	BAU	Provision of adequate financial and technological support from developed countries
T-11	Target	All	Moldova	No less than 25%: Absolute target	Achieve NAMA target	1999	
T-12	Target	All	Papua New Guinea	At least 50% by 2030: Absolute target	Achieve NAMA target	N/A	Interim Nature of the Copenhagen Accord, Need for Legally Binding Treaty, Delivery on Pledges and Potential, Enabling Climate Compatible Development, Periodic Review and Update

T-13	Target	All	Singapore	16%: Absolute target	Achieve NAMA target	BAU	All countries implement their commitments
T-14	Target	All	South Africa	34% by 2020, 42% by 2025: Absolute target	Achieve NAMA target	BAU	Provision of financial resources, the transfer of technology and capacity building support by developed countries

Annex 6 NAMA Long List evaluation result

Sub-sector	No.	NAMA Title / Measure to be Introduced	1st Screening							Result of 1st Screening	Remarks on 1st Screening Analysis
			Basic Condition					General			
			Distinctiveness	Information availability	No double-counting	Timeline	Voluntary participation	Compliance	GHG reduction potential		
Energy	1	Construction of a 790 MW Ultra Supercritical Lignite Power Plant TPP Nikola Tesla - Unit B3	Scope and contents of the mitigation action is clearly defined including the location and type of activities.	Pre FS including general design is completed. Enough information is available in order to analyze how the action contributes to GHG emission reduction, how to calculate the reduction amount, and what the BAU scenario is.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	The mitigation action has not started yet. According to the project schedule, construction is planned to start in 2013, and operation and emission reduction will start in 2017.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	Priority directions of the energy sector development in the "Energy Strategy Development Strategy of the Republic of Serbia by 2015" include construction of a new lignite fueled thermal power plant (700MWe / 4800GWh) in 2011/ 2012.	By increasing energy efficiency of the lignite power plant, new power plant will emit less GHGs than that from the conventional inefficient lignite power plants.	✓	**All 1st screening criteria are satisfied.**
Energy	2	Modernization and Capacity and Efficiency Increase of Unit B2 in Thermal Power Plant Nikola Tesla	Scope and contents of the mitigation action is clearly defined including the location and type of activities.	Feasibility Study with Idea Design for the project is under development. However, enough information is available in order to analyze how the action contributes to GHG emission reduction, how to calculate the reduction amount, and what the BAU scenario is.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure Implementing entity does not apply to CDM or any other carbon scheme in the future .	The mitigation action has not started yet. According to the project schedule, modernization is planned in 2013, and emission reduction will start in 2013.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	Modernization is in line with "Energy Development Strategy of the Republic of Serbia by 2015"	Reduction of GHGs will be achieved by increasing energy efficiency of the existing lignite-fired power plant.	✓	**All 1st screening criteria are satisfied.**
Energy	3	Modernization and Capacity and Efficiency Increase of Unit A3 in Thermal Power Plant Nikola Tesla	Scope and contents of the mitigation action is clearly defined including the location and type of activities.	Feasibility Study with Idea Design for the project is under development. However, enough information is available in order to analyze how the action contributes to GHG emission reduction, how to calculate the reduction amount, and what the BAU scenario is.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future .	The mitigation action has not started yet. According to the project schedule, modernization is planned in 2013, and emission reduction will start in 2013.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	Modernization is in line with "Energy Sector Development Strategy of the Republic of Serbia by 2015"	Reduction of GHGs will be achieved by increasing energy efficiency of the existing lignite-fired power plant.	✓	**All 1st screening criteria are satisfied.**
Energy	4	Replacement and Construction of a New Natural Gas Cogeneration Plant CHP Novi Sad	Scope and contents of the mitigation action is clearly defined including the location and type of activities.	Pre FS including general design is completed. Enough information is available in order to analyze how the action contributes to GHG emission reduction, how to calculate the reduction amount, and what the BAU scenario is.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	Construction is planned for 2012, while operation starts for 2014, that will be the year for start of emissions reduction.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	Activity is in line with Energy strategy and INC.	GHG emissions reduction will be achieved through installation of high-efficient CCGT heat and power generation plant	✓	**All 1st screening criteria are satisfied.**
Energy	5	Construction of a Super-critical Lignite Power Plant	Scope and contents of the mitigation action is clearly defined including the location and type of activities.	Pre FS including general design is completed. Enough information is available in order to analyze how the action contributes to GHG emission reduction, how to calculate the reduction amount, and what the BAU scenario is.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	The mitigation action has not started yet. According to the project schedule, construction is planned to start in 2015 and operation and emission reduction will start in 2020	Implementing entity is willing to be a NAMA implementing entity according to the interview.	Regulation on establishing the program for realizing the power supply development strategy for the Republic of Serbia up to year 2015 for the period from 2007 to 2012, Official Gazette of the Republic of Serbia No. 11/2007, 11/2007, 99/2009 and 27/2010.	GHG emissions reduction will be achieved through construction of high-efficient power plant using super critical steam power generation technology, which will reduce GHG that would be emitted by the conventional less-efficient lignite power plants. However, emissions associated with the reduced amount of electricity generation at the thermal power plant needs to be further analyzed.	✓	**All 1st screening criteria are satisfied.**

* Shaded cells indicate the NAMA candidate fulfills a screening criteria.

Sub-sector	No.	NAMA Title / Measure to be Introduced	1st Screening							Result of 1st Screening	Remarks on 1st Screening Analysis
			Basic Condition					General			
			Distinctiveness	Information availability	No double-counting	Timeline	Voluntary participation	Compliance	GHG reduction potential		
Energy	6	Introduction of combined source (electricity and thermal) for decentralized source	Mitigation action is not developed into specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Activity is in line with Energy strategy and INC.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission.		The action is **not analyzed any further** because: There is no concrete action planned in line with the country's national policy/ strategy and general characteristic of the technology/ measure to be introduced is unknown.
Energy	7	Construction of 9 New Small Hydropower Plants (HPPs) in Serbia	Scope and contents of the mitigation action is clearly defined including the location and type of activities.	Enough information is available in order to analyze how the action contributes to GHG emission reduction, how to calculate the reduction amount, and what the BAU scenario is.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	The mitigation action has not started yet. According to the project schedule, construction is planned to start in 2012 and operation and emission reduction will start in 2013 for Phase I.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	Modernization is in line with "Energy Sector Development Strategy of the Republic of Serbia by 2015" and INC.	GHG emissions reduction will be achieved through rehabilitation of existing HPPs and construction of new HPPs.	✓	**All 1st screening criteria are satisfied.**
Energy	8	Biogas production from agricultural waste	Mitigation action is not developed into specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	The measure is in line with Initial National Communication of Serbia.	GHG emission reduction will be achieved through avoiding methane emissions that would be generated from abandoned agricultural waste, as well as through utilization of abandoned biomass as a renewable fuel source for energy generation.		The activity **should be continuously monitored** whether a real action/ project is developed because Serbia has abundant agricultural waste throughout the country that can be developed into biogas energy projects.
Energy	9	Collection and utilization of landfill gas	Mitigation action is not developed into specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Proposed mitigation action is in line with The Strategy of Energy Development in the Republic of Serbia by 2015 (Official Gazette of RS, no. 4405): use of renewable energy and energy recovery.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through collection and utilization of landfill gas		The activity **should be continuously monitored** whether other real action/ projects are developed because each local government is currently using landfill to handle municipal wastes.
Energy	10	Landfill gas capture and electricity generation in Landfill Vinča (Belgrade)	Although the mitigation action is developed into a specific project, detailed scope and content of the action is not defined, including the current and expected condition/ treatment method of the municipal solid waste, amount of electricity generated from the waste.	Although information on how mitigation action will reduce GHG is available, basic information that can be used to analyze how emission reduction can be calculated, and what BAU is are not available.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future .	The mitigation action has not started yet. Project schedule is yet to be determined.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	Proposed mitigation action is in line with The Strategy of Energy Development in the Republic of Serbia by 2015 (Official Gazette of RS, no. 4405): use of renewable energy and energy recovery.	Reduction of GHG will be achieved by building a facility for landfill capture and electricity generation, which will displace the electricity that would be generated from other more carbon-intensive sources. Methane emissions from landfill site can also be avoided.		The activity **should be continuously monitored** whether sufficient data and information of the proposed project is available.

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Sub-sector	No.	NAMA Title / Measure to be Introduced	1st Screening							Result of 1st Screening	Remarks on 1st Screening Analysis
			Basic Condition					General			
			Distinctiveness	Information availability	No double-counting	Timeline	Voluntary participation	Compliance	GHG reduction potential		
Energy	11	Landfill gas capture and electricity generation in Landfill Novi Sad	Although the mitigation action is developed into a specific project, detailed scope and content of the action is not defined, including the current and expected condition/ treatment method of the municipal solid waste, amount of electricity generated from the waste.	Although information on how mitigation action will reduce GHG is available, basic information that can be used to analyze how emission reduction can be calculated, and what BAU is are not available.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	The mitigation action has not started yet. Operation is planned for January, 2012.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	Proposed mitigation action is in line with The Strategy of Energy Development in the Republic of Serbia by 2015 (Official Gazette of RS, no. 4405): use of renewable energy and energy recovery.	Reduction of GHG will be achieved by building a facility for landfill capture and electricity generation, which will displace the electricity that would be generated from other more carbon-intensive sources. Methane emissions from landfill site can also be avoided.		The activity **should be continuously monitored** whether sufficient data and information of the proposed project is available.
Energy	12	Collect and utilize of landfill gas: Nis	Scope and contents of the mitigation action is clearly defined including the location and type of activities.	CDM-PDD for the project provides enough information necessary to analyze how the action contributes to GHG emission reduction, how to calculate the reduction amount, and what the BAU scenario is.	The project is applying to CDM. The action needs to monitored to ensure the project is registered as a CDM project activity.	This mitigation action will generate emission reduction by 2020	Implementing entity has decided to conduct the mitigation action as a CDM project activity.	Proposed mitigation action is in line with The Strategy of Energy Development in the Republic of Serbia by 2015 (Official Gazette of RS, no. 4405)	The mitigation action will lead to the reduction of GHG emission through collection and utilization of landfill gas.		The action is **not analyzed further** because: The mitigation action will apply to CDM, and thus the action will not be listed on a NAMA short list in order to avoid double country of carbon emission reduction between NAMA and CDM. The action and related actions should be continuously monitored in case it is not registered as CDM project.
Energy	13	Increase the energy efficiency in the production, distribution and utilization of energy by end-consumers of energy-related service	Mitigation action is not developed into specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Mitigation action is in line with Energy Sector Development Strategy	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through rehabilitation of boiler room, heating pipes, distribution networks and house substations.		The activity **should be continuously monitored** whether a real action/ project is developed.
Energy	14	Replacement of electricity transmission and distribution lines	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not identified, Serbia has a plan to replace existing transmission and distribution network to reduce distribution loss. This action is potentially an important mitigation measure that is in line with Energy Sector Development Strategy.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through replacement of old transmission and distribution system network to reduce distribution loss.		The activity **should be continuously monitored** whether a real action/ project is developed because Serbian electricity grid suffers a high percentage of electricity transmission/ distribution loss that can be improved significantly.

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Sub-sector	No.	NAMA Title / Measure to be Introduced	1st Screening							Result of 1st Screening	Remarks on 1st Screening Analysis
			Basic Condition					General			
			Distinctiveness	Information availability	No double-counting	Timeline	Voluntary participation	Compliance	GHG reduction potential		
Energy	15	Introduction of Metering System and Billing on the Basis of Measured Consumption in District Heating Systems in Serbia	Scope and contents of the mitigation action is clearly defined including the location and type of activities. Exact locations and building to be installed with the device has been identified yet.	Enough information is available in order to analyze how the action contributes to GHG emission reduction, how to calculate the reduction amount, and what the BAU scenario is.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	The mitigation action has not started yet. According to the project schedule, construction is planned to start in 2012 and operation and emission reduction will start in 2016	Implementing entity is willing to be a NAMA implementing entity according to the interview.	Proposed mitigation action is in line with The first Energy efficiency plan of the Republic of Serbia for the period from 2010 to 2012: Billing on the basis of actual (measured) consumption of energy by consumers connected to district heating system. Reduction of heating energy consumption by providing individual metering of heat consumption.	Reduction of GHG emissions in the public sector for the central distribution of heat and hot water is achieved by introducing a heat metering system and payment for the consumed energy. Reduction of heat consumption in residential buildings connected to DH system is expected to be around 20%.	✓	**All 1st screening criteria are satisfied.**
Energy	16	Construction of new natural gas based thermal power units	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	The measure is in line with Initial National Communication of Serbia.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through construction of new thermal power unit with natural gas instead of lignite.		The activity **should be continuously monitored** whether a real action/ project is developed because Serbia has a strategy to increase the use of natural gas after gas pipeline construction is realized.
Energy	17	Fuel switch in heat distribution plants: from coal/ heavy oil to biomass	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	The measure is in line with Initial National Communication of Serbia.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through fuel switch from coal or heavy oil to renewable biomass resource.		The activity **should be continuously monitored** whether a real action/ project is developed because Serbia has set a strategy to introduce biomass sources that exist throughout the country to preserve energy reserves.
Energy	18	Introduction of contemporary technology in the heat distribution system	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	The measure is in line with Initial National Communication of Serbia.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through introduction of temporary technology in the heat distribution system		The activity **should be continuously monitored** whether a real action/ project is developed because there is a large potential in energy consumption reduction in heat distribution system of Serbia.
Energy	19	Introduction of contemporary technology for consumer	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	The measure is in line with Initial National Communication of Serbia.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through introduction of contemporary technology for consumer		The activity **should be continuously monitored** whether a real action/ project is developed.
Energy	20	New technologies of combustion of low quality coals, biomass and waste	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Proposed mitigation action is in line with The Strategy of Energy Sector Development in the Republic of Serbia by 2015.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through introduction of new technologies of combustion of low quality coals, biomass and waste.		The action is **not analyzed further** because: There is no concrete action planned in line with the country's national policy/ strategy and general characteristic of the technology/ measure to be introduced is unknown.

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Sub-sector	No.	NAMA Title / Measure to be Introduced	1st Screening							Result of 1st Screening	Remarks on 1st Screening Analysis
			Basic Condition					General			
			Distinctiveness	Information availability	No double-counting	Timeline	Voluntary participation	Compliance	GHG reduction potential		
Energy	21	Construction of wind farm	Scope and contents of the mitigation action is clearly defined including the location and type of activities. Exact locations and building to be installed with the device has been identified yet.	Enough information is available in order to analyze how the action contributes to GHG emission reduction, how to calculate the reduction amount, and what the BAU scenario is.	The activity will apply to CDM.	The mitigation action has not started yet. Emission reduction will occur before 2020.	The activity will apply to CDM.	Construction of wind power plant is in line with Energy Sector Development Strategy.	Although this action will apply to CDM scheme, this action will lead to the reduction of GHG emission through displacing electricity generation from grid-connected power plants.		The action is **not analyzed further** because: The mitigation action will apply to CDM, and thus the action will not be listed on a NAMA short list in order to avoid double counting of carbon emission reduction between NAMA and CDM. The action and related actions should be continuously monitored in case it is not registered as CDM project.
Energy	22	Installation of solar power generator	A mitigation action is a distinctive project but detailed scope and location of the project is not available.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Proposed mitigation action is in line with The Strategy of Energy Sector Development in the Republic of Serbia by 2015 (Official Gazette of RS, no. 4405)	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through installation of solar panels		The activity **should be continuously monitored** whether a real action/ project is developed because Serbia has been promoting the introduction of new and renewable energy such as solar power.
Energy	23	Installation of 5MW photovoltaic panels in Cagetina	Mitigation action is not developed into specific project activity. There is lack of information on type of activities.	There is lack of data and information needed for Assessment of mitigation related potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Proposed mitigation action is in line with The Strategy of Energy Sector Development in the Republic of Serbia by 2015 (Official Gazette of RS, no. 4405)	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through installation of solar panels, which will replace consumption of fossil fuel.		The activity **should be continuously monitored** whether a real action/ project is developed because Serbia has been promoting the introduction of new and renewable energy including solar power.
Energy	24	Introduction 1000 MW of Small Biomass Boilers in Serbia	Although the detailed sites are to be identified, general scope and content of the mitigation action is clearly defined.	Enough information is available to analyze how the action contributes to GHG emission reduction, and what the BAU scenario is. Also data for preliminary estimation of GHG emission reduction is available.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	The set of actions is expected to be constructed and start operation by 2018.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	Proposed mitigation action is in line with The Strategy of Energy Sector Development in the Republic of Serbia by 2015 (Official Gazette of RS, no. 4405)	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through construction of mall-scale thermal power unit using biomass.	✓	**All 1st screening criteria are satisfied.**
Energy	25	Use of geothermal energy for heating	Mitigation action is not developed into specific project activity. There is lack of information on type of activities.	There is lack of data and information needed for Assessment of mitigation related potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not clear, Serbia is promoting introduction of renewable energy including wind power. This action is potentially an important mitigation measure is in line with Energy Sector Development Strategy of Serbia.	Although the detail of the action is not clear, a potential action will lead to the reduction of GHG emission through the usage of renewable energy.		The activity **should be continuously monitored** whether a real action/ project is developed because Serbia has abundant geothermal resources throughout the country that can be used for heating purposes and related actions can be developed in line with national strategy of renewable energy promotion.

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			Basic Condition					General			
			Distinctiveness	Information availability	No double-counting	Timeline	Voluntary participation	Compliance	GHG reduction potential		
Energy	26	Use of Solar Energy for Domestic Hot Water Production in Heating Plant Cerak in Belgrade	Scope and contents of the mitigation action is clearly defined including the location and type of activities.	Enough information is available in order to analyze how the action contributes to GHG emission reduction, how to calculate the reduction amount, and what the BAU scenario is.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	Construction is planned for 2012, and operation starts in 2014, that will be the year for start of emissions reduction.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	Proposed mitigation action is in line with The Strategy of Energy Sector Development in the Republic of Serbia by 2015 (Official Gazette of RS, no. 4405)	Reduction of GHG will be achieved by replacing natural gas consumption with renewable energy source for water heating.	✓	**All 1st screening criteria are satisfied.**
Energy	27	Anaerobic treatment of animal manure from small and medium size farms	Mitigation action is not developed into specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the action is in line with the National Waste Management Strategy (2010-2019) ("Official Gazette of RS" no. 29/2010), the action is not related to energy efficiency improvement.	Evaluation could not be conducted because the nature of the action is not clear; GHG emissions reduction/ increase depends on the condition of anaerobic treatment.		The action is **not analyzed further** because: There is no concrete action planned in line with the country's national policy/ strategy and general characteristic of the technology/ measure to be introduced is unknown.
Energy	28	Using of Waste Heat from Power Plant for Heating the City of Belgrade, Serbia	Scope and contents of the mitigation action is clearly defined including the location and type of activities.	The Project has been continuously considered since 1981. The General design was finished in 1980s and construction of pipeline started in 1990s, but it is not finished. Sufficient data and information on activity is available.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	Construction is planned for 2013, and operation starts in 2016, that will be the year for start of emissions reduction.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	Activity is in line with Regulation on Establishing The Power Supply Development Strategy for the Republic of Serbia up to year 2015 for the period from 2007 to 2012. 1) Long-term heating solution for the city of Belgrade, 2) Reduction in energy dependence of the city of Belgrade on expensive imported natural gas with the cheaper domestically produced lignite, 3) Savings in fuel with using combined energy generation	GHG emissions reduction will be achieved through installation of pipeline for efficient use of abandoned heat energy, which will reduce GHG that would be emitted from heat plants (energy saving of natural gas and heavy oil) in the absence of the activity.	✓	**All 1st screening criteria are satisfied.**
Energy Industry	29	Awareness raising for energy efficiency improvement	Scope and contents of the mitigation action is clearly defined including the type of activities.	Information and data to estimate GHG emission reduction potential is not available.	The activity has not applied to CDM or any other type of carbon market scheme.	The mitigation action has completed with the support from Norway government. No similar activity is planned.	Mitigation action completed.	In compliance with First Energy Efficiency Plan 2010-2012 p42, p44	The mitigation measure will indirectly lead to the emission reduction in a long term; however, double-counting needs to be avoided for emission reduction from actual mitigation measure resulting from the target measure.		The action is **not analyzed further** because: There is no another concrete action planned in line with the country's national policy/ strategy than the one already completed and general characteristic of the technology/ measure to be introduced is unknown. Also, appropriate MRV system must be carefully established (methodology to estimate emission reduction, measurement and verification methods, how to avoid double-counting with other actual measures associated with this measure)

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Sub-sector	No.	NAMA Title / Measure to be Introduced	1st Screening							Result of 1st Screening	Remarks on 1st Screening Analysis
			Basic Condition					General			
			Distinctiveness	Information availability	No double-counting	Timeline	Voluntary participation	Compliance	GHG reduction potential		
Industry	30	Rationalization of energy consumption and energy efficiency improvement in industry sector	Mitigation action is not developed into specific project activity. There is lack of information on specific location and type of activities. Further detailed scope will be identified once the related law is adopted.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not identified yet, Serbia is promoting Rationalization of consumption and increase in energy efficiency described in the First energy Efficiency Plan. This action is potentially an important mitigation measure is in line with such policy.	Although the detail of the action is not identified, such measures as automation process, monitoring, waste energy utilization, etc. have a potential to reduce emissions from industrial processes.		The action is **not analyzed further** because: There is no concrete action planned in line with the country's national policy and strategy and general characteristic of the action to be taken is unknown. Also, appropriate MRV system must be carefully established (methodology to estimate emission reduction, measurement and verification methods, how to avoid double-counting with other actual measures associated with this measure)
Industry	31	Fuel switch from liquid fuel to natural gas in industry sector	Mitigation action is not developed into specific project activity.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	The measure is in line with Initial National Communication of Serbia.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through substitution of liquid fuel with natural gas.		The activity **should be continuously monitored** whether a real action/ project is developed because Serbia has a strategy to increase the use of natural gas after gas pipeline construction is realized.
Industry	32	Fuel change/ mix in large factories (refineries, cement plants)	Mitigation action is not developed into specific project activity. There is lack of information on location and type of activities.	There is lack of data and information needed for Assessment of mitigation related potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	The action is in line with the National Waste Management Strategy (2010-2019) ("Official Gazette of RS" no. 29/2010).	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through fuel change/ mix in large factories (refineries, cement plants)		The activity **should be continuously monitored** whether a real action/ project is developed because Serbia has a strategy to increase the use of natural gas after gas pipeline construction is realized while oil refineries and cement plants are big consumers of energy.
Industry Public	33	Introduction of energy management system for industry and commercial entities	Mitigation action is not developed into specific project activity. There is a lack of information on details of the system. Further detailed scope will be identified once the related law is adopted.	There is a general lack of data and information necessary for assessment of mitigation potential. Details will be available once the new law/ regulation is adopted.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	In compliance with First Energy Efficiency Plan 2010-2012 p42, p45	The mitigation measure will indirectly lead to the emission reduction in a long term; however, double-counting needs to be avoided for emission reduction from actual mitigation measure resulting from the target measure.		The action **should be continuously monitored** whether the relevant legal system is adopted. However, appropriate MRV system must be carefully established (methodology to estimate emission reduction, measurement and verification methods, how to avoid double-counting with other actual measures associated with this measure)

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Sub-sector	No.	NAMA Title / Measure to be Introduced	1st Screening							Result of 1st Screening	Remarks on 1st Screening Analysis
			Basic Condition					General			
			Distinctiveness	Information availability	No double-counting	Timeline	Voluntary participation	Compliance	GHG reduction potential		
Industry Public	34	Energy audits in industry	Mitigation action is not developed into specific project activity. There is a lack of information on details of the system. Further detailed scope will be identified once the related law is adopted.	There is a general lack of data and information necessary for assessment of mitigation potential. Details will be available once the new law/ regulation is adopted.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	In compliance with First Energy Efficiency Plan 2010-2012 p42, p46	The mitigation measure will indirectly lead to the emission reduction in a long term; however, double-counting needs to be avoided for emission reduction from actual mitigation measure resulting from the target measure.		The action **should be continuously monitored** whether the relevant legal system is adopted. However, appropriate MRV system must be carefully established (methodology to estimate emission reduction, measurement and verification methods, how to avoid double-counting with other actual measures associated with this measure)
Industry	35	Incentive tariffs for highly efficient cogeneration in industrial companies	"Decree on incentive measures for electricity generation using renewable energy sources and for combined heat and power (CHP) generation" in regard to the Energy Law was enacted and came into effect since 2010. No further plan on strengthening the CHP plant efficiency is identified.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	In compliance with First Energy Efficiency Plan 2010-2012 p42, p47	The mitigation measure will indirectly lead to the emission reduction in a long term; however, double-counting needs to be avoided for emission reduction from actual mitigation measure resulting from the target measure.		The action **should be continuously monitored** whether the relevant legal system is adopted. However, appropriate MRV system must be carefully established (methodology to estimate emission reduction, measurement and verification methods, how to avoid double-counting with other actual measures associated with this measure)
Industry Building Public	36	Establishment of Energy Efficiency Fund	Mitigation action is not developed into specific project activity. There is a lack of information on details of the system. Further detailed scope will be identified once the related law is adopted.	There is a general lack of data and information necessary for assessment of mitigation potential. Details will be available once the new law/ regulation is adopted.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	In compliance with First Energy Efficiency Plan 2010-2012 p18, p23, p30, p38, p47	The mitigation measure will indirectly lead to the emission reduction in a long term; however, double-counting needs to be avoided for emission reduction from actual mitigation measure resulting from the target measure.		The action **should be continuously monitored** whether the relevant legal system is adopted. However, appropriate MRV system must be carefully established (methodology to estimate emission reduction, measurement and verification methods, how to avoid double-counting with other actual measures associated with this measure)
Industry Building Public	37	Introduction of credit lines on favorable terms for implementation of EEI measures in industry, households, and commercial buildings	Mitigation action is not developed into specific project activity. There is a lack of information on details of the system. Further detailed scope will be identified once the related law is adopted.	There is a general lack of data and information necessary for assessment of mitigation potential. Details will be available once the new law/ regulation is adopted.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	In compliance with First Energy Efficiency Plan 2010-2012 p19, p23, p31, p39, p48	The mitigation measure will indirectly lead to the emission reduction in a long term; however, double-counting needs to be avoided for emission reduction from actual mitigation measure resulting from the target measure.		The action **should be continuously monitored** whether the relevant legal system is adopted. However, appropriate MRV system must be carefully established (methodology to estimate emission reduction, measurement and verification methods, how to avoid double-counting with other actual measures associated with this measure)

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Sub-sector	No.	NAMA Title / Measure to be Introduced	1st Screening							Result of 1st Screening	Remarks on 1st Screening Analysis
			Basic Condition					General			
			Distinctiveness	Information availability	No double-counting	Timeline	Voluntary participation	Compliance	GHG reduction potential		
Industry	38	Introduction of technical measures for reducing thermal losses	Mitigation action is not developed into specific project activity. There is a lack of information on details of the system. Further detailed scope will be identified once the related law is adopted.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	In compliance with Energy Sector Development Strategy	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through introduction of technical measures for reducing thermal losses		The action **should be continuously monitored** whether the relevant legal system is adopted.
Transport	39	Re-establishment of an efficient international rail transport	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	The measure is in line with Initial National Communication of Serbia.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through re-establishment of an efficient international rail transport.		The activity **should be continuously monitored** whether a real action/ project is developed because emissions from road transport is expected to increase in Serbia and rail transport has big mitigation potential.
Transport	40	Increase of the level and the efficiency of river transport	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not identified, the First Energy Efficiency Plan describes the action as a potentially important mitigation measure.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through increase of the level and efficiency of river transport.		The activity **should be continuously monitored** whether a real action/ project is developed because emissions from road transport is expected to increase in Serbia and river transport has big mitigation potential.
Transport	41	Modal shift from passenger and freight road transport to railway and waterway	Mitigation action is not developed into specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not identified, the First Energy Efficiency Plan describes the action as a potentially important mitigation measure.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through reducing road transport for passenger and goods by increasing other transportation modes (railway, river way, etc.)		The activity **should be continuously monitored** whether a real action/ project is developed because emissions from road transport is expected to increase in Serbia and rail and river transports have big mitigation potential.
Transport	42	Introduction of up to date and highly efficient motor vehicle	Mitigation action is not developed into specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not identified, the First Energy Efficiency Plan describes the action as a potentially important mitigation measure.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through introduction of up to date and highly efficient motor vehicle		The activity **should be continuously monitored** whether a real action/ project is developed because emissions from road transport is expected to increase in Serbia, which has a big mitigation potential.
Transport	43	Introduction of European standards for energy efficiency in the transport sector	Mitigation action is not developed into specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not identified, the First Energy Efficiency Plan describes the action as a potentially important mitigation measure.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through introduction of European standards for energy efficiency in the transport sector		The activity **should be continuously monitored** whether a real action/ project is developed because emissions from road transport is expected to increase in Serbia, which has a big mitigation potential.

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Sub-sector	No.	NAMA Title / Measure to be Introduced	1st Screening							Result of 1st Screening	Remarks on 1st Screening Analysis
			Basic Condition					General			
			Distinctiveness	Information availability	No double-counting	Timeline	Voluntary participation	Compliance	GHG reduction potential		
Transport	44	Creation of an energy efficient transport system	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not identified, the First Energy Efficiency Plan describes the action as a potentially important mitigation measure.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through introduction of public energy efficient public transport system.		The activity **should be continuously monitored** whether a real action/ project is developed because emissions from road transport is expected to increase in Serbia, which has a big mitigation potential.
Transport	45	Promotion of eco-driving and low cost energy efficient measures in transport	Mitigation action is not developed into specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not identified, the First Energy Efficiency Plan describes the action as a potentially important mitigation measure.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through promotion of eco-driving and low cost energy efficient measures in transport		The activity **should be continuously monitored** whether a real action/ project is developed because emissions from road transport is expected to increase in Serbia, which has a big mitigation potential.
Transport	46	Introduction of road transport fleet management	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not identified, the First Energy Efficiency Plan describes the action as a potentially important mitigation measure.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through introduction of road transport fleet management		The action is **not analyzed further** because: There is no concrete action planned in line with the country's national policy/ strategy and general characteristic of the technology/ measure to be introduced is unknown.
Transport	47	Introduction of incentive mechanisms for the replacement of existing fleet	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	The First Energy Efficiency Plan describes the action as a potentially important mitigation measure.	The action will lead to the reduction of GHG emission through replacement of existing buses with more energy-efficient ones.		The activity **should be continuously monitored** whether a real action/ project is developed because emissions from road transport is expected to increase in Serbia, which has a big mitigation potential.
Transport	48	Installation of gasoline and diesel hybrid	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not identified, the First Energy Efficiency Plan describes the action as a potentially important mitigation measure.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through installation of gasoline and diesel hybrid		The action is **not analyzed further** because: There is no concrete action planned in line with the country's national policy/ strategy and general characteristic of the technology/ measure to be introduced is unknown.
Transport	49	Refurbishment of road structure	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not identified, the First Energy Efficiency Plan describes the action as a potentially important mitigation measure.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through refurbishment of road structure		The activity **should be continuously monitored** whether a real action/ project is developed because emissions from road transport is expected to increase in Serbia, which has a big mitigation potential.
Transport	50	Use of biofuels	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not identified, the First Energy Efficiency Plan describes the action as a potentially important mitigation measure.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through introduction of biofuels in transport sector.		The activity **should be continuously monitored** whether a real action/ project is developed because emissions from road transport is expected to increase in Serbia, which has a big mitigation potential.

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Sub-sector	No.	NAMA Title / Measure to be Introduced	1st Screening							Result of 1st Screening	Remarks on 1st Screening Analysis
			Basic Condition					General			
			Distinctiveness	Information availability	No double-counting	Timeline	Voluntary participation	Compliance	GHG reduction potential		
Transport	51	Sustainable transport	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	In compliance with Master Plan study for transport sector of the City of Belgrade	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through improvement of sustainability in transportation sector		The action is **not analyzed further** because: There is no concrete action planned in line with the country's national policy/ strategy and general characteristic of the technology/ measure to be introduced is unknown.
Transport	52	Switching of old buses and energy efficiency improvement in Belgrade and Pancevo	Scope and contents of the mitigation action is clearly defined including the locations and type of activities.	Sufficient information is available in order to analyze how the action contributes to GHG emission reduction, how to calculate the reduction amount, and what the BAU scenario is.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	Mitigation action is expected to be realized in 2012.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	The First Energy Efficiency Plan describes the action as a potentially important mitigation measure.	The action will lead to the reduction of GHG emission through replacement of existing buses with more energy-efficient ones.	✓	**All 1st screening criteria are satisfied.**
Transport	53	Rehabilitation of Arterial Roads in Serbia	Scope and contents of the mitigation action is clearly defined including the locations and type of activities.	Sufficient information is available in order to analyze how the action contributes to GHG emission reduction, how to calculate the reduction amount, and what the BAU scenario is.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	All rehabilitation activities will be completed by 2016, and thus the emission reduction will be achieved before 2020.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	The measure is in line with Initial National Communication of Serbia as well as the Action plan for the Strategy of Railway, Road, Inland Waterway, Air and Intermodal Transport.	GHG emissions reduction will be achieved through rehabilitating inadequately-maintained arterial roads, that will allow cars to drive on a higher, more energy-efficient speed, in which cars consume less fuels to travel the same distance.	✓	**All 1st screening criteria are satisfied.**
Transport	54	Rehabilitation of Regional Roads in Serbia	Scope and contents of the mitigation action is clearly defined including the locations and type of activities.	Sufficient information is available in order to analyze how the action contributes to GHG emission reduction, how to calculate the reduction amount, and what the BAU scenario is.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	All rehabilitation activities will be completed by 2016, and thus the emission reduction will be achieved before 2020.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	The measure is in line with Initial National Communication of Serbia as well as the Action plan for the Strategy of Railway, Road, Inland Waterway, Air and Intermodal Transport.	GHG emissions reduction will be achieved through rehabilitating inadequately-maintained regional roads, that will allow cars to drive on a higher, more energy-efficient speed, in which cars consume less fuels to travel the same distance.	✓	**All 1st screening criteria are satisfied.**
Transport	55	Design and construction of 21 bypass roads in Serbia	Scope and contents of the mitigation action is clearly defined including the locations and type of activities.	Although the project scope is clearly defined, sufficient data to analyze emission reduction potential and BAU scenario.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	All rehabilitation activities will be completed by 2016, and thus the emission reduction will be achieved before 2020.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	The measure is in line with Initial National Communication of Serbia as well as the Action plan for the Strategy of Railway, Road, Inland Waterway, Air and Intermodal Transport.	Whether construction of bypass roads in target regions needs to be carefully analyzed using traffic volume data both current and projections, which are not available at the moment.		The activity **should be continuously monitored** whether sufficient data and methodology to analyze emission reduction potential is available, because emissions from road transport is expected to increase in Serbia, which has a big mitigation potential.

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Sub-sector	No.	NAMA Title / Measure to be Introduced	1st Screening							Result of 1st Screening	Remarks on 1st Screening Analysis
			Basic Condition					General			
			Distinctiveness	Information availability	No double-counting	Timeline	Voluntary participation	Compliance	GHG reduction potential		
Transport	56	Use of different types of road constructions on state roads of I and II category in the Republic of Serbia	Mitigation action is not developed into a specific project activity. Details are yet to be decided regarding the locations as well as technologies to be introduced among many options.	Mitigation action is not developed into a specific project activity. Details are yet to be decided regarding the locations as well as technologies to be introduced among many options.	The activity has not applied to CDM or any other type of carbon market scheme yet.	This mitigation action has not been realized and will not ensure emission reduction by 2020.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	In compliance with the Action plan for the Strategy of Railway, Road, Inland Waterway, Air and Intermodal Transport.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through various measures such as the reduced use of energy for preparing road construction material by introducing recycled road waste materials. etc.		
Building	57	Development of local natural gas network	Mitigation action is not developed into specific project activity. There is lack of information on location and type of activities.	There is lack of data and information needed for Assessment of mitigation related potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	In compliance with Energy Sector Development Strategy	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through development of local natural gas network		The activity **should be continuously monitored** whether a real action/ project is developed because emissions from road transport is expected to increase in Serbia, which has a big mitigation potential.
Building	58	Expansion of Existing Heating Network in Valjevo	Scope and contents of the mitigation action is clearly defined including the locations and type of activities.	Sufficient information is available in order to analyze how the action contributes to GHG emission reduction, how to calculate the reduction amount, and what the BAU scenario is.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	Mitigation action is expected to be realized in 2012.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	In compliance with Energy Sector Development Strategy	The action will lead to the reduction of GHG emission through allowing heat users to switch their heat source from old inefficient small heating boilers to modern large heat plant, by connecting users with expanded heating network system.	✓	**All 1st screening criteria are satisfied.**
Building	59	Improvement of Old Residential Buildings Envelope (exterior doors, windows and thermal insulation) in Serbia	Scope and contents of the mitigation action is clearly defined. Detailed locations and target buildings will need to be defined during the design phase.	General information on how mitigation action will reduce GHG, how emission reduction can be calculated, and what BAU is available.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	Replacement activity will start in 2013 and will be completed in 2020.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	Proposed mitigation action is in line with The first Energy Efficiency Plan of the Republic of Serbia for the period from 2010 to 2012; Regulation on energy efficiency in buildings.	GHG emissions reduction will be achieved through improvement of energy use efficiency by rehabilitation of existing old residential buildings.	✓	**All 1st screening criteria are satisfied.**
Building Public	60	Reduction of the use of electricity for heating purposes	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is lack of data and information needed for Assessment of mitigation related potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	In compliance with First Energy Efficiency Plan 2010-2012, p17, p21, p28, p34	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through reduction of the use of electricity for heating purposes, because the grid electricity is mostly generated by carbon-intensive lignite-fired thermal power plants.		The activity **should be continuously monitored** whether a real action/ project is developed because emissions from electricity use for heating purposes are large and switching such users to district heating system has a big emission reduction potential.

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Sub-sector	No.	NAMA Title / Measure to be Introduced	1st Screening							Result of 1st Screening	Remarks on 1st Screening Analysis
			Basic Condition					General			
			Distinctiveness	Information availability	No double-counting	Timeline	Voluntary participation	Compliance	GHG reduction potential		
Building Public	61	Construction of New Energy Efficient Buildings Based on Energy Efficiency Regulation in Serbia	Scope and contents of the mitigation action is clearly defined. All newly-built buildings are included.	General information on how mitigation action will reduce GHG, how emission reduction can be calculated, and what BAU is available. How to set BAU needs to be carefully analyzed if the regulation is an obligatory regulation.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	Construction under new regulation is expected to start in 2013.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	Proposed mitigation action is in line with The first Energy Efficiency Plan of the Republic of Serbia for the period from 2010 to 2012; Regulation on energy efficiency in buildings.	GHG emissions reduction will be achieved through construction of new buildings based on the new Regulations on energy efficiency in buildings in the period 2013 to 2020.	✓	**All 1st screening criteria are satisfied.**
Building	62	Improve efficiency in water heating in residential, commercial and public buildings	Mitigation action is not developed into specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not identified, the First Energy Efficiency Plan describes the action as a potentially important mitigation measure.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through improvement of efficiency in water heating in residential, commercial and public buildings.		The activity **should be continuously monitored** whether a real action/ project is developed because emissions due to building heating constitute a big part of national emissions and have a big reduction potential.
Building	63	Automatization for heating, cooling and lighting	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not identified, the First Energy Efficiency Plan describes the action as a potentially important mitigation measure.	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through introduction of energy efficient system.		The action is **not analyzed further** because: There is no concrete action planned in line with the country's national policy/ strategy and general characteristic of the technology/ measure to be introduced is unknown.
Building	64	Promotion of the use of energy efficient electrical household appliances	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not identified, Serbia is promoting this measure as described in First Energy Efficiency Plan 2010-2012 and Law on Rational use of Energy	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through promoting and supporting the replacement of old inefficient appliances with energy efficient ones.		The activity **should be continuously monitored** whether a real action/ project is developed because emissions from residential sector contributes to GHG emissions in Serbia and improving energy efficiency in houses has a big mitigation potential.
Building	65	Replacement of conventional incandescent light bulbs with energy efficient ones	Mitigation action is not developed into specific project activity. There is lack of information on location and type of activities.	There is lack of data and information needed for Assessment of mitigation related potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Although the detail of the action is not identified, Serbia is promoting this measure as described in First Energy Efficiency Plan 2010-2012 and Law on Rational use of Energy	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through promoting and supporting the replacement of conventional incandescent light bulbs with energy efficient ones.		The activity **should be continuously monitored** whether a real action/ project is developed because emissions from residential sector contributes to GHG emissions in Serbia and improving energy efficiency in houses has a big mitigation potential.

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Sub-sector	No.	NAMA Title / Measure to be Introduced	1st Screening							Result of 1st Screening	Remarks on 1st Screening Analysis
			Basic Condition					General			
			Distinctiveness	Information availability	No double-counting	Timeline	Voluntary participation	Compliance	GHG reduction potential		
Public and commercial services	66	Modernization of public lighting systems at municipalities	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Proposed mitigation action is in line with First Energy Efficiency Plan 2010- 2012; p22, p35	Although the detail of the action is not identified, a potential action will lead to the reduction of GHG emission through improvement of the public lighting system and its modernization		The action is **not analyzed further** because: There is no concrete action planned in line with the country's national policy/ strategy and general characteristic of the technology/ measure to be introduced is unknown.
Public and commercial services	67	Setting the energy efficiency as the criterion for best bid in public procurement	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is a general lack of data and information necessary for assessment of mitigation potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Proposed mitigation action is in line with First Energy Efficiency Plan 2010- 2012; p22, p36	Although the detail of the action is not identified, a potential action may lead to the reduction of GHG emission through setting the energy efficiency as the criterion for best bid in public procurement, so that all publicly procured goods and products will have to satisfy certain standard to energy efficiency, which is higher than the current efficiency level. However, there is no methodology available to analyze the potential.		The action is **not analyzed further** because: There is no concrete action planned in line with the country's national policy/ strategy and general characteristic of the technology/ measure to be introduced is unknown.
Public and commercial services	68	Energy Efficiency Improvements in Public Buildings: 23 Schools and 26 Hospitals – Serbian Energy Efficiency Project (SEEP)	Scope and contents of the mitigation action is clearly defined including the location and type of activities.	Enough information is available in order to analyze how the action contributes to GHG emission reduction, how to calculate the reduction amount, and what the BAU scenario is, based on the result of the previous two phases of the project and also energy audit conducted for the target buildings.	The activity has not applied to CDM or any other type of carbon market scheme yet. The activity needs to be monitored to ensure implementing entity does not apply to CDM or any other carbon scheme in the future.	The design and construction will start in 2013. And emission reduction will occur by 2020.	Implementing entity is willing to be a NAMA implementing entity according to the interview.	This action is an important mitigation measure is in line with Serbia's policy described in the First Energy Efficiency Plan.	GHG emissions reduction will be achieved through installation of energy efficient improvement measures at buildings (e.g. roof, ceiling and wall insulation, window replacement etc.)	✓	**All 1st screening criteria are satisfied.**
Public and commercial services	69	Promotion of energy service companies (ESCO)	Mitigation action is not developed into a specific project activity. There is a lack of information on project's overall characteristics.	There is lack of data and information needed for Assessment of mitigation related potential.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	This mitigation action has not been realized and will not ensure emission reduction by 2020.	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)	Proposed mitigation action is in line with Energy sector Development Strategy until 2015, First Energy Efficiency Plan 2010-2012 and Law on Rational use of Energy	Evaluation could not be conducted (taking into account the assessment results for the first two criteria)		The action is **not analyzed further** because: There is no concrete action planned in line with the country's national policy/ strategy and general characteristic of the technology/ measure to be introduced is unknown.

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Sub-sector	Long List No.	NAMA Title	2nd Screening			Analysis Result	Remarks on Analysis	Short List No.
			Sustainability		MRV			
			Financial Feasibility	Technical Viability	MRVability			
Energy	1	Construction of a 790 MW Ultra Supercritical Lignite Power Plant TPP Nikola Tesla - Unit B3	Although the initial investment cost is large and it is difficult for Serbian implementing entity to secure finance on its own, the mitigation action is financially feasible and can be operated in a sustainable manner.	The project will introduce ultra super-critical steam power generation technology. Since the experience in operation of sub-critical plant can be used in NAMA, it is expected that sufficient human resources for operation and maintenance of the plant can be found in Serbia but need to be trained by plant supplier.	- MRV of the project will be executed in accordance with the international MRV system. - Assessment of mitigation potential can be carried out based on: 1. approved CDM methodology (ACM0013 “Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology”), 2. a methodology applied in Initial National Communication that is based on IPCC, and 3. J-MRV - Sufficient and transparent data will be available for MRV during project implementation. - Monitoring and reporting will be performed by the implementing entity in accordance with the international MRV system.	**Shortlist**	The activity is considered as **an appropriate mitigation action** of Serbia.	**1**
Energy	2	Modernization and Capacity and Efficiency Increase of Unit B2 in Thermal Power Plant Nikola Tesla	Although it is difficult for operator to secure finance by its own, financial analyses indicate that this investment is feasible, i.e. that all profitability parameters of the mitigation action are indicated as positive.	The operator has already carried out rehabilitation of the existing units and thus will not encounter technical difficulties during operation.	- MRV of the project will be executed in accordance with the international MRV system. - Assessment of mitigation potential can be carried out based on: 1. approved CDM methodology (AM0061 “Methodology for rehabilitation and/or energy efficiency improvement in existing power plants”), 2. a methodology applied in Initial National Communication that is based on IPCC - Sufficient and transparent data will be available for MRV during project implementation. - Monitoring and reporting will be performed by the implementing entity in accordance with the international MRV system.	**Shortlist**	The activity is considered as **an appropriate mitigation action** of Serbia.	**2**
Energy	3	Modernization and Capacity and Efficiency Increase of Unit A3 in Thermal Power Plant Nikola Tesla	Although it is difficult for operator to secure finance by its own, financial analyses indicate that this investment is feasible, i.e. that all profitability parameters of the mitigation action are indicated as positive.	The operator has already carried out rehabilitation of the existing units and thus will not encounter technical difficulties during operation.	- MRV of the project will be executed in accordance with the international MRV system. - Assessment of mitigation potential can be carried out based on: 1. approved CDM methodology (AM0061 “Methodology for rehabilitation and/or energy efficiency improvement in existing power plants”), 2. a methodology applied in Initial National Communication that is based on IPCC - Sufficient and transparent data will be available for MRV during project implementation. - Monitoring and reporting will be performed by the implementing entity in accordance with the international MRV system.	**Shortlist**	The activity is considered as **an appropriate mitigation action** of Serbia.	**3**
Energy	4	Replacement and Construction of a New Natural Gas Cogeneration Plant CHP Novi Sad	Although it is difficult for operator to secure finance by its own, financial analyses indicate that this investment is feasible, i.e. that all profitability parameters of the mitigation action are indicated as positive.	CCGT technology even new for Serbia is already proven and used in the world.	- MRV of the project will be executed in accordance with the international MRV system. - Assessment of mitigation potential can be carried out based on the approved CDM methodologies (AM0029 "Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas" and ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources") - Sufficient and transparent data will be available for MRV during project implementation. - Monitoring and reporting will be performed by the implementing entity in accordance with the international MRV system.	**Shortlist**	The activity is considered as **an appropriate mitigation action** of Serbia.	**4**

Sub-sector	Long List No.	NAMA Title	2nd Screening			Analysis Result	Remarks on Analysis	Short List No.
			Sustainability		MRV			
			Financial Feasibility	Technical Viability	MRVability			
Energy	5	Construction of a Super-critical Lignite Power Plant	Although it is difficult for operator to secure finance by its own, financial analyses indicate that this investment is feasible, i.e. that all profitability parameters such as IRR and cost-benefit analysis result of the mitigation action are indicated as positive.	The project will introduce super-critical steam power generation technology. Since the operation of a super-critical power plant is not significantly different from that of sub-critical plant, which is a conventional type in Serbia, sufficient human resources for operation and maintenance of the plant can be found in Serbia but need to be trained by plant supplier.	- MRV of the project will be executed in accordance with the international MRV system. - Assessments of mitigation potential can be carried out based on at least the following approaches: 1) approved CDM methodology ACM0013 “Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology” Version 04.0.0; 2) a methodology applied in Initial National Communication that is based on IPCC, and 3) J-MRV Guideline J-MRV0004 “Fossil fuel fired power generation projects introducing low-carbon technology” - Sufficient and transparent data will be available for MRV during project implementation. - Monitoring and reporting will be performed by the implementing entity in accordance with the international MRV system.	**Shortlist**	The activity is considered as **an appropriate mitigation action** of Serbia.	**5**
Energy	7	Construction of 9 New Small Hydropower Plants (HPPs) in Serbia	Simple payback period of the program (which covers all target hydro power plants) indicates the mitigation action is financially feasible.	Technology has already been widely applied in Serbia and thus the activity will not encounter technical difficulties during operation. Sufficient human resources for operation and maintenance of the plants can also be found in Serbia.	- MRV of the project will be executed in accordance with the international MRV system. - Assessments of mitigation potential can be carried out based on: 1) approved CDM methodology (AMS-I.D. Grid connected renewable electricity generation), or 2) a methodology applied in Initial National Communication that is based on IPCC - Sufficient and transparent data will be available for MRV during project implementation. - Monitoring and reporting will be performed by the implementing entity in accordance with the international MRV system.	**Shortlist**	The activity is considered as **an appropriate mitigation action** of Serbia.	**6**
Energy	15	Introduction of Metering System and Billing on the Basis of Measured Consumption in District Heating Systems in Serbia	Result of preliminary financial analysis shows potential annual fuel savings of 61 million EUR and simple payback period 3.5 years. Financial source has not been identified yet.	Mitigation action will use already proven technology and pilot projects of heat consumption metering by consumers and billing on the basis of real consumption have been undergoing in Belgrade.	- MRV of the project will be executed in accordance with the international MRV system. - Assessment of mitigation potential can be conducted based on: 1) General calculation method as used in Initial National Communication, and 2) Japan MRV guideline J-MRV002 “Project which improve energy efficiency of equipment”, both of which are based on IPCC guideline. - Sufficient and transparent data will be available for MRV during project implementation. - Monitoring and reporting will be performed by the implementing entity in accordance with the international MRV system.	**Shortlist**	The activity is considered as **an appropriate mitigation action** of Serbia.	**7**
Energy	24	Introduction 1000 MW of Small Biomass Boilers in Serbia	Although the investment cost is large, preliminary financial analysis indicates the program as a whole is financially feasible. Detailed analysis on each boiler installation activity will be performed upon identification of actual target sites.	Mitigation action will introduce common boiler technology. Also the action will use pellets and wood chip as in input for biomass boilers. Although these biomass fuels have not been commonly used in Serbia, such fuels will be procured from the market and boiler owners do not need to have special technical experience to operate and maintain the boiler.	- MRV of the program will be executed in accordance with the international MRV system. - Assessment of mitigation potential can be conducted based on: 1) approved CDM methodology (AMS-I.C. "Thermal energy production with or without electricity"), or 2. General calculation method based on Serbia's regulation "Regulation on energy efficiency in buildings (August 2011)." - Sufficient and transparent data will be available for MRV during project implementation. - Detailed monitoring and reporting plan will be established once the target boiler owners are identified. Both monitoring and reporting will be performed by the responsible entity and checked by the implementing entity in accordance with the international MRV system.	**Shortlist**	The activity is considered as **an appropriate mitigation action** of Serbia.	**8**

Sub-sector	Long List No.	NAMA Title	2nd Screening			Analysis Result	Remarks on Analysis	Short List No.
			Sustainability		MRV			
			Financial Feasibility	Technical Viability	MRVability			
Energy	26	Use of Solar Energy for Domestic Hot Water Production in Heating Plant Cerak in Belgrade	Financial analysis in the Feasibility Study indicates the project is at the acceptable level for implementing entity.	Solar collector technology for water heating has been applied to many countries and the Serbian implementing entity has an experience of installing and operating the same technology, although the size is smaller than the project.	- MRV of the project will be executed in accordance with the international MRV system. - Assessments of mitigation potential can be conducted based on a methodology in 2006 IPCC Guidelines. - Sufficient and transparent data will be available for MRV during project implementation. - Monitoring and reporting will be performed by the implementing entity in accordance with the international MRV system.	**Shortlist**	The activity is considered as **an appropriate mitigation action** of Serbia.	**9**
Energy	28	Using of Waste Heat from Power Plant for Heating the City of Belgrade, Serbia	Financial analysis indicates all profitability parameters are positive. Detailed financial analysis still needs to be further analyzed upon feasibility study completion.	This mitigation action will use mainly waste heat recovery technology. Implementing entity has an experience in using similar technology before. (to be further analyzed)	- MRV of the project will be executed in accordance with the international MRV system. - Assessments of mitigation potential can be conducted based on a methodology applied in Initial National Communication that is based on IPCC. - Sufficient and transparent data will be available for MRV during project implementation. - Monitoring and reporting will be performed by the implementing entity in accordance with the international MRV system.	**Shortlist**	The activity is considered as **an appropriate mitigation action** of Serbia.	**10**
Transport	52	Switching of old buses and energy efficiency improvement in Belgrade and Pancevo	The mitigation action is considered to be financially non-feasible because of the relatively small fuel saving and large investment cost.	The mitigation action will introduce EURO V, VI or EEV emission standard diesel engines, and it will requires construction of new maintenance facilities. The implementing entity has sufficient experience and capacity to operate and maintain the new buses.	- MRV of the program will be executed in accordance with the international MRV system. - Assessment of mitigation potential can be conducted based on the approved CDM methodology (AMS-III.S. "Introduction of low-emission vehicles/ technologies to commercial vehicle fleets"). - Sufficient and transparent data will be available for MRV during project implementation. - Monitoring and reporting will be performed by the implementing entity in accordance with the international MRV system.	Remains in Long List	The activity **will be continuously monitored** whether there is any change in the proposed project that may increase financial feasibility up to the level the implementing entity considers the investment is acceptable.	-
Transport	53	Rehabilitation of Arterial Roads in Serbia	Although the total investment cost is large, program analysis and financial analysis concludes that the justification of the investment in the set of actions is confirmed.	Mitigation action will use technology that have been widely applied in road network in Serbia.	- MRV of the project will be executed in accordance with the international MRV system. - Assessments of mitigation potential is conducted based on methodologies shown in COPERT 4 that is based on 2006 IPCC Guidelines as well as in "Reducing Carbon Emissions from Transport Projects," an Evaluation Study by Asian Development Bank. - Sufficient and transparent data including traffic volume and fuel consumption by each vehicle type will be available for MRV. - Monitoring and reporting will be performed by the implementing entity in accordance with the international MRV system.	**Shortlist**	The activity is considered as **an appropriate mitigation action** of Serbia.	**11**
Transport	54	Rehabilitation of Regional Roads in Serbia	Although the total investment cost is very large, program analysis and financial analysis concludes that the justification of the investment in the set of actions is confirmed.	Mitigation action will use technology that have been widely applied in road network in Serbia.	- MRV of the project will be executed in accordance with the international MRV system. - Assessments of mitigation potential is conducted based on methodologies shown in COPERT 4 that is based on 2006 IPCC Guidelines as well as in "Reducing Carbon Emissions from Transport Projects," an Evaluation Study by Asian Development Bank. - Sufficient and transparent data including traffic volume and fuel consumption by each vehicle type will be available for MRV. - Monitoring and reporting will be performed by the implementing entity in accordance with the international MRV system.	**Shortlist**	The activity is considered as **an appropriate mitigation action** of Serbia.	**12**

Sub-sector	Long List No.	NAMA Title	2nd Screening			Analysis Result	Remarks on Analysis	Short List No.
			Sustainability		MRV			
			Financial Feasibility	Technical Viability	MRVability			
Building	58	Expansion of Existing Heating Network in Valjevo	Preliminary financial analysis indicates the simple payback period of the project is within acceptable level for the implementing entity.	The mitigation activity will involve construction of hot water distribution network system and substation, both of which the implementing entity has sufficient experience in construction, operation and maintenance.	- MRV of the program will be executed in accordance with the international MRV system. - Assessment of mitigation potential can be conducted based on the approved CDM methodology (AMS-II.B. "Supply side energy efficiency improvements – generation," or AM0058 "Introduction of a new primary district heating system"). - Detailed baseline data, including type of fuels currently used and fuel consumption by each fuel type needs to be identified and obtained for more accurate estimation. - Sufficient and transparent data will be available for MRV during project implementation. - Monitoring and reporting will be performed by the implementing entity in accordance with the international MRV system.	**Shortlist**	The activity is considered as **an appropriate mitigation action** of Serbia.	**13**
Building	59	Improvement of Old Residential Buildings Envelope (exterior doors, windows and thermal insulation) in Serbia	Preliminary financial analysis indicates the mitigation action is feasible as the simple payback period of the project is within acceptable level for the implementing entity.	The mitigation activity will involve installation of basic and widely-used insulation measures such as the ones for walls, partitions, roofs, ceilings, as well as replacement of windows.	- MRV of the program will be executed in accordance with the international MRV system. - Assessment of mitigation potential can be conducted based on the approved CDM methodology (AMS-II.E. "Energy efficiency and fuel switching measures for buildings") or a methodology specified in Serbia's regulation "Regulation on energy efficiency in buildings (August 2011)." - Depending on the methodology (and the extent the methodology requires for acquisition of data and parameter), a robust monitoring plan needs to be established in order to obtain sufficient and transparent data for MRV during project implementation. Baseline data may include type of fuels currently used and fuel consumption by each fuel type at each building. - Monitoring and reporting will be performed by the implementing entity in accordance with the international MRV system.	**Shortlist**	The activity is considered as **an appropriate mitigation action** of Serbia.	**14**
Building	61	Construction of New Energy Efficient Buildings Based on Energy Efficiency Regulation in Serbia	Preliminary financial analysis indicates the mitigation action is feasible as the simple payback period of the project is within acceptable level for the implementing entity.	The mitigation activity will involve installation of basic and widely-used insulation measures such as the ones for walls, partitions, roofs, ceilings, as well as replacement of windows.	- MRV of the program will be executed in accordance with the domestic MRV system, which is yet to be established. - If some new buildings are installed with thermal insulation measures that achieve more than energy efficiency standard required by the regulation, MRV of such actions will be executed in accordance with international MRV system. - Assessment of mitigation potential can be conducted based on the methodology specified in Serbia's regulation "Regulation on energy efficiency in buildings (August 2011)," or approved CDM methodology (AMS-II.E. "Energy efficiency and fuel switching measures for buildings"). - A robust monitoring plan needs to be established in order to obtain sufficient and transparent data for MRV during project implementation. Project emission data may include type of energy efficiency improvement measures and expected fuel saving effect, type of fuels used, etc. It may also be necessary albeit difficult to monitor whether all new buildings comply new regulation. - Monitoring and reporting will be performed by the implementing entity in accordance with the domestic MRV system.	**Shortlist**	The activity is considered as **an appropriate mitigation action** of Serbia.	**15**
Building	68	Energy Efficiency Improvements in Public Buildings: 23 Schools and 26 Hospitals – Serbian Energy Efficiency Project (SEEP)	Financial analysis indicates all profitability parameters are positive. Detailed financial analysis will be available upon feasibility study completion.	The mitigation action will involve installation of rather simple energy efficiency improvement measures to buildings, which are already used in the former phases of the project and the achievement has been monitored as well.	- MRV of the project will be executed in accordance with the international MRV system. - This mitigation action will be able to be measured by using the same original methodology applied to former phases. Application of approved CDM methodology will be further analyzed and identified. Also, reporting system has been established during the previous phases, which can be applied to proposed mitigation project. - Sufficient and transparent data will be available for MRV during project implementation. - Monitoring and reporting will be performed by the implementing entity in accordance with the international MRV system.	**Shortlist**	The activity is considered as **an appropriate mitigation action** of Serbia.	**16**

Annex 7 NAMA Portfolio

Construction of a 790 MW Ultra Supercritical Lignite Power Plant TPP Nikola Tesla -Unit B3

The NAMA involves construction of a new lignite fired thermal power plant in TPP Nikola Tesla. The new unit, called Unit B3, will have an installed capacity of 790 MW_e with net efficiency ≈ 43%, which is significantly higher than the efficiency of a conventional lignite power plant in Serbia. The project will introduce an ultra-supercritical steam power generation technology. The NAMA will contribute to climate change mitigation as the new more efficient power plant will emit less GHGs than that from the conventional inefficient lignite power plants.

Type of Action

- Project

Boundary and Location

- Near the town Skela and Usce, along the river Sava, 59 km upstream from Belgrade, Obrenovac municipality

BAU Scenario

- Exiting conventional lignite power plants continue operation at the current efficiency of about 25%.
- New thermal power plants will incorporate a conventional subcritical technology with efficiency of 37%, instead of a more energy-efficient ultra-supercritical technology.

Mitigation Target

- Efficiency of a lignite power plant is advanced to around 43% by introducing an ultra- supercritical steam technology.

Mitigation Potential

- **Type of GHGs reduced**: CO_2
- **Annual reduction**: 1,337,728 tCO_{2e}
- **Total reduction**: 40,131,830 tCO_{2e} (30 years)
- **Methodology applied for estimation**: based on the approved CDM methodology ACM0013

MRV

- In accordance with international MRV system

Contribution to Sustainable Development

- Efficient use of domestic fuel sources and reduction of dependence on fuel import
- Increase in competitiveness on international market
- Creation of local employment opportunities

Finance and Cost

- **Total Investment Cost**: EUR 1,200,000,000
- **Financial sources**: Serbian implementing entity (EPS) would provide up to 30% of the investment
- **IRR**: available by March 2013

Current Status and Schedule

Current Status

- Pre-Feasibility Study completed

Expected starting date of Action

- Construction starts in 2017; operation starts in 2020

Lifetime

- 30 years

Implementing Entity and Contact Information

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Modernization and Capacity and Efficiency Increase of Unit B2 in Thermal Power Plant Nikola Tesla B

The NAMA involves rehabilitation and modernization of a lignite thermal power plant with capacity increase of 47 MW. Adopted technologies include rehabilitation and modernization of the steam turbine, condensing plant and cooling system unit, boiler and auxiliary equipment (e.g. feed water heaters), as well as revitalization and improvement of the firing system and the combustion process by introducing "Low NOx" burners and increasing the efficiency of the old thermal units. The NAMA will contribute to climate change mitigation through increasing energy efficiency of the existing lignite-fired power plant.

Type of Action

- Project

Boundary and Location

- Near the town Skela and Usce, along the river Sava, 59 km upstream from Belgrade, Obrenovac municipality, Republic of Serbia

BAU Scenario

- The thermal power plant continues operation and its efficiency remains 31% (not improved) and is decreased overtime

Mitigation Target

- Modernization measures are applied and overall efficiency is improved from 31% to projected 34%

Mitigation Potential

- **Type of GHGs reduced**: CO_2
- **Annual reduction**: 355,142 tCO_{2e}
- **Total reduction**: 5,327,130 tCO_{2e} (15 years)
- **Methodology applied for estimation**: based on the approved CDM methodology

MRV

- In accordance with international MRV system

Contribution to Sustainable Development

- Efficient use of domestic fuel sources
- Reduction of air pollutants
- Achievement of higher proficiency of employees

Finance and Cost

- **Total Investment Cost**: EUR 22,716,750
- **Financial sources**: Serbian implementing entity and commercial credit
- **Internal Rate of Return**: 33.17%
- **NPV**: 22,210,199

Current Status and Schedule

Current Status

- Feasibility Study with Idea Design for the project under development

Expected starting date of Action

- Commissioning of the unit planned for 2013

Lifetime

- 15 years

Implementing Entity and Contact Information

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Modernization and Capacity and Efficiency Increase of Unit A3 in Thermal Power Plant Nikola Tesla A

The NAMA involves rehabilitation and modernization of a lignite thermal power plant with capacity increase of 30 MW. Adopted technologies are rehabilitation and modernization of the steam turbine, condensing plant and cooling system unit, boiler and auxiliary equipment (e.g. feed water heaters), as well as revitalization and improvement of the firing system and the combustion process by introducing "Low NOx" burners and increasing the efficiency of the old thermal units. The NAMA will contribute to climate change mitigation through increasing energy efficiency of the existing lignite-fired power plant.

Type of Action

- Project

Boundary and Location

- Power plant is located on the right bank of river Sava, 30 km upstream Belgrade, near the city of Obrenovac

BAU Scenario

- The thermal power plant continues operation and its efficiency remains 31% (not improved) and is decreased overtime

Mitigation Target

- Modernization measures are applied and overall efficiency is improved from 31% to projected 33%

Mitigation Potential

- **Type of GHGs reduced**: CO_2
- **Annual reduction**: 91,796 tCO_{2e}
- **Total reduction**: 1,376,940 tCO_{2e} (15 years)
- **Methodology applied for estimation**: based on the approved CDM methodology

MRV

- In accordance with international MRV system

Contribution to Sustainable Development

- Reduction of dependence on fuel import
- Reduction of air pollutants
- Creation of local employment opportunities

Finance and Cost

- **Total Investment Cost**: EUR 30.5 million
- **Financial sources**: Serbian implementing entity (loan or equity; to be decided)
- Financial analyses yielded positive result. Detailed information available upon request

Current Status and Schedule

Current Status

- Feasibility Study with Idea Design for the project under development

Expected starting date of Action

- Commissioning of the unit planned for 2013

Lifetime

- 15 years

Implementing Entity and Contact Information

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Replacement and Construction of a New Natural Gas Cogeneration Plant CHP Novi Sad

The NAMA involves construction of a new, energy efficient natural gas-fired cogeneration plant that will entirely replace the existing inefficient cogeneration plant, which is also fueled by natural gas and heavy oil. The existing cogeneration plant will be decommissioned when the new plant starts operation. The new cogeneration plant will generate 450 MW_e of electricity, which will be supplied to the national grid of Serbia, while the plant will also generate 300 MW_{th} of heat, which will be supplied to district heating plants of Novi Sad municipality through a pumping station.
The NAMA will contribute to climate change mitigation as 1) the new more efficient cogeneration plant will replace the existing inefficient plant for heat supply for district heating, and 2) it will replace fuel consumption at grid-connected thermal power plants, which are mainly fueled by carbon-intensive lignite.

Type of Action

- Project

Boundary and Location

- In the outskirts of the city of Novi Sad at the site of old CHP plant, Autonomous province of Vojvodina

BAU Scenario

- Inefficient cogeneration plant continues operation with the current and decreasing efficiency
- Grid-connected thermal power plants will continue operation and supply the equivalent amount of electricity that would be generated by the new cogeneration plant

Mitigation Target

- Installation of a new 450 MW_e/ 300 MW_{th} high-efficient natural gas fired combined cycle (CCGT) heat and power generation plant

Mitigation Potential

- **Type of GHGs reduced**: CO_2
- **Annual reduction**: 1,019,380 tCO_{2e}
- **Total reduction**: 35,678,300 tCO_{2e} (35 years)
- **Methodology applied for estimation**: based on the approved CDM methodology

MRV

- In accordance with international MRV system

Contribution to Sustainable Development

- Improvement of efficient use of fuel sources
- Reduction of impact on environment
- Creation of local employment opportunities

Finance and Cost

- **Total Investment Cost**: EUR 250 million
- **Financial sources**: 51% by strategic partner, 49% by Serbian implementing entity
- Financial analyses yielded positive result. Detailed information available upon request

Current Status and Schedule

Current Status

- Prefeasibility Study with General Design completed

Expected starting date of Action

- Commissioning planned for 2015

Lifetime

- 35 years

Implementing Entity and Contact Information

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Construction of a Super-Critical Lignite Power Plant TPP Kostolac B

The NAMA involves construction of a new lignite fired thermal power plant in TPP Kostolac B. The new unit, called block B3, will have an installed capacity of 600 MW_e (547 MW at TPP threshold) with net efficiency of 40.8%, which is significantly higher than efficiency of a conventional lignite power plant in Serbia. The project will introduce a super-critical steam power generation technology. The NAMA will contribute to climate change mitigation as the new more efficient power plant will emit less GHGs than that from the conventional inefficient lignite power plants.

Type of Action

- Project

Boundary and Location

- Located by river Mlava in the village Drmno, near the city of Kostolac, municipality of Pozarevac

BAU Scenario

- Exiting conventional lignite power plants continue operation (not improved).
- Newly-constructed thermal power plants will incorporate a conventional technology, instead of a more energy-efficient supercritical technology

Mitigation Target

- Efficiency of a lignite power plant is advanced to around 40% by introducing supercritical steam technology

Mitigation Potential

- **Type of GHGs reduced**: CO_2
- **Annual reduction**: 1,390,533 tCO_{2e}
- **Total reduction**: 55,621,320 tCO_{2e} (40 years)
- **Methodology applied for estimation**: based on the approved CDM methodology

MRV

- In accordance with international MRV system

Contribution to Sustainable Development

- Reduction of dependence on fuel import
- Increase of competitiveness
- Achievement of higher proficiency of employees

Finance and Cost

- **Total Investment Cost**: EUR 954 million
- **Financial sources**: N/A
- Financial analyses yielded positive result. Detailed information available upon request

Current Status and Schedule

Current Status

- Prefeasibility study and General Design completed

Expected starting date of Action

- Construction starts in 2015; operation starts in 2020

Lifetime

- 40 years

Implementing Entity and Contact Information

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Construction of 9 New Small Hydropower Plants (HPPs) in Serbia

The NAMA involves construction of new small scale HPPs (9 units with total installed capacity 30.4 MW and possible electricity production over 108 GWh/year).
The NAMA will contribute to climate change mitigation as the hydro power plants do not emit any GHG emissions, and reduce GHG that would otherwise be emitted from grid-connected power plants in the absence of the mitigation action.

Type of Action

- Project

Boundary and Location

- Nationwide in Serbia

BAU Scenario

- New small HPPs (9 plants) are not constructed and instead grid-connected power plants, mainly thermal power plants, continue operation and supply electricity.

Mitigation Target

- Construction of 9 new small HPPs which will produce electricity without GHG emission.

Mitigation Potential

- **Type of GHGs reduced**: CO_2
- **Annual reduction**: 102,343 tCO_{2e}
- **Total reduction**: 4,093,720 t CO_{2e} (40 years)
- **Methodology applied for estimation**: approved CDM methodology AMS-I.D.

MRV

- In accordance with international MRV system

Contribution to Sustainable Development

- Utilization of renewable energy sources
- Reduction of impact on environment
- Creation of local employment opportunities
- Awareness raising among general public about clean energy

Finance and Cost

- **Total Investment Cost**: EUR 54.684 million
- **Financial sources**: Serbian implementing entity equity and loan
- **Simple payback period**: 12 years
- **FIRR**: 1.3% - 30.9%

Current Status and Schedule

Current Status

- For 6 HP plants project documentation is completed and for the remaining 3 is under development.

Expected starting date of Action

- Construction starts in 2013 and operation starts from 2014 and continues till 2016

Lifetime

- 40 years

Implementing Entity and Contact Information

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Introduction of Metering System and Billing on the Basis of Measured Consumption in District Heating Systems in Serbia

Almost all residential consumers connected to the district heating (DH) network in Serbia are paying their bill based on the floor size, instead of the actual amount of heat consumption. This billing system has prevented consumers from having energy saving mindset. The NAMA involves installation of devices that allow metering of heat consumption by each consumer, which is a necessary prerequisite for billing on the basis of actual heat consumption.
Measures to be introduced include heat allocators with radio modem, thermostatic radiator valves as well as rehabilitation of 50% of existing substations in Serbia (approximately 12,500 substations) and installation of heat meters, automatic control, pumps with integrated frequency converters, plate heat exchangers, valves, etc. The NAMA will contribute to climate change mitigation through reducing the consumption of heat at residential sector, which is generated by fossil fuels.

Type of Action

- Program

Boundary and Location

- 55 towns that have district heating system

BAU Scenario

- Heat billing system will not change from the current system, which is based on the floor size instead of the actual amount of heat used
- Users consume heat at the current level as the billing system remains same

Mitigation Target

- Reduction of heat consumption by 20% in residential buildings connected to DH system

Mitigation Potential

- **Type of GHGs reduced**: CO_2
- **Annual reduction**: 329,117 tCO_{2e}
- **Total reduction**: 6,582,340 tCO_{2e} (20 years)
- **Methodology applied for estimation**: methodology used in Initial National Communication of Serbia, which is based on IPCC Guidelines

MRV

- In accordance with international MRV system

Contribution to Sustainable Development

- Efficient use of domestic and import energy sources
- Education and awareness raise of consumers about benefits and technical possibilities of energy saving
- Development of heat billing methodology
- Creation of local employment opportunities

Finance and Cost

- **Total Investment Cost**: EUR 212 million
- **Financial sources**: N/A
- **Simple payback period**: 3.5 years

Current Status and Schedule

Current Status

- Several pilot projects ongoing

Expected starting date of Action

- Installation complete by 2016

Lifetime

- 20 years

Implementing Entity and Contact Information

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Introduction 1000 MW of Small Biomass Boilers in Serbia

Serbia has abundant biomass resources throughout the country, which is estimated to be more than 100,000 TJ/ year (40,000 TJ/ year for wood waste and 68,000 TJ/ year for agricultural waste). This NAMA aims to install 1000 MW of new biomass boilers for all residential, commercial, and industrial sectors throughout the country that will be fueled by either wood waste (pellets or wood chips) or agricultural waste. Climate change mitigation will be achieved through replacing the existing small inefficient boilers that are fuelled mainly by carbon-intensive coal, oil, and grid electricity.

Type of Action

- Program

Boundary and Location

- Throughout the country

BAU Scenario

- Existing boilers will continue operation and be fueled by the same carbon-intensive energy sources

Mitigation Target

- Installation of 1000 MW of biomass boilers

Mitigation Potential

- **Type of GHGs reduced**: CO_2
- **Annual reduction**: 414,501 tCO_{2e}
- **Total reduction**: 10,362,525 tCO_{2e} (25 years)
- **Methodology applied for estimation**: Approved CDM methodology AMS-I.I.

MRV

- In accordance with international MRV system

Contribution to Sustainable Development

- Efficient use of domestic sources
- Creation of local employment opportunities
- Improvement of local environmental condition

Finance and Cost

- **Total Investment Cost**: EUR 250 million
- **Financial sources**: financial support from Annex I countries and international organizations through NAMA scheme
- **Simple pay-back period**: 6.9 years
- **IRR**: 12.9%
- **NPV**: EUR 88 million

Current Status and Schedule

Current Status

- Location of boilers to be replaced will be identified
- Pilot projects of biomass boiler installation ongoing

Expected starting date of Action

- Installation will start in 2015 and operation will start continuously. The installation can be finished in 2019

Lifetime

- 25 years

Implementing Entity and Contact Information

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Use of Solar Energy for Domestic Hot Water Production in Heating Plant "Cerak" in Belgrade

Heating plant Cerak currently uses natural gas to produce and deliver heat for space heating and domestic hot water to residential and non-residential customers in Belgrade municipalities, Cukarica and Rakovica. The NAMA involves installation of solar collectors to replace a part of the hot water generation, amounting for around 2,700 MWh which is supplied to 7,000 households. The action will introduce approximately 5,000 m^2 of solar collectors, hot water storage tank, heat exchanger, expansion vessel, pumps, valves, automatic control, and connect a new solar plant with the existing heating plant.

Type of Action

- Project

Boundary and Location

- Heat plant is located in the area of Cerak that is in one of central municipalities of Belgrade, Cukarica. Municipality of Rakovica is located next to Cukarica. Heat and domestic hot water are delivered to the customers in Cularica and Rakovica

BAU Scenario

- Natural gas will be continuously used throughout the year for domestic hot water production

Mitigation Target

- Reduction of fossil fuels consumption and GHG emission in Heat plant "Cerak" in Belgrade

Mitigation Potential

- **Type of GHGs reduced**: CO_2
- **Annual reduction**: 611 tCO_{2e}
- **Total reduction**: 12,220 tCO_{2e} (20 years)
- **Methodology applied for estimation**: General calculation method in IPCC Guidelines

MRV

- In accordance with international MRV system

Contribution to Sustainable Development

- Saving fossil fuel consumption
- Creation of local employment opportunities

Finance and Cost

- **Total Investment Cost**: EUR 1.05 million
- **Financial sources**: N/A
- **Simple pay-back period**: 8.7 years

Current Status and Schedule

Current Status

- Feasibility study completed in 2008

Expected starting date of Action

- Installation starts in 2013 and operation starts in 2015

Lifetime

- 20 years

Implementing Entity and Contact Information

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Using of Waste Heat from Thermal Power Plant for Heating the City of Belgrade, Serbia

The NAMA involves construction of a pipeline from thermal power plant Nikola Tesla A (TENT A). The pipeline will supply Heat Plant New Belgrade with hot water from the power plant. Waste heat from Nikola Tesla TENT A will cover the basic load at the Heat Plant. The total heat capacity of heat source and pipeline will be 570 MW. With operating time of 3500 hours/year, the pipeline will supply approximately 2,000 GWh of heat to district heating system in Belgrade, thus achieving energy savings of 194 million Nm^3 of natural gas and 34,000 tons of heavy oil consumption.

Type of Action

- Project

Boundary and Location

- Power plant is located on the right bank of river Sava, 30 km upstream Belgrade, near the city of Obrenovac
- Heat Plant New Belgrade is located on the left bank of river Sava in New Belgrade

BAU Scenario

- District heating system in Belgrade will continue using natural gas and heavy oil for heat production instead of waste heat from thermal power plant

Mitigation Target

- 2,000 GWh of waste heat supply to Belgrade district heating system yearly
- Reduction of energy consumption in heat plant: 194 million Nm^3 of natural gas and 34,000 tons of heavy oil yearly

Mitigation Potential

- **Type of GHGs reduced**: CO_2
- **Annual reduction**: 161,875 tCO_{2e}
- **Total reduction**: 6,475,012 tCO_{2e} (40 years)
- **Methodology applied for estimation**: General calculation method used in Initial National Communication of Serbia

MRV

- In accordance with international MRV system

Contribution to Sustainable Development

- Efficient use of waste heat as energy source
- Reduced negative impacts on natural environment
- Reduction of financial expenses by local community

Finance and Cost

- **Total Investment Cost**: EUR 200 million for basic investment for finishing construction work
- **Financial sources**: N/A
- **Simple payback period:** 2.1 years

Current Status and Schedule

Current Status

- The Project has been continuously considered since 1981. The basic design was finished in 1980s and construction of pipeline started in 1990s, but it has not been completed.
- Feasibility study ongoing

Expected starting date of Action

- Construction planned for 2013 and commissioning of the unit planned for 2016

Lifetime

- 40 years

Implementing Entity and Contact Information

Entity Name	Public Enterprise Electric Power Industry of Serbia (EPS) Public Utility Company District Heating Plants of Belgrade (JKP BE) City of Belgrade Ministry of Energy, Development and Environmental Protection (MEDEP)
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Rehabilitation of Arterial Roads in Serbia

Although approximately 3,500 km of roads have been rehabilitated in the past 10 years, a significant part of Serbian arterial roads has not been maintained sufficiently due to the lack of funds and are so deteriorated that caused congestion as well as traffic accidents. The NAMA involves rehabilitation of 19 arterial road sections, whose total length is 297.5 km.
Climate change mitigation will be achieved by improving road surface that will prevent excessive slow mobility of vehicles and accompanied fuel saving of gasoline and diesel.

Type of Action

- Project

Boundary and Location

- Project will take place on 19 different arterial road sections throughout the country

BAU Scenario

- Poor condition of pavement on proposed arterial road sections remains the same and fossil fuel consumption will remain large as the vehicles are forced to move slowly

Mitigation Target

- Improved fuel consumption level by all vehicles that is achieved by running speed of 80 km/h, or the International Roughness Index (IRI) of the proposed roads are improved up to the value of 2.0 m/km

Mitigation Potential

- **Type of GHGs reduced**: CO_2
- **Annual reduction**: 2,617 tCO_{2e}
- **Total reduction**: 52,340 tCO_{2e} (20 years)
- **Methodology applied for estimation**: General calculation method based on IPCC Guidelines

MRV

- In accordance with international MRV system

Contribution to Sustainable Development

- Improvement of local environmental condition
- Reduction of traffic congestion, and traffic accidents
- Creation of local employment opportunities

Finance and Cost

- **Total Investment Cost**: EUR 139.328 million
- **Financial sources**: N/A
- Program Analyses (PA) was done on the network level, through which it is confirmed justification of the investment in the nominated projects

Current Status and Schedule

Current Status

- Road database prepared as a source of relevant data (AADT, vehicle by type, IRI)

Expected starting date of Action

- Design will be prepared from 2013 to 2015 and rehabilitation works will be completed by 2020

Lifetime

- 20 years

Implementing Entity and Contact Information

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Rehabilitation of Regional Roads in Serbia

Although approximately 3,500 km of roads have been rehabilitated in the past 10 years, a significant part of Serbian regional roads has not been maintained sufficiently due to the lack of funds and are so deteriorated that caused congestion as well as traffic accidents. The NAMA involves rehabilitation of 129 regional road sections, whose total length is 2,768 km. Climate change mitigation will be achieved by improving road surface that will prevent excessive slow mobility of vehicles and accompanied fuel saving of gasoline and diesel.

Type of Action

- Project

Boundary and Location

- Project will take place on up to 129 different regional road sections throughout the country

BAU Scenario

- Poor condition of pavement on proposed regional road sections remains the same and fossil fuel consumption will remain large as the vehicles are forced to move slowly

Mitigation Target

- Improved fuel consumption level by all vehicles that is achieved by running speed of 80 km/h, or the International Roughness Index (IRI) of the proposed roads are improved up to the value of 2.0 m/km

Mitigation Potential

- **Type of GHGs reduced**: CO_2
- **Annual reduction**: 6,476 tCO_{2e}
- **Total reduction**: 129,520 tCO_{2e} (20 years)
- **Methodology applied for estimation**: General calculation method based on IPCC Guidelines

MRV

- In accordance with international MRV system

Contribution to Sustainable Development

- Improvement of local environmental condition
- Reduction of traffic congestion, and traffic accidents
- Creation of local employment opportunities

Finance and Cost

- **Total Investment Cost**: EUR 500 million
- **Financial sources**: N/A
- Program Analyses (PA) was done on the network level, through which it is confirmed justification of the investment in the nominated projects

Current Status and Schedule

Current Status

- Road database prepared as a source of relevant data (AADT, vehicle by type, IRI)

Expected starting date of Action

- Design will be prepared until October 2013 and rehabilitation works will be completed by 2017

Lifetime

- 20 years

Implementing Entity and Contact Information

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Expansion of Existing District Heating Network in Valjevo

The NAMA is the expansion of the existing district heating network to the city areas of Valjevo with the aim of energy efficiency improvement and air pollution reduction. Total heat capacity to be connected to the district heating system under the project will be 47.6 MW. The mitigation action involves installation of a hot water network in the length of 17.7 km (ϕ 125 mm) and closure of 49 existing inefficient heating stations (boiler rooms) and a large number of individual furnaces. 147 new heating substations will also be constructed in order to supply heat to the total surface area of 356,742 m^2. NAMA will lead to climate change mitigation through reducing fuel consumption at outdated inefficient boilers for heating.

Type of Action

- Project

Boundary and Location

- City of Valjevo, 75 km southwest from Belgrade

BAU Scenario

- Existing inefficient boiler and furnaces will continuously be used to supply heat to users

Mitigation Target

- Closure of 49 existing heating stations and furnaces in 98 residential buildings

Mitigation Potential

- **Type of GHGs reduced**: CO_2
- **Annual reduction**: 12,141 tCO_{2e}
- **Total reduction**: 364,230 tCO_{2e} (30 years)
- **Methodology applied for estimation**: General calculation method based on IPCC Guidelines

MRV

- In accordance with international MRV system

Contribution to Sustainable Development

- Reduction of local air pollution
- Efficient use of energy sources
- Creation of local employment opportunities

Finance and Cost

- **Total Investment Cost**: EUR 9.1 million (hot water network EUR 6.4 million and substations EUR 2.7 million)
- **Financial sources**: N/A
- **Simple pay back period**: 18 years

Current Status and Schedule

Current Status

- Technical documentation prepared for new heating substations and network

Expected starting date of Action

- Design and construction will start in 2013 and completed by 2016

Lifetime

- 30 years

Implementing Entity and Contact Information

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Improvement of Old Residential Buildings Envelope (Exterior Doors, Windows and Thermal Insulation) in Serbia

Residential buildings in Serbia that were built between 1950's and 1980's do not have effective thermal insulation, and thus consume tremendous amount of energy for space heating. Objective of the NAMA is the rehabilitation of about 10% of the existing residential buildings throughout Serbia that were built in the said period. Detailed measures to be applied to the buildings include rehabilitation of buildings' envelope (thermal insulation of non-transparent elements: external walls, partitions to unheated spaces, roofs, ceilings, etc.), and replacement of windows with new five-chamber PVC frames, double glazing, low-emissivity glass, filled with argon gas.
With the application of all above measures, specific annual energy consumption for heating will decrease from 160 kWh/m^{2}y to around 70 kWh/m^{2}y and GHGs emission reduction will be achieved.

Type of Action

- Program

Boundary and Location

- Targeted residential buildings are located throughout Serbia

BAU Scenario

- Old existing buildings will not be applied with any rehabilitation measures, and energy efficiency of the buildings remains the current level

Mitigation Target

- About 10,000 buildings with total surface area of about 10 million square meters to be retrofitted

Mitigation Potential

- **Type of GHGs reduced**: CO_2
- **Annual reduction**: 503,929 tCO_{2e}
- **Total reduction**: 15,117,870 tCO_{2e} (30 years)
- **Methodology applied for estimation**: General calculation method based on IPCC Guidelines

MRV

- In accordance with international MRV system

Contribution to Sustainable Development

- Efficient use of energy sources
- Increase the level of indoor comfort
- Creation of local employment opportunities

Finance and Cost

- **Total Investment Cost**: EUR 723.48 million
- **Financial sources**: A part of financial sources could be provided by building owners. Other parts will include the state and some sort of non-commercial loans.
- **Simple payback period**: 16 years

Current Status and Schedule

Current Status

- Pilot projects ongoing

Expected starting date of Action

- Rehabilitation of buildings will start in 2013 and will be completed in 2020

Lifetime

- 30 years

Implementing Entity and Contact Information

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Construction of New Energy Efficient Buildings Based on Energy Efficiency Regulation in Serbia

Although Serbia has introduced a regulation in the 1970's that requires minimum energy efficiency for new residential and non-residential buildings, and has continuously improved the regulation, the country is taking one further step to make the regulation even much stricter than the previous standard. Under the new regulation, "Regulations on Energy Efficiency in Buildings", all new buildings will be installed with better thermal insulation of non-transparent elements, including external walls, partitions to unheated space, roofs, ceilings, etc., and with better windows quality, such as five-chamber PVC frames, etc. This allows specific annual heat energy consumption for new residential buildings will decrease from 100 to 60 kWh/m^2y, and that for new non-residential buildings from 110 to 70 kWh/m^2y and GHGs emission reduction will be achieved.

Type of Action

- Program/ Regulation

Boundary and Location

- Targeted buildings located throughout the country

BAU Scenario

- All new buildings are installed with thermal insulation technologies that meet the minimum required energy efficiency standard, and technologies more efficient than that standard will not be introduced but it will be possible

Mitigation Target

- About 39% of energy for heating will be saved at target new buildings
- In the period from 2013 to 2020, approximately 9.2 million m^2 of residential area and 4.5 million m^2 of non-residential area will be built under new regulation

Mitigation Potential

- **Type of GHGs reduced**: CO_2
- **Annual reduction**: 275,282 tCO_{2e}
- **Total reduction**: 8,258,460 tCO_{2e} (30 years)
- **Methodology applied for estimation**: General calculation method based on IPCC Guidelines

MRV

- In accordance with domestic MRV system
- In accordance with international MRV system where technologies that achieve energy efficiency level higher than minimum standard required by the regulation

Contribution to Sustainable Development

- Reduction of fossil fuel import
- Creation of employment opportunities
- Awareness raising among general public regarding energy saving

Finance and Cost

- **Total Investment Cost**: EUR 285.5 million

Current Status and Schedule

Current Status

- The new Regulation on Energy Efficiency in Buildings was adopted in August 2011 and came into force in September 2012

Expected starting date of Action

- Construction will start in 2013 and operation will start continuously.

Lifetime

- Approximately 30 years

Implementing Entity and Contact Information

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Energy Efficiency Improvements in Public Buildings: 23 Schools and 26 Hospitals - Serbian Energy Efficiency Project (SEEP)

Most of the old public buildings in Serbia do not have any energy saving measures applied and they are consuming significant amount of energy, which is contributing to GHG emissions in Serbia.
The NAMA involves application of energy efficiency measures to public buildings such as schools and hospitals. Detailed site portfolio and locations will be identified by line ministries. Tentative number of potential sites for NAMA project is 49 public buildings (23 schools and 26 hospitals). Potential energy efficiency measures include façade insulation, roof, ceiling, wall insulation, window replacement, HVAC system reconstruction, etc.

Type of Action

- Program

Boundary and Location

- Target public buildings throughout the country

BAU Scenario

- Energy efficiency level of schools and hospitals remains same (not improved)

Mitigation Target

- Energy efficiency improvement at 49 public buildings
- Approximately 40% savings in energy consumption

Mitigation Potential

- **Type of GHGs reduced**: CO_2
- **Annual reduction**: 8,326 tCO_{2e}
- **Total reduction**: 208,150 tCO_{2e} (25 years)
- **Methodology applied for estimation**: original calculation methods based on IPCC Guidelines

MRV

- In accordance with international MRV system

Contribution to Sustainable Development

- Reduction of fuel consumption
- Energy efficiency improvement experience and awareness raising among the municipal and local government officials

Finance and Cost

- **Total Investment Cost**: EUR 12.5 million
- **Financial sources**:
- Average of Simple Payback Period for 23 schools: 10.2 years (varied from 3.4 to 20.2)
- Average of Simple Payback Period for 26 hospitals: 6.7 years (varied from 3.0 to 17.3)

Current Status and Schedule

Current Status

- SEEP 1 completed (2005-2010; 28 buildings)
- SEEP 2 ongoing (to be completed in April 2013; 64 buildings)
- Target buildings are tentatively selected. Preliminary energy audit will be conducted for target buildings.
- Technical discussion ongoing

Expected starting date of Action

- Construction starts in 2013 or when the financial sources are identified.

Lifetime

- 25 years

Implementing Entity and Contact Information

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Annex 8 NAMA Short Description

GENERAL INFORMATION

Title of NAMA

- Construction of a 790MW Ultra Supercritical Lignite Power Plant TPP Nikola Tesla – Unit B3

Description

Description of the Mitigation Action

The NAMA represents construction of the new 790 MW unit on TPP Nikola Tesla B location.
It is foreseen as condensing type, ultra supercritical steam parameters, with a river water once-through cooling system, mainly designed to operate in the electric power system of Serbia and at the base load level of the load diagram.
The NAMA will contribute to climate change mitigation as the highly efficient plant emits less GHG than existing TPPs. By its operation, it reduces GHGs that would be otherwise emitted by less efficient grid-connected TPPs in the absence of the mitigation action. The plant is expected to become the first ultra supercritical power plant in Serbia and will result in technology transfer of state-of-the-art clean coal technology.

Technologies / measures

The design must incorporate a high efficiency (coal usage) unit of modern construction with ultra supercritical steam parameters and cycle. Total power of the unit should be approximately 730 MW at the net connection. The unit will use lignite from the Open Pit Mine Kolubara as primary fuel. The lignite will be delivered to the plant location as homogenized coal of stated mean calorific value of 6,900 kJ/kg.
The unit will be connected to the electric power system at the 400 kV voltage level via transmission lines and the switchgear Mladost located 9 km from the TPP Nikola Tesla B.
Minimum expected annual operating time is 7,600 h/year.

TPP Nikola Tesla B3 technical data

Data in this table are of indicative nature. Preliminary technical analysis currently ongoing and the detailed technical data will be available by March 2013.

Parameter	Value	Unit
Boiler type		
Once-though, Benson type, with superheated steam parameters		
Turbine type		
Condensing, with steam extractions		
Unit power, total	~ 790	MW
Unit power, net	~ 730	MW
Rotor speed	3,000	r/min
Generator Voltage	24	kV
Number of reheating	1	
Number of turbine extractions	8	

Parameter	Value	Unit
Net Unit efficiency	≈ 43	%
Net specific heat consumption of the Unit	> 9,000	kJ/kWh
Boiler efficiency	~ 88	%
Live steam flow rate	> 2,000	t/h
Basic fuel – Coal		
Lignite, Low heating value	~ 6,900	kJ/kg
Cooling system		
Condensing pressure at nominal operating conditions	~ 0.043	Bar
Cooling water temperature t_{in}/t_{out}	14 / 23	^{o}C
Boiler Load		
Minimal boiler load with coal firing only	40	%
Minimal boiler load with liquid fuel firing only	35	%
Operating range at once-through operating conditions	40 – 100	%
Operating range at sliding operating conditions	40 – 100	%
Load change gradient		
in 40-80 % range and variation >25 %	6	%/min
in 80 - 100 % range and variation ≤ 20 %	4	%/min
in 90 -100 % range and variation >5 %	2	%/min
Emissions of harmful combustion products		
NO_x (at 6% O2)	≤ 200	mg/Nm^3
SO_2 (at 6% O2)	≤ 200	mg/Nm^3
CO_2	≤ 262	g/Nm^3
Particles	≤ 30	mg/Nm^3

Location

- TPP Nikola Tesla B is located on the right hand bank of the Sava River, 59 km upstream of Belgrade. The new power plant is located near the village Vorbis, between the villages of Skela and Usce, 12 km upstream of TPP Nikola Tesla A. Geographical location is given at the picture below.

NAMA Implementing Entity

- Public Enterprise Electric Power Industry of Serbia (EPS)
- EPS is a 100% state-owned company whose main business include electric power generation, electric power distribution and distribution system management, electric power trade, coal production, processing and transport, steam and hot water production in combined heating processes, water power utilization and services in river and lake traffic, wholesale trade in fuel and similar products. EPS operations also include research and development, design, construction and maintenance of energy and mining plants, design, construction and operation of telecommunication facilities and engineering.
- www.eps.rs

Implementing Schedule

Time span	Activity	
2013 – 2016	Preparatory period	Feasibility Study with Preliminary Design of TENT B3 – including Revision by the State Revision Committee, securing project funding, Main Designs for TENT B3 construction – including Technical Review, obtaining the necessary approvals from the relevant institutions, preparation of tender documents, bidding and contracting procedures and other necessary activities
2017 – 2020	Implementation	Construction, commissioning, trial operation and guarantee tests.

Expected starting date of Action

- Construction starts in 2017 and operation starts in 2020

Lifetime

- 30 years

Current Status

- Operations stability study and selection of the most favorable parameter values and TPP Kolubara B and TENT B3 turbo aggregates and block-transformer characteristics
- Study on Environmental Impact Assessment of TENT B3
- Preliminary technical and financial analysis of application of ultra supercritical technology in 2012 – 2013.

Coverage

- **Sector:** Energy – Fuel combustion – Energy industries - Energy efficiency improvement
- **GHG Gases:** CO_2

FINANCIAL INFORMATION

Finance and Cost

- Expected cost of **preparation**:

  EUR 40 million for investment and technical documentation
  (more accurate expected cost will be available by March 2013)

- Expected cost of **implementation**:

  EUR1,200 million
  (more accurate expected cost will be available by March 2013)

- Expected **incremental cost** of implementation:
  (more accurate expected cost will be available by March 2013)

- **Financial sources** identified:

  EPS would provide up to 30% of the investment.

- **Financial analysis**:

  Preliminary financial analysis is currently under development. Result of the analysis will be available by March 2013 upon request.

INFORMATION ON SUPPORT REQUIRED

Description of Support Required

Type of Support	Support required for preparation	Support required for implementation
Financial	30 million EUR for technical design	Approximately 850 million EUR as a share of the Strategic Partner in the project
Technical	x	Technology transfer of USC technology for electricity generation
Capacity Building	x	O&M of the new TPP

(more accurate information will be available by March 2013)

EXPECTED GHG EMISSION REDUCTIONS AND MRV

Expected Mitigation Potential

- **Annual reduction**: 1,337,728 tCO_{2e}
- **Total reduction**: 40,131,830 tCO_{2e} (30 years)

Methodologies and Assumptions

- **Methodologies**: Ex-ante and ex-post calculation of GHG emission reduction is conducted based on the approved CDM methodology, ACM0013 – "Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology." A deviation from the said methodology was applied in the calculation since several information was not available in order to determine the baseline power plants as specified in the CDM methodology, i.e. similar power plants that meet specified conditions in the geographical area in all neighboring non-Annex I countries or all non-Annex I countries in the continent.

  Instead of considering those power plants in other countries, the NAMA takes into consideration the current condition and reasonable future projections of the power generation and electricity market in Serbia.

- **BAU scenario:** Continued operation of the existing sub-critical lignite-fired power plants is the most likely baseline scenario, as it has the lowest levelized costs of electricity generation.

- **Calculation of emission reduction**

  <u>Baseline emissions</u>

  Baseline emissions are calculated by multiplying the electricity generated in the project plant using lignite fossil fuel ($EG_{PJ,y}$) with a baseline CO_2 emission factor ($EF_{BL,CO2}$), as follows:

$BE_y = EG_{PJ,y} * EF_{BL,CO2}$

and

$EF_{BL,CO2} = 3.6 * EF_{FF,co2} / \eta_{BL}$

Where:

$EG_{PJ,y}$	=	Total net quantity of electricity generated in the project plant in year *y* (MWh/yr)
$EF_{BL,CO2}$	=	Baseline emission factor (t CO_2/MWh)
$EF_{FF,co2}$	=	CO_2 emission factor of the fossil fuel type (lignite) used in the project and the baseline (t CO_2/GJ)
η_{BL}	=	Energy efficiency of the power generation technology that has been identified as the most likely baseline scenario
3.6	=	Unit conversion factor from GJ to MWh

Data / Parameter	$EG_{PJ,y}$
Unit	MWh
Description	Net electricity generated by the project power plant in year *y*
Source of data	Calculated based on installed capacity of the plant (790 MW) and anticipated working hours of the plant (7,600 h) Expected amount of electricity consumed for power plant operation is not included.
Value applied	6,004,000 MWh

Data / Parameter	$EF_{FF,CO2,y}$
Unit	tCO_2/GJ
Description	CO_2 emission factor of the fossil fuel type used in the project plant in year *y* – lignite from Kolubara pit mine
Source of data	Initial National Communication of the Republic of Serbia, Annex 1 "Net calorific value and emission factor of the raw lignite from pit-mine exploitation in the republic of Serbia"
Value applied	0.10962 tCO_2/GJ

Data / Parameter	η_{BL}
Unit	%
Description	Energy efficiency value of the power generation technology that can be considered as the most likely baseline scenario
Source of data	Efficiency is calculated based on the following reasonable projections and assumptions: 1. Four units of the existing power plant (Kolubara TPP, units A1 to A4), which are connected to the Serbian national grid, will be closed once the proposed ultra supercritical power plant is constructed, whose total installed capacity is 160MW.

	2. A new thermal power plant that uses conventional sub-critical technology will be installed and connected to the grid, which should be same or larger than 630 MW, a difference between the proposed power plant size (790MW) and the four units that will be closed (160MW). Efficiency of the above item 1. is 25%, based on the calculation by EPS. Efficiency of the above item 2. is 37%, based on the average efficiency of the conventional sub-critical technology available in the market today. η_{BL} is calculated as: (160*0.25 + 630*0.37) / 790 = 0.3457
Value applied	34.6%

Baseline emissions are calculated as:

BE_y = 3.6 * 0.10962 / 34.6 * 6,004,000

= 6,847,892 (t-CO_2)

Project emissions

Project emissions are the CO_2 emission from combustion of lignite at the new power plant. The CO_2 emissions from electricity generation in the project plant (PE_y) can be calculated as follows:

$PE_y = EG_{PJ,y} * EF_{PJ,CO2}$

and

$EF_{PJ,CO2} = 3.6 * EF_{FF,co2} / \eta_{PJ}$

Where:

$EF_{PJ,CO2}$ = Project emission factor (t CO_2/MWh)

η_{PJ} = Energy efficiency of the project power plant

Data / Parameter	η_{PJ}
Unit	%
Description	Project power plant energy efficiency value
Source of data	Manufacturer's catalogue
Value applied	43.0%

Project emissions are calculated as:

PE_y = 3.6 * 0.10962 / 43.0 * 6,004,000

= 5,510,164 (t-CO_2)

Emissions reductions

Emission reductions are a difference between baseline emissions and project emissions.

$ER_y = BE_y - PE_y$
$= 6{,}847{,}892\ tCO_2 - 5{,}510{,}164\ tCO_2$
$= 1{,}337{,}728\ tCO_2$

Measurement, Reporting, and Verification (MRV)

Monitoring plan

- **Data and parameters to be monitored**:

Data / Parameter	EG y
Unit	MWh
Description	Electricity generated by the project power plant in year *y*
Source of data	Operation centre at generation system
Measurement procedures	Measured continuously by electricity meter equipped at the power plant and recorded daily.
Monitoring frequency	Monthly compiled and aggregated data is recorded on computer.
QA/QC procedures	The electricity meters will be periodically calibrated according to the relevant national industrial standards and regulations. Meter readings will be compared to electricity sales receipts.

Data / Parameter	$FC_{lignite,y}$
Unit	Ton/ year
Description	Annual lignite fuel consumption at the project power plant in year *y*
Source of data	Operation centre at generation system
Measurement procedures	Measured continuously by weighing bridge at the power plant and recorded daily.
Monitoring frequency	Monthly compiled and aggregated data is recorded on computer.
QA/QC procedures	The weighing bridge and its meters will be periodically calibrated according to the relevant national industrial standards and regulations. The consistency of metered fuel consumption quantities will be cross-checked by an annual energy balance that is based on purchased quantities and stock changes.

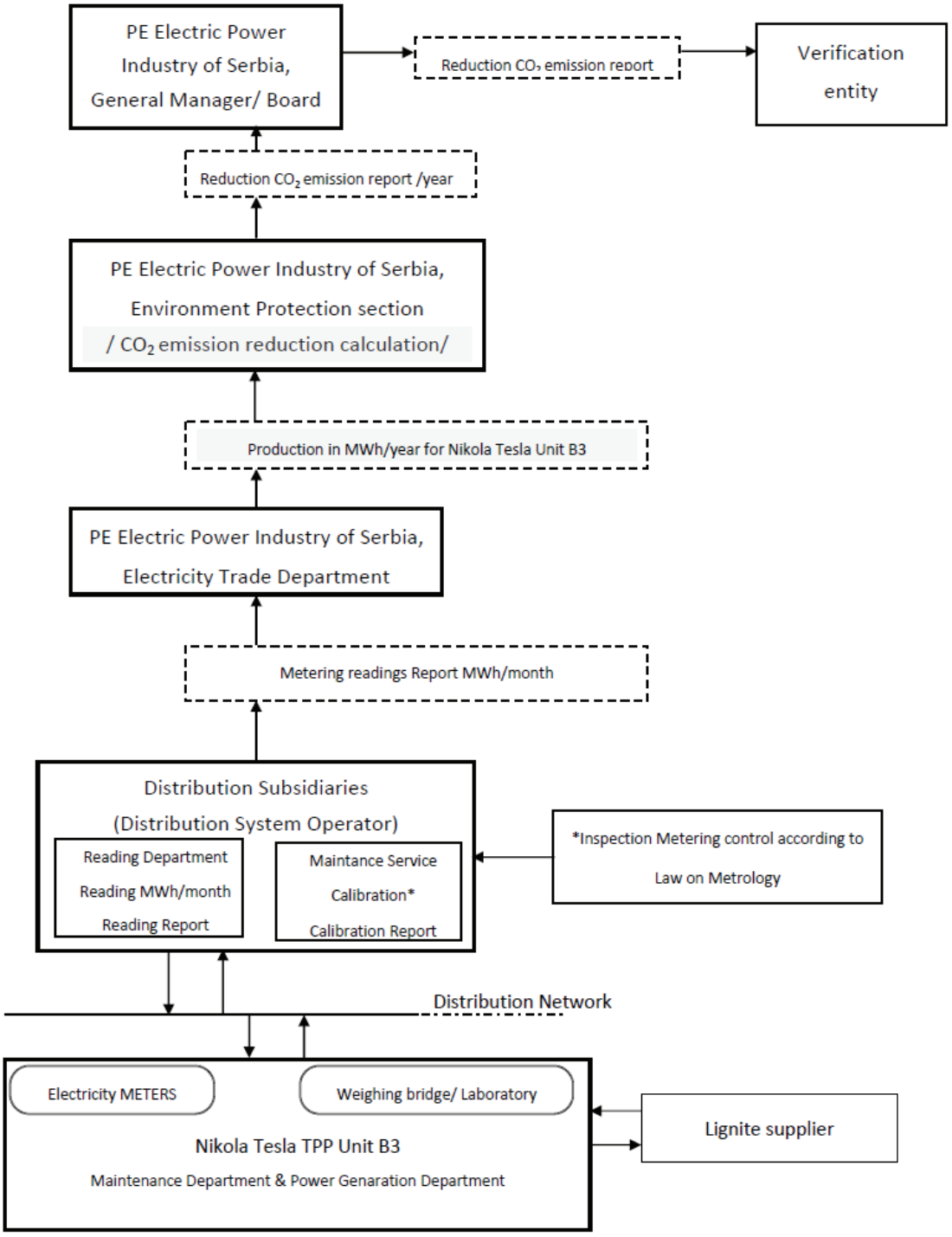
Data / Parameter	$NCV_{lignite,y}$
Unit	GJ/ton
Description	Weighted average net calorific value of lignite fuel in year *y*
Source of data	Values provided by the fuel supplier in invoices/ monitored at the laboratory located in the project power plant

Measurement procedures	Laboratories in the power plant will measure the value for each fuel delivery.
Monitoring frequency	NCV value will be obtained for each fuel delivery, from which weighted average annual values will be calculated.
QA/QC procedures	Laboratories will have ISO accreditation and data will be checked according to international standard.

- **Monitoring plan and structure:**

Monitoring of the data and parameters above will be conducted based on the EPS monitoring structure shown below.

Monitoring activities will be conducted by EPS, the NAMA implementing entity, based on its ISO 9001:2008 certified quality management system.



NAMA Monitoring Structure

Calibration * - Verification and benchmarking meters are calibrated by accredited Metrology laboratories, which are accredited by the Accreditation Body of Serbia (ATS).

The Distribution System Operator must take care that all meters in his ownership be verified and calibrated

in time and in the manner prescribed by the Law on Metrology, according to meters class.

All the meters for the calculation of generation/ consumed electricity are ownership of Distribution system operators, including meters in the Nikola Tesla TPP. Monthly reading generation/ consumption of electricity is done by Distribution system operator on a monthly basis.

Reporting course:

- After metering readings of electricity generation in TPP, all Distribution system operators - Distribution Subsidiariess submit monthly reports to EPS Electricity Trade Department for the calculation and payment of electricity delivered.
- EPS Electricity Trade Department, based on monthly reports at the request of the common functions of EPS Environmental Protection section submit the data for delivered and calculated electricity production on a annually base from TPP.
- Common functions of EPS Environmental Protection section include CO2 emissions reduction calculation based on data obtained from Electricity Trade Department on an annual basis and deliver to General Manager of EPS and Board of Directors.
- EPS submits CO_2 Emission Reduction Monitoring Report to Verification authorities.

Accuracy control:

- Verification and calibration standards of meters shall be subject to such terms and in the manner specified by regulatory law, by an accredited laboratory, on which a Distribution system operator shall maintain proper records.
- In case of conflict or doubt that there is a conflict in the read values assumed for calculation of delivered electric energy, all participants in the generation, reading and calculation of electric energy the TPP may request that the Commission establish the accuracy of the readings or calculated data, in accordance with long-term contracts.

Domestic MRV arrangements

- Domestic MRV arrangement of Serbia is currently under development.
- It is expected that under the Serbian domestic MRV system, a NAMA implementing entity is responsible for the Measurement (M) and Reporting (R) activities, which will go trough Verification (V) from third party.
- It is expected that the MRV of the proposed NAMA will be conducted in the following manner:
  1. EPS will conduct the Measurement activity based on the above-mentioned monitoring plan in order to calculate the emission reductions achieved by the NAMA.
  2. EPS will prepare a Report that contains information on 1) the detailed result of the monitoring activities conducted based on the monitoring plan, 2) the result of emission reduction calculation based on the above mentioned methodology, and 3) any support received under NAMA scheme from Annex-I countries or international organization regarding financial support, technical support, or support on capacity building.

OTHER INFORMATION

Contribution to Sustainable Development

Implementation of the NAMA is meeting majority of the Sustainable Development Indicators in accordance with three criterion indicated in appendix of the Serbian DNA Rules of procedure.

- According to the economic criterion, it satisfies following fields:
  1. Investing conditions - Construction of the new TPP will be carried out through strategic partnership of EPS and power utility that will be selected on the international tender. EPS would participate with up to 30% of the capital, while the strategic partner would provide the rest of investments amounting 900 millions EUR.
  2. Sustainable technology transfer - Final technological solution is not been defined yet, but it is anticipated that TPP Nikola Tesla B3 will be unit of the modern construction with supercritical steam parameters, which represent the best available technology at this point.
  3. Economic development of the region - Construction of the TPP Nikola Tesla B3 will bring construction of new infrastructure; it also contributes to the power system stability and supply security, which consequently have effect on the stability of the prices for electric energy.
  4. Employment - Construction of the TPP Nikola Tesla will provide work for many domestic companies. After commissioning and connection to the network, new work places will be available at the power plant and following facilities, as well as the chance for engagement of the companies from the sector of services and maintenance on long-term basis.
  5. Priorities of the sector - Power generation at the TPP Nikola Tesla B3 will contribute to the power system stability and supply security, which represent one of the priorities in the energy sector.
  6. Consumption and generation - Power generation at the new power plant will reduce need for electricity import, and its modern concept will reduce waste production per unit of generated energy as well as waste management in ecology acceptable manner.
- According to the social criterion, it satisfies following fields:
  1. Participation of the interested parties - Project TPP Nikola Tesla B3 will be implemented with strategic partner on mutual benefit. Strategic partner will provide technology and financing, while EPS will provide fuel supply, existing infrastructure, and part of the funds. Implementation of this project includes participation of every governmental structure from the state to the local level, which supporting project due to its many advantages.
  2. Life conditions improvement - Project implementation of such scope, lead up to the employment increase, as well as income increase, on the local and regional level.
  3. Capacity increase - According to the work needs and modern equipment maintenance, strategic partner will provide training for the employees, as well as expertise and tools for local companies engaged on this implementation of the project during its operational life.
- According to the environment and natural resources criterions, it satisfies following fields:
  1. Energy resources – Generation of TPP Nikola Tesla B3 will, due to the higher energy efficiency of the plant, reduce coal consumption for power generation, and significantly reduce need for electricity import.
  2. Air - Due to the application of the modern technology and higher energy efficiency of the plant, project will result in reduced emission levels of CO_2, SO_x and NO_x, comparing to the existing thermo power plants in Serbia.
  3. Water - Contribution to the sustainable water use would be the application of measures for water treatment of all water quantities used in the technological process of electricity generation.
  4. Soil - New thermo power plant will be constructed on the location of TPP Nikola Tesla B, where already exist land for this purpose, as well as joint systems, so it would not be necessary to change the purpose of the land. In addition, ash disposal will be at the area anticipated for this purpose with application of the reclamation measures.

5. Biodiversity – Whether the ash disposal will be at the area reserved for that purpose or at the area of the open pit mines of EPS - biological reclamation measures will contribute to the preservation of plants and increase of wooded areas.
6. Natural recourses - Modern concept of the unit TPP Nikola Tesla B3 will significantly contribute to the sustainable use of mineral recourses, because energy efficiency of primary energy transformation (≈ 43%) will be significantly higher than at existing thermal power plants in Serbia. Exploitation life of domestic lignite deposits is extended that way.

Stakeholder consultation

- EPS will conduct a public stakeholder consultation regarding the NAMA. At the consultation, objective and outcome, expected impacts on local environment, employment opportunities, etc. will be presented to stakeholders, and their comments will be collected and compiled.
- EPS will take necessary due actions to the comments received during the public consultation and report the results.
- Public consultation will be held either through website or through meetings near the project site.

CONTACT INFORMATION

Implementing Entity

Entity Name	Public Enterprise Electric Power Industry of Serbia
Contact Person	Mihajlo Gavric
Title	Environment Protection Manager of EPS
Phone	+381-11-3952-316
E-mail	mihajlo.gavric@eps.rs

NAMA Coordinating Entity

Entity Name	Ministry of Energy, Development, and Environmental Protection Climate Change Division
Contact Person	State Secretary: Mr. Vladan Zdravkovic Head of Climate Change Division: Ms. Danijela Bozanic
Phone	+381-11-3131-355
E-mail	danijela.bozanic@merz.gov.rs

GENERAL INFORMATION

Title of NAMA

- **Construction of 9 new small hydropower plants (HPPs) in Serbia**

Description

- **Description of Mitigation Action**

The NAMA involves construction of 9 new small hydropower plants (HPP) throughout Serbia. The total capacity of 9HPP is 30.40 MW with possible electricity production of 108.3 GWh/year. All of the electricity generated will be supplied to the Serbian electricity grid, which is currently composed mostly of carbon-intensive lignite-fired thermal power plants.

The NAMA will contribute to climate change mitigation as the hydro power as renewable energy source does not emit any greenhouse gases (GHGs) during operation, and reduces GHGs that would otherwise be emitted from grid-connected power plants in the absence of the mitigation action.

Detailed list of HPPs is as below. Size of HPP varies from 0.5 MW to 11 MW.

Table 1 List of HPPs

N°	HPP name	Location	Watercourse	Capacity (MW)	Expected Generation (GWh/y)	Investment (Million €)
1	Rovni	Valjevo	Jablanica	1.25	5.2	1.612
2	Svrackovo	Arilje	Veliki Rzav	7.65	22	9.28
3	Jezero	Surdulica	Bozicki tunnel	1	4.85	2.98
4	Mala Vrla 1	Surdulica	Vrla, Gradska reka	0.47	1.83	0.8
5	Zavoj	Pirot	Visocica	0.58	2.94	1.112
6	W. s. Nis	Nis	Water supply Nis	4.9	4.88	1.0
7	Banjica	Sicevo	Nisava	2.3	12	5.9
8	Stalac	Stalac	Juzna Morava	11	48	29.0
9	Sokolja	Kraljevo	Sokolja, Gvozdacka reka	1.25	6.6	3.0
Total				**30.40**	**108.3**	**54.684**

Technology/ measure

Technical specification varies among 9 HPPs as shown in the tables below.

Construction activities differ from plant to plant. The main difference is whether a dam has to be built or it already exists and can be used for the new HPP. Generally, civil structure and equipment for specified HPPs usually consist of: water pipeline (different length, diameter and installed discharge), turbine (Francis, Kaplan, Pelton type), generator set (one to four units), auxiliary equipment and control system.

9 HPPs can be categorized into three groups as follows:

- HPPs constructed on existing management facilities

  2 HPPs of this type will be built. Total construction investments cover only the HPPs construction.

- HPPs constructed using the water discharged from the existing HPPs

  The current plan is to build 2 HPPs of this type.

- HPPs constructed on new sites

  This group of HPPs has still not been analyzed in details, and that other possible sites may be included if, based on preliminary analyses, they are suitable for further consideration.

Table 2 Technical specifications of 9HPPs

HPP Name	Rovni	Svrackovo	Jezero
Nominal capacity	1.25 MW	7.65 MW	1.0 MW
Annual generation	5.2 GWh/year	22.0 GWh/year	4.85 GWh/year
Nominal head (m)	67 m	53.5 m	12 m
Discharge	Installed 2.1 m^3/s, mean annual 1.341 m^3/s	Installed 15.86 m^3/s , mean annual 6.21 m^3/s	Installed 8.0 m^3/s , mean annual 3.9 m^3/s
Number of turbines	3	3	2
Hydraulic turbines	Francis type	Francis type	Kaplan type
Dam type	Rock-fill dam with clay core, under reconstruction	Rock-fill dam with clay core	N/A
Available storage vol.	N/A	21 million m^3	N/A
Total storage volume	49.5 million m^3	27 million m^3	N/A

HPP Name	Mala Vrla 1	Zavoj	Water supply Nis
Nominal capacity	0.47 MW	0.58 MW	4.9 MW
Annual generation	1.83 GWh/year	2.94 GWh/year	4.88 GWh/year
Nominal head (m)	42 m	80 m	47 - 133 m
Discharge	Installed 1.4 m^3/s , mean annual 0.8 m^3/s	Installed 0.9 m^3/s,	Installed 0.65 m^3/s , mean annual 0.65 m^3/s
Number of turbines	2	1	4
Hydraulic turbines	Banky type	Francis type	Francis type
Dam type	Tyrol intake	Rock-fill dam with clay core	N/A
Available storage vol.	N/A	150 million m^3	N/A
Total storage volume	N/A	180 million m^3	N/A

HPP Name	Banjica	Stalac	Sokolja
Nominal capacity	2.3 MW	11 MW	1.25 MW
Annual generation	12.0 GWh/year	48 GWh/year	6.6 GWh/year
Nominal head (m)		7 m	
Discharge	Installed 45 m^3/s ,	Installed 140 m^3/s	Installed 0.92 m^3/s
Number of turbines	2	2	2
Hydraulic turbines	Francis type	Kaplan type	Pelton type
Dam type	Low concrete gravitation dam	Low concrete gravitation dam with rock-fill section	
Available storage vol.	N/A	N/A	N/A
Total storage volume	N/A	N/A	N/A

Location

- 9 different locations as shown in the map below.

Figure 1 Location of HPPs

NAMA Implementing Entity

- Public Enterprise Electric Power Industry of Serbia (EPS)
- EPS is a 100% state-owned company whose main business include electric power generation and distribution, distribution system management, electric power trade, coal production, processing and transport, steam and hot water production in combined heating processes, water power utilization and services in river and lake traffic, wholesale trade in fuel and similar products. EPS operations also include research and development, design, construction and maintenance of energy and mining plants, design, construction and operation of telecommunication facilities and engineering.
- www.eps.rs

Implementing Schedule

The project consists of two phases:

Phase I: Construction of 6 small scale hydropower plants in the area of existing hydro facilities
Phase II: Construction of 3 small scale hydropower plants in the new locations

Expected starting date of Action

Information about Technical documentation and starting and finishing date of construction is given in the table 3。

Table 3 Expected starting date of HPPs

N°	HPP name	Expected timing of construction	Expected timing of operation	Status of preparation of documentation
1	Rovni	2014	2015	Conceptual design and Prefeasibility Study
2	Svrackovo	2013	2016	Main design and Construction licence
3	Jezero	2014	2015	Conceptual design and Prefeasibility Study
4	Mala Vrla 1	2014	2015	Conceptual design and Prefeasibility Study
5	Zavoj	2013	2014	Main design and Construction licence
6	W. s. Nis	2013	2014	Conceptual design and Prefeasibility Study
7	Banjica	N/A	N/A	2013 Preparation of Technical documentation
8	Stalac	N/A	N/A	2013 Preparation of Technical documentation
9	Sokolja	N/A	N/A	2013 Preparation of Technical documentation

Lifetime

- 40 years

Current Status

Explained in the Table 3 above.

Coverage

- **Sector**: Renewable energy generation
- **GHG Gases**: CO_2

FINANCIAL INFORMATION

Finance and Cost

- Expected cost of **preparation**:
  none (preparation and feasibility studies completed)
  Feasibility study for 6 HPPs has been completed and for 3 HPPs will be prepared in 2013 (see Table 3). EPS will incur cost for feasibility studies of HPPs, and other necessary technical documentation.

- Expected cost of **implementation**: EUR 54.684 million (for 9 HPPs)

- Expected **incremental cost** of implementation:
  none

- **Financial sources**:
  EPS equity and loan

- **Financial analysis**:
  Please find attachement for the financial analysis.

Simple payback period:	12.1 years
FIRR:	6.0% (for 40 years)
NPV:	- 9,130 EUR

INFORMATION ON SUPPORT REQUIRED

Description of Support Required

Type of Support	Support required for Preparation	Support required for implementation
Financial	x	54.684 million EUR (soft loan): for the initial investment cost for all 9 HPPs
Technical	x	x
Capacity Building	x	x

EXPECTED GHG EMISSION REDUCTIONS AND MRV

Expected Mitigation Potential

- **Annual reduction**: 102,343 tCO_{2e}
- **Total reduction**: 4,093,720 tCO_{2eq} (40 years)

Methodologies and Assumptions (including BAU scenario)

- **Methodology**: Approved CDM methodology, AMS-I.D. "Grid connected renewable electricity generation" is applied to estimate emission reductions from the NAMA.
- **BAU scenario**: new small HPPs (9 plants) are not constructed and instead grid-connected power plants, mainly thermal power plants, continue operation and supply electricity to the grid.

- **Calculation of emission reductions**:

  $BE = EG_{baseline} * EF_{grid}$

  Where

  BE = baseline GHG emissions

  $EG_{baseline}$ = electricity generation at baseline BAU case

  EF_{grid} = emission factor of the electricity grid

Data / Parameter	$EG_{baseline}$
Unit	MWh
Description	Quantity of electricity supplied to the grid by 9 HPPs which in the absence of the NAMA would have been sourced from the grid
Value applied	108,3 MWh/yr
Source of data	Estimated based on the manufacturer's specification and expected plant factor provided by NAMA implementing entity
Comment	Plant factor varies on each HPP

Data / Parameter	EF_{grid}
Unit	t-CO_2/MWh
Description	CO_2 emission factor of the grid
Source of data	Official data provided by Serbian Ministry of Environment, Mining and Spatial Planning, which is a

	Designated National Authority for CDM.
Value applied	0.945 tCO_2/MWh
Comment	Emission factor was calculated in accordance with the CDM guidance "Tool to calculate the emission factor for an electricity system" and Serbia's official data was used. Simple OM calculation option is applied for Operating Margin calculation. Data years are 2008, 2009, and 2010. http://www.ekoplan.gov.rs/DNA/index_en.html

BE = 108,300 MWh * 0.945 tCO_2/MWh
= 102,343 t-CO_{2eq}

Measurement, Reporting, and Verification (MRV)

Monitoring Plan

- **Data and parameters to be monitored**:

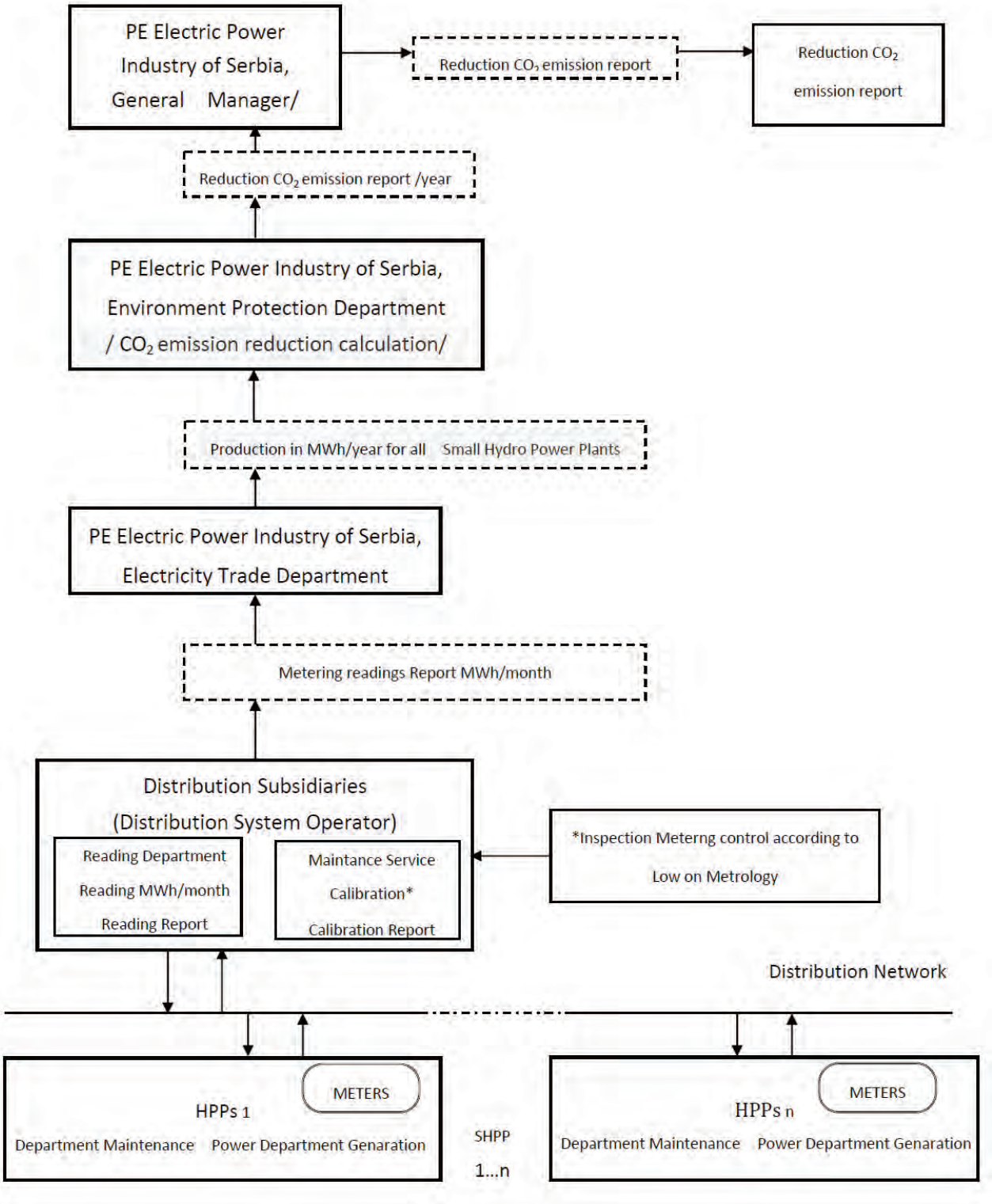
Following two parameters will be monitored in order to calculate emission reductions from the NAMA.

Data / Parameter	EG_y
Unit	MWh
Description	Quantity of electricity supplied to the grid by 9 HPPs
Source of data	Operation centre at generation system
Measurement procedures	Measured continuously by electricity meter equipped at each of the HPPs and recorded daily.
Monitoring frequency	Monthly Compiled and aggregated data is recorded on computer.
QA/QC procedures	The electricity meters will be periodically calibrated according to the relevant national industrial standards and regulations. Meter readings will be compared to electricity sales receipts.

Data / Parameter	EF_{grid}
Unit	t-CO_2/MWh
Description	CO_2 emission factor of the grid
Source of data	Official data provided by Serbian Ministry of Energy, Development and Environmental Protection
Measurement procedures	Website of Serbian Ministry of Minister of Energy, Development and Environmental Protection is checked for an update.
Monitoring frequency	Yearly
QA/QC procedures	No QA/QC necessary for this data item.

- **Monitoring plan and structure:**

Monitoring of the data and parameters above will be conducted based on the EPS monitoring structure shown below. Monitoring activities will be conducted by EPS, the NAMA implementing entity, based on its ISO 9001:2008 certified quality management system.



Monitoring Structure of NAMA

Calibration * - Verification and benchmarking meters are calibrated by accredited Metrology laboratories, which are acredited by the Accreditatation Body of Serbia (ATS).

The Distribution System Operator must take care that all meters in his ownership be verified and calibrated in time and in the manner prescribed by the Law on Metrology, according to meters class.

All the meters for the calculation of generation / consumed electricity are ownership of Distribution system operators, including meters in the HPPs. Monthly reading generation/consumption of electricity is done by Distribution system operator on a monthly basis.

Reporting course:

- After metering readings of electricity generation in HPPs, all Distribution system operators - Distribution Subsidiaries submit monthly reports PE Electric Power Industry of Serbia, to Electricity Trade Department for the calculation and payment of electricity delivered.
- PE Electric Power Industry of Serbia, Electricity Trade Department, based on monthly reports at the request of the common functions of PE Electric Power Industry of Serbia, Environmental Protection section submit the data for delivered and calculated electricity production on a annually base from HPP.
- Common functions of PE Electric Power Industry of Serbia, Environmental Protection section include CO_2 emissions reduction calculation based on data obtained from Electricity Trade Department on an annuall basis and deliver to General Manager of PE Electric Power Industry of Serbia/ Board of Directors.
- PE Electric Power Industry of Serbia submit CO_2 Emission Reduction Monitoring Report to Verification authorities.

Accuracy control:

- Verification and calibration standards of meters shall be subject to such terms and in the manner specified by regulatory law, by an accredited laboratory, on which a Distribution system operator shall maintain proper records.
- In case of conflict or doubt that there is a conflict in the read values assumed for calculation of delivered electric energy, all participants in the generation, reading and calculation of electric energy the HPP may request that the Commission establish the accuracy of the readings or calculated data, in accordance with long-term contracts.

Considering the abundant experience of EPS in operating hydro projects, the current monitoring system should be able to be applied to these 9 HPPs. Republic of Serbia soon will start the process of harmonization with EU Emission trading system, that include MRV system.

Domestic MRV arrangements

- Domestic MRV arrangement of Serbia is currently under development.
- It is expected that under the Serbian domestic MRV system, a NAMA implementing entity is responsible for the Measurement (M) and Reporting (R) activities, which will go through Verification (V) from third party.
- It is expected that the MRV of HPP NAMA will be conducted in the following manner.

1. EPS will conduct the Measurement activity based on the above-mentioned monitoring plan in order to calculate the emission reductions achieved by the NAMA.
2. EPS will prepare a Report that contains information on 1) the detailed result of the monitoring activities conducted based on the monitoring plan, 2) the result of emission reduction calculation based on the above mentioned methodology, and 3) any support received under NAMA scheme from Annex-I countries or international organization regarding financial support, technical support, or support on capacity building.

OTHER INFORMATION

Contribution to Sustainable Development

- "Energy Sector Development Strategy Of the Republic of Serbia by 2015" lists in its priority activity, the program of selective use of New Renewable Energy Sources, including small and mini hydropower plants – facilities of up to 10 MW.
- The NAMA is expected to contribute to sustainable development of Serbia and co-benefit in the following manners.
  - Utilization of renewable energy sources
  - Reduction of impact on environment
  - Creation of local employment opportunities
  - Awareness raising among general public about clean energy
  - Mittingation of CO_2 emissions

Stakeholder consultation

- EPS will conduct a public stakeholder consultation regarding the NAMA. At the consultation, objective and outcome, expected impacts on local environment, employment opportunities, etc. will be presented to stakeholders, and their comments will be collected and compiled.
- EPS will take necessary due accounts to the comments received during the public consultation and report the results.
- Public consultation will be held either through website or meetings near the project site.

PE EPS regularly conducts a public consultation before commercial operation of HPPs, and that procedure will be applied to new 9 HPPs projects. This procedure will be according to EIA Law and Law on information and Law on implementation of Aarhus Convention.

CONTACT INFORMATION

NAMA Implementing Entity

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NAMA Coordinating Entity

Entity Name	Ministry of Energy, Development, and Environmental Protection Climate Change Division
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Attachment: Financial Information

No	HPP Name	Location	Power [MW]	Expected production [GWh/y]	Investment k€	Yearly Income 12Y FiT k€	IRR (40 years)	NPV k€	Pay Back Period (years)
1	Rovni	Valjevo	0.77	5.20	1,612	323.69	19.4%	1,756	8.0
2	Svrackovo	Arilje	7.65	22.00	9,280	1,288.10	10.3%	1,800	10.2
3	Jezero	Surdulica	1.00	4.85	2,980	301.91	5.7%	-490	12.9
4	Mala Vrla 1	Surdulica	0.47	1.83	800	117.30	12.9%	315	9.8
5	Zavoj	Pirot	0.58	2.94	1,112	183.01	14.6%	628	9.1
6	W. s, Nis	Nis	4.90	4.88	1,000	312.81	30.9%	2,350	6.2
7	Banjica	Sicevo	2.30	12.00	5,900	702.60	7.7%	-135	11.4
8	Stalac	Stalac	11.00	48.00	29,000	2,400.00	1.3%	-15,919	15.1
9	Sokolja I&II	Kraljevo	1.25	6.60	3,000	410.84	11.1%	756	10.3
Whole 9 Porjects			**29.92**	**108.30**	**54,684**	**6,040.27**	**6.0%**	**-9,130**	**12.1**

Assumptions:

1) Feed In Tariff is applied for the first 12 years of operation in accordance with the *"Decree on Incentive Measures for Electricity Generation Using Renewable Energy Sources and for Combined Heat and Power (CHP) Generation"*
2) From the 13th year from operation, electricity sales price is set as 5 €C/kWh
3) Life time 40 yeas, O&M cost 5% of total investment, construction period 3 years
4) Discount rate; 8%

GENERAL INFORMATION

Title of NAMA

- Introduction 1000 MW of small biomass boilers in Serbia

Description

- **Description of the Mitigation Action**

The NAMA aims to install new biomass boilers totaling 1,000 MW that can provide around 3,150TJ of hear energy for residential, commercial and industrial sectors throughout the country that will be fueled by either wood waste (wood chips) or agricultural waste. Climate change mitigation will be achieved through replacing the existing small inefficient boilers that are fuelled mainly by carbon-intensive coal, oil, natural gas and grid electricity.

A domestic crediting mechanism will be developed as the tool to trigger private/public users to invest in new high-efficient biomass boilers. The increase of biomass usage is strategic goal of the Government and it would be promoted through donations and with loans with some incentives.

- **Technologies / measures**

Boilers will be used for space heating, domestic hot water and technical purposes.

There are two projects that are expected to start during 2013 for creating biomass market in Serbia. One is "Reducing Barriers to Accelerate the Development of Biomass Markets in Serbia" (UNDP, as implementing agency of Global Environmental Fund – GEF) and the other is "Development of a Sustainable Bioenergy Market in Serbia" (KfW and GIZ). Both projects will be realized with cooperation of competent Ministries of Republic Serbia. Under these projects, biomass potential will be analyzed and barriers for implementation of biomass projects in Serbia will be analyzed in detail. At second stages of these projects there will be an established public-private company that would supply prepared biomass for use in boilers. In accordance with available raw biomass, there should be standardized prepared biomass available on market.

The first stages of the projects consider making few pre-feasibility studies for creating sustainable biomass market in some areas. According to the results of the pre-feasibility studies and existing experience, it will be decided the optimal actions for installation 1000 MW of small biomass boilers in Serbia.

The potential for the biomass can be categorized as wood biomass and crop residues. The structure of those potentials is shown in the table:

Table 1 Biomass potential in Serbia

Biomass source	Potential (ktoe)
Wood biomass	*1,527*
Fuel wood	1,150
Forest residue	163
Wood processing residue	179
Agricultural biomass	*1,670*
Crop residue	1,023
Residues from fruit growing, viniculture and fruit processing	605

(Source: Biomass Action Plan for the Republic of Serbia 2010-2012)

Since some parts of this woody biomass potential are already being consumed (1059 ktoe), estimated available biomass potential is more then 1500 ktoe. Estimated amount of consumption by 1000 MW boilers is less then 100 ktoe, so the potential is sufficient enough to be an input for planned capacities.

It is expected that the existing boilers can be switched to biomass boilers or new biomass fired boilers can be installed in total capacity of 1000 MW. Expected range of boiler capacity is 100 kW – 1000 kW with average capacity of 250 kW. According to these expectations, total number of new biomass boilers should be around 4,000. According to statistical analysis of boilers in use, it is expected that number of replaced boilers should be in the next proportions:

Table 2 Type of boilers to be replaced by biomass boilers

Type of boilers that will be replaced	Number of boilers	Boilers in use, %
electrical	800	20
oil	1200	30
gas	600	15
coal	1400	35
Total:	**4000**	**100**

Construction activities differ from boiler to boiler. Depending on availability of biomass and local needs, appropriate type of boiler will be used. Biomass boilers are bigger and need more space than fossil fuel boilers, as well as requiring more storage space, and therefore the technical feasibility of each individual installation needs to be examined.

Location

- Boilers will be installed throughout Serbia. Serbia consists of 150 municipalities and every municipality will be asked to determine few project locations if there are biomass available. There will be possibility and for private initiatives so every potential investor will be able to apply for credit for locations where the project is sustainable.

NAMA Implementing Entity

Final structure of the project has not yet been defined and it will be determined by the feasibility study. However, it is expected that following actors may be involved.

- Ministry of Energy, Development and Environmental Protection - MEDEP

Ministry of Energy, Development and Environmental Protection deals with the state administration affairs with regard to: energy; energy balances of the Republic of Serbia; oil and gas industry; safe pipe transport of gaseous and liquid hydrocarbons; nuclear power plants the purpose of which is the production of electric i.e. thermal energy, the production, use and disposal of radioactive substances in these facilities; environmental protection; taking measures to provide the conditions for public enterprises to operate in the fields for which the Ministry was set up; supervision in the fields within the scope of the Ministry as well as other affairs stipulated by law.

MEDEP will coordinate between all Entities. The unit for support of biomass project will be established. Ministry will supervise SPC.

- Municipality

Local governments will assist in finding potential sites for the replacement of boilers.

- Special purpose company - SPC

SPC will be responsible for the collection of data on biomass consumed by boilers and creating reports for reporting and verification. SPC could be partly financed through budget, but final decision will be made during negotiations with potential financier.

- Boiler owners

Boiler owners will conduct monitoring activities determined in NAMA by keeping track of biomass consumption and to periodically send reports to SPC.

Implementing Schedule

Expected starting date of Action

- Installation will start in 2015 and operation will start continuously. It is expected the installation be finished in 2019.

Lifetime

- 25 years

Current Status

- The contracts with GIZ and KfW for the project “Development of a Sustainable Bioenergy Market in Serbia” will be signed by the end of 2012.
- Preparation of documents for project and requests for funding a project “Reducing Barriers to Accelerate the Development of Biomass Markets in Serbia” is in final stage. The decision on acceptance of the project by the GEF is expected by the end of September 2013.

Coverage

- Sector: renewable energy
- GHG Gases: CO_2

FINANCIAL INFORMATION

Finance and Cost

- Expected cost of **preparation**:
  EUR 0.5 million

- Expected cost of **implementation**:
  EUR 250 million

- Expected **incremental cost** of implementation:
  N/A

- **Financial sources** identified:
  Ministry of Energy, Development and Environmental Protection is searching financial support from Annex-I countries and international organizations through NAMA scheme. Development Bank of Serbia will be intermediate and it could provide some sort of incentive.

- **Financial analysis**:

  Financial analysis is done without calculating value of CO_2 and with discount rate 8%.
  Simple payback period: 6.9 years
  IRR: 12.9 %
  NRV: 88 million EUR

INFORMATION ON SUPPORT REQUIRED

Description of Support Required

Type of Support	**Support required for preparation**	**Support required for implementation**
Financial	x	250 million EUR for loans which will be distributed as loans with some incentives to the boiler owners.
Technical	500,000 EUR – support for feasibility study in order to identify the project sites and technical specifications	x
Capacity Building	x	x

EXPECTED GHG EMISSION REDUCTIONS AND MRV

Expected Mitigation Potential

- **Annual reduction**: 414,501 tCO_{2e}
- **Total reduction**: 10,362,525 tCO_{2e} (25 years)

Methodologies and Assumptions

- **Methodologies**: Approved CDM methodology, AMS-I.I. "Biogas/biomass thermal application for households/small users"

- **BAU scenario:** Small biomass boilers are not installed and instead technologies based on electricity, oil, natural gas, coal continue producing thermal energy

- **Calculation of emission reduction**

Calculation of emission reductions is done based on assumption that structure of replaced boilers will be proportional to the current share of particular boiler types in use. The share of boiler types currently in use is shown in section "Description" part of this document.

In accordance with selected methodology emission reductions are calculated using the formula:

$$ER_y = \sum_k N_{k,0} * n_{k,y} * BS_{k,y} * EF * \eta_{PJ/BL} * NCV_{biomass} - LE_y$$

Where:

$N_{k,0}$	Number of thermal applications *k* commissioned
$n_{k,y}$	Proportion of $N_{k,0}$ that remain operating in year *y* (fraction)
$BS_{k,y}$	The net quantity of renewable biomass or biogas consumed by the thermal application *k* in year *y* (mass or volume units, dry basis)
EF	CO_2 emission factor (tCO_2/GJ) $EF = \sum_j x_j * EF_{FF,j}$ Where: x_j is a fraction representing fuel type *j* used by the baseline thermal applications displaced by biomass/biogas
$\eta_{PJ/BL}$	Ratio of efficiencies of project equipment and baseline equipment (e.g. cook stove using coal) measured once prior to validation applying the same test procedure (e.g. lab test), as per a national or an international standard. Official data or scientific literature can be used for cross-check purposes
$NCV_{biomass}$	Net calorific value of the biomass (GJ/unit mass or volume, dry basis).

Data / Parameter	$N_{k,0}$
Description	Number of thermal application k commissioned
Value applied	1

Data / Parameter	$n_{k,y}$
Description	Proportion of $N_{k,0}$ that remain operating in year y (fraction)
Value applied	1

Data / Parameter	$BS_{k,y}$
Unit	t
Description	The net quantity of renewable biomass by the thermal application k in year y (mass or volume units, dry basis)
Source of data	Estimated value for heat production of 3150TJ
Value applied	Value for each baseline fuel type k is estimated as follows: $BS_{electricity,y}$ = 233,333 tons * 20% = 46,667t $BS_{oil,y}$ = 233,333 tons * 30% = 70,000t $BS_{gas,y}$ = 233,333 tons * 15% = 35,000t $BS_{coal,y}$ = 233,333 tons * 35% = 81,667t
Comment	The plan is to change boilers that are now producing 3150 TJ equivalent of energy with biomass boilers that has the efficiency of 0.9. Expected amount of biomass fuels used for the project is calculated as follows: 3150 TJ / $NCV_{biomass}$ /0.9 = 233,333 t

Data / Parameter	EF
Unit	tCO_2/GJ
Description	CO_2 emission
Source of data	Calculated according formula $EF = \sum x_j EF_{FF,j}$
Value applied	0.11595 tCO_2/GJ
Comment	Weighted average of baseline fuel emission factors; Electricity 0.2625 t-CO_2/GJ Oil 0.0774 Gas 0.0561 Coal 0.0909

Data /	$\eta_{PJ/BL}$

Parameter	
Unit	1/1
Description	Ratio of efficiencies of project equipment and baseline equipment
Source of data	Calculation based on general statistics
Value applied	$\eta_{PJ/BL}$ (electricity) = 0.9/ 1.0 = 0.9 $\eta_{PJ/BL}$ (oil) = 0.9/ 0.85 = 1.06 $\eta_{PJ/BL}$ (gas) = 0.9/ 0.9 = 1.0 $\eta_{PJ/BL}$ (coal) = 0.9/ 0.75 = 1.2

Data / Parameter	$NCV_{biomass}$
Unit	GJ/t
Description	Net calorific value of the biomass (dry basis)
Source of data	Literature: - Austrian standard ONORM EN 14961-2 for pellet defines NCV = 16,5 MJ/kg - Austrian standard ONORM M 7133 for wood chips with 25% moisture defines NCV =14,4 MJ/kg - Martinov M., Đurkov Đ., in article "Čvrsta biomasa za grejanje - ocena ekonomičnosti" , in paper "Savremena poljoprivredna tehnika" vol. 36, No 4, pp 382-386, 2100. shows that NCV for wood residues with moisture 15% is 15MJ/kg
Value applied	15 GJ/t
Comment	At this moment it is not possible to estimate share of biomass types on the market, so value for the net calorific value is taken from the literature.

Data / Parameter	LE_y
Unit	tCO_2
Description	Leakage during the year y
Value applied	0
Comment	The proposed action does not emit any leakage emissions since the biomass boilers introduced by the project activity will not be transferred to another location.

$$ER_y = \sum_k N_{k,0} * n_{k,y} * BS_{k,y} * EF * \eta_{PJ/BL} * NCV_{biomass} - LE_y$$

= 0.11595 t-CO_2/GJ * 15 GJ/t * (46,667t *0.9 + 70,000t * 1.05 + 35,000t * 1.0 + 81,667t *1.2) - 0

Calculated emission reduction is:

$$ER_y = 414{,}501 \cdot tCO_2$$

Measurement, Reporting, and Verification (MRV)

Monitoring plan

- **Data and parameters to be monitored**:

Following parameters will be monitored in order to calculate emission reduction from the NAMA.

Data / Parameter	$N_{k,0}$
Description	Number of thermal application k commissioned
Source of data	MEDEP – NAMA implementing entity
Measurement procedures	At the time of installation all project activity system shall be inspected and undergo acceptance testing for proper compliance with specification. The installation date of each system shall be recorded
Monitoring frequency	Once, at the time of installation

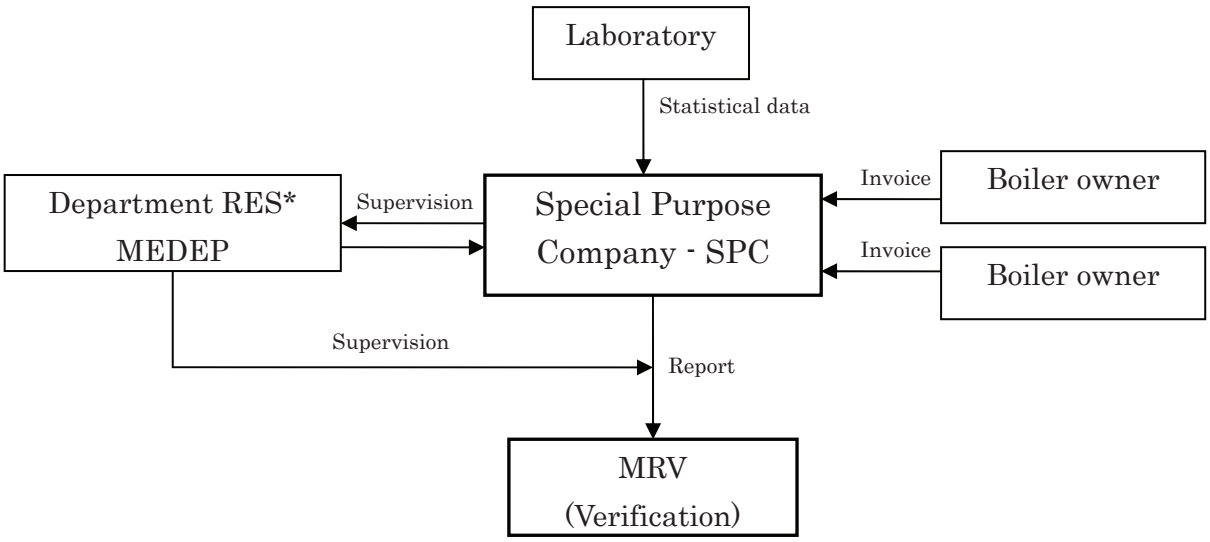
Data / Parameter	$n_{k,y}$
Description	Proportion of $N_{k,0}$ that remain operating in year y (fraction)
Source of data	MEDEP – NAMA implementing entity
Measurement procedures	A statistically valid sample of the residences where the systems are installed, with consideration, in the sampling design, of occupancy and demographic differences can be used to determine the percentage of systems operating, as per the relevant requirements for sampling in the "General guidelines for sampling and surveys for small-scale CDM project activities.
Monitoring frequency	2 years

Data / Parameter	$BS_{k,y}$
Unit	t
Description	The net quantity of renewable biomass by the thermal application k in year y (mass or volume units, dry basis)
Source of data	MEDEP – NAMA implementing entity
Measurement procedures	Data shall be collected for mass, moisture content, NCV of briquettes that are supplied to users with an appropriate sampling frequency. Cross-check with annual energy/mass balance that is based on purchased/sold quantities and stock
Monitoring frequency	Monthly
Comment	Project entity could collect information on used quantity of renewable biomass based on collected invoices for biomass.

Data / Parameter	$NCV_{biomass}$
Unit	GJ/t
Description	Net calorific value of the biomass (dry basis)
Source of data	Laboratory
Measurement procedures	Measurement in laboratories according to relevant national/international standards. Measure the NCV based on dry biomass. Check the consistency of the measurements by comparing the measurement results with measurements from previous years, relevant data sources (e.g. values in the literature, values used in the national GHG inventory) and default values by the IPCC
Monitoring frequency	Annually

- **Monitoring plan and structure:**

Monitoring structure will be decided once the final structure of the project is defined.
The working concept of monitoring of the data and parameters above will be conducted based on monitoring structure shown below:



* RES: Department for Renewable Energy Sources

Responsibility of each key monitoring department is summarized below:

Implementing entity	Function and responsibility
MEDEP, Department for Renewable Energy Sources	- Supervise the whole process - Control work of SPC - Control report before MRV
Special Purpose Company - SPC	- Check installations of boilers - Capture monitoring data from installation process identifying each boiler by unique reference number and GPS tag. - Ensures that Project locations provide data - Ensures that all forms are filled correctly - Compile and analyze all the data and cross-check the reports - Elaborate an estimate of emission reduction in Monitoring Report
Boiler owner	- Regularly fill forms with data for: stack quantities, purchased/ sold quantities - Send invoices for purchased/ sold biomass to SPC
Laboratory	- Sampling and determining $NCV_{biomass}$ for all biomass types on the market. - Check the consistency of the measurements - Regularly submit data to SPC

Monitoring data collected during the installation and operation of the boilers will be stored in an electronic data management system, or monitoring database. Monitoring of working boilers will be done on the statistical sample. From this data, emissions reductions of this NAMA will be determined.

Domestic MRV arrangements

Domestic MRV arrangement of Serbia is currently under development

It is expected that under the Serbian domestic MRV system, a NAMA implementing entity is responsible for the Measurement (M) and Reporting (R) activities, which will go through Verification (V) from third party.

OTHER INFORMATION

Contribution to Sustainable Development

- Environmental
  - This mitigation action will reduce Serbia's greenhouse gas emissions over its lifetime
  - Improvement of local environmental condition - wood waste and agricultural waste would be used for heat generation
  - Agricultural waste that may cause environmental problems, such as odor and waste management problems for local residents and land owners, will be properly treated

- Social
  - Quality of life - New boilers have abilities for automation, so less time will be spent operating with boilers

- Economic
  - This action will help develop rural economy - biomass market
  - Creation of local employment opportunities
  - Cost incurred in the purchase of fuel will be reduced through increased thermal efficiency
  - Energy security - reducing dependence on imported fossil fuels.

Stakeholder consultation

- The public will be informed about this project through various activity:
  - Public institutions will be questionnaire directly or through local governments
  - Investors will be informed through Chamber of Commerce and Industries of Serbia and its sections
  - The whole activity will be accompanied through media with organizing forums and public discussions

CONTACT INFORMATION

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NAMA Coordinating Entity

Entity Name	Ministry of Energy, Development, and Environmental Protection Climate Change Division
Contact Person	State Secretary: Mr. Vladan Zdravkovic Head of Climate Change Division: Ms. Danijela Bozanic
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GENERAL INFORMATION

Title of NAMA

- REHABILITATION OF ARTERIAL ROADS IN SERBIA

Description

- **Description of the Mitigation Action**

This NAMA represents rehabilitation of the 19 different arterial road sections throughout the country. Total length of all proposed road sections is 324 km. Project introduce rehabilitation of roads as a way to mitigate the intensity of carbon emissions for transport projects.

Mitigation target is to improve the efficiency and operation of Serbian roads and reduce CO2 emissions from road vehicles. Decreasing of CO2 emissions will be ensured through improved fuel consumption level (-3.64%) by all vehicles that is achieved by running speed of 60 km/h, or the International Roughness Index (IRI) of the proposed roads are improved up to the value of 2.0 m/km.

This NAMA will contribute to climate change mitigation as the traffic on rehabilitated roads (highly efficient traffic) emit less GHG than traffic performed on proposed road sections which currently are in very poor condition. According to the studies developed by Asian Development Bank (ADB), periodic road maintenance projects have a major impact on carbon emissions reductions in transport sector. Road maintenance projects also ensure reducing of road user costs, discomfort, pollution and travel time delays.

In order to ensure full control in project implementation, it is planned to establish a Project Implementation Team (PIT) within the Sector for Investment of Public Enterprise "Roads of Serbia" (PERS). PIT will be incharged for fully implementation of the project.

- **Technologies / measures**

Based on following facts:

- Traffic management and speed optimization can cut CO2 emissions. Reductions in CO2 of about 20% can be obtained by techniques to mitigate congestion, manage excess speeds, and smooth traffic flow. Road maintenance projects can significantly reduce Carbon Dioxide Emission Rates.[1]
- An uneven road can increase fuel consumption by up to 12% relative to an even road. A rough macrotexture may increase fuel consumption by 7% relative to a very smooth macrotexture. Fuel consumption for a car may be influenced as much as 12% by road surface characteristics within the tested range.[2]

Optimal maintenance of roads is a tool to reduce fuel consumption and greenhouse gas emission. Reducing the rolling resistance loss can contribute significantly to the overall fuel need: the smoother the road, the lower the fuel consumption![3]

[1] ADB Evaluation Study - Reducing Carbon Emissions from Transport Projects, July 2010

[2] Eurobitume & European Asphalt Pavement Association (EAPA), Industry Report, Study in Sweden, March 2004 (Eurobitume was established as an international association in 1969, to provide a forum for bitumen producers to share and develop technical and scientific information.)

[3] EAPA & EUROBITUME, Environmental Impacts and Fuel Efficiency of Road Pavements, March 2004

PERS decided to candidate rehabilitation of 19 arterial roads in Serbia as an appropriate NAMA from Serbian transport sector. PERS selected roads sections which are very important for everyday transport of humans and goods in their regions, but with serious damages on the road surface (pavement) and very high Roughness Index (IRI). The International Roughness Index (IRI) is the roughness index most commonly obtained from measured longitudinal road profiles. It is calculated using a quarter-car vehicle math model, whose response is accumulated to yield a roughness index with units of slope (in/mi, m/km, etc.).[1] Since its introduction in 1986,[2] IRI has become the road roughness index most commonly used worldwide for evaluating and managing road systems.All proposed arterial road sections could be considered as uneven road. Average of their current IRI is 7.85 m/km. High values of IRI caused higher fuel consumption[4] and higher emissions of CO2[5].

arterial road section	Lenghth [km]	AADT [veh/day]	IRI [m/km]
Pirot - Sukovo	14,627	4.355	6,05
Loznica 5 - Zavlaka 2 (Likodra) (0184-0187)	27,345	4.498	5,70
Zavlaka 2 (Likodra) - Valjevska Kamenica (0188-0191)	27,008	2.319	5,28
Despotovac 2 (Manastir Manasija) - Dvorište	7,063	1.269	7,91
Prijepolje - Sjenica 3 (Medare) (0337-1, 0340)	17,711	2.636	7,74
Sušica - Dojevice (0344,0345)	30,155	3.427	6,56
granica APKiM (Mutivode) - Maćedonce (0348-0349)	20,485	700	7,59
Negosavlje - Krivača	17,897	1.660	6,33
Leskovac 5 (Bratmilovci) - Nomanica (km 2.595 - 5.238)	5,480	4.451	6,73
Vlasotince - Svođe	15,850	3.593	5,33
Svođe - Babušnica (0366,0367)	21,358	1.780	7,45
Babušnica - Donji Striževac	4,405	1.600	6,29
Donji Striževac - Sadikov Bunar (0369,0370)	19,693	1.615	10,71
Valjevo 5 (obilaznica) - Kaona (0464,0465)	28,802	3.377	5,78
Duga Poljana - Karajukića Bunari (0.0-6.3km)	6,319	800	16,77
Duga Poljana - Karajukića Bunari (6.3-22.4km)	16,081	800	16,77
Petrovaradin 6 - Inđija 1 (Novi Karlovci) (05932-0595)	14,780	5.255	6,17
Bukovo 2 - Negotin 1 (0687,0688)	5,077	1.693	7,04
Beloljin - Rudare (0735,0736)	24,088	2.123	6,93

[4] ADB, 2009. Green Transport – Resource Optimization in the Road Sector in the People's Republic of China

[5] National Highway Authority of India project documents and reports from Salem – Namakkai highwa

Project technology comprise routine maintenance of proposed road sections which will ensure desired level of service, smoother roads, increasing of average transport speed to the optimal level (up to 80 km/h) and decreasing of fuel consumption and CO2 emissions.

Location

Proposed road sections are located in different part of Serbia. Most of them belong to the southern-east region. Seven of them are located along arterial M-9S road, connecting Kosovo border, Leskovac and Pirot. Two more road section is located within the same region (Beloljin - Rudare on arterial road M-25S and Pirot – Sukovo on arterial road M-1.12S)

Four road sections are located in southern-west part of Serbia. Two of them are located on M-8S Novi Pazar – Sjenica – Prijepolje arterial road. Remaining two road sections (M-21.1S Duga Poljana – Karajukica Bunari) are excluded from Serbian arterial road network by Government Decree during 2012.

Three road sections are located on western Serbia (M-4S Loznica – Zavlaka, M-4S Zavlaka – Valjevska Kamenica and M-21S Valjevo – Kaona)

Road section M-22.1V Petrovaradin – Indjija is located in northern part of Serbia, Autonomous Province of Vojvodina.

Two remaining road sections are located in eastern Serbia. Road section M-24S Bukovo – Negotin is located close to Romanian Border. Last road section M-4S Despotovac – Dvoriste is also excluded from Serbian arterial road network by Government Decree during 2012.

All proposed road sections, except the ones which are excluded from arterial road network are shown on Picture No. 1 – State Road Network NAMA Program.

Overview of proposed road sections is shown within the following table:

N°	Name	Length (km)	Cost (EUR)	Location
1	M-1.12S (0140) Pirot – Sukovo	14.6	5.032.000,00	Pirot
2	M-4S (0184-0187) Loznica 5 - Zavlaka 2 (Likodra)	27.3	11.812.000,00	Loznica
3	M-4S (0188-0191) Zavlaka 2 (Likodra) – Valjevska Kamenica	27.0	12.973.000,00	Zavlaka
4	M-4S (0236) Despotovac 2 (Manastir Manasija) – Dvoriste	7.1	3.329.000,00	Despotovac
5	M-8S (0337,3-0340) Prijepolje - Sjenica 3 (Medare)	17.7	8.278.000,00	Prijepolje
6	M-8S (0344-0345) Susica - Dojevice	30.2	13.564.000,00	Susica
7	M-9S (0348-0349) granica APKiM (Mutivode) – Macedonce	20.5	11.087.000,00	Macedonce
8	M-9S (0351) Negosavlje – Krivaca	17.9	9.140.000,00	Leskovac
9	M-9S (0361-0363) Leskovac 5 (Bratmilovci) – Nomanica	8.1	3.790.000,00	Leskovac
10	M-9S (0365) Vlasotince – Svodje	15.9	7.244.000,00	Vlasotince
11	M-9S (0366-0367) Svodje – Babusnica	21.4	9.321.000,00	Babusnica
12	M-9S (0368) Babusnica - Donji Strizevac	4.4	1.836.000,00	Babusnica
13	M-9S (0369-0370) Donji Strizevac – Pirot	19.7	8.131.000,00	Pirot
14	M-21S (0464-0465) Valjevo 5 (obilaznica) – Kaona	28.8	14.868.000,00	Valjevo
15	M-21.1S (0490-1) Duga Poljana - Karajukica Bunari	6.3	3.095.000,00	Duga Poljana
16	M-21.1S (0490-2) Duga Poljana - Karajukica Bunari	15.8	12.831.000,00	Duga Poljana
17	M-22.1V (0593,2-0595) Petrovaradin 6 - Indjija 1 (Novi Karlovci)	14.8	7.902.000,00	Novi Sad
18	M-24S (0687-0688) Bukovo 2 - Negotin 1	5.1	2.149.000,00	Negotin
19	M-25S (0735-0736) Beloljin – Rudare	24.1	12.201.000,00	Beloljin
TOTAL:		**297.5**	**139.328.000**	

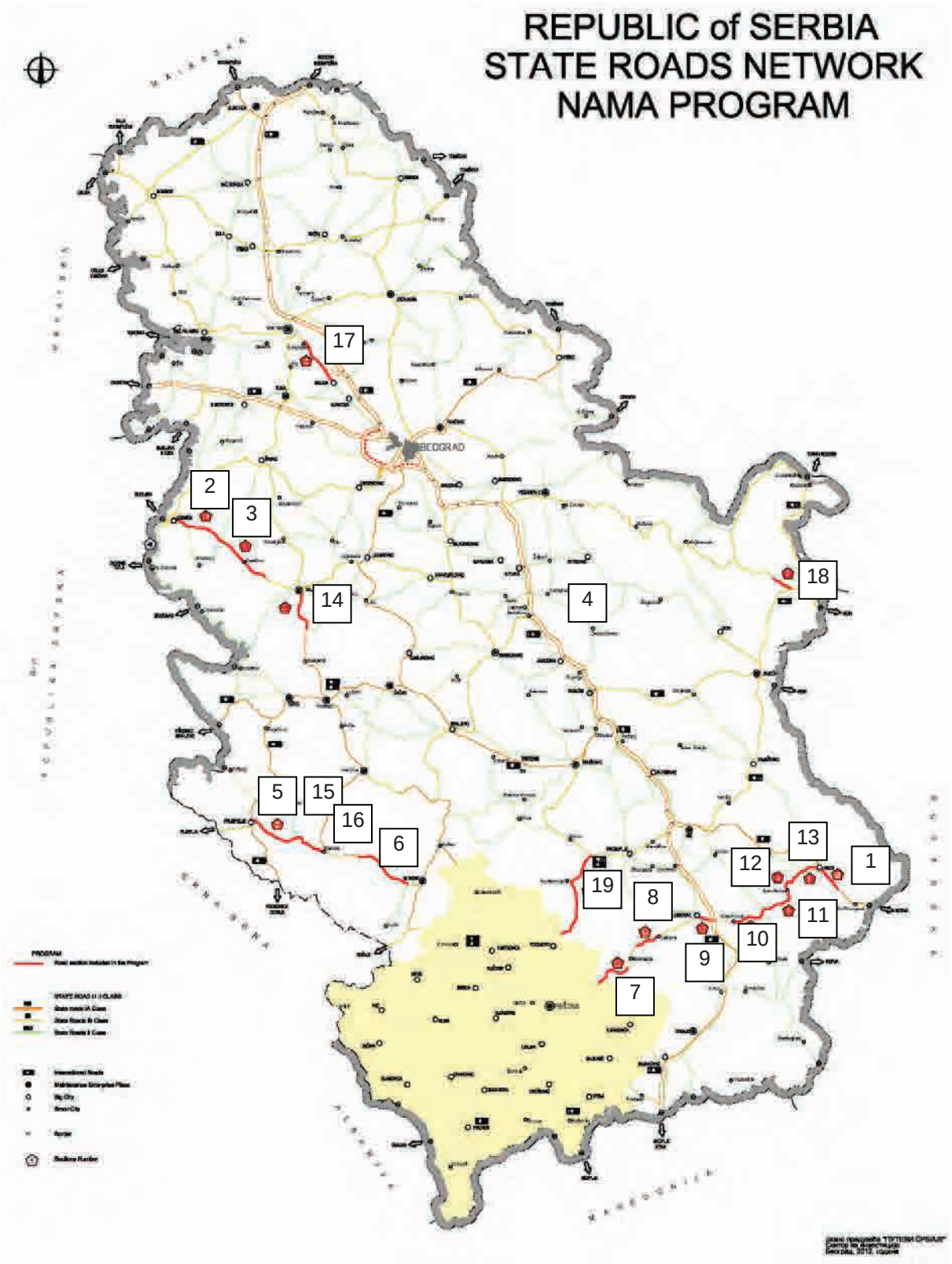


Figure 1: State Road Network - NAMA Program

NAMA Implementing Entity

- PE "Roads of Serbia" - PERS

  Pursuant to the Law on Public Roads (The Official Gazette of the Republic of Serbia, No. 101-05), PERS is established for managing state roads. (see Annex 01 to this document).

  PERS is responsible for maintenance, protection, usage, development and management of state roads of I and II category in the Republic of Serbia. Tasks of primary national importance are set for the PERS in the area of preservation, further construction and improvement of the road network in the Republic of Serbia.

  Financing of construction and reconstruction, maintenance and protection of public roads is provided from:

  - Fee for using state road - toll
  - Financial loans
  - Budget of the Republic of Serbia
  - Other sources pursuant to the Law

Implementing Schedule

Time span	Activity	
2013 – 2015	Preparatory period	19 Main Designs for proposed road rehabilitation projects, including Technical Review, obtaining the necessary approvals from the relevant institutions, preparation of tender documents, bidding and contracting procedures and other necessary activities. Purchasing of necessary equipment for CO2 monitoring and zero monitoring measurement.
2016 – 2020	Implementation	rehabilitation of proposed roads, supervision activities, CO2 monitoring activities, technical acceptance.

Expected starting date of Action

Start date: 2013
End date: 2020

Lifetime

20 years

Current Status

Poor condition of pavement on proposed road sections caused many problems related with traffic safety and congestion. Carbon monitoring program is not established yet, but first monitoring activities will start immediately after signing Contract between PERS and International Financing Institution which will funded (partially or in total) Serbian Arterial Road Rehabilitation Project.

Proposed road sections are planned to be rehabilitated according to routine maintenance plan. Lack of financial means caused serious damaging of existing pavement on proposed road sections. Roughness index

become much higher that is acceptable (8-16) which caused very low level of service on proposed roads. Devastation of proposed road section caused many traffic safety and environmental problems. Low levels of average transport speed increased fuel consumption and CO2 emissions on proposed road sections.

Summarizing above mentioned facts, PERS has undertaken many different activities in order to analyze possible project benefits which can be achieved through the rehabilitation of proposed road sections. Activities already completed are:

- Feasibility Study is completed by using HDM-4 Model. Most important figures (feasibility data, economic analysis, estimated Costs) and conclusions are presented within this Short Description. Road database is already prepared by PERS as a source of relevant data (AADT, vehicle by type, IRI)
- Roughness detection is measured on each road section during 2009 with special vehicle type ARAN
- Data for each section were taken from "Program Analyses of State Road Network", PERS, 2011. Data analyzed by using software HDM-4 and HIMS
- Fuel consumption on proposed road sections estimated by using COPERT 4 Model

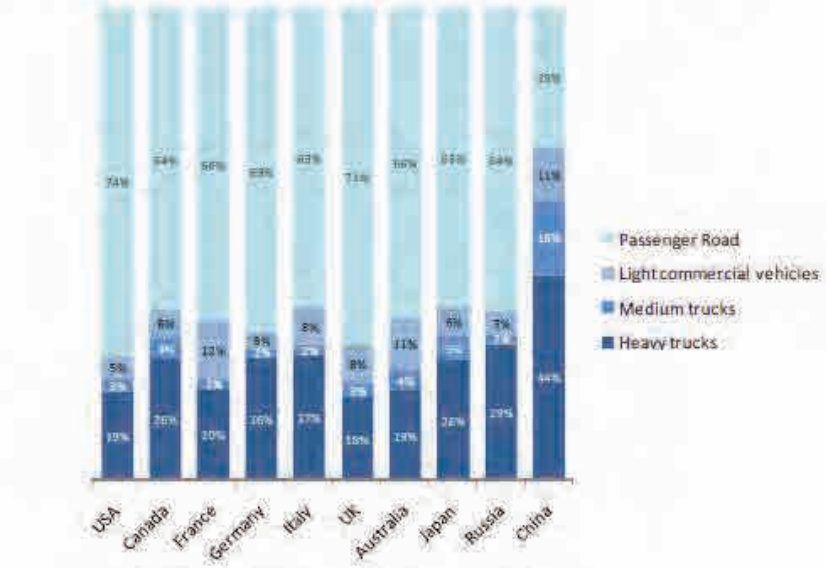
Coverage

- Sector: Transport

Transport-sector CO2 emissions represent 23% (globally) and 30% (OECD) of overall CO2 emissions from Fossil fuel combustion. The sector accounts for approximately 15% of overall greenhouse gas emissions. Automobile transport is the principal CO2 emitter.

Road sector emissions dominate transport emissions with light-duty vehicles accounting for the bulk of emissions globally. In certain ITF member countries for which estimates can be made, road freight accounts for up to 30% to 40% of road sector CO2 emissions.

Figure 1-5: Estimated Breakdown of Freight Versus non-Freight Road CO2 Emissions (Mt CO2) in Selected Countries (2005)



- GHG Gases: CO_2

Global CO2 emissions from transport are expected to continue to grow by approximately 40% from 2007 to 2030 – though this is lower than pre-crisis estimates.

FINANCIAL INFORMATION

Finance and Cost

- Expected cost of **preparation**:

  Feasibility study: NONE (this document is already completed)
  Design: 3.5 mil €

- Expected cost of **implementation**:

  Works: 139.328 mil €
  Supervising: 3.5 mil €

- Expected **incremental cost** of implementation:

  None

- **Financial sources** identified:

  N/A

  Serbian Arterial Road Rehabilitation Project is planned to be primarily financed as a **Grant**. However, it can be financed by **Loan** too, but under specific conditions which should be a subject of potential Negotiations between PERS and Financial Institutions which will consider possibility to finance this Project. PERS is searching financial support from Annex-I countries and international organizations through NAMA scheme. Development Bank of Serbia will be intermediate and it could provide some sort of incentive.

- **Financial analysis**:

  Based on a Serbian road database and executed measurement of the road characteristics, for the benefit of PERS, a Program Analyses of State Road Network and Transport Rehabilitation Project Performance Indicators (World Bank Project, Contract No. WBC/ICS-PA/2010-05) was done. Program Analyses (PA) was done on the network level. Through PA it is confirmed justification of the investment in the respective nominated projects. The data presented in the accompanying tables are presented based on abovementioned PA.

N°	Name	Length (km)	Cost (EUR)	NPV mil €	EIRR %	NPV/ CAP
1	M-1.12S (0140) Pirot – Sukovo	14.6	5.032.000,00	16.42	59.9	4.37
2	M-4S (0184-0187) Loznica 5 - Zavlaka 2 (Likodra)	27.3	11.812.000,00	10.97	27.8	1.25
3	M-4S (0188-0191) Zavlaka 2 (Likodra) – Valjevska Kamenica	27.0	12.973.000,00	.366	10.7	0.04
4	M-4S (0236) Despotovac 2 (Manastir Manasija) – Dvoriste	7.1	3.329.000,00	1.466	20.0	0.59

N°	Name	Length (km)	Cost (EUR)	NPV mil €	EIRR %	NPV/ CAP
5	M-8S (0337,3-0340) Prijepolje - Sjenica 3 (Medare)	17.7	8.278.000,00	7.707	28.8	1.25
6	M-8S (0344-0345) Susica - Dojevice	30.2	13.564.000,00	10.21	24.9	1.01
7	M-9S (0348-0349) granica APKiM (Mutivode) – Macedonce	20.5	11.087.000,00	-2.739	1.5	-0.40
8	M-9S (0351) Negosavlje – Krivaca	17.9	9.140.000,00	0.736	12.0	0.11
9	M-9S (0361-0363) Leskovac 5 (Bratmilovci) – Nomanica	8.1	3.790.000,00	5.613	36.5	1.99
10	M-9S (0365) Vlasotince – Svodje	15.9	7.244.000,00	1.569	14.9	0.29
11	M-9S (0366-0367) Svodje – Babusnica	21.4	9.321.000,00	3.359	17.9	0.48
12	M-9S (0368) Babusnica - Donji Strizevac	4.4	1.836.000,00	1.091	20.9	0.80
13	M-9S (0369-0370) Donji Strizevac – Pirot	19.7	8.131.000,00	9.795	33.6	1.62
14	M-21S (0464-0465) Valjevo 5 (obilaznica) – Kaona	28.8	14.868.000,00	3.744	15.9	0.34
15	M-21.1S (0490-1) Duga Poljana - Karajukica Bunari	6.3	3.095.000,00	0.477	14.4	0.21
16	M-21.1S (0490-2) Duga Poljana - Karajukica Bunari	15.8	12.831.000,00	5.374	17.0	0.60
17	M-22.1V (0593,2-0595) Petrovaradin 6 - Indjija 1 (Novi Karlovci)	14.8	7.902.000,00	9.721	32.9	1.65
18	M-24S (0687-0688) Bukovo 2 - Negotin 1	5.1	2.149.000,00	0.236	12.7	0.15
19	M-25S (0735-0736) Beloljin – Rudare	24.1	12.201.000,00	6.400	21.3	0.70
TOTAL:		**297.5**	**139.328.000**	**136.731**	**23.2**	

INFORMATION ON SUPPORT REQUIRED

Description of Support Required

Type of Support	Support required for preparation	Support required for implementation
Financial	3,500,000 €	139,328,000 €
Technical	establishing of appropriate CO2 monitoring technology and monitoring equipment It must be corresponding to the "Monitoring plan and structure" part of this document; who will purchase monitoring equipment and who will perform monitoring	
Capacity Building	transfer of knowledge (knowledge on relation between GHG emission reduction and road rehabilitation projects, appropriate monitoring tools etc.), study tours (in order to collect information hoe monitoring og GHG emission is working in countries which already established such activities as a consisting part of road management), strengthening of PERS monitoring capacity	

EXPECTED GHG EMISSION REDUCTIONS AND MRV

Expected Mitigation Potential

- **Annual reduction**: 2,138 tCO_{2e}
- **Total reduction**: 46,360 tCO_{2e} (20 years)

Methodologies and Assumptions (including BAU scenario)

- **Methodologies**:

PERS used a **C**omputer **P**rogramme to calculate **E**missions from **R**oad **T**ransport (COPERT) methodology for calculating CO2 emissions from proposed road sections.

COPERT 4 is a software tool used world-wide to calculate air pollutant and greenhouse gas emissions from road transport. The development of COPERT is coordinated by the European Environment Agency (EEA), in the framework of the activities of the European Topic Centre for Air Pollution and Climate Change Mitigation. The European Commission's Joint Research Centre manages the scientific development of the model. COPERT has been developed for official road transport emission inventory preparation in EEA member countries. However, it is applicable to all relevant research, scientific and academic applications.

The COPERT 4 methodology is part of the EMEP/EEA air pollutant emission inventory guidebook for the calculation of air pollutant emissions and is consistent with the 2006 IPCC Guidelines for the calculation of greenhouse gas emissions. The use of a software tool to calculate road transport emissions allows for a transparent and standardized, hence consistent and comparable data collecting and emissions reporting procedure, in accordance with the requirements of international conventions and protocols and EU legislation.

COPERT 4 draws its origins in a methodology developed by a working group which was set up explicitly for this purpose in 1989 (COPERT 85). This was then followed by COPERT 90 (1993), COPERT II (1997) and COPERT III (1999). The current version is a synthesis of results of several large-scale activities and dedicated projects, such as:

- Dedicated projects funded by the Joint Research Centre / Transport and Air Quality Unit
- The annual work-programme of the European Topic Centre for Air Pollution and Climate Change Mitigation (ETC/ACM)
- The European Research Group on Mobile Emission Sources (ERMES) work programme.
- The MEET project (Methodologies to Estimate Emissions from Transport), a European Commission (DG VII) sponsored project within 4th Framework Program (1996-1998)
- The PARTICULATES project (Characterization of Exhaust Particulate Emissions from Road Vehicles), a European Commission (DG Transport) PROJECT within the 5th Framework Program (2000-2003)
- The ARTEMIS project (Assessment and Reliability of Transport Emission Models and Inventory Systems), a European Commission (DG Transport) PROJECT within the 5th Framework Program (2000-2007)
- A joint JRC/CONCAWE/ACEA project on fuel evaporation from gasoline vehicles (2005-2007)
- Emission factor work conducted by the HBEFA group.

Methodology Outline

COPERT 4 estimates emissions of all major air pollutants (CO, NOx, VOC, PM, NH3, SO2, heavy metals) produced by different vehicle categories (passenger cars, light commercial vehicles, heavy duty trucks, busses, motorcycles, and mopeds) as well as greenhouse gas emissions (CO2, N2O, CH4). It also provides speciation for NO/NO2, elemental carbon and organic matter of PM and non-methane VOCs, including PAHs and POPs.

Emissions are produced from two sources: Engine emissions, distinguished into those produced during thermally stabilized engine operation (hot emissions), and emissions occurring during engine start from ambient temperature (cold-start and warming-up effects). Diffuse emissions, i.e. NMVOC emissions due to fuel evaporation and non-exhaust PM emissions from tires and break wear. Total emissions are calculated as a product of activity data provided by the user and speed-dependent emission factors calculated by the software.

The software application of COPERT 4 methodology has been developed for the compilation of national inventories (i.e. NUTS 0) on a yearly basis. However, it has been shown that the methodology can also be used with a sufficient degree of certainty at a higher resolution too, i.e. for the compilation of urban emission inventories with a spatial resolution of 1×1 km2 and a temporal resolution of 1 hour.

In order to estimate exhaust emissions from internal combustion engines used in off-road applications (agriculture, forestry, household, industry, waterways and railways) one must still use the separate module of COPERT III.

Based on the methodology of COPERT Tier 1, 2 and 3, calculation of CO2 emission of baseline was conducted as follows.

$$E_{CO2} = \sum_j \left(\sum_m \left(FC_{j,m} * EF_{j,m} \right) \right)$$

Where;

E_{cO2} -Emission of CO2 [g]

$FC_{j,m}$ -Fuel Consumption [kg] fuel type *m* ; vehicle category *j*

$EF_{j,m}$ -Emission Factor [g/kg] fuel type *m* ; vehicle category *j*

Vehicle categories (*j*) contain five vehicle categories (passenger car, light trucks, heavy trucks, motorcycles and mopeds) and vehicle technology (*k*) includes 7 categories (conventional, Euro 1, Euro 2, Euro 3, Euro 4, Euro 5 and Euro 6). Fuel types (*m*) include 5 categories(petrol, diesel, LPGa, LPGb and NG).

$FC_{j,m}$ [kg] is estimated by the following equation;

$$FC_{j,m} = \sum_m \left[N_{j,k} * M_{j,k} * FC_{j,k} / n \right]$$

Where;

$FC_{j,m}$ Fuel Consumption, [kg],fuel type m; vehicle category j

$N_{j,k}$ Number of vehicle with vehicle technology k, fuel type m, vehicle category j

$M_{j,k}$ Av. annual single vehicle trip, [km/veh], vehicle technol. k, fuel type m, vehicle category j

$FC_{j,k}$ Fuel Consumption Factor, [g/km], vehicle technol. k, fuel type m, vehicle category j

n Fuel consumption efficiency by IRI

Fuel consumption will be affected by roughness of the road. Fuel consumption efficiency by IRI was reported by Asian Development Bank, based on statistical data of impact on road roughness on fuel consumption. Impact on fuel consumption (fuel efficiency by IRI) is shown in the following Table.

Table A3.4: Impact of Road Roughness on Fuel Consumption

Roughness (m/km)	Impact on Fuel Consumption
2	1.00
3	0.99
4	0.98
5	0.98
6	0.97
7	0.96
8	0.95
9	0.95
10	0.94
11	0.93
12	0.92
13	0.92
14	0.91
15	0.90

km = kilometer, m = meter.
Source: Asian Development Bank and Ministry of Transport, People's Republic of China. 2009. *Green Transport: Resource Optimization in the Road Sector in the People's Republic of China*. Manila. Collaborative project. http://www.adb.org/Documents/Books/Green-Transport/ Green-Transport.pdf

- **BAU scenario:**

Poor condition of pavement on proposed arterial road sections remains the same and fossil fuel consumption will remain large as the vehicles are forced to move slowly. Additional deterioration of proposed road section will cause increased fuel consumption and increased CO2 emissions.

- **Calculation of emission reduction**

Baseline emission

Baseline emission was calculated as follows.

$$BE_{CO2} = \sum_j (\sum_m (FC_{j,m} * EF_{j,m}))$$

$$= \sum_j (\sum_m (N_{j,k} * D_{j,k} * FCF_{j,k} / n_B * EF_{j,m}))$$

Where;

BE_{CO2}	Baseline Emission of CO2 [kg]
$FC_{j,m}$	Fuel Consumption, [kg], fuel type m; vehicle category j
$N_{j,k}$	Number of vehicle with vehicle technology k, fuel type m, vehicle category j
$M_{j,k}$	Av. annual single vehicle trip, [km/veh], vehicle technol. k, fuel type m, vehicle category j
$FCF_{j,k}$	Fuel Consumption Factor, [g/km], vehicle technol. k, fuel type m, vehicle category j
n_B	Fuel consumption efficiency by baseline IRI
$EF_{j,m}$	Emission Factor [kg CO2/kg] fuel type m; vehicle category j

Fuel Consumption Factor [g/km] by vehicle category, vehicle technology, engine capacity and speed range is provided by COPERT 4 version 9.1, Tire 3 method. For calculation of Baseline emission, Fuel Consumption Factor in vehicle speed 60km/h was used.

CO_2 Emission Factors ($EF_{j,m}$) by fuel type are shown in following table:

Fuel	kg of CO_2 per kg of fuel
Petrol	3,180
Diesel	3,140
LPG	3,017
NG	2,750

Source: EMEP/EEA emission inventory Guidebook 2009, updated May 2012

Project emission

Project CO_2 emission was calculated as follows.

$$PE_{CO2} = \sum_j (\sum_m (FC_{j,m} * EF_{j,m}))$$
$$= \sum_j (\sum_m (N_{j,k} * D_{j,k} * FCF_{j,k} / n_p * EF_{j,m}))$$

PE_{CO2}	Project Emission of CO2 [kg]
$FC_{j,m}$	Fuel Consumption, [kg],fuel type m; vehicle category j
$N_{j,k}$	Number of vehicle with vehicle technology k, fuel type m, vehicle category j
$M_{j,k}$	Av. annual single vehicle trip, [km/veh], vehicle technol. k, fuel type m, vehicle category j
$FCF_{j,k}$	Fuel Consumption Factor, [g/km], vehicle technol. k, fuel type m, vehicle category j
n_P	Fuel consumption efficiency by Project IRI (IRI=2.0, n_p=1)
$EF_{j,m}$	Emission Factor [kg CO2/kg] fuel type m; vehicle category j

Fuel Consumption Factor [g/km] by vehicle category, vehicle technology, engine capacity and speed range is provided by COPERT 4 version 9.1, Tire 3 method. For calculation of Baseline emission, Fuel Consumption Factor in vehicle speed 60km/h was used.

Data / Parameter	$N_{j,k}$
Unit	vehicle
Description	Number of vehicle with vehicle technology k, fuel type m, vehicle category j
Source of data	Database of Road of Serbia (Annual vehicle number in each road section) National Statistical Data (The ratio of vehicle technology k, vehicle category j in all roads of Serbia)
Value applied	
Comment	Annual vehicle number with vehicle technology k, vehicle category j is not monitored in each road section. The ratio of vehicle technology k, vehicle category j is multiplied to annual vehicle number in each road section.

Data / Parameter	$M_{j,k}$
Unit	km/veh
Description	Average of annual single vehicle trip
Source of data	Database of Road of Serbia
Value applied	
Comment	Average of annual single vehicle trip is same as length of each road section

No.		arterial road sections	length	AADT	IRI (Baseline)	IRI (Project)	**Fuel efficiency (nB)**	Fuel consumption (Baseline)	Fuel consumption (Project)	Fuel consumption Reduction
			[km]	**[veh/day]**	**[m/km]**	**[m/km]**	**-**	**[ton/year]**	**[ton/year]**	**[ton/year]**
1	M017	**Pirot - Sukovo**	15	4,355	6.05	2.00	0.97	1,366	1,323	-44
2	M034	**Loznica 5 - Zavlaka 2 (Likodra) (0184-0187)**	27	4,498	5.70	2.00	0.97	2,631	2,554	-77
3	M035	**Zavlaka 2 (Likodra) - Valjevska Kamenica (0188-0191)**	27	2,319	5.28	2.00	0.97	1,335	1,300	-35
4	M053	**Despotovac 2 (Manastir Manasija) – Dvorište**	7	1,269	7.91	2.00	0.95	195	186	-9
5	M095	**Prijepolje - Sjenica 3 (Medare) (0337-1, 0340)**	18	2,636	7.74	2.00	0.96	1,015	970	-45
6	M098	**Sušica - Dojevice (0344,0345)**	30	3,427	6.56	2.00	0.96	2,225	2,146	-79
7	M100	**granica APKiM (Mutivode) - Maćedonce (0348-0349)**	20	700	7.59	2.00	0.96	311	298	-14
8	M102	**Negosavlje - Krivača**	18	1,660	6.33	2.00	0.97	639	617	-22
9	M104	**Leskovac 5 (Bratmilovci) - Nomanica (km 2.595 - 5.238) (0361-0363)**	5	4,451	6.73	2.00	0.96	526	507	-19
10	M106	**Vlasotince - Svođe**	16	3,593	5.33	2.00	0.97	1,215	1,183	-32
11	M107	**Svođe - Babušnica (0366,0367)**	21	1,780	7.45	2.00	0.96	824	789	-35
12	M108	**Babušnica - Donji Striževac**	4	1,600	6.29	2.00	0.97	151	146	-5
13	M109	**Donji Striževac - Sadikov Bunar (0369,0370)**	20	1,615	10.71	2.00	0.93	708	660	-47
14	M143	**Valjevo 5 (obilaznica) - Kaona (0464,0465)**	29	3,377	5.78	2.00	0.97	2,082	2,020	-62
15	M157	**Duga Poljana - Karajukića Bunari (0.0-6.3km)**	6	800	16.77	2.00	0.89	118	105	-13
16	0	**Duga Poljana - Karajukića Bunari (6.3-22.4km)**	16	800	16.77	2.00	0.89	301	267	-34
17	M176	**Petrovaradin 6 - Inđija 1 (Novi Karlovci) (05932-0595)**	15	5,255	6.17	2.00	0.97	1,668	1,613	-55
18	M210	**Bukovo 2 - Negotin 1 (0687,0688)**	5	1,693	7.04	2.00	0.96	186	178	-7
19	M227	**Beloljin - Rudare (0735,0736)**	24	2,123	6.93	2.00	0.96	1,105	1,062	-43
Total			**324**	-	-		**-**	**18,602**	**17,925**	-677

Emission Reduction

CO_2 emission reduction was calculated as follows.

$ER = \sum_n (BE_n - PE_n)$

ER	Emission Reduction of CO_2 [kg]
BE_n	Baseline emission in road section $_n$
PE_n	Project emission in road section $_n$

Reduction of fuel consumption by fuel type in 19 road sections is shown as follow.

Fuel type	Reduction of fuel consumption (ton/year)	EF (t CO2 / t fuel)	Emission Reduction (tCO2/year)
Petrol	367.7	3.180	1169.4
Diesel	287.9	3.140	904.0
LPG	15.8	3.017	47.7
Hyb	0.0	3.180	0.0
Other	5.3	3.180	16.9
Total	677	-	2,138

Measurement, Reporting, and Verification (MRV)

Monitoring plan

The PERS will conduct quantification and monitoring of greenhouse gas emissions annually in accordance with internationally recognized methodologies. GHG calculation is NOT required by Air Protection Law of Serbia. In addition, the PERS will evaluate technically and financially feasible and cost/effective options to reduce or offset project-related greenhouse gas emissions during project design and operation.

Installing devices which will allow measuring of CO2 emissions (possible link with Road Weather Information System - RWIS stations) is part of this project too. Resultats will be automatically collected and stored (in real time) in PERS Server.

- **Data and parameters to be monitored**:

CO2 emission reduction will be calculated as follows.

$ER = \sum_n (BE_n - PE_n)$

ER Emission Reduction of CO_2 [kg]

BE_n Baseline emission in road section $_n$

PE_n Project emission in road section $_n$

Data / Parameter	Road length
Unit	km
Description	Length of rehabilitated road section n
Source of data	Road of Serbia
Measurement procedures	
Monitoring frequency	Yearly
QA/QC procedures	-
Comment	-

Data / Parameter	$N_{j,k}$
Unit	vehicle
Description	Number of vehicle with vehicle technology k, fuel type m, vehicle category j in road section n
Source of data	Database of Road of Serbia
Measurement procedures	PERS will monitor the number of vehicle with vehicle technology , fuel type, vehicle category in each road section.
Monitoring frequency	Yearly
QA/QC procedures	-
Comment	If PERS can not monitor the number of vehicle by vehicle type, the ratio of vehicle technology k, vehicle category j in all roads of Serbia will be monitored and used.

Data / Parameter	Vehicle speed
Unit	Km/h
Description	Average vehicle speed in each road section
Source of data	Database of Road of Serbia
Measurement procedures	PERS will monitor vehicle speed in each road section.
Monitoring frequency	Yearly
QA/QC procedures	-
Comment	

Data / Parameter	$FCF_{j,k}$
Unit	g/km
Description	Fuel Consumption Factor with vehicle technol. k, fuel type m, vehicle category j, speed range
Source of data	COPERT
Measurement procedures	-

Monitoring frequency	Yearly
QA/QC procedures	-

Data / Parameter	IRI
Unit	[m/km]
Description	International Roughness Index
Source of data	Database of Road of Serbia
Measurement procedures	PERS will monitor IRI in each road section.
Monitoring frequency	Yearly
QA/QC procedures	-

Data / Parameter	$EF_{j,m}$
Unit	kg CO2/kg
	Emission Factor with fuel type m
Source of data	COPERT or IPPC
Measurement procedures	-
Monitoring frequency	Yearly
QA/QC procedures	-

- **Monitoring plan and structure:**

Monitoring activities will be conducted by PERS (or accredited laboratory), based on its ISO 9001:2008 certified quality management system.

PERS will perform monitoring activities and measurement on the site.

- **Domestic MRV arrangements**

Domestic MRV arrangement of Serbia is currently under development.

It is expected that under the Serbian domestic MRV system, a PERS is responsible for the Measurement (M) and Reporting (R) activities, which will go through Verification (V) from third party. It is expected that the MRV of proposed NAMA will be conducted in the following manner:

PERS will conduct the Measurement activity based on the above-mentioned monitoring plan in order to calculate the emission reductions achieved by the NAMA.

PERS will prepare a Report that contains information on 1) the detailed result of the monitoring activities conducted based on the monitoring plan, 2) the result of emission reduction calculation based on the above mentioned methodology, and 3) any support received under NAMA scheme from Annex-I countries or international organization regarding financial support, technical support, or support on capacity building.

OTHER INFORMATION

Contribution to Sustainable Development

Implementation of the NAMA is meeting majority of the Sustainable Development Indicators in accordance with three criterion indicated in appendix of the Serbian DNA Rules of procedure.

- According to the economic criterion, it satisfies following fields:

  1. Social benefits - Economic development of the region – Rehabilitation of proposed road sections will ensure better traffic conditions on Serbian road network. It can significantly contribute to the economic development of those regions.

  2. Employment – Rehabilitation of proposed roads will provide work for many domestic companies.

- According to the social criterion, it satisfies following fields:

  2. Life conditions improvement - Project implementation of such scope, lead up to the employment increase, as well as income increase, on the local and regional level.

  3. Capacity increase - According to the work needs and modern equipment maintenance, strategic partner will provide training for the employees, as well as expertise and tools for local companies engaged on this implementation of the project during its operational life.

- According to the environment and natural resources criterions, it satisfies following fields:

  - Energy resources – rehabilitated road sections will ensure smooth traffic and will reduce fuel consumption.

  - Air - Due to the application of the modern technology and higher energy efficiency of the road, project will result in reduced emission levels of CO_2, SO_x and NO_x, comparing to the existing conditions on proposed road sections.

  - Soil – Rehabilitation of proposed roads will be performed within the road right of way, so it would not be necessary to change the purpose of the land. In addition, waste disposal will be at the area anticipated for this purpose with application of the reclamation measures.

Stakeholder consultation

- PERS will conduct a public stakeholder consultation regarding the NAMA. At the consultation, objective and outcome, expected impacts on local environment, employment opportunities, etc. will be presented to stakeholders, and their comments will be collected and compiled.
- PERS will take necessary due actions to the comments received during the public consultation and report the results.
- Public consultation will be held either through website or through meetings near the project site.

CONTACT INFORMATION

Implementing Entity (1)

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NAMA Coordinating Entity

Entity Name	Ministry of Energy, Development, and Environmental Protection Climate Change Division
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GENERAL INFORMATION

Title of NAMA

- **Improvement of old residential buildings envelope (exterior doors, windows and thermal insulation) in Serbia**

Description

- **Description of Mitigation Action**

Residential buildings in Serbia up to 1980's were generally built without any thermal insulation. That is the main reason for their tremendous energy consumption for space heating today. The objective of this project is rehabilitation of about 10% of the existing residential buildings in Serbia that were built in the period from 1950's to 1980's, what is approximately 10 millions square meters of houses and apartments buildings.

Energy efficiency improvements in selected residential buildings of different size and shape throughout Serbia, aim to:

a. reduce heat energy consumption and costs;
b. increase the level of indoor comfort and end users' satisfaction;
c. reduce GHG emission.

- **Technology/ measure**

1. Rehabilitation of buildings' envelope – thermal insulation of non-transparent elements including external walls, partitions to unheated spaces, roofs, ceilings, etc.
2. Replacement of windows. Installing new five-chamber PVC frames, double glazing, low-emissivity glass, filled with argon gas.

With the application of all above-mentioned measures, specific annual energy consumption for heating will decrease from the simple average value for old targeting buildings (analysis conducted by local companies) of 160 kWh/m^{2}y to 70 kWh/m^{2}y which is limited final energy consumption for heating for rehabilitated old buildings, according to the Regulations on Energy Efficiency in Buildings (2011).

- **Potential Number of sites for NAMA project**

The number of potential sites for NAMA project is about 10,000 buildings with total surface floor area of 9.66 million square meters as shown in the next table. The surface area of the existing buildings for different period of construction was taken from Population and housing census in Serbia as well as Statistical Yearbook. Surface area of windows and walls was estimated for typical buildings in Serbia built in the period from 1950 to 1980.

Period of construction	Floor surface area of the existing buildings P (m²)	Area for rehabilitation (10% of P)	Windows surface area (m²)	Walls and roofs surface area (m²)
1951-1960	18,640,781	1,864,000	342,000	3,386,000
1961-1970	33,140,692	3,314,000	607,000	6,021,000
1971-1980	44,878,506	4,488,000	823,000	8,153,000
Total		9,666,000	1,772,000	17,560,000

Location

- Targeted residential buildings are located throughout Serbia.

NAMA Implementing Entity

- Serbian Ministry of Energy, Development and Environmental Protection in coordination with local municipalities.

Implementing Schedule

Depending on financial resources dynamic, the project could be implemented continuously or in phases.

Expected starting date of Action

- Buildings rehabilitation will start in 2013. Start of operation will continuously happen as each building's rehabilitation is completed. The reconstruction of app. 10,000 buildings should be finished in 2020.

Lifetime

- Expected lifetime of thermal insulation and new windows is approximately 30 years.

Current Status

- There are a certain number of pilot projects of improving building envelope thermal performances, resulting in heat consumption reduction and GHG emission reduction.

  GIZ Project which is currently being implemented aims to support the Serbian government in the development and implementation of the national programme on energy efficiency for buildings by improving the existing legal framework, raising awareness on the importance and benefits of energy efficiency and providing information and financial resources.

  Serbia established incentive system for rehabilitation of existing building envelope in certain number of houses for improving thermal insulation, increasing thermal comfort and reducing energy consumption for heating. In 2012, former Ministry of Environment, Mining and Spatial Planning granted funds of 1.3 billion RSD (approximately 13 million Euro) to tenants for rehabilitation of existing buildings.

Coverage

- **Sector**: Buildings energy sector
- **GHG Gases**: CO_2

FINANCIAL INFORMATION

Finance and Cost

- Expected cost of **preparation**:
  EUR 5 million (General design or/and Feasibility study for each of the buildings)

- Expected cost of **implementation**:
  EUR 723.48 million

- Expected **incremental cost** of implementation:
  none

- **Financial sources**:

  A part of financial sources could be provided by building owners. Other parts will include the state and some sort of non-commercial loans. Establishment of financial measures such as tax incentives for thermal insulation products, windows and exterior doors will be essential.

  The details regarding the financial sources necessary for the preparation and the implementation of the project will be analyzed in the Feasibility study. The financial mechanism will be decided upon the completion of the Feasibility study.

  Since the Law on Efficient Use of Energy is currently in the last phase of preparation, according to which Budget Fund will be introduced aiming to secure funds for the purposes of efficient energy use, it is possible that this project will receive support from that source also.

INFORMATION ON SUPPORT REQUIRED

Description of Support Required

Type of Support	**Support required for Preparation**	**Support required for implementation**
Financial	EUR 5 million	EUR 723.48 million*
Technical	x	x
Capacity Building	x	x

* EUR 723.48 million is the total cost of the project, of which EUR 144.696 million (20% of the total cost) would be covered by building owners. The remaining EUR 578.784 million (80%) is the total expected amount required for support. It includes EUR 217.044 million (30%) for which the state would ask a grant which would be the offered to the owners as a state subsidy and the remaining EUR 361.74 million (50%) for which some sort of non-commercial loan would be secured.

EXPECTED GHG EMISSION REDUCTIONS AND MRV

Expected Mitigation Potential

- **Annual reduction**: 503,929 tCO_{2e}
- **Total reduction**: 15,117,870 tCO_{2e} (30 years)

Methodologies and Assumptions

- **Methodology**: Methodology applied for ex-ante GHG estimation is shown below.
- **BAU scenario**: The rehabilitation of existing residential buildings without building envelope thermal insulation is not conducted. Energy efficiency of these residential buildings remains the same (very low).
- **Calculation of emission reductions**:

- **Baseline GHG emission**

Assumptions:

- Total floor areas to be rehabilitated in the existing buildings built from 1950's to 1980's: 9,666,000 m^2
- Average energy consumption for heating for buildings without thermal insulation built 30-50 years ago: 160 kWh/m^2y
- Total annual energy consumption for these buildings:
  160 kWh/m^2y x 9,666,000 m^2 = 1,546,560,000 kWh/y
- Energy is supplied by various sources (% share in the market based on the data from PE "Belgrade District Heating"):
  Electricity (40%) District heating (40%) Coal (10%) Natural gas (10%)

Fuel/energy	Share of the market [%]	Final energy [GWh/y]	Conversion factor to primary energy	Primary energy [GWh/y]	Primary energy [TJ/y]
Electricity	40	618.62	1	618.62	2,227.03
District heating	40	618.62	1.3*	804.21	2,895.16
Coal	10	154.66	1.3**	201.06	723.82
Natural gas	10	154.66	1.1**	170.13	612.47
Σ		**1,546.56**		**1,794.02**	**6,458.48**

* An average value for all heat plants in DH systems fueled with different fuels (natural gas, heavy oil, light oil, coal) including heat losses in pipelines (estimation):

$\eta_{DH} = (0.5 \cdot 0.9 + 0.3 \cdot 0.85 + 0.2 \cdot 0.75) - 0.1 = 0.76$

** Based on average value of boiler efficiency (for coal 75%, for natural gas 90 to 92%)

Fuel/energy	Primary energy	CO_2 Emission factor	CO_2 emission [t CO_2/y]
Electricity	618,620 [MWh/y]	0.945 [t CO_2/MWh]	584,596
District heating	2,895.16 [TJ/y]	71 [t CO_2/TJ]*	205,556
Coal	723.82 [TJ/y]	98.6 [t CO_2/TJ]**	71,369
Natural gas	612.47 [TJ/y]	56.1 [t CO_2/TJ]	34,360
∑		-	**895,881**

* An average value for natural gas (50%), light and heavy oil (30%) and coal (20%) (estimation based on the data from district heating companies in Serbia).

** An average value for lignite and brown coal used in Serbia.

- **GHG emission after implementing project (10,000 buildings rehabilitation)**

  Total floor areas to be rehabilitated in the existing buildings built from 1950's to 1980's: 9,666,000 m^2

  Average energy consumption for heating after buildings rehabilitation (according to the new Regulation on Energy Efficiency in Buildings): 70 kWh/m^2y.

  Total energy consumption: 70 kWh/m^2y x 9,666,000 m^2 = 676,620,000 kWh/y

  Energy is supplied by various sources (% share in the market):

  Electricity (40%) District heating (40%) Coal (10%) Natural gas (10%)

Fuel/energy	Share of the market [%]	Final energy [GWh/y]	Conversion factor to primary energy	Primary energy [GWh/y]	Primary energy [TJ/y]
Electricity	40	270.65	1	270.65	974.34
District heating	40	270.65	1.3*	351.85	1,266.66
Coal	10	67.66	1.3	87.96	316.66
Natural gas	10	67.66	1.1	74.43	267.95
∑		**676.62**		**784.89**	**2,825.61**

* An average value for all heat plants in DH systems fueled with different fuels

Fuel/energy	Primary energy	CO_2 Emission factor	CO_2 emission [t CO_2/y]
Electricity	270,650 [MWh/y]	0.945 [t CO_2/MWh]	255,764
District heating	1,266.66 [TJ/y]	71 [t CO_2/TJ]*	89,933
Coal	316.66 [TJ/y]	98.6 [t CO_2/TJ]**	31,223
Natural gas	267.95 [TJ/y]	56.1 [t CO_2/TJ]	15,032
∑		-	**391,952**

* An average value for natural gas (50%), light and heavy oil (30%) and coal (20%):

$EF_{DH} = (0.5 \cdot 56.1 + 0.3 \cdot 77.4 + 0.2 \cdot 98.6) = 71$

** For mixture of lignite and brown coal used in boilers in Serbia.

- **GHG emission reduction**

GHG emission reduction = 895,881 - 391,952 = 503,929 [t CO_{2e}/y]

Measurement, Reporting, and Verification (MRV)

Monitoring Plan

Improvement of old residential buildings envelope will be implemented according to the Regulations on Energy Efficiency in Buildings (2011) and Regulations on Certification of Energy Performance of Buildings (2011).

The Regulations on Energy Efficiency in Buildings prescribes the energy performance and the way to calculate thermal performance of buildings, as well as the requirements regarding energy performance for new and existing facilities. The Regulations categorizes buildings based on energy properties and methods of calculating thermal properties.

Regulation on Certification of Energy Performance of Buildings requires building owners to prepare energy plan for their building before rehabilitation works, and have to receive energy audit and certification by accredited companies and then submit the “Energy Passport” (please see below for the contents of Energy Passport) to responsible entities (Ministries or Municipalities). After implementation, building owners have to receive re-certification by accredited companies and submit revised Energy Passport to responsible entities (Ministries or Municipalities).

Ministry of Construction and Urbanism will monitor all issued Energy Passports before and after implementation of the proposed rehabilitation works, and confirm CO_2 emission of the building in each Energy Passport.

Energy Passport includes the following information;

1. General information of the Building, Energy certificates for buildings
2. Data on building, climate condition, HVAC (heating, ventilation, and air conditioning), building envelope
3. Data on heating system of the building, heating control system, heat loss of the building, Energy needs of the building, energy consumption, CO_2 emissions
4. Proposals for improvement of the energy efficiency of the building

Through comparison of the CO_2 emission described in each Energy Passport (before/ after), CO_2 emission reduction will be confirmed.

- **Data and parameters to be monitored**:

CO_2 Emission reduction will be calculated as follows.

$$ERy = \sum n \ (BEi - PEi)$$

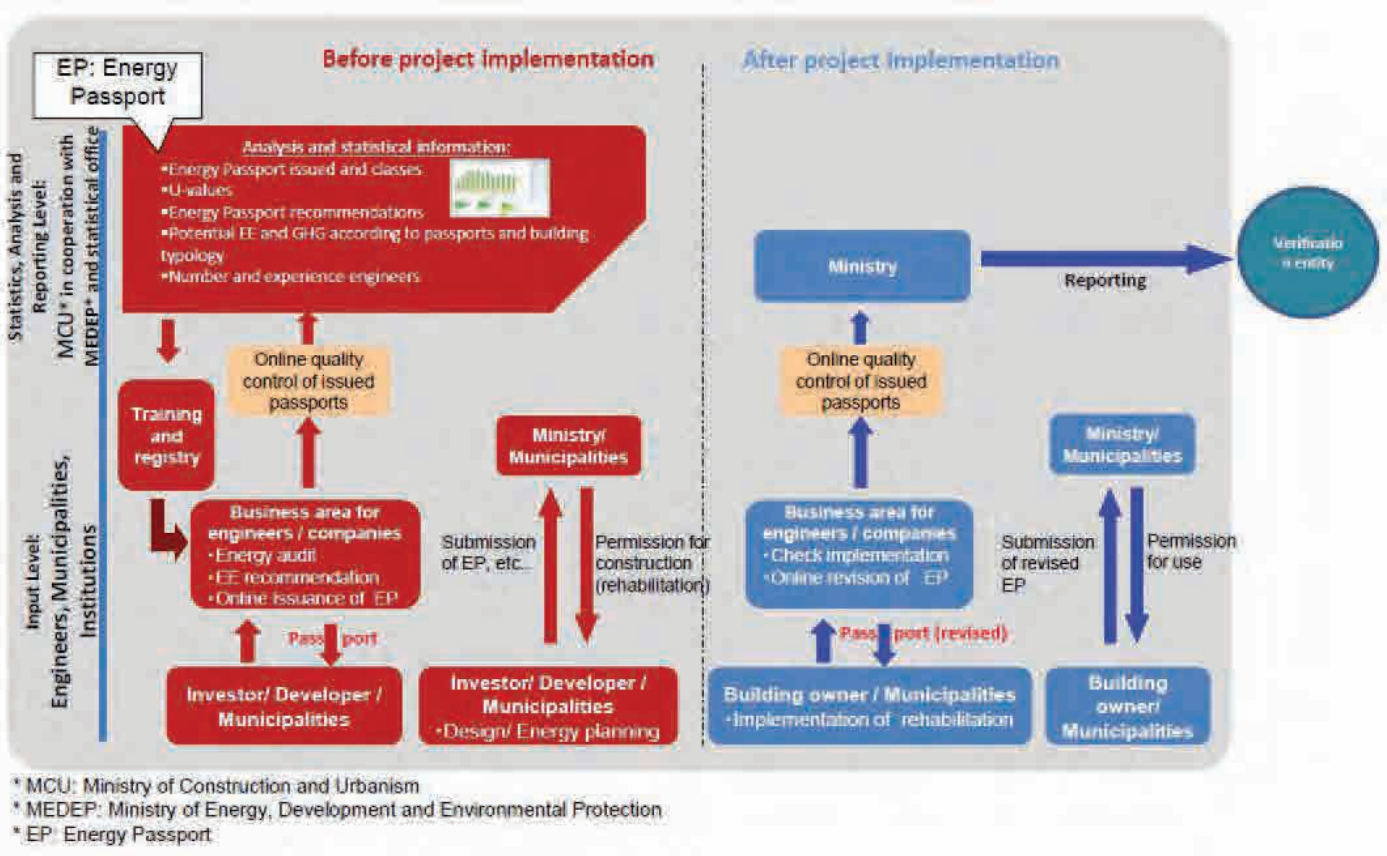
Where:
ER y = Emission Reduction in Year y
n = Number of rehabilitated buildings that with Energy Passports issued.
BE i = CO_2 Emission before rehabilitation in building i
PE i = CO_2 Emission after rehabilitation in building i

Data / Parameter	ER_i
Unit	kg-CO_2/ year
Description	Amount of CO_2 Emission Reduction as a result of building envelope improvement
Source of data	Energy Passport issued to each rehabilitated building (both Energy Passports that are prepared before and after rehabilitation will be monitored)
Measurement procedures	Ministry of Construction and Urbanism will monitor all issued Energy Passports before and after implementation of rehabilitation works, and confirm CO_2 emission of the building. Through comparison of the CO_2 emissions described in each Energy Passports (before/ after), CO_2 emission reduction will be calculated.
Monitoring frequency	Once a year
QA/QC procedures	via web-site

- **Monitoring plan and structure:**

The final structure of the project has not yet been completely defined, as it is being developed as part of the GIZ Project - Energy Efficiency in Buildings, which will result in setting up a web site which will contain all the data, information and analysis regarding the subject of energy efficiency in buildings and GHG emissions. As a result of cooperation of GIZ and the Faculty of Architecture of Belgrade University, with the support of the Ministry of Construction and Urbanism, the Typology project was completed, results of which are available on www.building-typology.eu with detailed information of types of residential buildings in Serbia. This information will be used in the preparation of the Feasibility study of this project.

The concept of monitoring structure is shown in the figure below.



Monitoring will be conducted both before and after the project implementation. Before the implementation, the following will be conducted: submission of the Energy Passport by the investors/developers/municipalities to either Ministry or the municipalities upon which permission of construction will be issued; online quality control of issued passports; analysis and statistical processing of the data regarding: Energy Passports, U-values, Energy Passport recommendations, potential EE and GHG according to passports and building typology, number of experienced engineers, etc. The data will be submitted by engineers, municipalities and institutions involved. The entire system will also be accessible to general public via internet.

After the implementation, following monitoring activities will be conducted: submission of the revised Energy Passport by the companies authorized for certification/ to the Ministry or the municipalities upon which permission for use will be issued; online quality control of issued passports submitted to the Ministry; submission of the reports to the Verification entity.

Domestic MRV arrangements

- Domestic MRV arrangement of Serbia is currently under development.
- It is expected that under the Serbian domestic MRV system, a NAMA implementing entity is responsible for the Measurement (M) and Reporting (R) activities, which will go through Verification (V) from third party.
- It is expected that the MRV of the proposed NAMA will be conducted in the following manner.

1. Ministry of Construction and Urbanism will conduct and supervise the Measurement activities based on the above-mentioned monitoring plan in order to calculate the emission reductions achieved by the NAMA.
2. Ministry of Construction and Urbanism will prepare a Report that contains information on 1) the detailed result of the monitoring activities conducted based on the monitoring plan, 2) the result of emission reduction calculation, and 3) any support received under NAMA scheme from Annex-I countries or international organizations regarding financial support, technical support, or support on capacity building.

OTHER INFORMATION

Contribution to Sustainable Development

The project will have various positive economic, social and environmental effects. The project counts on the involvement of local partners in terms of production of construction products, project design and execution of works. It will increase demand and production of construction products, thus resulting in increase of revenue and employment of local companies, contributing to economic development of all regions of Serbia. The project requires the involvement of stakeholders at local level (enterprises, certified engineers, local authorities for issuing building permits). As for the environmental impact - the implementation of the project will result in reduction of energy consumption, reduction of GHG emissions and the increase the level of indoor comfort and end users' satisfaction.

Stakeholder consultation

Numerous meetings with building owners, representatives of local authorities and certified engineers have been held so far in 30 communities throughout Serbia, as a part of the project of GIZ. Implementation of energy efficiency measures and GHG emission reductions were promoted, raising awareness amongst members of the local communities and local authorities regarding the positive impacts of the introduction of the energy efficiency measures and Energy Passports.

CONTACT INFORMATION

NAMA Implementing Entity

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NAMA Coordinating Entity

Entity Name	Ministry of Energy, Development, and Environmental Protection Climate Change Division
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GENERAL INFORMATION

Title of NAMA

- **Energy Efficiency Improvements in Public Buildings: 23 schools and 26 hospitals – Serbian Energy Efficiency Project (SEEP)**

Description

- **Description of the Mitigation Action**

The overall goal of the Project is to provide optimal conditions for the people living and working in public buildings, **23 schools and 26 hospitals,** in an energy efficient and sustainable manner.

The NAMA involves refurbishment of 23 schools and 26 hospitals throughout Serbia.

The total potentially refurbished area of the 23 schools is 76,483 m^2 with expected CO_2 emission reduction of 2,142 tones/annually and the total potentially refurbished area of the 26 hospitals is 143,825 m^2 with expected CO_2 emission reduction of 6,184 tones/annually.

The total potentially refurbished area of the 23 schools and 26 hospitals is 220,308 m^2 with expected CO_2 emission reduction of 8,326 tones/annually.

The NAMA will contribute to climate change mitigation as refurbished Public buildings will use less energy and consequently emit less CO_2 for about 8,326 tones/annually during their life cycle that would be emitted in absence of the mitigation action.

Detailed list of the 23 schools and 26 hospitals are given in tables in annex.

- **Technologies/ measures**

The measures proposed can be divided into two general groups:

1. Upgrading the building envelope (e.g. insulating walls, roofs, ceiling, basement; replacing windows; etc.);
2. Upgrading the heating system (equipment and controls – both central plant and local terminal units);

Detailed list of the measures proposed on 23 schools and 26 hospitals are given in tables in annex.

Location

- 23 locations of schools and 26 locations of hospitals are shown in the maps below
  Numerations are according tables in annex

SCHOOLS

HOSPITALS

NAMA Implementing Entity

- Ministry of Energy, Development and Environmental Protection - MEDEP

  Implementation and Measurement, Reporting, and Verification (MRV) process should be implemented in cooperation with:
  - Energy Managers – when system of energy managers will be established. By new Law on Efficient Use of Energy (draft) should be established this system.
  - Local Governments – responsible for schools
  - Hospital's management – responsible for hospitals

Implementing Schedule

Expected starting date of Action

- Buildings rehabilitation will start in 2013 or when the project will accept.
  Depending on financial resources dynamic, the project could be implemented continuously or in phases.

Lifetime

- 25 years for installed envelopes
- According by manufacturers specified life time of the installed equipments

Current Status

- Preliminary energy audits for target 49 public buildings completed in 2007 and 2009
- Seeking the financial source
- As project is not yet accepted there is no coordination with local governments responsible for schools and hospital's management. Only previously coordination was in the frame of the project SEEP 2.

Coverage

- Sector: Buildings
- GHG Gases: CO_2

FINANCIAL INFORMATION

Finance and Cost

- Expected cost of **preparation**: **1.6 million euro**

Expected cost of preparation is about 15% of Total expected cost for implementation:

- Detailed audits - checking of the primary defined EE measures by Preliminary audits carried out before several years,
- Preparation of project documentation,
- Building Certification,
- Tendering,
- Supervision

- Expected cost of **implementation**: **10.90 million Euros**.
  - for 23 schools is 4.97 million euro,
  - for 26 hospitals is 5.93 million euro
  - Please see Attachment for the investment cost of each building

- Expected **incremental cost** of implementation: N/A

- **Financial sources** identified: Not identified, but soft loan, donations, grants, etc. are possible. Also, ESCO model are one of the option for financing.
  One part of financial sources could be provided by building owners.

- **Financial analysis**: Please see Attachment for expected investment cost and payback period for each of the building.

INFORMATION ON SUPPORT REQUIRED

Description of Support Required

Type of Support	Support required for preparation	Support required for implementation
Financial	Expected cost of preparation and MRV of **1.6 million euro** is about 15% of Total expected cost for implementation for: – Detailed audits - checking of the primary defined EE measures by Preliminary audits – Preparation of project documentation, – Building Certification – Tendering, – Supervision	Expected cost of implementation of refurbishment 23 schools and 26 hospitals throughout Serbia is **10.9 million euro.**
Technical	x	X
Capacity Building	x	x

EXPECTED GHG EMISSION REDUCTIONS AND MRV

Expected Mitigation Potential

- **Annual reduction**:

  Schools: 2,142 tCO_{2e}/y

  Hospitals: 6,184 tCO_{2e}/y

  Total: 8,326 tCO_{2e}/y

- **Total reduction**: 208,150 tCO_{2e} (25 years)
- **BAU scenario:** Energy efficiency level of schools and hospitals remains same as the current level
- **Calculation of emission reduction**

Ex-ante estimation of GHG emission reductions was conducted using the available monitored data from the previous energy efficiency improvement projects by the same NAMA implementing entity called “Serbian Energy Efficiency Project I (SEEP I)” and “Serbian Energy Efficiency Project II (SEEP II).” Both projects involved installation to the same types of public buildings, i.e. schools and hospitals, of energy saving measures such as window replacement, modernization of boiler rooms and substations, installation of radiator thermostatic valves, etc.

In these previous projects, the NAMA implementing entity conducted monitoring of the buildings by measuring the amount of energy consumption by each building and calculating CO_2 emissions before and after rehabilitation.

Results of the monitoring activities are shown below.

Building type	Project name	Number of monitored buildings	Total area of the building (m^2)	CO_2 emission reduction (kg CO_2/m^2y)
Schools	SEEP I	16	51,589	29
	SEEP II	9	32,876	27
			Average	**28**
Hospitals	SEEP I	12	69,577	39
	SEEP II	17	75,915	47
			Average	**43**

Average value of CO_2 emission reduction from all monitored schools in SEEP I and SEEP II (28 kg CO_2/m^2y) was applied to the total floor size of the 23 schools of the proposed NAMA project in order to estimate the expected annual CO_2 emission reduction from schools:

$$\Delta CO_2 = 76{,}483\ m^2 \cdot 28\ kg\ CO_2/m^2y = 2{,}142\ t\ CO_2/y$$

Similarly, average value of CO_2 emission reduction from monitored hospitals in the previous projects (43 kg CO_2/m^2y) was applied to 26 hospitals for NAMA. Total expected annual CO_2 emission reduction from hospitals is:

$$\Delta CO_2 = 143{,}825\ m^2 \cdot 43\ kg\ CO_2/m^2y = 6{,}184\ t\ CO_2/y$$

Measurement, Reporting, and Verification (MRV)

Monitoring plan

Ex-post calculation of GHG emission reduction will be conducted based on the information on CO_2 emissions before and after rehabilitation of each target building, which will be contained in an official document called "Energy Passport," which is required to be prepared by each building owner and be submitted to the ministry under the Serbia's regulation "Regulation on Certification of Energy Performance of Buildings."

Regulation on Certification of Energy Performance of Buildings requires building owners to prepare energy performance improvement plan for their building before rehabilitation works, and have to receive **energy audit and certification** by accredited companies and then submit the "**Energy Passport**" to responsible ministries or municipalities. After implementation, building owners have to receive re-certification by accredited companies

and submit revised Energy Passport to responsible ministries or municipalities.

Energy Passport includes the following information;

1. General information of the building, energy certificates for buildings
2. Data on building, climate condition, HVAC (heating, ventilation, and air conditioning), building envelope
3. Data on heating system of the building, heating control system, heat loss of the building, energy needs of the building, energy consumption
4. CO_2 emissions from the building (automatically calculated)
5. Proposals for improvement of the energy efficiency of the building

Through comparing CO_2 emissions described in each Energy Passport, which is prepared before and after rehabilitation takes place, CO_2 emission reduction will be confirmed.

Energy Manager who will be assigned for a certain public building(s) will monitor Energy Passports issued both before and after implementation of the proposed rehabilitation works, and confirm CO_2 emission reductions of the building.

Energy manager will also be responsible for reporting the calculated amount of CO_2 emission reduction of each rehabilitated public building to Ministry of Energy, Development and Environmental Protection (MEDEP). The government of Serbia in cooperation with GIZ is currently developing an online system to manage all the issued Energy Passports and CO_2 emissions data contained in these Energy Passports, which will make the monitoring activity even more efficient and transparent.

Total CO_2 emission reduction (ER) from all target schools and hospitals will be calculated as follows.

$$ER = ER_{school} + ER_{hospital}$$
$$ER_{school} = \sum (BE_{school} - PE_{school})$$
$$ER_{hospital} = \sum (BE_{hospital} - PE_{hospital})$$

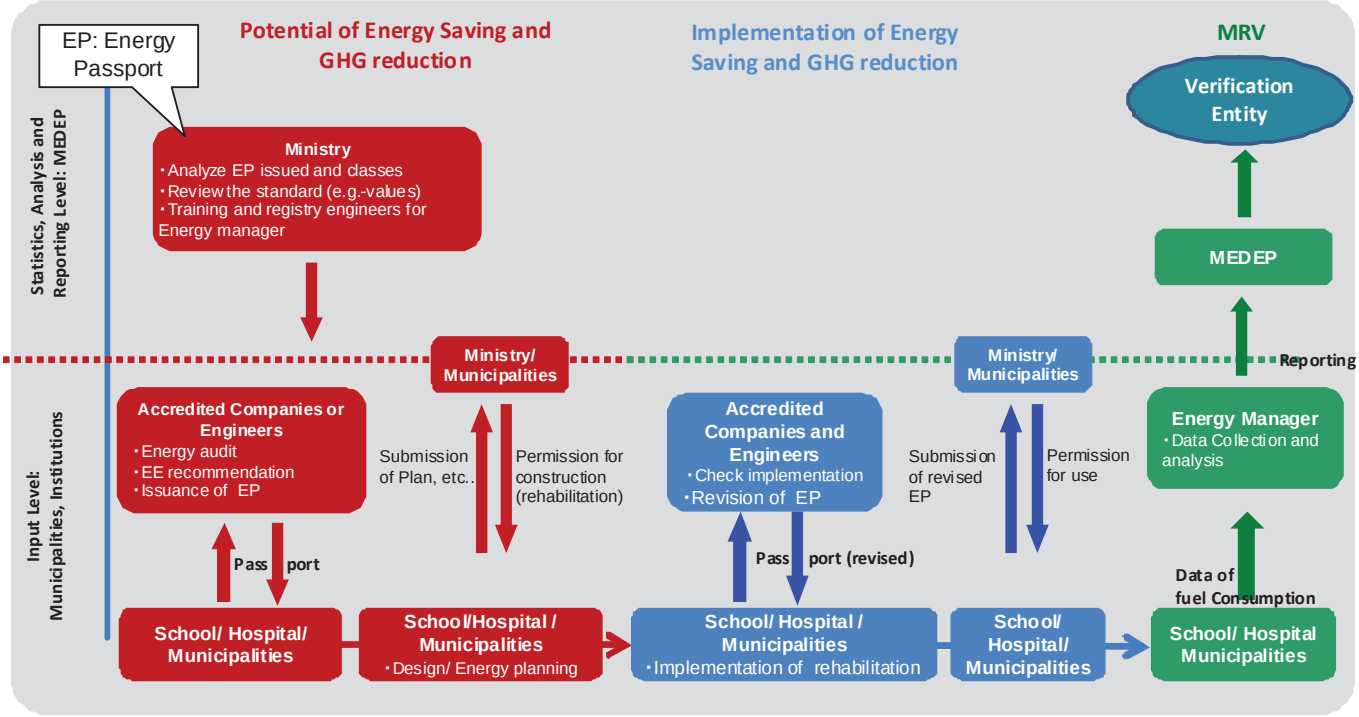
- **Data and parameters to be monitored**:

Data / Parameter	ER
Unit	kg-CO_2/ year
Description	Amount of CO_2 emission reduction achieved through installing energy saving measures at each building
Source of data	- Energy Passport issued to each rehabilitated building before rehabilitation - Energy Passport issued to each rehabilitated building after rehabilitation
Measurement procedures	Energy Manager will monitor all Energy Passports issued before and after implementation of rehabilitation works, and confirm CO_2 emissions of the building. Through comparison of the CO_2 emissions described in each Energy Passports (before/ after), CO_2 emission reduction will be calculated.
Monitoring frequency	Yearly

Monitoring plan and structure:

MRV process should be established and implemented in cooperation with:

- Ministry of Energy, Development and Environmental Protection (MEDEP)
- Energy Managers
- Local Governments – responsible for schools
- Hospital's management – responsible for hospitals



Domestic MRV arrangements

- Domestic MRV arrangement of Serbia is currently under development.
- It is expected that under the Serbian domestic MRV system, a NAMA implementing entity is responsible for the Measurement (M) and Reporting (R) activities, which will go through Verification (V) from third party.
- It is expected that the MRV of the proposed NAMA will be conducted in the following manner.

1. MEDEP will supervise the Measurement activities based on the above-mentioned monitoring plan in order to calculate the emission reductions achieved by the NAMA.
2. MEDEP will prepare a Report that contains information on 1) the detailed result of the monitoring activities conducted based on the monitoring plan, 2) the result of emission reduction calculation based on the above mentioned methodology, and 3) any support received under NAMA scheme from Annex-I countries or international organization regarding financial support, technical support, or support on capacity building.

OTHER INFORMATION

Contribution to Sustainable Development

- 23 schools and 26 hospitals will be retrofitted.
- Reduction of fuel consumption
- Energy efficiency improvement experience and awareness raising among the municipal and local government officials

- **Sector's policy / Target**

  The overview of the potential energy efficiency improvement (EEI) measures in residential sector and commercial and public to be implemented in the scope of within National Energy Efficiency Action Plan. The targets of different sectors have been set on the basis of estimated potential of various technical measures and are based on the estimated electricity consumption by sub-sectors.

  Expected energy savings in 2018 (Public and commercial activities / building) 0.22 Mtoe

Stakeholder consultation

- MEDEP plans to inform interested parties about NAMA project through: its website, mass media and direct contact with stakeholders.
  MEDEP plans to collect comments from local governments, facilities management and energy managers by e-mails and through direct contact with interested parties.

CONTACT INFORMATION

Implementing Entity

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NAMA Coordinating Entity

Entity Name	Ministry of Energy, Development, and Environmental Protection Climate Change Division
Contact Person	State Secretary: Mr. Vladan Zdravkovic Head of Climate Change Division: Ms. Danijela Bozanic
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Attachment

List of target schools

No	Name of the Building	Location	Area	Investment cost	Pay back period	Proposed measures
			(m^2)	(EUR)	years	
1	Secondary school "Besedeš Jož ef" Kanjiža	Senta	2,623	291,415	7.5	1.Window Replacement 2.Wall and roof Insulation 3.Thermocontrol
2	Secondary school "Đura Jakšić" Rača (fiskulturna sala)	Kragujevac	1,455	110,580	5.4	1.Window Replacement in the gym 2.Wall and roof Insulation 3.Thermocontrol 4.Boiler reconstruction
3	Primary school "Vuk Karadžić" Lovćenac	Vrbas	3,502	310,000	17.8	1.Window Replacement 2.Wall and roof Insulation 3.Thermocontrol 4.Gas burner
4	Aeronautical-technical school "Petar Drapšin" Beograd	Beograd	2,700	202,770	11.0	1. Window Replacement 2. Mechanical works
5	Secondary school "Lazar Nešić" Subotica	Subotica	5,670	207,511	5.6	1.Window Replacement 2.Thermocontrol
6	Primary school "Veljko Vlahović" Pečenjevce	Leskovac	1,632	131,375	7.8	1.Window Replacement 2.Wall Insulation 3.Thermocontrol 4.Boiler Replacement
7	Primary school "Čeh Karolj" Ada	Senta	3,208	258,245	11.1	1.Window Replacement 2.Wall and roof Insulation 3.Thermocontrol 4.New boiler room
8	Primary school "Čibukovački partizani" Kraljevo	Kraljevo	2,667	236,296	9.8	1.Window Replacement 2.Wall and roof Insulation 3.Thermocontrol 4.Balancing
9	Primary school "Svetozar Marković" Lapovo	Kragujevac	1,465	111,340	6.3	1.Window Replacement 2.Wall and Ceiling Insulation 3.Thermocontrol
10	Primary school "Janko Veselinović" Crna Bara	Šabac	898	72,378	10.5	1.Window Replacement 2.Wall and roof Insulation 3.Thermocontrol 4.Boiler Replacement
11	Primary school "Vuk Karadžić" Bačko Dobro Polje	Vrbas	1,630	89,650	10.8	1.Wall and roof Insulation 2.Partial Replacement of Windows and Doors 3.Thermocontrol
12	Primary school "Dimitrije Todorović" Knjaževac	Knjaževac	4,040	460,560	20.2	1.Window Replacement 2.Wall and roof Insulation 3.Thermocontrol 4.Balancing
13	Primary school "Borivoje Milojevi ć" Krupanj	Krupanj	1,019	76,526	5.9	1.Window Replacement 2.Thermocontrol 3. Balancing 4.Heat Pipeline Reparation
14	Primary school"Vuk Karadžić" Kladovo	Kladovo	6,376	478,837	16.2	1.Window Replacement 2. Roof Insulation 3.Thermocontrol 4. Balancing
15	Technical school "Rade metalac" Leskovac	Leskovac	8,277	455,235	14.9	1.Window replacement 2.Wall and roof Insulation 3.Thermocontrol 4.Balancing
16	Primary school "Jovan Cvijić" Kostolac	Kostolac	4,958	272,250	12.9	1.Window Replacement 2.Wall and roof Insulation 3.Thermocontrol 4. Balancing
17	Primary school "Hristo Botev" (Moše Pijade) Dimitrovgrad	Dimitrovgrad	4,853	266,915	14.5	1.Window Replacement 2.Wall and roof Insulation 3.Thermocontrol 4.Balancing
18	Secondary school "Miloš Savkovi ć" Aranđelovac	Arandjelovac	1,960	78,400	6.8	1.Wall and roof Insulation 2.Thermocontrol
19	Primary school "Filip Filipović"	Čačak	3,910	346,426	13.4	1.Window Replacement 2. Wall and roof Insulation 3.Thermocontrol 4. Balancing
20	Primary school"Ljupče Španac" Bela Palanka	Bela Palanka	3,153	173,415	11.1	1.Window Replacement 2.Wall and roof Insulation
21	Agriculture and Forestry Secondary School"Josif Pančić" Surdulica	Surdulica	3,475	139,000	17.9	1.Wall and roof Insulation 2.Thermocontrol 3. Balancing
22	Secondary Economic School Valjevo	Valjevo	3,714	69,160	5.6	1.Only works in boiler room (windows replaced in 2003, brick facade, flat roof in good condition)
23	Primary school "Vuk Karadžić"	Loznica	3,298	131,920	17.4	1.Wall and roof Insulation 2.Thermocontrol
Average			**3,325**	**216,096**	**11.3**	* Windows have already been replaced if not given
Total			**76,483**	**4,970,204**	-	

List of target hospitals

No	Name of the Building	Location	Area	Investment cost	Pay back period	Proposed measures
			(m²)	(EUR)	years	
1	Medical Centre Gornji Milanovac	Gornji Milanovac	4,714	188,560	3.9	1.Window Replacement 2.Roof Insulation 3.Thermocontrol
2	Rehabilitation Institute "Dr Miroslav Zotović" Sokobanjska 13, Beograd	Beograd	17,500	262,500	5.1	1.Gas Boiler Room 2.Thermocontrol
3	Medical Centre Kuršumlija	Kuršumlija	1,522	63,091	3.0	1.Wall and roof Insulation 2.Thermocontrol 3.Balancing
4	Special Rehabilitation Hospital" AGENS" Mataruška Banja	Kraljevo	5,939	478,683	6.7	1.Window Replacement 2.Wall and roof Insulation 3.Thermocontrol 4.Gas Boiler Room
5	Institute for Thyroid Gland and Metabolism "Čigota" Zlatibor (Block A)	Zlatibor	2,425	195,455	6.5	1.Window Replacement 2.Roof Insulation 3.Thermocontrol 4.Gas Boiler Room
6	Clinical Centre (Orthopaedic Ward and Traumatology) Novi Sad	Novi Sad	1,520	60,800	3.8	1.Window Replacement 2. Roof Insulation 3.Thermocontrol
7	General Hospital Leskovac	Leskovac	2,425	160,292	6.6	1. Window Replacement 2.Wall and roof Insulation 3.Thermocontrol 4.Balancing
8	Medical Centre Prokuplje	Prokuplje	2,776	183,493	4.5	1.Window Replacement 2.Wall and roof Insulation 3.Thermocontrol 4. Balancing
9	Special Hospital "Ozren" (Department of Thoracic Medicine) Sokobanja	Sokobanja	5,936	478,442	13.4	1.Partial Window Replacement 2.Ceiling Insulation 3.Thermocontrol 4.Boiler Reconstruction
10	Special Hospital "Sveti Vračevi" Novi Kneževac	Kikinda	3,489	167,921	7.9	1.Window Replacement 2.Wall and roof Insulation 3.Thermocontrol 4. Pipe insulation
11	Medical Centre Zaječar	Zaječar	3,476	235,673	3.5	4.Heat Pipeline Reparation 5. Boiler Room Reconstruction
12	Special Rehabilitation Hospital (Children's Ward) Banja Koviljača	Loznica	1,502	60,080	6.5	1.Window and Door Replacement 2.Roof Insulation 3.Thermocontrol 4.Balancing
13	Medical Centre Užice	Užice	26,244	787,320	11.9	1. Window Replacement 2.Thermocontrol
14	Medical Centre "Kosta Sredojević Š ljuka" Kikinda	Kikinda	11,575	347,250	9.3	1.Window Replacement 2.Thermocontrol 3. Pipe insulation 4.Balancing
15	Polyclinic Kula	Vrbas	2,520	138,300	6.4	1.Wall and roof Insulation 2.Thermocontrol 3.Gas Boiler Room
16	Special Hospital «Rusanda» Melenci	Zrenjanin	10,533	526,650	12.3	1.Window Replacement 2.Wall and roof Insulation 3.Thermocontrol 4.Heat Pipeline Reparation
17	Polyclinic Novi Kneževac	Kikinda	1,078	109,872	17.3	1.Window Replacement 2.Wall and roof Insulation 3.Thermocontrol 4.Gas Boiler Room
18	Medical Centre "Dr Dragisa Mišović" Č ačak / Polyclinic Ivanjica	Čačak	3,301	218,196	11.2	1.Window Replacement 2.Wall Insulation 3.Thermocontrol 4.Balancing
19	Special Hospital "Dr Borivoje Gnjatić" Stari Slankamen	Novi Sad	6,857	351,764	12.0	1.Window Replacement 2.Wall and roof Insulation 3.Thermocontrol
20	Blood Disease Institute "Anemija" Ivanjica	Ivanjica	5,614	224,560	7.0	1.Partial Window Replacement 2.Wall and roof Insulation 3.Thermocontrol 4.Balancing
21	Medical Centre Bor	Bor	4,194	153,500	5.7	1.Wall and roof Insulation 2.Thermocontrol 3.Balancing
22	Clinical Hospital Centre (pharmacology) Kragujevac	Kragujevac	582	18,915	4.5	1.Window Replacement 2.Ceiling Insulation
23	Medical Centre	Jagodina	7,920	316,800	10.1	1.Roof Insulation 2.Thermocontrol 3. New Boiler
24	Medical Centre «Dr Milenko Marin» (psychiatric ward), Loznica	Loznica	690	25,254	15.0	1.Wall and roof Insulation 2.Thermocontrol 3.Balancing 4. Pipe insulation
25	Medical Centre "Dr Radivoje Simonovi ć" Sombor	Sombor	6,181	80,165	8.1	1.Door replacement 2.Thermocontrol 3.Heat Pipeline Reparation
26	Polyclinic Ljubovija	Ljubovija	3,312	99,369	9.7	1.Roof Insulation 2.Thermocontrol 3.Balancing
Average			5,532	228,189	8.2	* Windows have already been replaced if not given *Thermocontrol - replacement of all radiators' valves and thermostatic valves
Total			143,825	5,932,905	-	