Introduction 1000 MW of small biomass boilers in Serbia

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Presentation Index

1. Description
2. Location
3. Technologies
4. Expected GHG Emission Reductions
5. Expected Mitigation Potential
6. Financial Information
7. Measurement, Reporting, and Verification (MRV)
8. NAMA Implementing Entities
9. Implementing Schedule
10. Stakeholder consultation

Description

- New biomass boilers and replacing the existing small inefficient boilers that are fuelled mainly by fossil fuels
  - 1,000 MW (3,150TJ)
  - Expected range of boiler capacity: 100 kW – 1000 kW
  - average capacity: 250 kW
  - total number around: 4,000
- Wood waste (wood chips) or agricultural waste
- Residential, commercial and industrial sectors

Location

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

Technologies

- According to statistical analysis of boilers in use, it is expected that number of replaced boilers should be in the next proportions

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

- Potential of biomass
  - estimated available biomass potential is more then 1500 ktoe
  - Estimated amount of consumption by 1000 MW boilers is less then 100 ktoe

Biomass source	Potential (ktoe)
Wood biomass	*1,527*
Fuel wood	1,15
Forest residue	163
Wood processing residue	179
Agricultural biomass	*1,67*
Crop residue	1,023
Residues from fruit	605

Expected GHG Emission Reductions

- **BAU scenario:** Small biomass boilers are not installed and instead technologies based on electricity, oil, natural gas, coal continue producing thermal energy
- **Methodologies**:
  - Approved CDM methodology, AMS-I.I. *"Biogas/biomass thermal application for households/small users"*
    - Deviation from an applicability condition that limits up to 150 kW per thermal energy generation unit

Expected Mitigation Potential

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

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

$N_{k,0}$ – Number of thermal applications *k* commissioned

$n_{k,y}$ – Proportion of 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)Where: 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)

$NCV_{biomass}$ – Net calorific value of the biomass (GJ/unit mass or volume, dry basis)

- **Annual reduction**: 414,501 tCO_2e
- **Total reduction**: 10,362,525 tCO_2e (25 years)

Financial Information

- Expected cost of preparation: EUR 0.5 million
  - support for feasibility study in order to identify the project sites and technical specifications
- Expected cost of implementation: EUR 250 million
  - 250 million EUR for loans which will be distributed as loans with some incentives to the boiler owners
- Financial sources:
  - financial support from Annex-I countries and international organizations through NAMA scheme
  - Development Bank of Serbia will be intermediate and it should provide some sort of incentive

Financial Information 2

- Assumptions:
  - discount rate 8%
  - without calculating value of CO_2
  - 250 EUR / kW
- Financial analysis:
  - Simple payback period: 6.9 years
  - IRR: 12.9 %
  - NRV: 88 million EUR

Location	Previous type of Boiler	Power, kW	Investment, EUR/kW	Specific investment	Yearly savings, EUR	IRR (25 years)	NPV	Pay back period
Imaginary	Electricity	250	62500	250	6854,2	8,6%	2.857	9,1
Imaginary	Oil	250	62500	250	22784,3	35,4%	158.157	2,7
Imaginary	Gas	250	62500	250	5376,1	5,5%	-11.552	11,6
Imaginary	Coal	250	62500	250	116,7	#DIV/0!	-62.826	535,7

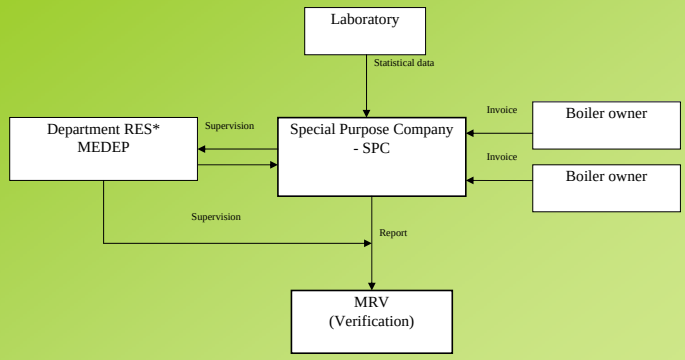
Measurement, Reporting, and Verification (MRV)

- Measurement
  - Data and parameters to be monitored

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

    - Number of thermal application k commissioned
    - Proportion of that remain operating in year y
    - The net quantity of renewable biomass by the thermal application k in year y
    - Net calorific value of the biomass (dry basis)

MRV Structure



- * RES: Department for Renewable Energy Sources

NAMA Implementing Entities

- Ministry of Energy, Development and Environmental Protection – MEDEP
  - Organization and coordinating of all project
- Municipality
  - assist in finding potential sites for the replacement of boilers
- Special purpose company – SPC
  - responsible for the collection of data on biomass consumed by boilers
  - creating reports for reporting and verification
  - partly financed through budget (negotiations with potential financier)
- Boiler owners
  - 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
  - Developing biomass market
    - The contracts with GIZ and KfW for the project “Development of a Sustainable Bioenergy Market in Serbia”
    - 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.

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

Thank you for your attention!

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