

# **ELEMENTS OF THE FBUR AND INDCS OF THE REPUBLIC OF SERBIA WITH SPECIAL OVERVIEW ON THE ENERGY SECTOR**

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## **INTRODUCTION**

As a result of the risks that high temperatures pose on communities and ecosystems around the world, the international community has adopted a goal under the UNFCCC to limit global warming to 2 °C compared to pre-industrial temperatures. While The Fifth Assessment Report (AR5) suggests that it's still possible to limit average global temperature rise to 2 °C, it will require rapid reductions of emissions and changes to our current energy mix. Emissions through 2030 will determine how realistic it is for the world to shift to a low-emissions pathway.

Republic of Serbia became a member of the United Nations Framework Convention on Climate Change (UNFCCC) on June 10, 2001. Under its status as a non-Annex I party to the UNFCCC and according to Decision 2/CP.17 Republic of Serbia should prepare and submit their first biennial update report (FBUR) by December 2014 and consistent with the Party's capabilities or level of support, and every two years thereafter as a summary of their National Communication (NC) or a stand-alone report.

Annex III to Decision 2/CP.17 provides guidelines for the preparation of the biennial update reports from non-Annex I Parties.

Non-Annex I Parties should submit updates of national greenhouse gas (GHG) inventories according to paragraphs 8–24 in the “Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention” as contained in the annex to decision 17/CP.8.

The scope of the updates on national GHG inventories should be consistent with capacities, time constraints, data availabilities and the level of support provided by developed countries Parties for biennial update reporting.

Non-Annex I Parties should use the methodologies established by the latest UNFCCC guidelines for the preparation of national communications from non-Annex I Parties approved by the Conference of the Parties (COP) or those determined by any future decision of the COP on this matter.

Global Warming Potentials (GWP) used for calculation of CO<sub>2</sub> equivalent emissions (trends and projections) are from Annex III of Decision 24/CP.19 and are in accordance with IPCC Fourth Assessment Report (4AR).

Also, at COP 19 in Warsaw in 2013, the COP decision invited Parties to initiate or intensify preparation of Intended Nationally Determined Contributions (INDCs) towards achieving the objective of the Convention and to communicate the INDCs by the first quarter of 2015, by Parties ready to do so, or at least well in advance of the 21<sup>st</sup> session of the Conference of the Parties (COP 21) at the end of 2015. Because the new agreement will likely establish a long-term process for future climate action, it is likely that subsequent contributions by Parties will be communicated in the future.

INDCs are the contributions Parties will make toward achieving the objective of the Convention. While the term INDC is not defined by any decision of the COP, and there still remains significant ambiguity surrounding the scope of INDCs, the language “intended nationally-determined contribution” provides some indications of the anticipated process that can inform Parties’ preparation.

## NATIONAL GREENHOUSE GAS INVENTORY

The GHG inventory for the Republic of Serbia was prepared according to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, and employing the Tier 1 Method for all inventoried years, i.e. 1990, as the base year, and the years 2010-2013.

The total GHG emissions in the referent year 1990, after revision of data described in the Serbia’s First National Communication Under the United Nations Framework Convention on Climate Change, excluding removals, was 83,519.50 GgCO<sub>2</sub>eq. In 2013, according National Greenhouse Inventory provided by Serbian Environmental Protection Agency (SEPA), total GHG emissions in the Republic of Serbia, excluding removals, amounted to 62,520.88 Gg CO<sub>2</sub> eq.

Figure 1 presents share of GHG emissions by sectors in the period 2010-2013, including year 1990. The GHG emissions are expressed in CO<sub>2</sub> equivalent in accordance with the IPCC’s AR4 (Global warming potential values are 1 for CO<sub>2</sub>, 25 for CH<sub>4</sub> and 298 for N<sub>2</sub>O).

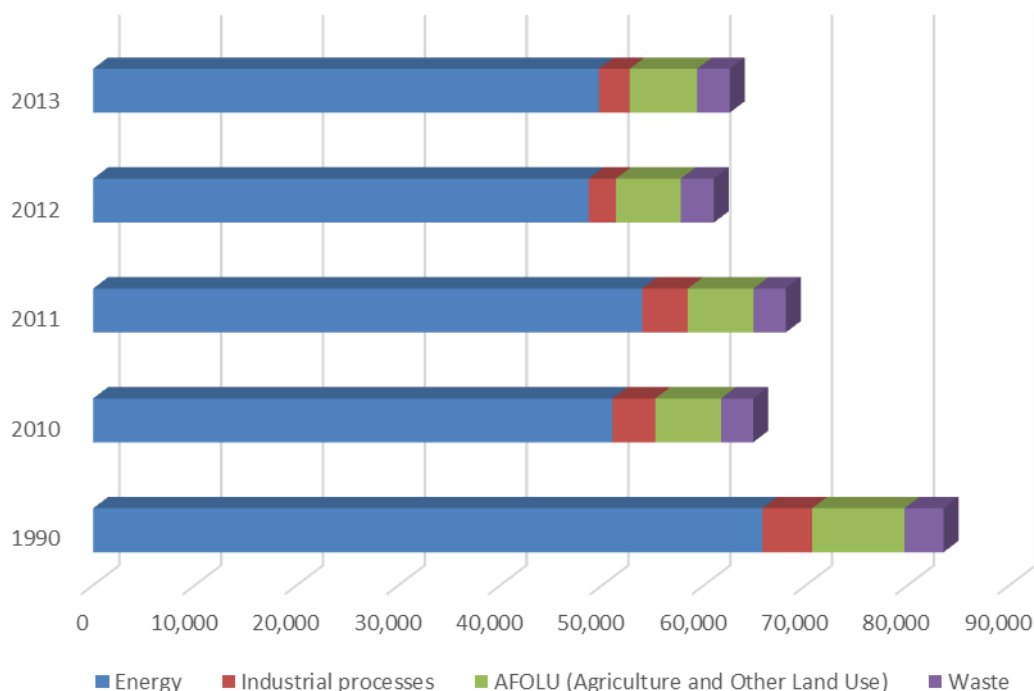


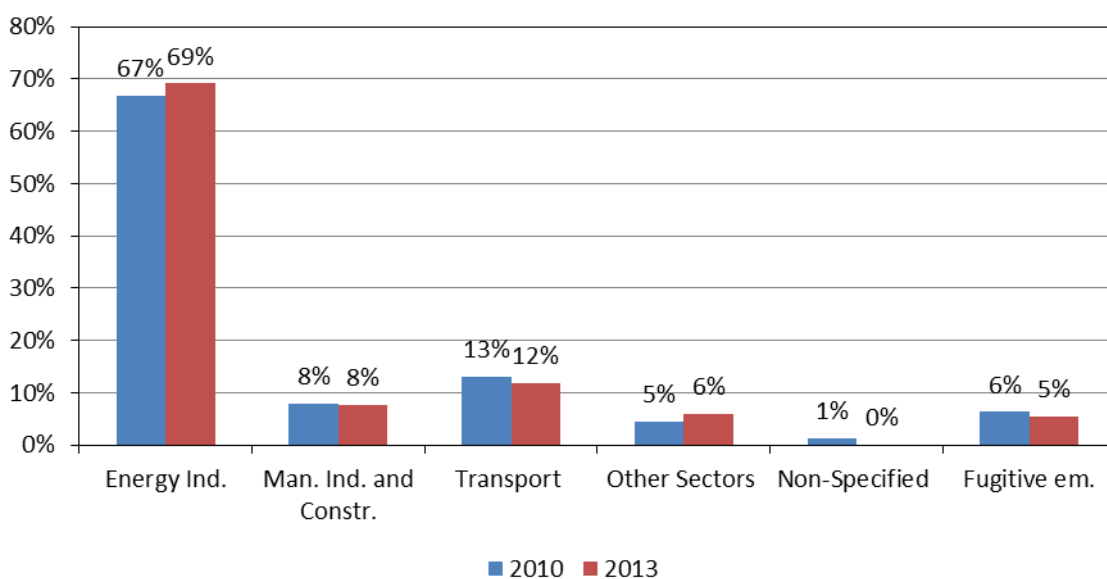
Figure 1 GHG emissions by sectors, 1990, 2010-2013 (Gg CO<sub>2</sub> eq)

Total GHG emissions in 2013 decreased by 3.5% in comparison to 2010.

### Energy sector

The energy sector is the main contributing sector in the GHG inventory of the Republic of Serbia. In 2013, emissions from the energy sector amounted to 49,661.06 Gg CO<sub>2</sub> eq, or 79.4% of total GHG emissions. Since 2010, emissions have decreased by 2.6%, mainly as a result of lower consumption of diesel and gasoline in road transport and fuel consumption in manufacturing industries and construction. In comparison to 1990 emissions have decreased by 24.4.

Within the sector, 69.1% of the emissions were from energy industries, followed by 11.7% from transport, 7.7% from from manufacturing industries and construction and and 5.9% from other sectors. The remaining 5.5% were from fugitive emissions from fuels (solid fuels and oil and natural gas). Figure 2 provide comparative view on shares of GHG emissions from source categories within Energy sector in 2010 and 2013. This figure shows that contribution of individual source categories to the total emissions in this sector remains more or less constant.



*Figure 2 Comparative view on shares of GHG emissions from source categories within Energy sector in 2010 and 2013.*

## MITIGATION ACTIONS AND THEIR EFFECTS

Strong impetus for planning and development of climate change mitigation policies in the Republic of Serbia are obligations arising from the Treaty establishing the Energy Community, particularly in the field of renewable energy sources and energy efficiency and harmonization of national legislation with the EU environmental and climate acquis through the accession process to the EU.

Due to its cross-sectoral impact, climate change mitigation actions should be also horizontally integrated in general economic and sectoral policies and strategies, particularly in energy, transport, agriculture, forestry and waste management sectors and related economic activities which represent the key emissions source categories and sinks.

Strategic national framework for environment and climate change policy consists of the main strategic documents, which were developed parallel with process of EU integration, legislation development and international obligations. Those documents identify climate change, direct or indirect, as a key risk that has to be included in sectorial and development strategies and propose actions related to adaptation and mitigation of climate change. For the purposes of designing the development scenarios of GHG emissions in the Republic of Serbia, the following data has been used:

- Energy balances of the Republic of Serbia for the 1990-2013 period have been provided by the relevant ministry, with the 1991-2009 period not being used, due to the inconsistency of the submitted data, which will be dealt with in the future; for the year 1990 and 2010-2013 period, energy balances have been altered and amended several times, in order to be used for the making of the GHG Inventory by SEPA;
- Draft Energy Development Strategy for the period until 2025, with projections until 2030 [1];
- Data of the Statistical Office of the Republic of Serbia relating to the population [2] and [3];
- Appropriate documents concerning the development of the sector of energy efficiency and renewable energy sources [4] and [8];
- The National Environmental Approximation Strategy for the Republic of Serbia [5];
- Data on economic indicators [6] and [7];
- Strategic documents in the field of industrial development [9] and [10];
- Documents in the field of agricultural development [11] and [12];
- Documents relating to the development of the waste management sector [13];
- Documents that define the development of the use of natural resources [16];
- Results of international projects [14] and [15];

In order to strengthen integration of climate change mitigation actions into other sectorial policies and to build critical institutional capacities needed for effective implementation of climate change mitigation policies and measures, the Republic of Serbia in cooperation with international organizations and donors have initiated implementation of project-based activities targeting at Monitoring Reporting and Verification (MRV) elements, investments through carbon financing, GHG reduction options, development of National Appropriate Mitigation Actions (NAMAs), Clean Development Mechanism (CDM) and low-carbon development.

In addition to information on policies and measures (PaMs), including NAMAs, an estimation of PaMs on GHG reduction is provided based on GHG projections analysis for the period till 2020.

Projections are presented on sectorial basis for three scenarios:

- ‘basic’ scenario.
- ‘with measures’ scenario,
- ‘with additional measures’ scenario

The ‘basic scenario’ implies the implementation of policies and measures that are planned in the applicable national legislation and plans. Scenario ‘with measures’ includes adopted legislation and measures that are currently being implemented. The scenario ‘with additional measures’ includes planned PaMs, ie. those that are under discussion and have a realistic chance of being adopted and implemented in the future period.

## **Energy sector**

Energy sector is the largest contributor to GHG emissions in the Republic of Serbia, accounting to almost 80% of total emissions in 2013, but at the same time this sector has the highest technical potential for emission reduction primarily by increasing the share of renewable energy in final energy consumption and improvement of energy efficiency.

Deployment of renewable energy technologies, dominantly biomass, hydro, solar and wind, are envisaged to target all source categories and all greenhouse gases in this sector, including: energy industries, manufacturing industries and construction, transport and other sectors (commercial/institutional, residential, agriculture/forestry/fisheries).

The assessment of the mitigation potential is based on the assumptions and values used in the National Renewable Energy Action Plan (2013) and the latest Draft of Strategy of Energy Sector Development (2015) which covered the use of renewable energy sources in final energy consumption and in energy industries.

National economy-wide mandatory targets for RES in the period till 2020:

- 27% share of energy from renewable energy sources in gross final consumption (and will remain at approximately that level till 2030);
- 10% share of renewable energy in gross final energy consumption in transport sector.

Estimated annual GHG mitigation potential, expressed in t CO<sub>2</sub> eq, resulted from the increase of share of renewable energy sources is calculated as a difference between GHG emissions from scenario which includes RES in a share that was set as a mandatory target, i.e. ‘with measures’ scenario and GHG emissions from ‘basic scenario’ scenario which assumes that share of RES in final energy consumption will remain at the level from 2010 due to lack of enforcement of strategic documents.

Although ‘basic scenario’ is a only theoretical scenario for calculating the mitigation (emission reduction) potential in the future period, the tendency of not meeting the planned trajectories is already noticed in the present. There has been an indicative decline in the share of RES in gross final consumption from 20.27% in 2012 to 19.10% in 2013.

In Table 1 assumed energy produced from the renewable energy sources in scenarios are shown.

*Table 1 Capacity added and energy produced from the renewable energy sources*

RES source	Scenario		With measures	With additional measures
	Year		2020	2020
RES for electricity				
Hydro	Installed capacity	MW	438	438
	Energy produced	GWh	1.831	1.831
		ktoe	157	157
Wind	Installed capacity	MW	500	1.090
	Energy produced	GWh	1.250	2.725
		ktoe	107	234
Sun	Installed capacity	MW	10	75
	Energy produced	GWh	14	105
		ktoe	1	9
Biomass	Installed capacity	MW	143	143
	Energy produced	GWh	1.001	1.001
		ktoe	86	86
Geothermal	Installed capacity	MW	1	1
	Energy produced	GWh	7	7
		ktoe	49	49
RES for transport				
Biofuels	Energy produced	ktoe	246	246
RES for heat				
Biomass	Energy consumed	ktoe	84	84
Geothermal	Energy consumed	ktoe	10	10

Solar thermal	Energy consumed	ktoe	55	55
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The assumed additional capacity of renewable energy sources installed in scenario ‘with additional measures’ could prove feasible due to the decreasing trend of cost of wind and photovoltaic solar power plants. The potential increased ambition will depend on future price of technologies and other national circumstances such as security and regulation of power system with the higher share of RES, growth of GDP etc.

In Table 2 mitigation potential for the use of renewable energy sources across the sectors are shown.

*Table 2 Mitigation potential for the use of RES in ‘with measures’ scenario (GgCO<sub>2</sub> eq)*

Year	2015	2030
Electricity and heat production	1,143	7,360
Industry	81	160
Transport	68	727
Other sectors	55	1,175
Fugitive emissions	71	496
<b>Total</b>	<b>1,418</b>	<b>9,918</b>

In Table 3 mitigation potentials for the additional increase of installed capacity for electricity production from renewable energy sources in ‘with additional measures’ scenario are shown across the sectors.

*Table 3: Mitigation potential for the increased use of RES in ‘with additional measures’ scenario (GgCO<sub>2</sub> eq)*

Year	2015	2030
Electricity and heat production	1,899	11,074
Industry	81	160
Transport	68	727
Other sectors	55	1,175
Fugitive emissions	111	691
<b>Total</b>	<b>2,214</b>	<b>13,827</b>

Implementation of energy efficiency measures are envisaged to target all source categories and all greenhouse gases in energy sector, including: energy industries, manufacturing industries and construction, transport and other sectors (commercial/institutional, residential, agriculture/forestry/fisheries).

Increase the energy efficiency in line with the EU goals and the national goals set during the EU accession negotiations could reduce the consumption of domestic finite fossil fuel reserves, increase the energy independence, reduce the GHG emissions and the emissions of pollutants and implementation of economically viable measures.

<p>Indicative economy-wide targets for the period 2010-2018:</p> <ul style="list-style-type: none"> <li>• To achieve 9% cumulative savings, i.e. 752 ktoe, by 2018 based on reference year 2008;</li> <li>• Indicative target is distributed on sub-sectors</li> <li>• Manufacturing industries and construction: 272 ktoe</li> <li>• Transport: 196.7 ktoe</li> <li>• Commercial/Institutional: 220 ktoe</li> </ul>
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- Residential: 83.1 ktoe

The planned energy efficiency measures include total of 29 measures in residential building sector, public and commercial services sector, industrial sector and transport sector. Measures can be divided on voluntary agreements and cooperation instruments, regulations (standards and norms), financial instruments, energy service and to information and mandatory information measures.

Scenarios, projections and assessment of the mitigation potential are based on the assumptions and values used in the First Energy Efficiency Plan of the Republic of Serbia for the Period from 2010 to 2012 (2010) and the latest Draft of Strategy of Energy Sector Development (2015).

In Table 4 mitigation potentials for the increase of energy efficiency across the sectors are shown.

*Table 4: Mitigation potential for the increase of energy efficiency across the sectors (GgCO<sub>2</sub> eq)*

Year	2015	2030
Electricity and heat production	128	375
Industry	621	558
Transport	103	1,145
Other sectors	128	194
Fugitive emissions	52	120
<b>Total</b>	<b>1,032</b>	<b>2,392</b>

### **Nationally appropriate mitigation actions (NAMAs)**

Nationally appropriate mitigation actions refer to any action that reduces emissions in developing countries and is prepared under the umbrella of a national governmental initiative. They can be policies directed at transformational change within an economic sector, or actions across sectors for a broader national focus. NAMAs are supported and enabled by technology, financing, and capacity-building and are aimed at achieving a reduction in emissions relative to 'business as usual' emissions in 2020.

NAMAs are defined at the national level as a formal submission by Parties declaring intent to mitigate greenhouse gas emissions in a manner commensurate with their capacity and in line with their national development goals; and at the individual action level as detailed actions or groups of actions designed to help a country meet their mitigation objectives within the context of national development goals.

The Republic of Serbia has identified 12 NAMAs at the individual action level which are in the process of recognition. All NAMAs are envisaged to be implemented in the Energy sector in the next 15 to 30 years since analysis shows that this sector holds the most significant technical potential for GHG emissions reduction in the Republic of Serbia. NAMAs could be further disaggregated in those related to:

- electricity production and distant heating networks (NS-31, NS-40 and NS-50) with the total estimated emission reduction potential of 2,436,980 t/yr;
- energy efficiency in buildings (NS-32, NS-41, NS-46) with the total estimated emission reduction potential of 841,412 t/yr;
- energy efficiency in industry (NS-34, NS-39) with the total estimated emission reduction potential of 446,666 t/yr;
- renewable energy sources (NS-33, NS-35, NS-37) with the total estimated emission reduction potential of 517,511 t/yr and
- transport (NS-36) with 0,27 GgCO<sub>2</sub> eq 266 t/yr.

All these individual actions are additional measures to those already envisaged by the relevant national strategic and programme documents in energy sector. The total emission reduction effect of NAMAs equals 4,242,835 t CO<sub>2</sub>eq/yr

## OVERVIEW OF GHG EMISSIONS PROJECTIONS

Figure 3 presents aggregated GHG emission trend and projection in the period 1990-2030 for three scenarios. It could be concluded that departure from 'basic' scenario in 'with measures' scenario equals 11 and 14 per cent in 2020 and 2030, respectively, and in 'with additional measures' scenario departure from 'basic' scenario equals 18 and 22 per cent in 2020 and 2030, respectively.

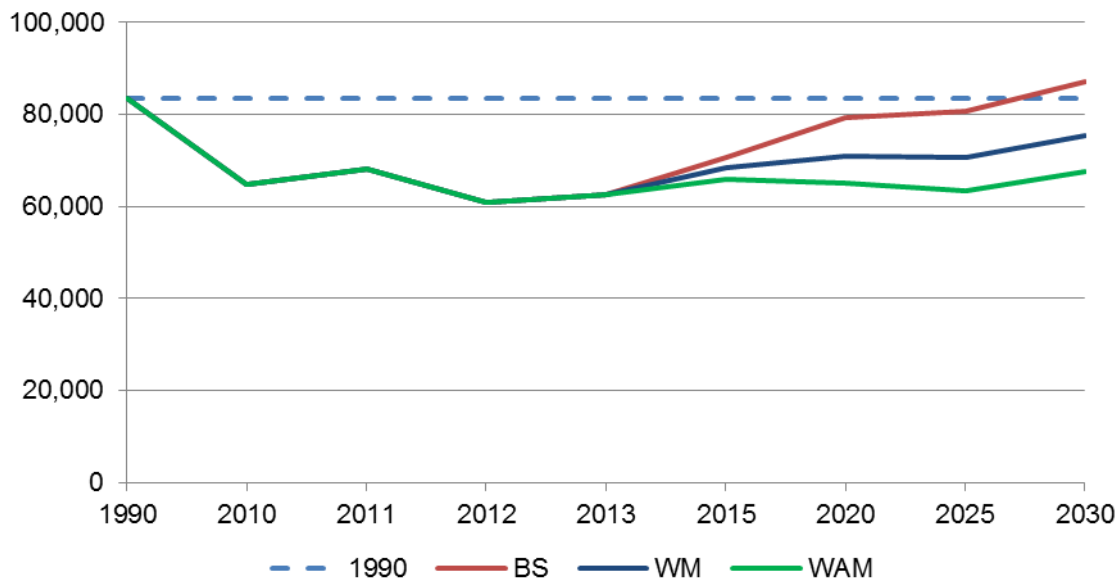


Figure 3 Aggregated GHG emission trend and projections in the period 1990-2020 for three scenarios (basic (BS), with measures (WM), with additional measures (WAM)), Gg CO<sub>2</sub> eq

It should be noted that in 2010, following the Copenhagen Accord, the Republic of Serbia agreed to limit the increase in GHG emissions by 2020 in the amount of 18% compared to 1990.

The setting of the new target values, such as GHG emissions in 2020 and 2030 that are lower by 4.9% and 4.3% ('basic') or 15.0% and 9.8% ('with measures' scenario) compared to 1990 respectively, significantly indicates the determination of the RS in the fight against climate change. Moreover, by joining the EU in the expected period (2020/2021), the EU climate policy, including the EU Emissions Trading Scheme (EU ETS), will be fully implemented, while emissions could be additionally reduced. However, this still remains an ambitious goal for a country like the RS, which is still considered a developing country under the UNFCCC.



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