Resource Efficiency Gains and Green Growth Perspectives in Bosnia and Herzegovina

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- Environmental policy making in Bosnia and Herzegovina remains at an early stage, at least in part due to lack of administrative capacity. So far, BiH has not adopted EU Law on Environmental Protection, although it committed itself to do so with the signing of the SAA. Bosnia and Herzegovina is the only country in Europe that does not have either a Ministry or an Agency for environmental protection at the national level. BiH has signed and ratified the Arhus Convention, which relates to access to information, public participation in decision-making, and access to justice in relation to the environment.

- The energy structure is dominated by coal (64 per cent of Total Primary Energy Supply), Oil products make for around 19 per cent, while hydro and natural gas account for about 6 per cent each. Bosnia and Herzegovina's carbon intensity is one of the highest in the Western Balkans, Emissions have tripled since 1995, coal accounts for 75 per cent of emissions.

- Energy intensity has improved since 2000 (by about 10 per cent) but it remains high due to inefficient use of energy. Energy Intensity is estimated about 4 times above the average for OECD Europe. This reflects high levels of losses in energy transformation and inefficient conversion of primary energy particularly in power generation. Energy end-use is also inefficient. The buildings sector (private, public and residential) accounts for one-third of Total Fuel Consumption. Buildings are generally poorly insulated, generating heat losses of more than 30 per cent. In addition, since the gas distribution network is not fully connected, the majority of the heating requirements of households are met by electricity, which is used inefficiently.

- There is significant potential for reducing the burden of expenditure in energy services in the public and private sectors by improving energy efficiency. Improving energy efficiency would also yield positive economic value through increased employment, more competitive economies and eventually increased power exports. Despite this significant potential, several market barriers to energy efficiency exist.

Content

1. Introduction

Bosnia and Herzegovina does not have a centre for the gathering and analysis of data on the state of the environment, and there is no continuous and systematic monitoring. However, there are a number of institutions that conduct monitoring for their own needs, in other words, to meet the needs of their clients. Regular annual reports on the emissions of certain air polluting substances are within the purview of various ministries in Republika Srpska, the Federation of BiH, and Brčko District; these activities are governed by specific environmental laws related to greenhouse gases, but they have not yet been implemented.

In BiH, there are no reliable updated data on the consumption of energy, not even the most basic, including energy balance sheets at the national level. Sectoral indicators of energy efficiency are not produced, which makes it difficult to assess the potential for energy efficiency by sector or to determine priorities for energy efficiency. This makes it difficult to prepare quality action plans for energy efficiency with realistic goals that could be monitored.

Therefore, this study has been prepared on the basis of available studies and recommendations made by the relevant institutions. Consequently, it does not have any pretensions to be original; it only seeks to identify problems and to offer possible solutions.

2. National Interest: The Four Es (Energy Efficiency and Ecological Economy)

The most disputed issue in Bosnia and Herzegovina is the national interest or, rather, national interest***s***. A particularly interesting concept in this connection is the »vital national interest«, although it has not yet been properly clarified; instead, it tends to be defined by the political authorities on a case-by-case principle. Nevertheless, one issue that remains open is what it is that everyone in BiH has in common, what it is in relation to which neither ethnic nor entity, cantonal nor municipal lines can be drawn, irrespective of whether we live alongside one another, or together with one another.

The concept of sustainable development has become widely accepted; first, as the condition for survival and, second, as the condition for the progress of mankind. Today's generation should not burden coming generations with fewer opportunities for development. Another dimension of our current attitude towards nature is that man is only a part of it and therefore is not entitled to destroy it. Sustainable development is also more efficient economically because the lack of it leads to inefficient economic development and to growing waste of resources and energy, on one hand, while, on the other hand, it entails huge costs with regard to pollution, harming human health and exhausting resources. It also creates a growing societal gap and increases the proportion of the poor and socially excluded.

The Preamble to Agenda 21 reads: »Humanity stands at a defining moment in history. We are confronted with a perpetuation of disparities between and within nations, a worsening of poverty, hunger, ill health and illiteracy, and the continuing deterioration of the ecosystems on which we depend for our well-being. However, integration of environment and development concerns and greater attention to them will lead to the fulfilment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future. No nation can achieve this on its own; but together we can – in a global partnership for sustainable development.« (Agenda 21, the Rio Declaration on Environment and Development, and the Statement of Principles for the Sustainable Management of Forests were adopted by more than 178 governments at the United Nations Conference on Environment and Development - UNCED, held in Rio de Janeiro, Brazil, 3–14 June 1992.)

In 1992, when Agenda 21 was adopted, a war was being waged in Bosnia and Herzegovina, as a result of which the country experienced saw a decades-long regression. Even now, 20 years later, GDP has still not reached its pre-war level.

Since the Brundtland Report and the »First Rio de Janeiro«, sustainable development has become a universally embraced concept, while the support of international institutions, governments, companies and societies across the world has become ever greater; as of 2009, 106 governments of the world had adopted national stra-

tegies for sustainable development. Despite all of this, there are still huge problems in implementing the concept of sustainable development and, according to the assessments of the International Institute for Sustainable Development (IISD), in a Background Paper prepared for the High Level Panel on Global Sustainability at its first meeting, on 19 September 2010, it has been unsuccessful so far. According to the same assessment, the world has not made sufficient progress with eradicating poverty and integrating the three pillars of sustainable development: economic development, social development and environmental protection, which remain humanity's imperative task. The plan is to organise, in 2012, a new United National Sustainable Development Conference in Rio de Janeiro (4–6 June). The aim of this Conference is to reach a renewed political consensus concerning sustainable development and to assess the progress made so far in terms of tasks and goals set 20 years ago, as well as to develop new plans for the future. The Conference will focus on two themes: the green economy, in the context of sustainable development and poverty reduction, and an institutional framework for sustainable development.

Sustainable development is not a motionless state of perfect harmony, but rather a constant process of change. The exploitation of resources, the management of investments, the directing of technological development and institutional changes must correspond both to future and to present needs.

3. Institutional and Legal Framework in Bosnia and Herzegovina in the Area of Environmental Protection

The Constitution of Bosnia and Herzegovina (BiH) is an Annex to the General Framework Agreement for Peace in Bosnia and Herzegovina (the Dayton Agreement, adopted in 1995. The state was defined as a sovereign state with a decentralised policymaking and administrative structure and with several levels of political governance:

1. The authority at the level of the state of Bosnia and Herzegovina (legislative authority: the Parliamentary Assembly of BiH, executive: the Presidency of BiH and the Council of Ministers of BiH, judicial: the Constitutional Court of BiH and the Court of BiH).

2. Two entities:

- The Federation of Bosnia and Herzegovina (legislative authority: the Parliament of FBiH; executive: the President of FBiH and the Government of FBiH; judicial: the Constitutional Court, the Supreme Court). FBiH is a decentralised entity with 10 cantons, each of which has its own government, parliament and courts.

- Republika Srpska (legislative authority: National Assembly of RS; executive: the President of RS and the Government of RS; judicial: the Constitutional Court, the Supreme Court). Republika Srpska is a centralised entity with two levels of government: entity level and local-municipal level.

3. Brčko District is a self-governing administrative unit under the sovereignty of Bosnia and Herzegovina, officially a part of both entities. Legislative authority is in the hands of the District Assembly, the executive is the District Government and judicial authority is exercised by the courts of Brčko District.

Environmental issues are not included in the points of the Constitution of Bosnia and Herzegovina that regulate the competences of state-level institutions: »All governmental functions and powers not expressly assigned in this Constitution to the institutions of Bosnia and Herzegovina shall be those of the Entities« (Article III, Para. 3).

The Constitution of the Federation of Bosnia and Herzegovina defines the competences of this entity and its cantons in the area of environmental protection:

- The exclusive competence of the Federation is: »›Making economic policy, including planning and reconstruction, and land use policy at the federal level« (Article III.1c – Amendment VIII), as well as »Making energy policy, including inter-cantonal distribution matters, and providing and maintaining the related infrastructure« (Article III.1g – Amendment VIII).

- Shared competences of the Federation and the cantons are, for example, health, environmental protection policy, tourism and the use of natural resources (Article III.2). »As appropriate, the responsibilities in Article 2 may be exercised jointly or separately, or by the Cantons as coordinated by the Federation Government« (Article III.3).

- The Cantons shall exercise all responsibilities not expressly granted to the Federation Government, such as policymaking concerning the regulation and provision of public services; regulating local land use, including zoning: regulating and ensuring the availability of local energy production facilities; establishing and implementing Cantonal tourism policy; and developing tourism resources (Article III.4).

In the Constitution of Republika Srpska, Chapter II, Human Rights and Freedoms, it is stipulated that »Everyone shall have the right to a healthy environment. Everyone shall be bound, in accordance with the law and within their possibilities, to protect and improve the environment« (Article 35); Article 64 stipulates that »The Republic shall protect and encourage ... the rational use of natural resources with a view to protecting and improving quality of life and protecting and reviving the environment to the general benefit«; and in Article 68, »Republika Srpska is responsible for regulating and ensuring environmental protection, as well as the main objectives and directions of economic, scientific, technological, demographic and social development, the development of agriculture and villages, the use of space, policies and measures for directing development and commodities«. Municipal competences include »enacting a development programme, urban planning« and »taking care of meeting the specific needs of citizens in the areas of culture, education, health and social welfare, physical culture, public information, handicrafts, tourist trade and catering services, environmental protection and other areas« (Article 102).

The supreme law of Brčko District of Bosnia and Herzegovina is the Statute of Brčko District, based on the General Framework Agreement for Peace in BiH, Final Decision of the Court of Arbitration relating to disputes over the inter-entity boundary line in the area of Brčko, and the Constitution of Bosnia and Herzegovina. Article 9 of the Statute stipulates that the environment is one of the competences of the District public authorities, but there is no precise definition of those competences.

With financial and technical assistance from the European Union – or more precisely, the CARDS Programme (Community Assistance for Reconstruction, Development and Stabilization) – the first set of laws on environmental protection was drafted in BiH.

In the period from 1998 to 2006, there was a functioning Inter-entity Environmental Steering Committee that adopted the following set of laws:

- Framework Law on Environmental Protection
- Law on Air Protection
- Law on Water Protection
- Law on Waste Management
- Law on Nature Protection
- Law on the Environment Fund/Law on Environmental Protection Fund

These laws were adopted in Republika Srpska in 2002, in the Federation of Bosnia and Herzegovina in 2003 and in Brčko District in 2004. The Entity and District laws are not identical, although there are no critical differences among them. However, the Law on Water Protection is no longer in force; in both Entities it has been replaced by a new Law on Water, passed in 2006.

Current laws directly or indirectly related to the issues of the environment and environmental protection, as well as the institutions relevant in this area are presented in Appendix 1.

4. BiH and the European Union

On 16 June 2008, Bosnia and Herzegovina signed the Stabilisation and Association Agreement (SAA) with the European Union, thus creating a framework for cooperation between BiH and the EU. SAA is crucial for reforms in the areas of politics, economy, trade and human rights. SAA provides for »Policies and other measures (that) shall be designed to bring about the sustainable economic and social development of Bosnia and Herzegovina. These policies should ensure that environmental considerations are also fully incorporated from the outset and that they are linked to the requirements of harmonious social development« (Article 86, Para. 2 of SAA).

One of the policy areas for cooperation referred to in Title VIII of SAA is the environment (Article 108): »The Parties shall develop and strengthen their cooperation in the environmental field with the vital task of halting further degradation and starting to improve the environmental situation with the aim of sustainable development.

Overview of Multilateral Agreements (MEA) on the Environment in BiH

Convention		Date of signing	Place of signing	Status	Official Gazette of:
1.	Convention on Public Participation, Access to Information and Access to Justice in Environmental Matters (AARHUS)	25 April 1998	Aarhus Denmark	Ratification 15 September 2008	BiH-IA 8/08
2.	Convention on Environmental Impact Assessment (EIA) in Trans-boundary Context (ESPOO)	25 February 1991	Espoo Finland	Ratification 14 March 2010	BiH-IA 8/09
3.	Convention on the Trans-boundary Effects of Industrial Accidents	17 March 1992	Helsinki Finland	Ratification in progress	–
4.	United Nations Framework Convention on Climate Change (UNFCCC)	13 June 1992	Rio de Janeiro Brazil	Ratification 20 July 2000	BiH 19/00
a.	Kyoto Protocol (KP)	1 December 1997	Kyoto Japan	Ratification 22 April 2008	BiH-IA 3/08
5.	Convention on Long-Range Trans-boundary Air Pollution (CLRTAP)	13 November 1979	Geneva Switzerland	Taken over by succession 6 March 1992	Off. Gazette of SFRY-IA 11/86 and R BiH 13/94 (Source: NEAP BiH)
a.	Protocol to the 1979 Convention on Long-Range Trans-boundary Air Pollution on Long-Term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long Range Transmission of Air Pollutants in Europe (EMEP)	28 September 1984	Geneva Switzerland	Ratification	Off. Gazette of SFRY-IA 2/87 and R BiH 13/94 (Source: NEAP BiH)
6.	Vienna Convention for the Protection of the Ozone Layer	22 March 1985	Vienna Austria	Taken over by succession	Off. Gazette of SFRY-IA 1/90 and R BiH 13/94 (Source: NEAP BiH)
a.	Montreal Protocol on Substances that Deplete the Ozone Layer	16 September 1987	Montreal Canada	Taken over by succession	Off. Gazette of SFRY-IA 16/90 (Source: NEAP BiH)
b.	London Amendments and Adjustments to the Montreal Protocol on Substances that Deplete the Ozone Layer	29 June 1990	London United Kingdom	Ratification August 2003	BiH-IA 8/03
c.	Copenhagen Amendments to the Montreal Protocol on Substances that Deplete the Ozone Layer	25 November 1992	Copenhagen Denmark	Ratification August 2003	BiH-IA 8/03
d.	Vienna amendments to the Montreal Protocol on Substances that Damage the Ozone Layer	1985	Vienna Austria	Ratification August 2003.	BiH- IA 8/03
e.	Beijing amendments to the Montreal Protocol on Substances that Damage the Ozone Layer	1999	Beijing China	Ratification August 2003	BiH- IA 8/03
f.	Montreal Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer	17 September 1997	Montreal Canada	Ratification August 2003	BiH-IA 8/03
7.	United Nations Convention to Combat Desertification (UNCCD)	17 June 1994	Paris France	Ratification 26 August 2002	BiH-IA 12/02
8.	Convention on Biological Diversity (CBD)	13 June 1992	Rio de Janeiro Brazil	Ratification 31 December 2002	BiH-IA 12/02
a.	Cartagena Protocol on Bio-safety	15 May 2000	Nairobi Kenya	Ratification 24 December 2008	BiH-IA 12/08
9.	Convention on Wetlands of International Importance Especially as Waterfowl Habitat (RAMSAR)	2 February 1971	Ramsar Iran	Taken over by succession 2001	Notification on succession 2001 (Source: NEAP BiH)

Convention		Date of signing	Place of signing	Status	Official Gazette of:
10.	Convention on the Conservation of European Wildlife and Natural Habitats	19 September 1979	Bern Switzerland	Ratification 15 September 2008	BiH-IA 8/08
11.	Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)	3 March 1973	Washington USA	Ratification 5 Dec. 2008	BiH-IA 11/08
12.	Convention on the Protection and Use of Transboundary Watercourses and International Lakes	17 March 1992	Helsinki Finland	Ratification 3 September 2009	BiH-IA 8/09
13.	Convention on Protection and Sustainable Use of Danube River	29 June 1994	Sofia Bulgaria	Ratification 11 July 2005	BiH 65/05
14.	Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal	22. March 1989	Basel Switzerland	Ratification December 2000	BiH 31/00 (Source: NEAP BiH)
15.	Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	10 September 1998	Rotterdam Netherlands	Ratification 20 Nov. 2006	BiH-IA 14/06
16.	Stockholm Convention on Persistent Organic Pollutants (POPs)	22 May 2001	Stockholm Sweden	Ratification 2 March 2010	BiH-IA 1/10
17.	International Plant Protection Convention (IPPC)	12 June 1951	Rome Italy	Ratification 30 June 2003	BiH-IA 8/03
18.	United Nations Convention on the Law of the Sea (UNCLOS)	1982	Montego Bay Jamaica	Ratification	R BiH 15/95
19.	Convention for the Protection of World Cultural and Natural Heritage	17 October 1972	Paris France	Ratification	R BiH 25/93
20.	Convention for the Protection of the Mediterranean Sea against Pollution (Barcelona Convention)	16 February 1976	Barcelona Spain	Taken over by succession	Off. Gazette of SFRY-IA 12/77 (Source: NEAP BiH)
21.	Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources (LBS Protocol)	17 May 1980	Athens Greece	Taken over by succession	Off. Gazette of SFRY-IA 1/90 and R BIH 13/94 (Source: NEAP BiH)
22.	Protocol Concerning Mediterranean Specially Protected Areas (SPA Protocol)	2 April 1982	Geneva Switzerland	Taken over by succession	Off. Gazette of SFRY-IA 9/85 and R BIH 13/94 (Source: NEAP BiH)
23.	International Convention for the Prevention of Pollution from Ships	1954	London United Kingdom	Taken over by succession	Off. Gazette of SFRY-IA 60/73, 53/74 and R BIH 13/94 (Source: NEAP BiH)

Source: The Ministry of Foreign Trade and Economic Relations of BiH.

The Parties shall, in particular, establish cooperation with the aim of strengthening administrative structures and procedures to ensure strategic planning of environmental issues and coordination between relevant actors and shall focus on the alignment of Bosnia and Herzegovina's legislation with the Community ***acquis***. Cooperation could also centre on the development of strategies to significantly reduce local, regional and trans-boundary air and water pollution, including waste and chemicals, to establish a system for efficient, clean, sustainable and renewable production and consumption of energy, and to execute environmental impact assessment and strategic environmental assessment. Special attention shall be paid to the ratification and the implementation of the Kyoto Protocol.«

Support provided by the EU in this sector is defined by the pre-accession policy of the Union and the national strategy referred to in the following documents: European Partnership, the Stabilisation and Association Agreement and the Multi-annual Indicative Plan.

5. European Partnership

Short-term priorities:

- adopt a state environmental law to create the framework for nationwide harmonised environmental protection;

- implement further legislation on environmental impact assessment;

- ratify and start implementing relevant international conventions, including the Aarhus and Espoo Conventions;

- establish and ensure proper functioning of the State Environment Agency;

- further strengthen the administrative capacity of environment-related institutions, in particular at state level, and improve communication and coordination between those institutions.

Mid-term priorities:

- Continue work on progressive transposition of the ***acquis***, with particular emphasis on waste management, water quality, air quality, nature protection and integrated pollution prevention and control.

- Implement strategic plans, including investment strategies and increase investment in environmental infrastructure, with particular emphasis on wastewater collection and treatment, drinking water supply and solid waste management.

- Ensure integration of environmental protection requirements into the definition and implementation of other sectoral policies.

6. Multi-annual Indicative Plan

In Chapter 2.2.3, related to European Standards, the Multi-annual Indicative Plan envisages the achievement of the following results:

Environment: A countrywide Environment Strategy shall be adopted and implemented; the BiH Environment Agency shall be established and made operational; the alignment of the sector to the environmental ***acquis*** shall be advanced; tools for the prioritization of environmental infrastructure investments and determination of measures for environmental protection shall be made operational; the generation of co-financing mechanisms for environmental infrastructure shall be advanced; investments in environmental infrastructure shall be enhanced.

Since March 2002, the European Commission regularly reports to the European Council and the European Parliament on the progress made by the countries of the Western Balkans, with the environment as one of the themes. Progress reports describe the relations between the analysed country and the Union, political and economic criteria for membership and the country's capacities with regard to implementing European standards.

The 2011 Progress Report of Bosnia and Herzegovina states that there was little progress in ***horizontal legislation***. The parties to the Aarhus Convention approved Bosnia and Herzegovina's first national report on implementation of the Convention. The Federation has also published state of the environment reports. However, no such reports exist at State-level, in Republika Srpska or in

Brčko District. Further efforts are required to transpose and implement the ***acquis*** through horizontal legislation. A Framework Law on the Environment remains to be adopted. Transposition of the Strategic Environmental Assessment Directive is at an early stage. The Environmental Impact Assessment Directive remains to be fully implemented. Bosnia and Herzegovina did not start implementing the Espoo Convention on Environmental Impact Assessment in a Transboundary Context. The poor quality of environmental data and the lack of dissemination of data to the public and policymakers remain causes for concern. The active involvement of civil society in the law drafting process needs to be improved.

Little progress can be reported on ***air quality***. Republika Srpska adopted an air protection strategy. The Federation adopted its Integrated Environmental Protection Strategy which includes the air protection strategy. However, the air quality monitoring systems in the Entities need further development.

There was little progress on ***waste management***. Implementing legislation on management of animal by-products was adopted. The Federation adopted a decree on packaging and packaging waste. In Republika Srpska, a decree on the management of packing and packaging waste came into force. However, the waste management infrastructure remains to be further developed. Organisations for the recovery of packaging waste to implement the extended producer responsibility do not exist in the Entities. The lack of coordination on implementing packaging waste management systems remains a concern. Investment in waste management is insufficient. No practical steps were taken to establish systems for recycling and recovery of other waste streams. Capacity to manage industrial and hazardous waste is limited.

There was little progress in transposing the ***acquis*** on ***water quality***. However, most of the legislation is not in place. Implementation of water laws, monitoring and river-basin planning is not harmonised between the Entities. Inadequate administrative capacity and lack of ready-made projects caused considerable delays in sectoral investment. Access to drinking water, untreated discharges of wastewater and flood management remain key challenges.

There was some progress on ***nature protection***. Bosnia and Herzegovina adopted the National Biodiversity Strategy and an action plan (2008–2015). Republika Srpska adopted a Law on National Parks and a Nature Protection Strategy. However, key obligations under the Convention on International Trade in Endangered Species of Wild Fauna and Flora were not implemented. Alignment with the Habitats and Birds Directives remains at an early stage.

There was limited progress in the fields of ***industrial pollution control and risk management***. Bosnia and Herzegovina ratified the Convention on the Transboundary Effects of Industrial Accidents. However, the permit process is fragmented due to complex administrative procedures and structures. Due to scarce information, public participation in decision-making is low. The administrative capacity for inspection activities needs to be significantly strengthened.

There was some progress in the field of ***chemicals***. Republika Srpska adopted implementing legislation regarding biocidal products and the import and export of certain hazardous chemicals and products. There was no progress in the field of ***noise***.

Regarding *climate change,* there was no progress on general policy developments despite the nomination of a focal point for the Working Group on Climate Change. However, significant awareness-raising is required at all levels. Climate change is not integrated into sectoral policies and strategies and there is no comprehensive strategy for climate change.

No progress was made on alignment with EU climate policies and legislation. The country needs to take practical steps to gradually adopt a greenhouse gas (GHG) reduction/limitation target in order to be able to implement the ***acquis***, especially the EU emission trading scheme, and to join the EU's effort-sharing.

Little progress was made at the international level. Bosnia and Herzegovina ratified the Beijing Amendment to the Montreal Protocol of the Vienna Convention on the Protection of the Ozone Layer. The country associated itself with the decision taken at the 22nd meeting of the Parties to the Montreal Protocol on the global transition away from HCFCs and CFCs. However, further steps remain to be taken to align with the EU legislation on ozone-depleting substances and fluorinated gases. Although associated with the Copenhagen Accord, the

country has no plans to formulate pledges for reducing its GHG emissions. The first National Communication under the United Nations Framework Convention on Climate Change (UNFCCC) was submitted, covering only the greenhouse gas inventory. The country did not participate in the climate work under the Regional Environmental Network for Accession (RENA). Convergence with the EU Monitoring Mechanism Decision remains to be strengthened.

Administrative capacity in the environmental sector remains weak. A State-level Environmental Protection Agency remains to be established. Administrative capacity within the Ministry of Foreign Trade and Economic Relations on environmental and climate change issues is limited. Environmental institutions do not have the capacity to implement and enforce legislation at Entity, Canton and local levels. Integration of environmental concerns in other sectors remains weak. There has been no progress on the administrative capacity to address climate change, with no staff and resources allocated to climate work. The national authority designated to implement the Kyoto Protocol's Clean Development Mechanism is not yet in operation.

Overall, preparations in the environmental field remain at an early stage. Establishment of a harmonised legal framework for environmental protection, the State Environmental Protection Agency and a functioning environmental monitoring system remain the priorities. Improvements remain to be made to horizontal and vertical communication and exchanges of information on environmental and climate change issues between all authorities. Regarding climate change, considerable efforts are required on awareness-raising, aligning with and implementing the ***acquis,*** as well as strengthening administrative capacity.

BiH has not adopted the Law on Environmental Protection, although it committed itself to do so with the signing of the SAA, and although the adoption of this Law is one of the short-term priorities and obligations assumed in the processes of EU accession. BiH is the only country in Europe that does not have either a Ministry or an Agency for environmental protection at the national level.

BiH signed the Arhus Convention in 1998 and ratified it in 2008. The Arhus Convention, which relates to access to information, public participation in decision-making, and access to justice in relation to the environment, represents the international legal framework in the area of environmental protection. The Arhus Convention represents a link between the responsibility of public authorities and environmental protection since it is focused on democratic cooperation between public and public bodies. It also lays the foundations for a new procedure of public participation in the development and implementation of international agreements.

BIH is obligated to work on the following two key processes related to the Arhus Convention:

(i) the development of international legal norms;

(ii)regional activities (that is, »Environment for Europe« process).

Unresolved issues and obstacles in BiH include the following:

- lack of an adequate public information system;
- it is unknown where and how to ask questions, where and how to lodge complaints or proposals, since there is no legal framework that could allow the public to get involved;
- insufficient active provision of information relating to the state of the environment (through publications, electronic format and other public information channels);
- absence of a defined focal point;
- insufficient capacities;
- lack of funding;
- lack of structures to implement the Arhus Convention;
- lack of defined procedures for the exchange of information between all sides in BiH;
- undeveloped capacities and insufficient training of staff at all levels of government;
- lack of permanent access to information about the environment;

- possibilities related to access to justice are not known;
- lack of clarity concerning the improvement and closer involvement of NGOs in decision-making.

Given the aforementioned facts, the following needs to be done:

- establish a focal point for communication between BiH and the Arhus Convention secretariat;
- define the structure for the implementation of the Arhus Convention;
- develop the First National Communication on the implementation of the Arhus Convention in BiH;
- secure the establishment of an Arhus Information Centre in major towns and cities in BiH;
- develop plans for the implementation of the Arhus Convention, and especially work on the implementation of its two pillars (public access to information on environment and participation of public in decision-making on environmental issues);
- conduct activities of building capacities in administrative bodies at the national, entity, cantonal and local levels;
- develop and implement a national awareness-raising campaign aimed at informing the public on how to obtain information relating to the environment, and how to take part in decision-making;
- train judicial bodies on the relevance of implementing the provisions of the Arhus Convention and get involved in updating recommendations for the Manual for Practical Implementation of the Arhus Convention in BiH.

7. Ecological Map of BiH

Bosnia and Herzegovina does not have a centre for gathering and analysing data on the state of the environment, and there is no continuous and systematic monitoring. However, a number of institutions conduct monitoring for their own needs, that is, for the needs of their clients. Regular annual reports on the calculation of emissions of certain air polluting substances are within the jurisdiction of the ministries of Republika Srpska, the Federation of BiH and Brčko District. These activities are governed by specific environmental laws related to greenhouse gases, but they have not been yet been implemented. The link between the global, regional and national levels when it comes to tackling problems and the need to introduce serious measures on the sustainable use of natural resources is evident in the example of air protection.

Pursuant to the United Nations Framework Convention on Climate Change, the First National Communication for Bosnia and Herzegovina (INC – Initial National Communication) was prepared in 2009 in cooperation with UNDP. Every country is obliged to submit its national report to the UNFCCC Secretariat. Thus, with the development, verification and submission of its INC, Bosnia and Herzegovina has become an equal participant in the global process of adaptation to climate change and the mitigation of its effects. This document also explains other relevant circumstances, limitations and shortcomings, as well as international cooperation. Finally, it offers basic recommendations and defines the future steps to be taken. INC was completed in October 2009, upon which it was adopted by the Government of Republika Srpska. The Ministry of Environment and Tourism of FBiH has also verified this report and it has also been adopted by the Council of Ministers of BiH.

UNDP BiH, in partnership with the Ministry of Spatial Planning, Construction and Ecology of Republika Srpska, and with financial support from GEF, initiated implementation of the Project of ***Preparation of the Second National Communication for Bosnia and Herzegovina to UNFCCC***. The Project's aim is to enable Bosnia and Herzegovina to prepare and distribute its Second National Communication (SNC) to the Conference of the Parties (CoP) of the UN Framework Convention on Climate Change (UNFCCC), pursuant to Decision 17/CP8 and other relevant guidelines. SNC will offer updated and improved information on climate change, the inventory of greenhouse gases, measures for the mitigation of climate change, vulnerability to climate change and steps undertaken to adapt to climate change, as well as information on public awareness, education, systematic research and the transfer of technology. The Project will increase the capacity for development of subsequent reports that will be made in accordance with the CoP guidelines.

The United Nations Framework Convention on Climate Change (UNFCCC) was adopted in 1992 and put into force in 1994. It was ratified by 186 countries and by the EU, as an economic community. Bosnia and Herzegovina became a member of the Convention on 6 December 2000 and it established the BiH Climate Change Committee, comprising 32 representatives, tasked with the implementation of UNFCCC. As a consequence, and in line with the conclusions of the 66th session of the Council of Ministers of BiH (held on 16 May 2002), a 10-member BiH Climate Change Sub-Committee for BiH was formed, with the majority of members also serving on the BiH Climate Change Committee.

In the First National Communication for BiH, the methodology – that is, the methodology on which its calculations were based – applied was the European CORINAIR methodology. The Hydrometeorological Institute of FBiH, which made the calculations, has gained great experience in the application of this methodology and generally in the process of emission assessment. This knowledge, positive practice and the data gathered provided for a good basis for the assessment of greenhouse gas emissions in this Communication. Other methodologies used include those of the Intergovernmental Panel for Climate Change (IPCC), stipulated in the Convention, on the basis of the reference manual of the IPCC 1966 Revised Guidelines for National GHG Inventories, the Good Practice Guidance and Uncertainty Management and the CORINAIR methodology, with predominant use of the IMCC-recommended emission factors, except for the energy sector, where local emission factors were used.

According to the First National Communication for BiH, the overall emission of CO_2 equivalent in Bosnia and Herzegovina in 1990 amounted to 34.043,49 Gg. The highest percentage of emissions came from the energy sector (74 per cent), followed by the agricultural sector, with 12 per cent, industry, with 11 per cent, and waste, with 3 per cent.

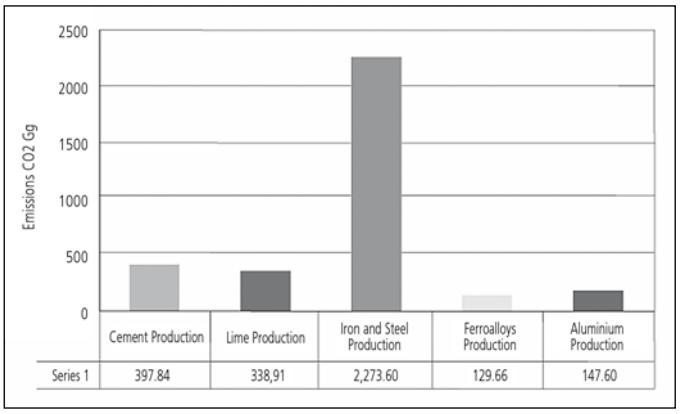
Emissions by the sub-sectors of the energy sector are presented below.

The calculation of emissions per energy sub-sector is based on the data on the consumption of fossil fuels obtained from official written information provided by energy operators for 1990 relating their consumption of fossil fuels, in which the consumption of fuels is provided in sufficient detail to enable a more thorough variant of calculation by sub-sector within the framework of the IPCC and CORINAIR methodology (the so-called Sectoral Approach). We have also applied a simpler variant of calculation (the so-called Reference Approach) that takes into account only the total balance of fuel, without sub-sectoral analyses. Comparison of data in both variants of calculation (as internal control of a kind), differs by 1 per cent to the benefit of the sectoral method of calculation.

The greatest share (77 per cent) goes to solid fuels – in other words, coal – followed by liquid fuels (17 per cent) and gas (6 per cent). Uncontrolled (fugitive) emissions of greenhouse gases from exploitation in coal mines, with quite a high share in the overall energy sector, are not negligible in Bosnia and Herzegovina, amounting to 6.8 per cent of total emissions.

The biggest source of CO_2 in industry is the production of iron and steel, at above 67 per cent. The IPCC methodology, recommended by the Convention, was used to calculate industry emissions. Data on annual economic activity – that is, the production or consumption of individual industrial processes – are taken from the Annual Report of the Institute for Statistics of the Socialist Republic of Bosnia and Herzegovina for 1990 (Annual Statistical Report for SR Bosnia and Herzegovina, 1991).

When it comes to the CO_2 emissions in this sector, the production of cement is ranked third, right after iron and steel, with the quantity of CO_2 emissions directly proportionate to the content of lime in clinker. Thus, the estimate of CO_2 emissions is carried out by multiplying the emission factor (in tonnes of CO_2 emitted per tonnes of clinker produced) and total annual production of clinker corrected by the amount of clinker lost from rotation furnaces through the emission of clinker dust.



Source: First National Communication for BiH.

As for infiltration of greenhouse gases, the total annual infiltration of CO_2 from forest eco-systems in BiH, for the baseline year of 1990, amounts to 7.423,53 Gg CO_2.

According to this Report, the emission of methane (CH4) for the baseline year of 1990 was as follows: agriculture 87.31 Gg; energy sector, uncontrolled (fugitive) emissions from coal mines 75.51 Gg and waste 47.26 Gg, as three sectors that are the key sources of methane.

The methodology used in the study distinguishes three sources of emission of nitrogen dioxide (N_{2O}): direct emissions from agricultural land, emissions caused by animals and indirect emissions caused by agricultural activities. Among the aforementioned sources, the highest emission comes directly from agricultural land and from farming, at 8.95 Gg. This includes the use of mineral fertilisers, nitrogen from manure, the cultivation of leguminous plants and soy (nitrogen fixation), and nitrogen from the residue of agricultural crops and the treatment of peateries. In the energy sector, emissions are calculated on the basis of fuel consumption and the corresponding emission factors (IPCC) and amount to 0.45 Gg, while from industrial processes it amounts to 0.69 Gg. The emissions calculations from indirect greenhouse gases amount to: NO_x 83,07; CO 124.51; NMVOC 70.68 and SO_2 453.16.

In this Report, the calculation of greenhouse gas emissions in Bosnia and Herzegovina, with the exception of data on economic activities, is based mainly on the data on emission factors referred to in the Convention manual (Revised 1996 IPCC Guidelines), excluding the emission factors for coal. In addition to the scope of uncertainty referred to in the manual, other uncertainties are determined solely on the basis of opinions of experts dealing with specific areas. Given that one single method was not used in this calculation, it does not provide total quantitative uncertainty of calculation. Instead, it provides relative subjective qualitative opinions that are gathered from individual segments and sectors in order to obtain a methodological, formalised and maximally precise quantification of these opinions in the future.

The same problems faced the expert who made the BiH Energy Sector Study (March 2008, financed by the World Bank and carried out by the consortium of the "Hrvoje Požar" Energy Institute, Croatia, Soluziona, Spain, the Institute for Economics Banja Luka, BiH, and the Institute for Mining Tuzla, BiH). This was the first time in the recent history of BiH that data on the energy sector were gathered at one place, based on standards that are valid worldwide. The Study Module 13 – Environment – is based on the legal frameworks of BiH, while it provides an analysis of the most relevant aspects of a number of international conventions, protocols and EU directives, with an emphasis on the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, as well as the Convention on Long-range Transboundary Air Pollution (CLRTAP) and the Protocol to Abate Acidification, Eutrophication and Ground-Level Ozone. Special attention was paid to the LCP Directive (2001/80/EC) on large combustion plants emission limit values, the IPCC Directive (96/61/EC) on integrated pollution prevention and control, and the EU-ETS Directive (2003/87/EC) establishing a scheme for greenhouse gas allowance trading. Environmental elements of the International Energy Community treaty have also been taken into consideration.

Other data on the state of the environment in Bosnia and Herzegovina used in this study were gathered from the official web pages of the Ministry of Environment and Tourism of FBiH and the Ministry of Spatial Planning, Construction and Ecology of RS, as well as from the official web pages of international organisations, such as UNEP and FAO. Detailed information on the state of water quality and categorisation of rivers was obtained from the Directorate for Water in Republika Srpska, while for the Federation of BiH, the information was obtained from the Public Company for the Adriatic Sea Water District. The gathering of data on the environment protection system in energy plants, the water management system and the waste management system was organised in cooperation with three Elektroprivredas in Bosnia and Herzegovina and the Institute for Mining in Tuzla. For energy plants, the following four questionnaires were prepared in order to gather the information necessary for analysis: the Questionnaire for Hydro-power Plants, the Questionnaire for Thermal-power Plants, the Questionnaire of Coal Mines and the Questionnaire for Oil Refineries. Information was requested from individual energy plants (hydro-power plants, thermal-power plants, coal mines and refineries) and is basically of the same character, although it was adjusted to the characteristics of production in different plants. The questions contained in these questionnaires can be divided into three groups: those related, generally, to

the environmental protection system (for example, ***Have you introduced any of the internationally recognised standards of environmental protection?***); questions related to quantities and characteristics of waste produced in the course of production, as well as those relating the method of its disposal; questions related to the issue of water as a resource, and the quantity, method of treatment and characteristics of waste water that are discharged into natural recipients. The questionnaire sent to the coal mines in Bosnia and Herzegovina contains questions related to the use of land, degree of degradation and plans for re-cultivation once coal mines are closed. Emission projections were analysed in view of the possibility of meeting international obligations. Emission projections were assessed on the basis of energy balance projections for 2010, 2015 and 2020.

The Rulebook on Emission Value Limits into Air from Large Combustion Plants (Official Gazette of FBiH, No. 12/05) in the Federation of BiH and the Rulebook on Emission Value Limits into Air from Large Combustion Plants (Official Gazette of RS, No. 39/05), in Republika Srpska regulate the emission value limits of pollutants for large combustion plants using fossil fuels. In the Federation of BiH and Republika Srpska, identical rulebooks are in force, but they are not harmonised with EU Directive 2001/80/EC on limit values for the emission of pollutants from large combustion plants. These rulebooks regulate the ELM (Emission Limit Values) from fossil fuels combustion plants (crude, liquid and gas fuels). Limit values are thus assessed for SO_2, NO_x, particles, CO and for volatile organic compounds (VOC). Provisions of these rulebooks are not applied on installations that use diesel, petrol and gas engines or gas turbines, irrespective of the kind of fuel.

Based on the data gathered for the purpose of this study on the factors of emission and the concentrations of pollutants in smoke gases from Elektroprivreda BiH and Elektroprivreda RS, the information gathered from the CollectER database of the Hydrometeorological Institute of FBiH, and the values recommended in the relevant literature (CORINAIR and the IPCC manuals), the factors of emission from thermal-power plants – or, more precisely, from those plants whose data were available – were established.

Emissions of SO_2 in 2005 were 3 per cent higher than in 2004, but they were 18 per cent lower than in 2003. This reduction of SO_2 emissions in the past two years is the result of a somewhat lower content of sulphur in the coal burned in thermal-power plants. Emissions of CO and particles in 2005 were 7 per cent and 10 per cent higher, respectively, than in the previous year, while emissions of NO_x and CO_2 were at the same level as the previous year.

Specific emissions of SO_2, NO_x, CO, particles and CO_2 for the period from 2000 to 2005, per generated electro-energy from thermal-power plants in Bosnia and Herzegovina, are given below:

g/kWh	2000	2001	2002	2003	2004	2005
Emission of SO_2	26.02	33.69	36.76	36.59	29.17	30.22
Emission of NO_x	4.16	4.38	4.10	3.85	3.80	3.76
Emission of CO	0.50	0.39	0.30	0.28	0.31	0.33
Emission of particles	1.98	2.57	2.39	1.85	1.80	1.99
Emission of CO_2	1182	1245	1163	1149	1166	1171

Source: EIHP

Emission factors for liquid fuels:

	1990*	2000	2001	2002	2003	2004	2005
Fuel oil							
SO_2 (g/GJ)	995	995	995	995	995	995	995
NO_x (g/GJ)	180	180	180	180	180	180	180
CO (g/GJ)	15	15	15	15	15	15	15
CO_2 (g/GJ)	76593	76593	76593	76593	76593	76593	76593
Particles (g/GJ)	40	40	40	40	40	40	40
Extra light-weight fuel oil							
SO_2 (g/GJ)	238	238	238	238	238	238	238
NO_x (g/GJ)	100	100	100	100	100	100	100
CO (g/GJ)	15	15	15	15	15	15	15
CO_2 (g/GJ)	73326	73326	73326	73326	73326	73326	73326
Particles (g/GJ)	5	5	5	5	5	5	5

Source: CORRINAR and IPCC methodology.

For the calculation of emissions of greenhouse gases and other pollutants into the air from stationary energy sectors (except for electro-energy), measurement results have not been available and instead we have used mainly the recommended emission factors taken from IPCC (for greenhouse gases) and CORINAIR (for other pollutants) manuals. For individual types of coal, depending on the coal mines of extraction, specific emission factors for Bosnia and Herzegovina were used.

Factors for the calculation of emissions into air were de-

fined by the experts of the Hydrometeorological Institute of FBiH.

To assess the quantity of emissions from road transport, we have applied the COPERT III Programme for 1990, 2000 and 2005, while emissions for other years (2001–2004) were assessed by interpolation. The minimum necessary data were the number of vehicles (private cars, light freight vehicles, heavy freight vehicles, buses, motorcycles and mopeds) and the consumption of fuel (energy balance). The number of vehicles in the Federation of BiH was taken from the Statistical Report of the Federation of Bosnia and Herzegovina for 2006, while estimates were used for Republika Srpska and District Brčko. Other data necessary for the calculation of road transport emissions were assessed in cooperation with the Hydrometeorological Institute of FBiH or, alternatively, by using the typical values provided by the COPERT Model.

Unlike road transport, the emissions of off-road transport were defined by applying more simple methods of calculation, based on consumed fuel from the energy balance and the corresponding emission factor. These emissions are produced by railway, maritime, river and air transport, as well as from agricultural, forest, industrial and household mobile appliances.

As in the case of energy balances, when assessing emissions into air for the period from 2000 to 2005, we have first assessed emissions into air in the Federation of BiH, Republika Srpska and District Brčko, while total emissions for Bosnia and Herzegovina were obtained by summing up emissions from these territorial units (entities and District Brčko). For 1990, emissions into air were assessed only for Bosnia and Herzegovina. The results of calculation of greenhouse gases and other pollutants' emissions obtained by applying the AE-DEM model (the COPERT included) for Bosnia and Herzegovina are given below.

Sulphur dioxide – According to the results of our calculations, annual emission of SO_2 from the energy sector in Bosnia and Herzegovina, in the period from 2000 to 2005, was between 182 and 279 kt. In 1990, emission of SO_2 was significantly higher (422 kt), due to higher consumption of coal and fuel oil. Emission in 2005 was 4.1 per cent higher than in 2004 and 31.0 per cent higher than in 2000. This great reduction in emissions after 1990 was caused by the war and the restructuring of the economy. If we observe the trend in emissions in the past six analysed years (2000–2005), we notice a rise in the emission of SO_2 in 2001 and 2002, whereas the level of total emission of SO_2 in the last two years of the observed period went down. The reduction of emission of SO_2 is the result of use of fuels with a lower sulphur content and a more favourable structure of burnt fuel.

In 2005, the share of stationary energy was above 98 per cent in total emissions from the energy sector. Most of the SO_2 was emitted from thermal-power plants (83.3 per cent). The share of combustion in smaller furnaces in households and the service sector (non-industrial furnaces) in 2005 amounted to 6.8 per cent of total emissions of SO_2 from energy, while the combustion in industry and construction sector amounted to 4.8 per cent; the emission caused by the combustion of fuels in installations for the generation and transformation of energy (except for thermal-power plants) was 3.3 per cent. The share of road transport and other mobile sources in total emissions was 1.4 per cent and 0.4 per cent, respectively.

Nitrogen oxides – In the period from 2000 to 2005, the annual emission of NO_x from stationary and mobile energy sources amounted to 52–54 kt, while in 1990 it was 88 kt. Emissions in 2005 were 0.8 per cent higher than in the previous year, and 5.7 per cent higher than in 2000.

Carbon monoxide – Our calculations indicate that the annual emission of CO caused by the combustion of fuels in energy sources in the observed years amounted to 471–574 kt. Emissions in 2005 were 8.2 per cent higher than in 2004 and 12.1 per cent higher than in 2000.

Annual emission of particles from energy sources in the period from 2000 to 2005 amounted to 29.3–35.7 kt, while in 1990 it was 56.2 kt. Emission in 2005 was 9.1 per cent higher than in the previous year and 21.9 per cent higher than in 2000.

The greatest source of particle emissions from energy in 2005 was combustion in non-industrial furnaces (55.1 per cent) and thermal-power plants (35.7 per cent). These are followed by road transport (3.0 per cent), industry and construction (2.4 per cent) and off-road transport (2.1 per cent). Such a significant level of emissions oc-

curred due to the wearing of tyres and brakes in road transport, although these emissions were not calculated since they were not the consequence of combustion.

Non-methane volatile organic compounds (NMVOC) are relevant because tropospheric ozone is created in the process. Some of the NMVOC substances, for example, benzenes and xylenes, are lethal. Annual emission of NMVOC from energy in the observed period amounted to 36.8–42.8 kt. In 2005, emissions were 5.0 per cent higher than in 2004 and 5.5 per cent higher than in 2000.

In 2005, all sectors of stationary energy taken together had a 64.6 per cent share in the total emission of NMVOC from energy sources. The greatest share of emissions from stationary sources was from small non-industrial furnaces (60.8 per cent). A significant source of emissions of NMVOC was road transport, with a 33.1 per cent share in total emissions. It must be emphasised that the biggest share in total emissions in any country belongs, as a rule, to non-energy sectors (use of solvents and production processes).

Carbon dioxide – According to the results of calculations made for this study, annual emission of CO_2 from stationary and mobile energy sources in the past 6 observed years amounted to 12.0–13.8 mil. t, while in 1990 it was 24.9 mil. t. Emissions in 2005 were 3.6 per cent higher than in the previous year and 15.0 per cent higher than in 2000.

In 2005, emissions from stationary energy sources amounted to 81.8 per cent, that is, 55.2 per cent from thermal-power plants, 10.9 per cent from non-industrial furnaces and 10.2 per cent from industry and construction.

The share of road transport in emissions was 15.3 per cent, while off-road transport had a 2.9 per cent share. In line with the IPCC recommendations, balance includes only emissions from fossil fuels. Emissions of CO_2 that result from the process of burning biomass (fuelwood and fuelwood residues, bio-diesel, bio-gas, and so on) are not included in countries' total emissions since the emitted CO_2 is previously absorbed in the process of biomass growth and development.

Methane – In the period from 2000 to 2005, annual emission of CH_4 from energy amounted to 41.8–46.9 kt. A significantly higher emission of methane was recorded in 1990 (94.4 kt), primarily due to greater production of coal in BiH. In 2005, emission of methane was 2.6 per cent higher than in 2004 and 8.8 per cent higher than in 2000.

In 2005, stationary energy installations emitted 35.8 per cent of the total emission of methane, and the emission from mobile energy sources amounted to 1.3 per cent. Most of the emissions were from coal mines (62.9 per cent). It must be emphasised that a significant portion of methane emission originated from non-energy sources (agriculture and waste management).

Dinitrogen oxide – In the period from 2000 to 2005, annual emission of N_2O from energy amounted to 430–505 t, while in 1990 it was 597 t. In 2005, emission was 5–7 per cent higher than in the previous year, and 17.5 per cent higher than in 2000.

The share of stationary energy sources in total emissions from energy in 2005 was 65.8 per cent, while the share of road and off-road transport was 34.2 per cent. Out of stationary energy sources, the highest emissions originated from combustion processes in small non-industrial furnaces (39.6 per cent) and from combustion in thermal-power plants (22.1 per cent). In road transport, there was a rise in the emission of N_2O, as a consequence of the use of three-way catalysts that provide for an efficient reduction of NO_x, CO, and NMVOC emissions; at the same time, this process results in an increase in N_2O emissions.

Dinitrogen oxide greenhouse gas is emitted predominantly by agricultural activities and production processes, while the share of energy in D_2O emissions is usually relatively low.

Application of recommended greenhouse potentials determines the **total emission of greenhouse gases originating from energy.** In the six observed years, annual emissions of greenhouse gases from stationary and mobile energy sources and fugitive emissions from coal mines amounted to 13.0–14.9 mil. t, while in 1990 they amounted to 27.1 mil. t. Emissions in 2005 were 3.5 per cent higher than in the previous year and 14,6 per cent higher than in 2000.

The biggest share in the total emission of greenhouse gases is that of CO_2 (92–93 per cent), while those of CH_4

and N_2O are 6–7 per cent and approximately 1 per cent, respectively. The dominant source of emissions of greenhouse gases in 2005 was combustion in thermal-power plants (51.2 per cent), followed by road transport (14.5 per cent) and non-industrial (12.8 per cent) and industrial (9.4 per cent) furnaces. The share of emissions of methane from coal mines in the emission of greenhouse gases from energy sources was 4.2 per cent.

Total greenhouse gas emissions in agriculture in BiH in 2009 amounted to 3.2 million tonnes of CO_2 equivalent emissions (CO_2-eq), which is a 30.1 per cent reduction relative to greenhouse gas emissions in 1990. According to the data gathered by the BiH Agency for Statistics, this reduction is the consequence of the specific situation in Bosnia and Herzegovina, where, in the post-war period, the country saw a decline in economic activities.

Generally speaking, greenhouse gas emissions (GGE) in agriculture show a downward trend. In 2007, greenhouse gas emissions were 11.6 per cent higher than in the previous year. The reason behind this increase was the increase in direct emissions of nitrogen dioxide from agricultural land as well as an increased use of artificial fertilizers. In the period from 2005 to 2009, the share of emissions of greenhouse gases in agriculture viewed individually did not change significantly (see table below).

8. Other Sectors with an Environmental Impact

Energy Sector

In Bosnia and Herzegovina, there are four thermal-power plants: Kakanj and Tuzla, as part of Elektroprivreda BiH, and Gacko and Ugljevik, as part of Elektroprivreda RS. All these thermal-power plants use coal (lignite and hard coal) extracted in Bosnia and Herzegovina. For thermal-power plants Tuzla and Kakanj, where the quality management system is implemented in line with the ISO 9001:2000 standard, alongside the ISO 14001:2004 standard-based environment management system, and with the introduction of an integrated quality and environment management system now under way, the questionnaires created for the BiH Energy Sector Study were completed in much more detail. On the other hand, the thermal-power plants Gacko and Ugljevik, where standardised management system has not yet been introduced, the data gathered provide only basic information about the activities undertaken in pursuit of environmental protection (see chart 1 on next page).

Twelve major hydro-power plants use the hydro-potential of the Neretva, Vrbas, Drina and Trebišnjica River Districts. The data on environmental protection measures undertaken by these hydro-power plants show that, in some of them, systematic environmental protection is at an embryonic phase, while in others a system that is in line with international ISO 14001:2004 standards has been introduced, and its implantation has begun.

Agriculture		**1990[1)]**	**2005**	**2006**	**2007**	**2008**	**2009**
		Greenhouse gases emission (CO_2 equivalent G_g) GHG emissions					
A. Cattle breeding-internal fermentation	CH_4	1,548,33	1,069,3	1,097,7	1,075.2	1,055.5	1,062.0
Organic manure management	CH_4	285.18	140,2	143.0	134.7	131.4	133.6
		396,80	227,9	235.3	233.5	230.8	234.6
D. Agriculture soil	N_2O	2,377,70	1,577,5	1,643.2	2,043.4	1,875.9	1,770,8
F. Burning of agriculture residues	CH_4	0.00	13.1	13,1	10.8	13.4	13.4
		0.00	5.0	5,1	3.9	5.1	5.1
Total GHG emissions	N_2O	4,608,01	3,033.0	3,137.4	3,501.5	3,312.1	3,219.5

Source: Initial National Communication for BiH under UNFCCC, BiH Agency for Statistics, 23 November 2011, Environment Statistics, greenhouse gas emissions.

Chart 1

Parameter	TPP Tuzla	TPP Kakanj	TPP Gacko	TPP Ugljevik
Environmental management system				
Environmentally hazardous accident prevention plan				
Hazardous chemicals management plan				
Waste management system				
Detailed list of hazardous waste				
Monitoring of waste formation and disposal				
Monitoring of water consumption and wastewater formation				
Waste water treatment			*	
Waste water quality control**				

* Neutralisation is being performed

** Waste water quality control in TPP Tuzla takes place twice a week, in TPP Kakanj every four hours, and in TPP Ugljevik once a week

Chart 2

Parameter	HPP Jablanica, HPP Grabovica, HPP Salakovac
Environmental management system	
Environmentally hazardous accident prevention plan	
Hazardous chemicals management plan	
Waste management system	
Detailed list of hazardous waste	
Monitoring of waste formation and disposal	
Monitoring of water consumption and wastewater formation	
Waste water treatment	
Waste water quality control*	

* Waste quality control is conducted one a year, and sampling is done before and after the HPP

Chart 3

Parameter	PHE Čapljina	HPP Rama	HPP Peć Mlini	HPP Mostar	HPP Jajce I	HPP Jajce II
Environmental management system						
Environmentally hazardous accident prevention plan						
Hazardous chemicals management plan						
Waste management system						
Detailed list of hazardous waste						
Monitoring of waste formation and disposal						
Monitoring of water consumption and wastewater formation						
Waste water treatment				*		
Waste water quality control**						

* In HPP Mostar sanitary waste water is treated, and there are also oil separators

** Water quality control is conducted continously before and after each HPP managed by EP HZHB

Chart 4

Parameter	HPP Vrbas	HPP Trebišnjica	HE Drina
Environmental management system			
Environmentally hazardous accident prevention plan			
Hazardous chemicals management plan			
Waste management system			
Detailed list of hazardous waste			
Monitoring of waste formation and disposal			
Monitoring of water consumption and wastewater formation			
Waste water treatment			
Waste water quality control**			

Summary presentation of basic environmental management parameters in hydro-power plants of the Elektroprivreda of BiH (EP BIH) – see chart 2.

Summary presentation of basic environmental management parameters in hydro-power plants of Elektroprivreda in the Croatian Community of Herceg-Bosna (HZHB) – see chart 3.

Summary presentation of basic environmental management parameters in hydro-power plants of Elektroprivreda Republika Srpska – see chart 4.

Legend:

- In place and implemented
- Partly implemented
- Planned/in preparation
- Not in place
- Information not available

Source: BiH EnergySector Study.

Out of the twelve active coal mines, nine are in the Federation of BiH and three in Republika Srpska. These coal mines apply the technology of surface and underground exploitation of hard coal and lignite. ISO 14001:2004 environmental management standards have been introduced in only one coal mine, and in another coal mine, preparations are under way for the implementation of a quality management system, so we can assume that, in the foreseeable future, the implementation of an environmental protection system can start in that coal mine as well (see chart 5 on next page).

Chart 5

Parameter	In place and implemented	Partly implemented	Not in place
Environmental management system	Kakanj, Stanari		Adib Lolić - Bila, Banovići, Breza, Đurđevik, Gračanica Gacko, Gračanica G. Vakuf, Kreka, Tušnica, Ugljevik, Zenica
Environmentally hazardous accident prevention plan	Đurđevik, Stanari, Ugljevik		Adib Lolić - Bila, Banovići, Breza, Gračanica Gacko, Gračanica G. Vakuf, Kakanj, Kreka, Tušnica, Zenica
Hazardous chemicals management plan			
Waste management system	Đurđevik, Stanari, Ugljevik	Banovići, Breza, Kakanj, Zenica, Gračanica Vakuf, Tušnica	Adib Lolić - Bila, Gračanica Gacko, Kreka
Detailed list of hazardous waste		Banovići, Đurđevik, Stanari, Ugljevik	Adib Lolić - Bila, Breza, Gračanica Gacko, Gračanica G. Vakuf, Kakanj, Kreka, Tušnica, Zenica
Monitoring of waste formation and disposal	Banovići, Đurđevik, Stanari, Ugljevik		Adib Lolić - Bila, Breza, Gračanica Gacko, Gračanica G. Vakuf, Kakanj, Kreka, Tušnica, Zenica
Monitoring of water consumption and wastewater formation	Banovići, Breza, Gračanica G. Vakuf, Stanari, Ugljevik	Adib Lolić - Bila, Đurđevik, Kakanj, Kreka, Tušnica	Gračanica Gacko, Zenica
Waste water treatment	Kakarj, Ugljevik *(Mechanic and biological treatment)*	Banovići, Breza, Đurđevik, Zenica, Stanari (*Mechanic treatment)* Gračanica Gacko *(Neutralisation)*	Adib Lolić - Bila, Gračanica G. Vakuf, Kreka, Tušnica
Waste water quality control	Banovići: *continous* Ugljevik: *weekly* Đurđevik, Kakanj, Zenica: *once in 2 years* Stanari: *twice a year*	Gračanica Gacko *(pH value monitoring)*	Adib Lolić - Bila, Breza, Gračanica G. Vakuf, Kreka, Tušnica

Source: BiH Energy Sector Study.

9. Recommendations for the Reduction of Emissions into Air from Electro-energy Plants

In view of the prospective accession of Bosnia and Herzegovina to the European Union, the existing ELV Rulebooks need to be changed in order to harmonise them fully with LCP Directive 2001/80/EC.

In Bosnia and Herzegovina, Elektroprivreda BiH and Elektroprivreda RS are the owners of nine large combustion plants and all these installations can be considered the »existing« installations.

Analysis of coal burnt in thermal-power plants shows that the heat of combustion value of all types of coal is above 5.8 MJ/kg, the content of humidity, weight-wise, is below 45 per cent, while the total content of humidity and ash, weight-wise, is below 60 per cent. Therefore, according to the LCP Directive, there are no conditions

Thermal power plant		**ELV under LCP Directive**		
		SO2	**NOx**	**particles**
		mg/mn³	**mg/mn³**	**mg/mn³**
Elektroprivreda BiH				
TPP Tuzla	block 3	814	600	100
	block 4	400	500 (200[2])	50 (100[1])
	block 5	400	500 (200[2])	50 (100[1])
	block 6	400	500 (200[2])	50 (100[1])
TPP Kakanj	block 5	966	600	100
	block 6	768	600	100
	block 7	400	500 (200[2])	50 (100[1])
Elektroprivreda RS				
TPP Ugljevik		400	500	50 (100[1])
TPP Gacko		400	500	50 (100[1])

1 for low quality coal (Hd<5,8 MH/kg, moisture content over 45% in weight, moisture and ash content total over 60% in weight and calcium ocide content in coal above 10%)

2 after 1/1/2016 ELV for NOx is 200 mg/mn³

Source: LCP Directive. *Taken from the BiH Energy Sector Study*

for the implementation of a higher ELV for particles (100 mg/m3) per unit of heat yield above 500 MWt.

Pursuant to the LCP Directive, for Block 3 of TPP Tuzla and Blocks 5 and 6 of TPP Kakanj the applied ELV for particles is 100 mg/m^3, since their heat yield is between 50 and 500 MWt, while for all other units the ELV for particles is 50 mg/m^3.

Investment costs for different technologies of the reduction of emissions into air applied in this study are taken from the Activity Plan of Elektroprivreda BiH, and from the information gathered by Elektroprivreda RS, while for TPP Gacko the data used are those published in the GIS Study.

	Installed power	**Rehabilitation costs**	**Costs of air emission reduction technologies**	**Total costs**
	(MW)	**(mill. EUR)**	**(mill. EUR)**	**(mill. EUR)**
TPP Gacko	300	105.0	37.6	142.6
TPP Ugljevik	300	105.0	63.2	168.2
Total EP RS		**210.0**	**100.8**	**310.8**
TPP Tuzla 4	200	--	13.3	13.3
TPP Tuzla 5	200	70.0	13.3	83.3
TPP Tuzla 6	215	75.0	27.2	102.2
TPP Kakanj 6	110	36.0	--	36.0
TPP Kakanj 7	230	--	34.0	34.0
Total EP BiH		**181.0**	**87.8**	**268.8**

Sources: Elektroprivreda BiH and Elektroprivreda RS

9.1 Waste Water

The discharge of waste water into natural recipients from electro-energy installations has been identified as having one of the most significant negative impacts on the environment due to the inefficiency of the existing installations for waste water purification. This results in a quality of waste water discharged into natural recipients that does not meet legal requirements.

When it comes to the quantity and characteristics of waste water discharged into natural recipients in hydro-power plants, the most significant is sanitary waste water, while the quantity of technological waste water is significantly lower. In several cases, the survey of data gathered from hydro-power plants in BiH emphasises that the operation of hydro-power plants does not result in the production of waste water, while, in other cases, the treatment of sanitary waste water is required. The only exceptions are the hydro-power plants of Elektroprivreda BiH, where the quantities of individual categories of waste water are carefully monitored. There are only two hydro-power plants where waste water is biologically treated before being discharged into natural recipients.

9.2 Waste

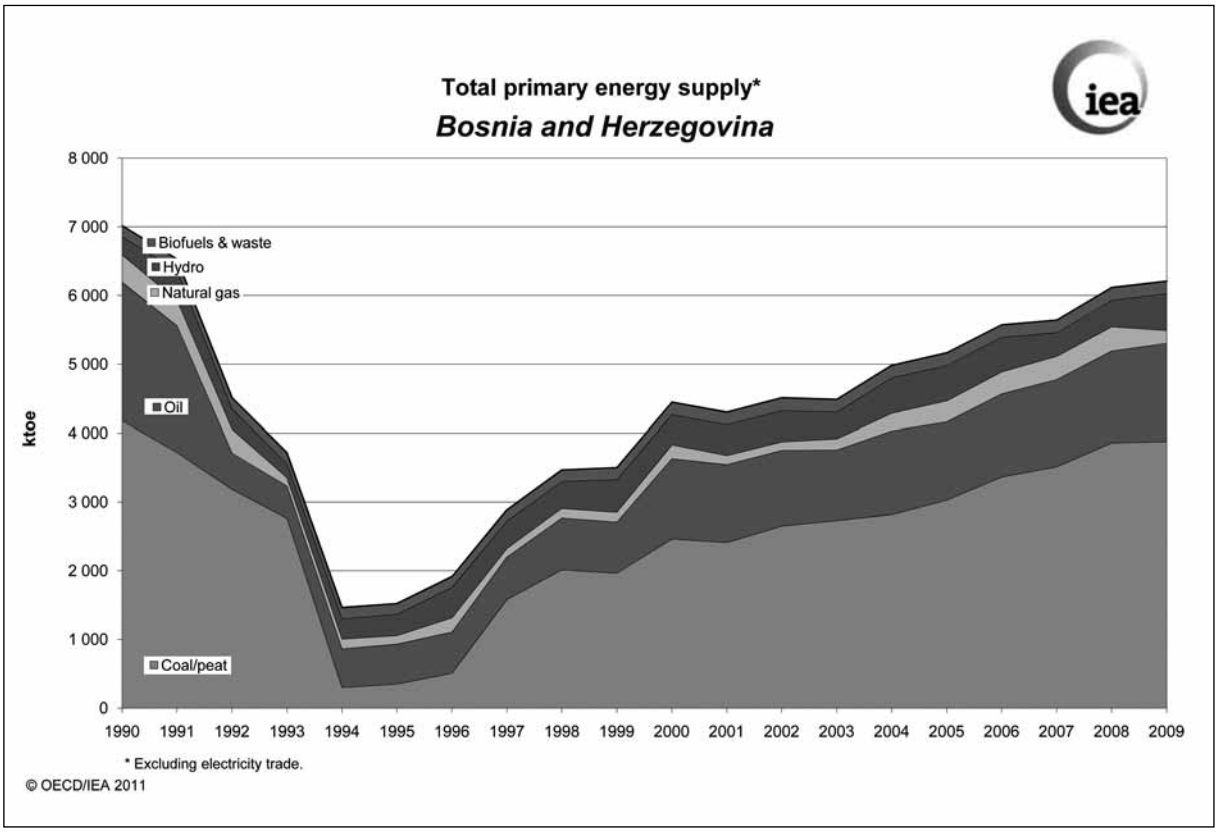
In many cases, although information on hazardous waste does exist, it is not categorised as prescribed in the Rulebook on categories of waste in FBiH and RS. In the case of thermal power plants, the ash and slag dumps represent a serious pollution risk for soil ground water.

9.3 Energy Efficiency

From the information presented in the Study on the Energy Sector in BiH and also in the findings of the World Bank document ***BH, Challenges and Directions for Reform – Public Expenditures and Institutions Review*** (February 2012) it is obvious that Bosnia and Herzegovina has very high energy intensity – above the global and developing countries' averages. This is a result of the low level of development, low energy efficiency, but also of irrational energy consumption, both in industry and utilities.

Here follows a summary of the World Bank findings with relevant and comparable indicators that are appropriate for this type of short study.

Although energy intensity decreased between 2000 and 2005, an increase in GDP of 66.1 per cent was observed in the same period. Energy consumption in Bosnia and Herzegovina had been going down continually until 2002, when a sharp increase in energy consumption was seen. Between 2000 and 2009, primary energy demand expansion (6.2 per cent annual average) outstripped GDP (4.6 per cent a year). During the same period, the primary energy increase in OECD countries was only 0.7 per cent per year. The energy structure is dominated by coal, as shown above, which provides around 64 per cent of the Total Primary Energy Supply (TPES). Oil



products make for around 19 per cent, while hydro and natural gas account for about 6 per cent each. Given the country's reliance on domestic coal and hydropower, dependence on energy imports (37.5 per cent) is significantly lower than that of OECD Europe (which stands at 48 per cent, see Table 8.1). However, it is worth noting that almost 100 per cent of oil products and natural gas are imported, thus indicating a high import dependence on these fossil fuels

As a result, BiH's carbon intensity is one of the highest in the Western Balkans. In 2007, the International Energy Agency (IEA) estimated total CO_2 emissions at 16.3 Mt, broken down as follows: energy sector (52 per cent), construction and agriculture (16 per cent), transport (14 per cent), industry (13 per cent) and residential (5 per cent). Emissions have tripled since 1995, and increased by 21 per cent between 2000 and 2004 as energy consumption increased. At the same time, a switch to lower-carbon fuels did not occur; coal accounts for 75 per cent of emissions, followed by oil products (21 per cent) and natural gas (4 per cent).

In 2009, the transport sector (31 per cent) accounted for the largest share of total fuel consumption (TFC), followed by buildings (20 per cent), industry (21 per cent) and services and public buildings (4 per cent). Due to the reliance on oil and electricity of the transport and buildings sectors, their share in BiH's final energy consumption has risen over time to 42 per cent and 23 per cent, respectively. Coal and gas each accounted for around or above 10 per cent, with the remainder coming from fuelwood and others.

Energy intensity (EI) has improved since 2000 (by about 10 per cent) but it remains high due to inefficient use of energy. In 2008, EI was estimated at 0.71 toe per thousand USD of GDP (in 2000 USD), about 4 times above the average for OECD Europe and about 30 per cent above the average in the Western Balkans. This reflects high levels of losses in energy transformation, which are estimated at about 50 per cent of TPES. Inefficient conversion of primary energy (particularly in power generation) is due largely to outdated equipment and technologies (see below), and to the limited share of combined heat and power (CHP) in the energy mix.

Energy end-use is also inefficient, thus indicating a huge potential for reducing the burden of energy expenses in both the public and the private sector. The buildings sec-

tor (private, public and residential) accounts for one-third of TFC. Buildings are generally poorly insulated, generating heat losses of more than 30 per cent. In addition, since the gas distribution network is not fully connected, the majority of the heating requirements of households are met by electricity, which is used inefficiently. As a result, about 65 per cent of the total electricity consumed in 2009 went to the residential and public buildings sector. By contrast, annual electricity consumption per capita was 2467 kWh, about 2.5 times lower compared to average levels of 6287 kWh in OECD Europe in 2009.

By 2009, coal companies were registering losses and accumulating large debts. Mining companies suffered a loss of about 20.2 and 13.1 million euros in 2005 and 2006, respectively.

More recently, the merger between coal companies and EPBH, along with the much needed modernisation of coal mining infrastructure led to a significant fiscal burden and it is also likely to put additional pressure on the sector's financial viability. The combination of low productivity (due to overstaffing) and lack of investment in advanced technologies has led to financial difficulties in the coal sector. Mining companies continued to accumulate losses as their costs have exceeded the economic break-even point for almost a decade.

The coal industry is a key sector, accounting for 65 per cent of electricity generation and energy supply and provides employment to about 16,000 people. Proven reserves of coal (both brown coal and lignite) are estimated at 5.7 billion tonnes.

Power utilities operate as three small vertically integrated monopolies in three separate, irregularly shaped geographical areas, giving rise to inefficiencies. The BiH power sector is being restructured to reduce these inefficiencies and to comply with the provisions of EC Directive 2003/54 (electricity), which promotes competition in the electricity sector. The first step was taken in 1999 with the establishment of the Joint Power Coordination Centre (JPCC). JPCC was owned by the three Elektroprivredas, which were represented on its management board. Its role was to coordinate electricity exchanges between the Elektroprivredas and with foreign countries, to coordinate scheduled generation and transmission outages and to maintain the operating reliability of the transmission system as a whole.

Compounding these problems there is fragmented regulation of generation and distribution at the state and entity levels. There are three separate electricity regulators. First, the State Electricity Regulatory Commission (SERC), based in Tuzla, is responsible for electricity transmission tariffs. Transmission is now performed by a separate transmission system operator (TSO), Elektroprenos BH. Then there are separate regulators at the entity level. The FBH Regulatory Commission for Electricity (FERC), based in Mostar, responsible for electricity generation and distribution in FBH. The RS Regulatory Commission for Electricity (RCERS) based in Trebinje is responsible for electricity generation and distribution in RS. The entity regulators are responsible for licensing, proposing network access tariffs and end-user energy prices and protecting customers.

So far, electricity tariffs have enabled power utilities to carry out their operations reasonably efficiently, although they did not fully cover depreciation costs. Over the years, the financial strategy of the three utilities has been aimed at generating adequate cash from internal generation to cover cash operating expenses and debt servicing, and to provide a reasonable share of self-financing for carrying out capital investments. So far, electricity tariffs were set at levels that enabled the utilities to achieve this strategy, but did not necessarily fully cover annual depreciation charges. This has led in some years to net losses in accounting terms, but has not prevented the utilities from being able to carry out their operations efficiently.

However, existing and expected future tariff levels are likely to become inadequate to sustain the needed investments, thus jeopardising the sector's financial and commercial viability.

The projections of financial performance indicate that all three utilities would face challenges in meeting their debt servicing requirements and the required counterpart funding for investment projects. In this context, access to financing is likely to become more difficult and costly if the tariff and productivity issues analysed above are not solved. Some government support – most likely some credit enhancements – would be needed. This would in turn create contingent liabilities for the governments.

There is significant potential for reducing the burden of expenditure in energy services in the public and private

sectors by improving energy efficiency. Improving energy efficiency would also yield positive economic value through increased employment, more competitive economies and eventually increased power exports (since it would free up domestic energy supplies). Energy end-use is inefficient; public buildings are generally poorly insulated and the estimated potential for energy savings ranges between 30 per cent and 35 per cent. Despite this significant potential, several market barriers to energy efficiency exist.

Heating of buildings (residential, public and services) is a major contributor to energy consumption and it is expected to grow significantly over the next two decades. Between 2000 and 2009, energy consumption in the buildings sector grew strongly at an average annual rate of 8.2 per cent. Its share of total final energy consumption has also increased over time to reach one-third in 2009. Looking forward, end-use energy consumption, including the buildings sector, is expected to increase by around 70 per cent during 2006–2027. This translates into annual growth rates of more than 3 per cent. The most rapid growth is expected in the commercial sector (140 per cent) followed by industry (100 per cent) and the residential sector (60 per cent).

Most building heating needs are satisfied by natural gas and by the much more inefficient use of electricity. Access rates are about 20 per cent for natural gas, more than 99 per cent for electricity, while only about 12 per cent of household and public buildings are connected to district heating systems. Only about 17 cities have access to district heating networks, all of which face stiff competition from subsidized electricity, fuelwood and natural gas. Because of low regulated energy prices in the past, there was an excessive use of electricity for heating, the least fuel-efficient way of space heating. *About 70 per cent of total annual sales of electricity are to households and the public sector, which use about half of it for heating.*_

So far, action to improve demand-side energy efficiency has been limited. Up to now, efforts to improve energy efficiency have concentrated on the supply side, through the rehabilitation of updated infrastructure in the power and DH sectors. However, progress in improving energy efficiency on the demand side is very limited. The lack of progress is compounded by the cumulative effect of policies that channelled subsidies to firms, and the population through cheap energy, which stimulated excessive and wasteful consumption

Significant efforts are required to create an institutional framework that would enable implementation of energy efficiency measures. The implementation, support and diffusion of energy efficiency services and technologies will require the establishment of an institutional framework comprising:
(i) a policy framework;
(ii) supporting structures;
(iii) implementation and know-how;
(iv) incentives; and
(v) information.

The country has made little progress in creating such an institutional framework, and it compares poorly to its regional neighbours.

Market barriers to begin investing in improved energy efficiency:

- Reliable updates of energy consumption data are lacking in BiH, even the most basic data, such as national energy balances and sectoral energy efficiency indicators; therefore it is difficult to calculate estimates for energy efficiency potential by sector, or to establish energy efficiency priorities. Thus, in turn, it is difficult to prepare high-quality Energy Efficiency Action Plans with monitorable and realistic interim targets.

- Energy efficiency policy falls under the responsibility of the ministries responsible for energy. Implementation of such policies is further devolved to the Cantonal level in FBH and the Municipal level in Republika Srpska. However, a formal policy is not in place with regard to energy efficiency. Legal and regulatory frameworks for supporting energy efficiency measures have not been adopted either, although there is a growing requirement for the country to address energy efficiency issues through its adoption of the Energy Community Treaty and Energy Charter. Energy Efficiency is only indirectly covered in other legislation. Regulators, for example, have the responsibility to consider both environmental and energy efficiency issues in their tariff making and investment approval regulations and decisions.

- Consumers at all levels, including asset managers in local government and line ministries responsible for

building operation and maintenance, lack information to support energy efficiency measures and behaviour changes. Training and know-how on energy efficiency measures are also scarce.

- There is no designated Energy Institute and/or Agency to provide governments with the data to formulate policies, and to be the change agency or champion to help implement policy and establish and operate the dissemination support scheme for energy efficiency services and technologies. The country is also running behind schedule in the preparation of its National Energy Efficiency Action Plan, which is required by European Community Directive 2006/32 due to: (i) a lack of energy data, including energy efficiency indicators; (ii) a lack of qualified staff; and (iii) limited government support due to lack of good data; hence, governments are unaware of the extent of the problems they face in the energy sector.

- In addition to price distortions in energy, the lack of consumption-based billing, although it is applied by a few district heating companies, creates a disincentive for those buildings connected to district heating systems to reduce consumption and, at the same time, does not enable heat suppliers to improve the efficiency of production and delivery systems. In addition, there are split incentives in investing in energy efficiency; the direct financial benefits of energy efficiency measures would not, in most cases, be captured by administrators of energy efficiency buildings (schools, hospitals) since energy bills are usually paid out of local and/or entity budgets.

- The primary source of financing for energy efficiency investments, for the time being, is regular commercial loans which are usually short-term and high cost. To jump-start the market, longer maturities would be required to allow more comprehensive initial investments which can both renew buildings and achieve significant energy savings. This fact, coupled with the low level of awareness and the difficult financial situation of many governments, rank energy efficiency investments low in priority.

10. World Bank Recommendations

»The energy sector is already having a significant impact on public finances and steps are needed to ensure that sector does not become a greater burden in the future. The key to controlling the fiscal impact lies largely with the power and coal sector. The efficiency of both needs to be sharply improved and new investments made to meet rising demand. This will only be possible if the authorities confront the need to overhaul the electricity tariff regime. These reforms need also to be supplemented with energy efficiency measures, particularly in the buildings sector which accounts for fully one-third of total final energy consumption and is highly inefficient. The following recommendations are directed at meeting these objectives:

- Continue the restructuring and modernization of coal mines within the new institutional setup. Efforts should focus on improving efficiency by adopting modern technologies and improving labour productivity.

- Continue the restructuring of the electricity sector towards EU standards for corporate governance; and set tariffs at their full cost-recovery levels, while putting in place targeted social protection mechanisms to protect the vulnerable population.

- Prepare and adopt an investment strategy for each of the power utilities based on a comparative least-cost investment plan which takes into account the power sector demand forecast at the entity, national and regional levels. Options for private sector involvement should also be considered.

- Adopt an exemplary role by implementing an energy efficiency program in public buildings, focusing for instance on schools and hospitals.

- Develop a basic legal framework and set up institutional arrangements, including establishing a ›change agency‹ to champion the implementation of energy efficiency programs.

- Set up a comprehensive and systematic energy data gathering and reporting system and launch targeted information campaigns.

- Establish a financing support mechanism for energy efficiency investments, such as Energy Efficiency Funds.

Appendix 1

Current legislation relating to environmental protection and institutions relevant for the area are as follows:

1. At the national level

- Law on Concessions (Official Gazette of BiH No. 32/02, amendments 56/04);

- Law on Veterinary Medicine (Official Gazette of BiH No. 34/02);

- Law on Plant Health Protection (Official Gazette of BiH No. 23/03);

- BiH Law on Phytopharmaceutical Substances (Official Gazette of BiH No. 49/04);

- Law on Radiation and Nuclear Safety (Official Gazette of BiH No. 88/07);

- Law on Agriculture, Food and Rural Development (Official Gazette of BiH No. 50/08);

- Law on Genetically Modified Organisms (Official Gazette of BiH No. 23/09);

- Law on Protection and Welfare of Animals (Official Gazette of BiH No. 25/09).

Institutions:

- Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina (MOFTER BiH), with its Sector for Natural Resources, Energy and Environmental Protection, which comprises five departments: Water Resources, Tourism, Primary Energy and Policy, Secondary Energy and Projects, Environmental Protection and Project Implementation.

- Ministry of Communication and Transport of Bosnia and Herzegovina.

- Bosnia and Herzegovina Agency for Statistics (BHAS), with its Sector for Agriculture, Environment and Regional Statistics, which is comprised of two Departments: Environment, Energy and Regional Statistics, and Agriculture.

- Veterinary Medicine Office of BiH (VMO BiH) comprises the following departments: Department for Animal Health and Welfare, Department for Food Safety and Conditions in Facilities, Department of Veterinary Medicine Inspection, Agency for Animal Identification.

- Bosnia and Herzegovina Authority for Plant Health Protection comprises three departments: Department of Plant Health Protection, Department of Phytopharmaceutical Substances and Mineral Fertilizers and Department of Seeds and Planting Materials for Agricultural Crops and Variety Protection.

- Inter-Entity Coordination Body for the Environment, established in 2006, deals with all environmental protection issues which require a harmonised approach by both Entities and is competent for harmonising environmental laws, regulations, standards and action plans, international treaties addressing environmental issues and their implementation; participation in international processes and cooperation with international organisations; monitoring of the environment, information systems and information exchange as well as transboundary and inter-entity environmental issues. This Committee consists of eight members, four nominated by the Government of the Republic of Srpska and four nominated by the Government of the Federation of Bosnia and Herzegovina, who meet at least six times a year.

- The Designated National Authority of Bosnia and Herzegovina for Implementing Clean Development Mechanism Projects of the Kyoto Protocol of the United Nations Framework Convention on Climate Change was established by virtue of the decision of the BiH Council of Ministers dated 13 December 2010 (Official Gazette of BiH No. 102/10), thus solving the issue of the establishment of this Designated National Authority (DNA BiH), which is necessary for including Bosnia and Herzegovina in the activities of the Clean Development Mechanism (CDM). It is anticipated in the said Decision that DNA BiH shall comprise the Executive Board of DNA, Entity secretariats, the Brčko District Secretariat and Expert Councils (Expert Panels). The Republic of Srpska Ministry of Spatial Planning, Construction and Ecology shall preside over the Executive Board as the institution nominated to implement the UN Framework Convention on Climate Change (UNFCCC) on behalf of Bosnia and Herzegovina in the capacity of the president of the Executive Committee.

Other important state institutions that deal with environmental issues are the Ministry of Foreign Affairs of BiH and the Directorate for European Integration of Bosnia and Herzegovina.

2. At the level of the Federation of Bosnia and Herzegovina (FBiH):

- Law on the Requirements for and Manner of Carrying Out Woodcutting Activities, (Official Gazette of FBiH No. 27/97, amendments 25/06);
- Law on Protection against Ionising Radiation and Radiation Safety (Official Gazette of FBiH No. 15/99);
- Law on Veterinary Medicine (Official Gazette of FBiH No. 46/0);
- Law on Concessions (Official Gazette of FBiH No. 40/02, amendments 61/06, in June 2011, a new Law on Concessions was drafted and presented for public debate);
- Law on Waste Management (Official Gazette of FBiH 33/03, amendments 72/09);
- Waste Management Law on Air Protection (Official Gazette of FBiH No. 33/03, amendments 4/10);
- Environmental Protection Law (Official Gazette of FBiH No. 33/03, amendments 38/09);
- Law on the Environmental Protection Fund FBiH (Official Gazette of FBiH No. 33/03);
- Law on Nature Protection (Official Gazette of FBiH No. 33/03);
- Law on Waste Management (Official Gazette of No. 33/03, amendments 72/09);
- Law on Freshwater Fishing (Official Gazette of FBiH No. 64/04);
- Law on Inspections in FBiH (Official Gazette of FBiH No. 69/05);
- Law on Seeds and Planting Material for Forest and Horticultural Types of Trees and Shrubs (Official Gazette of FBiH No. 71/05, amendments 8/10);
- Law on Spatial Planning and the Use of Land in FBiH (Official Gazette of FBiH, No. 2/06. amendments 72/07, 32/08, 4/10, 13/10);
- Law on Hunting (Official Gazette of FBiH No. 4/06, amendments 8/10);
- Law on Water (Official Gazette of FBiH No. 70/06);
- Law on Agriculture (Official Gazette of FBiH No. 88/07, amendments 4/10);
- Law on the Una National Park (Official Gazette of FBiH No. 88/07);
- Law on Agricultural Land (Official Gazette of FBiH No. 52/09);
- Law on the Geological Survey (Official Gazette of FBiH No. 9/10);
- Law on Mining of FBiH (Official Gazette of FBiH 26/10);
- Law on Health Protection (Official Gazette of FBiH No. 46/10);
- Law on Noise Protection (adopted by the House of Peoples of the Parliament of FBiH on 20 December 2011);
- Law on Forests – the Constitutional Court of FBiH, at the session held on 14 April 2009, established the violation of local self-governance rights by the Law on Forests. Forestry in the Federation of BiH is currently regulated by the Decree on Forests, while the new draft of the Law is in process.

The FBiH institutions relevant for environmental protection:

- Ministry of Environment and Tourism of the Federation of Bosnia and Herzegovina;
- Federal Ministry of Spatial Planning;
- Advisory Council for the Environment of FBiH;

- Environmental Protection Fund of the Federation of Bosnia and Herzegovina;
- Foundation for Sustainable Development of the FBiH Government;
- Federal Ministry of Agriculture, Water Management and Forestry;
- Federal Ministry of Health;
- Federal Ministry of Energy, Mining and Industry;
- Federal Authority for Inspection Activities;
- Agency for the Adriatic Sea Water District;
- Agency for the Sava River District;
- Public Health Institute of the Federation of Bosnia and Herzegovina;
- Federal Office of Statistics;
- Federal Hydrometeorological Institute.

At the cantonal level:

Canton No. 1 – Una-Sana Canton – Ministry of Construction, Spatial Planning and Environmental Protection;

Canton No. 2 – Posavina Canton – Ministry of Transport, Communication, Tourism and Environmental Protection;

Canton No. 3 – Tuzla Canton – Ministry of Urban Planning, Spatial Planning and Environmental Protection;

Canton No. 4 – Zenica-Doboj Canton – Ministry of Spatial Planning, Transport, Communication and Environmental Protection;

Canton No. 5 – Bosnian Podrinje Canton – Ministry of Urban Planning, Spatial Planning and Environmental Protection;

Canton No. 6 – Central Bosnia Canton – Ministry of Spatial Planning, Reconstruction and Refugee Return (including Environment);

Canton No. 7 – Herzegovina-Neretva Canton – Ministry Trade, Tourism and Environmental Protection;

Canton No. 8 – Western Herzegovina Canton – Ministry of Spatial Planning and Environmental Protection;

Canton No. 9 – Sarajevo Canton – Ministry of Spatial Planning and Environmental Protection;

Canton No. 10 – Ministry of Construction, Reconstruction, Spatial Planning and Environmental Protection.

FBiH comprises 79 municipalities and Article 8 of the Law on Principles of Local Self-Government in the Federation of Bosnia and Herzegovina (Official Gazette of FBiH No. 49/06) regulates, inter alia, that municipalities are competent for: establishment and implementation of spatial planning and environmental protection policies; adoption of regional, urban and implementation plans, including zoning; establishing and implementation of a housing policy and adoption of programmes for housing development and other types of property development; establishing a policy for managing the natural resources of the local unit of self-government and distribution of revenue collected for the use of those resources; establishing a policy and setting the level of reimbursement for the use of public goods; water supply, wastewater disposal and treatment; solid waste collection and disposal organisation; and implementation and responsibility for rescuing people and material goods in natural disasters. This Article also stipulates that: »Unless the law specifically treats a competency as a delegated competency, a competency set forth or envisaged by the law shall be considered an inherent competency of the local unit of self-governance.«

3. At the level of Republika Srpska (RS):

- Law on Meteorological and Hydrological Activity of RS (Official Gazette of RS No. 20/00);
- Law on Hunting (Official Gazette of RS No. 4/02, amendments 34/08);
- Law on Fishing (Official Gazette of RS No. 4/02, amendments 58/09);

- Law on Concessions (Official Gazette of RS No. 25/02, amendments 91/06, 92/09);
- Law on Nature Protection (Official Gazette of RS No. 50/02, amendments 34/08, 59/08, edited text 113/08);
- Law on the Environmental Protection Fund (Official Gazette of RS No. 51/02, amendments 53/07);
- Law on Waste Management (Official Gazette of RS No. 53/02, amendments 53/07);
- Law on Environmental Protection (Official Gazette of RS No. 53/02, amendments 109/05, 41/08, 29/10);
- Law on Geological Surveys (Official Gazette of RS No. 51/04);
- Law on Organic Food Production (Official Gazette of RS No. 75/04, amendments 71/09);
- Law on Protection against Ionizing Radiation (Official Gazette of RS No. 2/05);
- Law on Mining (Official Gazette of RS No. 107/05, amendments 75/10);
- Law on Water (Official Gazette of RS No. 50/06, amendments 92/09);
- Law on Agriculture (Official Gazette of RS No. 70/06, amendments 20/07, 86/07, 71/09);
- Law on Agricultural Land (Official Gazette of RS No. 93/06, amendments 86/07, 14/10, 5/12);
- Law on Veterinary Medicine in RS (Official Gazette of RS No. 42/08, amendments 6/12);
- Law on Forests (Official Gazette of RS No. 75/08);
- Law on Genetically Modified Organisms (Official Gazette of RS No. 103/08);
- Law on Animal Protection and Welfare (Official Gazette of RS No. 11/08);
- Law on Chemicals (Official Gazette of RS No. 25/09);
- Law on Plant Health Protection (Official Gazette of RS No. 25/09);
- Law on Biocides (Official Gazette of RS No. 37/09);
- Law on Planting Material (Official Gazette of RS No. 37/09, amendments 117/11);
- Law on Agricultural Plants and Seeds (Official Gazette of RS No. 37/09 , amendments 100/11);
- Law on Energy (Official Gazette of RS No. 49/09);
- Law on Hunting (Official Gazette of RS No. 60/09);
- Law on Forest Reproductive Material (Official Gazette of RS No. 60/09);
- Law on Plant Protection Products (Official Gazette of RS No. 52/10);
- Law on Beekeeping (Official Gazette of RS No. 52/10);
- Law on Spatial Planning and Construction (Official Gazette of RS No. 55/10);
- Law on National Parks (Official Gazette of RS No. 75/10, superseded the 1996 Law and the 2005 amendments);
- Law on Construction Products (Official Gazette of RS No. 5/12);
- Law on the Fund and Financing of Environmental Protection of RS (Official Gazette of RS No. 117/11, superseded the 2002 Law and the 2007 amendments);
- Law on Air Protection (Official Gazette of RS No. 124/11, the 2002 Law was superseded).

RS institutions relevant for environmental protection:

- RS Ministry of Agriculture, Forestry and Water Management;
- RS Ministry of Health and Social Protection;
- RS Ministry of Industry, Energy and Mining;

- Environmental Protection Fund of the Republic of Srpska;
- Republic Authority for Inspection Activities of the Republic of Srpska;
- Agency for the Sava River Basin District;
- Agency for the Trebišnjica River Basin District;
- Public Health Institute of RS;
- Republic Srpska Institute of Statistics;
- Republic Srpska Hydrometeorological Institute, Banja Luka;
- Republic Institute for Protection of the Cultural, Historical and Natural Heritage of Republika Srpska.

There are 63 municipalities in the Republic of Srpska and the Law on Local Self-Government (Official Gazette of RS No. 101/04) regulates their competencies. As stated in Article 12 of this Law, municipalities in RS have independent competencies in public services, such as environmental protection and water management. Specific competencies of local self-government regarding protection of the environment and natural resources listed in Article 22 are as follows:

- protection and development of agricultural land;
- identification of erosion areas and anti-erosion measures;
- defining requirements and manners of development of pastureland;
- management of natural lakes, springs, public wells and fountains;
- water supply management;
- protection, development and improvement of areas with natural healing properties;
- prescribing emission limit values for hazardous substances as stipulated by law;
- publishing data on air quality and improving air quality as necessary;
- noise pollution prevention and noise measurement;
- protection of municipal natural heritage and values;
- veterinary medicine issues;
- livestock farming and bee-keeping.

4. At the level of Brčko District:

- Law on Nature Protection (Official Gazette of BD No. 24/04, amendments 19/07, 1/05, 9/09);
- Law on Environmental Protection (Official Gazette of Brčko District No. 24/04, amendments 19/07, 1/05, 9/09);
- Law on Water Protection of BD (Official Gazette of BD No. 25/04, amendments 19/07);
- Law on Waste Management (Official Gazette of BD No. 25/04, amendments 19/07, 1/05, 2/08, 9/09);
- Law on Air Protection (Official Gazette of BD No. 25/04, amendments 19/07, 1/05, 9/09);
- Law on Agricultural Land (Official Gazette of BD No. 32/04, amendments 20/06, 10/07, 19/07);
- Law on Freshwater Fishing (Official Gazette of BD No. 35/05, amendments 19/07);
- Law on Concessions (Official Gazette of BD No. 41/06, amendments 19/07, 2/08);
- Law on Spatial Planning and Construction (Official Gazette of BD No. 29/08);
- Law on Forests in Brčko District (Official Gazette of BD No. 14/10)

Sources

In Bosnia and Herzegovina it is an extremely complicated endeavour to obtain the relevant data. First, the existing data, which are not necessarily relevant, are kept at different levels of government and in different institutions. Second, this is a particularly unevenly researched and poorly updated area and most of the data available are based on estimates. Very few documents can be quoted.

The following documents were used; they are quoted following the order of their appearance in the text:

1. Agenda 21, the Rio Declaration on Environment and Development, and the Statement of Principles for the Sustainable Management of Forests were adopted by more than 178 Governments at the United Nations Conference on Environment and Development – UNCED held in Rio de Janeiro, Brazil, 3 to 14 June 1992.

2. International Institute for Sustainable Development (IISD), Background Paper prepared for consideration by the High Level Panel on Global Sustainability at its first meeting, 19 September 2010.

3. European Commission – Progress Report for Bosnia and Herzegovina for 2011.

4. First National Communication for Bosnia and Herzegovina (INC – Initial National Communication).

5. Studies of the Energy Sector in BiH (March 2008, financed by the World Bank and produced by the consortium comprising the Hrvoje Požar Institute for Energy, Croatia; Soluziona, Spain; Institute for Economics Banja Luka, BiH; and the Institute for Mining Tuzla, BiH.

6. BiH Agency for Statistics, 23 November 2011, Statistics on environment and greenhouse gas emissions.

7. Bosnia and Herzegovina: Challenges and Directions for Reform. A Public Expenditure and Institutional Review (February 2012), World Bank.

The Internet pages of all the aforementioned institutions were also used.

About the author

Svetlana Cenic worked in foreign trade area and as a consultant within several foreign companies. She was advisor of President of Republika Srpska Mr. Dragan Cavic and Minister of Finance of the Republic of Srpska (2007/2008).

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