

A stylized world map composed of a grid of dots in various shades of gray, with several dots highlighted in red. The map is centered behind the title.

# Resource Efficiency Gains and Green Growth Perspectives in Macedonia

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- Macedonia's emissions per capita are higher than corresponding emissions in the emerging economies. The main contributor to emissions is the energy sector, with about 70 per cent of total emissions. Energy consumption has rapidly grown since 2001. The Macedonian economy is extremely energy intensive, mainly due to outdated technology and infrastructure. The country is extremely dependent on imported fossil fuels as primary energy sources.
- Several basic legislative measures on energy efficiency, greenhouse gas emissions, environmental protection, and climate change mitigation based on and complying with EU policies have been implemented, but they are not supported by necessary by-laws or an appropriate institutional framework. The main obstacles to successful implementation are the absence of clear responsibilities among the bodies involved, weak capacities at all institutional levels and low public awareness.
- The main potential for green growth and green jobs in Macedonia lies within these sectors: construction, forestry, renewable energies, agriculture, waste management and transport. There are already some small and medium enterprises active in green business in the national market. There are also international projects for green growth (e.g. by World Bank). The main obstacles are missing financial resources and credit schemes, subsidies to traditional energy sources, lack of infrastructure, and legislative and regulatory barriers.



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## List of abbreviations

CDM	Clean Development Mechanism
DNA	Designated National Authority
GEF	Global Environment Facility programme
GHG	Greenhouse Gas
LUCF	Land-Use Change and Forestry
MAFWE	Ministry of Agriculture, Forestry and Water Economy
MASA	Macedonian Academy of Sciences and Arts
MoE	Ministry of the Economy
MoEPP	Ministry of the Environment and Physical Planning
MoH	Ministry of Health
MolA	Ministry of Internal Affairs
MTC	Ministry of Transport and Communication
NPAA	National Programme for the Adoption of the EU Acquis
NSEA	National Strategy for Environmental Approximation
UNFCCC	United Nations Framework Convention on Climate Change

## 1. Basic Country Data<sup>1</sup>

The Republic of Macedonia is situated in South-Eastern Europe, at the centre of the Balkan Peninsula. According to its geographical location, it is a central Balkan country bordering four countries: to the east, Bulgaria, to the north, Serbia, to the west, Albania, and to the south, Greece. The length of its borders is 766 km.

The Republic of Macedonia covers an area of 25,713 km<sup>2</sup>. The terrain is mostly hilly and mountainous. According to the Census in 2002, the total population of the Republic of Macedonia is 2,022,547. The gender structure shows almost equal representation of both genders (50.2 per cent men and 49.8 per cent women).

The Republic of Macedonia has a predominantly sub-Mediterranean climate with characteristic warm and dry summers, and cold and humid winters. Mean annual temperatures decrease from the north to the south of the country. The mean annual precipitation in the mountains is approximately 1000–1500 mm, and in the basins it is 600–700 mm.

The longest river is the Vardar, 388 km long (of which 301 km are in the Republic of Macedonia), and it flows mainly through the central part of the country. Its basin occupies most of the territory of the country and is part of the Aegean Basin. On the southern border there are three large natural lakes: Lake Ohrid, Lake Prespa and Lake Dojran. The territory of the Republic of Macedonia lies on a seismically active area. In industry, the most significant sectors are food and tobacco, as well as the manufacture of iron and steel. Unemployment is approximately 32 per cent.

### 1.1 Air Temperature

The data on temperature refer to the mean monthly value calculated from the mean daily temperature obtained on the basis of a daily measurement at 7 a.m., at 2 p.m. and at 9 p.m. local time.

The temperature data are taken from the Hydrometeorological Service. The territory of the Republic of

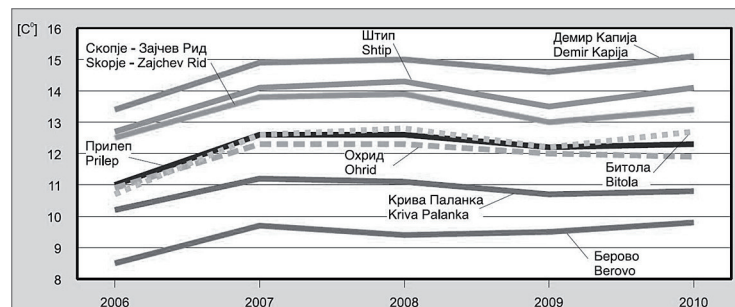
<sup>1</sup> Republic of Macedonia, State Statistical Office, Environmental statistics.

Macedonia is under the influence of two zonal climates – Mediterranean and continental – and one local, mountain climate. The zonal and the local climate influences combine with each other, which creates special, local climate characteristics in different parts of the Republic of Macedonia.

The air temperature is the most important climate element for the formation of the weather and the climate. By comparing the mean annual air temperatures in the Republic of Macedonia, from north to south, several thermal regions can be distinguished (which can be seen in the chart).

The region with the highest average temperature is the southernmost part of the Republic of Macedonia along the valley of the River Vardar, namely the Gevgelija-Valandovo basin that extends to Demir Kapija to the north. This region is under heavy thermal influence from the Aegean Sea, with mean annual air temperature of 13 to 14 C° and more. On the other hand, the coldest regions with lowest average air temperatures are the high basins, such as the Berovo basin and the high mountain areas under the heavy influence of the local mountain climate with mean annual air temperature under 10 C° (see Figure 1)

Figure 1



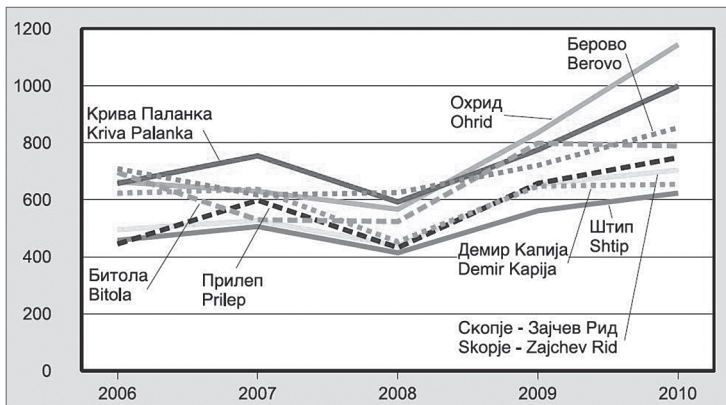
Source: Hydrometeorological Directorate.

### 1.2 Precipitation

With regard to precipitation – which is monitored in 200 measurement stations, located throughout the country – the Republic of Macedonia belongs to the continental-Mediterranean area. The precipitation regime is dependent on the general circulation in the atmosphere. Precipitation is mostly related to and dependent on Mediterranean cyclones.

During winter, spring and autumn they pass over the Republic of Macedonia and are an important factor in the occurrence of precipitation. During summer, the Republic of Macedonia is usually in the centre of the subtropical anticyclone, which causes warm and dry summers. From a spatial aspect, over a longer period of time, the area with least precipitation in Macedonia is the one between the Tikvesh basin (Kavadarci, Demir Kapija), the Ovche Pole basin (Sveti Nikole) and the Shtip basin (Shtip). In this area, the mean annual precipitation, over a longer period of time and with small variations, amounts to 500 mm or under (see chart). From this central, driest area, in every direction, the mean annual precipitation also increases because of the increase in either the influence of the Mediterranean climate or the influence of the height above sea level. The data on precipitation refer to the annual amount of precipitation measured at the meteorological stations, in millimetres, and are obtained from the Hydrometeorological Service (see Figure 2).

Figure 2



Source: Hydrometeorological Directorate.

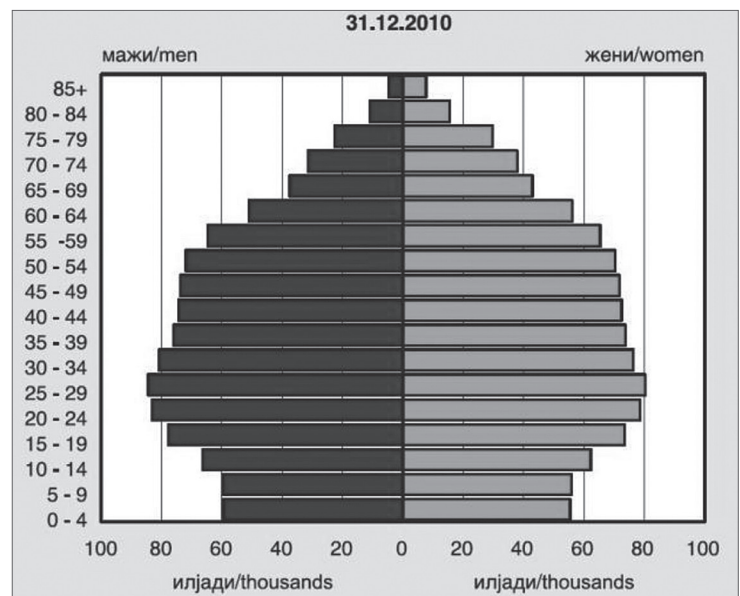
### 1.3 Population

According to the last Population Census, Households and Dwellings, conducted in November 2002, the total population is 2,022,547. The gender structure shows approximately equal representation of the two genders (50.2 per cent men and 49.8 per cent women). The territorial distribution of the population in the Republic of Macedonia is very uneven. According to the 2002 Census, 57.8 per cent of the population live in the towns and cities (there are 34 towns and cities in the Republic

of Macedonia), the highest concentration being in the capital Skopje (20.5 per cent). A large number of rural settlements (the total number of settlements is 1,728) are completely depopulated (141 settlements) or have an extremely small number of inhabitants.

The population of the Republic of Macedonia, as a result of the positive natural increase, still maintains an upward trend, though at a slower pace. According to the latest population estimates (as of 31.12.2010) the total population is 2,057,284 inhabitants. In the period 2000–2010, the population increase was 26,172 persons or 1.3 per cent. There have also been significant changes in the age structure of the population. In the period 2000–2010, the proportion of children aged 0–14 in the total population decreased from 22 per cent to 17.4 per cent, whereas the proportion of the old (age group 65 and over) increased of 10.1 per cent to 11.7 per cent. The municipalities in the western and north-eastern part of the country (the Polog region and the North-eastern region) are characterised by much higher representation of younger people, as opposed to the municipalities in the southern and the eastern part of the country, where the older population is dominant (see Figure 3).

Figure 3



Source: State Statistical Office.

The average population density is 82.6 inhabitants per km<sup>2</sup> (population estimates as of 31.12.2010). Because of intensive migration movements, there are huge differ-



ences in population density. Skopje, as the most densely populated region (333 inhabitants per km<sup>2</sup>), has almost ten times higher density than the Vardar region, which is the least densely populated (38.1 inhabitants per km<sup>2</sup>). Municipalities that include urban settlements show higher population density, while the purely rural municipalities are much less populated.

## 1.4 Employment

According to the Labour Force Survey conducted in accordance with the methodological recommendations of the International Labour Organisation (ILO) and the Statistical Office of the European Communities (Eurostat), persons over 15 years of age are considered employed if they:

- have been working for money (in cash, in kind or profit) for at least 1 hour;
- have been temporarily absent from work, but formally have been employed; or
- have been helping (on the family land or enterprise) without payment.

In the period from 2006 to 2010, the highest number of employed persons was registered in 2010, at 637,855, and the lowest number, 570,404, was registered in 2006.

In the period from 2006 to 2010, the sectors of manufacturing and agriculture, hunting and forestry had the highest share in total employment.

## 2. Current Situation

### 2.1 Energy Efficiency Regulation

In December 2011, the Government of the Republic of Macedonia, with the 2012 revision of the National Programme for Adoption of the Acquis (NPAA), prepared a cross-section of the legal framework and legislative priorities in all sectors, including the energy and environment sector.

The Law on Energy (Official Gazette of RM No. 16/11) regulates the legal framework for carrying out activities

in the field of energy, securing reliable, safe and quality energy supply to consumers, increasing energy efficiency and encouraging the utilisation of renewable energy sources and protecting the environment from the adverse impacts of particular activities in the energy field.

The Energy Development Strategy of the Republic of Macedonia up to 2030, developed by MASA and adopted in 2010, has set the following priorities:

- improving energy efficiency in the production, transmission and utilisation of energy;
- using domestic resources (hydropower potential, wind and solar energy) for electricity production;
- increasing the use of renewable energy sources.

Within the Global Environment Facility programme (GEF), the project for sustainable energy (28 October 2011), the Ministry of Economy (MoE) in collaboration with the Macedonian Academy for Sciences and Arts (MASA) began drafting the Energy Development Strategy Implementation Programme. The programme should be developed by the end of 2012 and is to specify the measures, terms, manner and dynamics of implementation.

The implementation of the new legal framework in the energy sector imposes numerous obligations on the:

- Ministry of Economy – Energy Sector;
- Regulatory Commission;
- Energy Agency;
- State Statistical Office – Department of Energy;
- local government.

As a medium-term priority, in 2013–2014, the MoE plans to strengthen capacity and train staff to monitor the incorporation of renewable energy sources into energy consumption in Macedonia.

The laws, strategies and regulations on energy efficiency adopted by the government of Macedonia include:

- First Energy Efficiency Action Plan of the Republic of Macedonia up to 2018 (2011);
- Rulebook on Energy Efficiency Labelling for Household Appliances (Official Gazette of the Republic of Macedonia No. 63/2006 and 36/2007)



- Rulebook on Energy Performance of Buildings – under preparation, supported by CeProSARD

In terms of saving energy and energy efficiency at national level, the following strategies and plans have been adopted:

- Strategy for Energy Development in the Republic of Macedonia up to 2030;
- Strategy for utilisation of renewable energy sources up to 2020;
- Strategy for promotion of energy efficiency in the Republic of Macedonia up to 2020;
- National Action Plan for Energy Efficiency of the Republic of Macedonia 2010–2018.

## 2.2 Greenhouse Gas Emissions and Environmental Regulation

In terms of legislation related to environmental protection and greenhouse gas emissions there is a basic legal framework, but its implementation is not supported by the necessary by-laws or the appropriate institutional framework. Special emphasis should be placed on compliance with EU policies in the area of climate change, especially after 2012, when the new Copenhagen Accord (December 2009) is expected to be implemented. This will apply in particular to a possible change of the country's status (the Republic of Macedonia does not belong to the group of Annex I countries under the Convention, nor in Group B countries under the Kyoto Protocol, despite belonging to one of the most vulnerable regions in the world).

In this regard, the Republic of Macedonia will have to accept required action based on estimates of the potential reduction of its national greenhouse gas emissions, on one hand, and EU expectations on taking stronger action to reduce emissions, on the other hand.

In Annex 1, there is a list of all national legislation related to environmental protection. Regardless of the large number of laws and bylaws harmonised with EU legislation, the need still remains to complete the existing legal framework with the necessary secondary legislation

aimed at providing the mechanisms for monitoring and law enforcement. At the same time, capacities at central and local level have been identified as one of the major weaknesses in the Republic of Macedonia's approximation with the EU with regard to the environment. In this context, insufficient institutional and human resource capacities at the local level, as well as of the other relevant stakeholders (especially in the industrial sector), should be emphasised in terms of the implementation of the EU Directives transposed into Macedonian legislation.

The problems are compounded by:

- the absence of clear allocation of responsibilities between the numerous bodies involved;
- the absence of functional connection between the local and the national level, which is very important in terms of the new responsibilities and tasks that should be taken over by the units of the local self-government that need models for the exchange of experience and significant capacity increase;
- the weak capacities of local government in all domains of environmental protection, including the establishment and maintenance of environmental media and areas, completion of the national environmental information system, establishment of inspection, law enforcement, monitoring, issuing of integrated environmental licenses and other responsibilities within the framework of EU requirements and local conditions;
- the need for further training of central and local administration in order to mainstream and accelerate the transition phase and to ensure adequate vertical coordination between the authorities;
- the need for enhanced action to increase public awareness and education at all levels, emphasising transparency.

The lack of complete and accurate data on polluting substances and polluters, the lack of an integrated approach to solving environmental problems, especially in the areas of water resource management and waste management, as well as the lack of capital investment to finance infrastructure in these areas are further impediments to the establishment of an efficient system for environmental protection in the Republic of Macedonia.

## 2.3 National Initiatives on Climate Change Mitigation

### Climate Change-related Institutional and Policy Framework

As a candidate for full EU membership, the climate change-related policies of the Republic of Macedonia are based on and comply with general EU policies. This manifests itself at several levels: strategic, legislative, institutional and technical and certainly through cooperation at the bilateral, regional and global levels. The Ministry of Environment and Physical Planning (MOEPP) is the UNFCCC Focal Point and DNA for CDM.

#### *International Agreements*

The Republic of Macedonia ratified the UNFCCC in December 1997 and the Kyoto Protocol in July 2004. Macedonia is a non-Annex I Party to the Convention. As a signatory of the UN Framework Convention on Climate Change and not a major greenhouse gas emitter in absolute terms, Macedonia respects the principle of the Convention on common but differentiated responsibilities in stabilising atmospheric concentrations of greenhouse gases.

#### *National Strategic Documents*

- The First National Communication on Climate Change;
- The Second National Communication on Climate Change
- National Strategy for the First Commitment Period 2008–2012 according to the Kyoto Protocol;
- National Strategy on Environmental Investments;
- National Strategy for a Clean Development Mechanism;
- National Strategy for Sustainable Development;
- Second National Environmental Action Plan.

Preparations for the Third National Communication are ongoing. The project is expected to start in September 2012.

## National Initiatives Related to Climate Change Mitigation in Macedonia

### *Overview of Macedonia's GHG Emissions<sup>2</sup>*

The total CO<sub>2</sub>-eq emissions in Macedonia for the year 2000 amount to 14,318 kt CO<sub>2</sub>-eq. The main contributor to total CO<sub>2</sub>-eq emissions is the energy sector, with about 70 per cent of total emissions. The second biggest contribution comes from the agricultural sector, with about 8–15 per cent, while all other sectors contribute less than 10 per cent each. The only exception to this was in the year 2000, when due to enormous forest fires, the emissions from the LUCF sector were about 14 per cent of total national emissions. About 75–80 per cent of equivalent emissions are direct CO<sub>2</sub> emissions from burning, 12–14 per cent are CH<sub>4</sub> emissions, 5–9 per cent are N<sub>2</sub>O emissions and about 2 per cent are CO emissions. Comparing the recalculated CO<sub>2</sub>-eq emissions for the years 1990–1998, there was a decrease in the range of 7.5–13.5 per cent. All sectors report smaller emissions except the LUCF sector where the recalculated emissions are about three times larger. In the energy sector, recalculated emissions are about 6–14 per cent lower due to the different lignite emissions, both direct CO<sub>2</sub> emissions from lignite burning and fugitive CH<sub>4</sub> emissions from lignite mining. The most important factor leading to emissions reduction was the correction in the fugitive emissions factor for lignite mining, which was taken for underground mines in the Initial National Communication, although lignite mines in Macedonia are on the surface.

Table 1: Energy sector's contribution to CO<sub>2</sub> emissions

<b>Total carbon dioxide emissions from the consumption of energy (million metric tonnes)*</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>
CO <sub>2</sub> emissions from the consumption of petroleum	2.89808	3.02446	3.14593	2.99612	NA
CO <sub>2</sub> emissions from the consumption and flaring of natural gas	0.19018	0.15214	0.13313	0.15214	NA
CO <sub>2</sub> emissions from the consumption of coal	5.19087	5.40146	5.94379	4.23081	NA

\* International Energy Statistics

2. The Second National Communication on Climate Change.

In relative values (percentages), the biggest differences in recalculated emissions are found in industrial processes (6–46 per cent) and in the waste sector (30–34 per cent), followed by agricultural sector emissions (4–7 per cent).

One indicator of emissions level that may be used in international comparative analyses is CO<sub>2</sub>-eq emissions per capita. For Macedonia, for the year 2000, according to official census data, the average value of this indicator amounts to 7.16 t CO<sub>2</sub>-eq/capita.

Emissions per capita are lower than those in other economies in transition, which may reflect the overall economic situation in Macedonia. This is partially true since total CO<sub>2</sub>-eq emissions do not necessarily correspond to general economic trends in the country. Some countries with a large hydroelectric share in energy production may report low GHG emissions despite the relatively good economic position (for example, Croatia). It is interesting to note that Macedonia's emissions per capita are higher than corresponding emissions in some large and economically growing countries such as Turkey, Mexico, Brazil, China, Indonesia, Pakistan and India (descending order of emissions in the range of 5 to 2 t CO<sub>2</sub>-eq/capita).

#### *National Initiatives on Climate Change Mitigation*

In the Republic of Macedonia, in cooperation with the Ministry of the Environment and Physical Planning, a series of projects related to climate change mitigation is being implemented. Project activities are aimed at reducing greenhouse gas emissions by improving energy efficiency in public buildings, housing facilities and the industrial sector. Also, priority is being given to promoting the utilisation of renewable energy sources in order to save the limited conventional energy sources and reduce greenhouse gas emissions.

Related to the energy efficiency of public buildings, the Ministry of Environment and Physical Planning is implementing the project »Mitigating climate change through improved energy efficiency in building sector« with UNDP. The focus of the project is to contribute to reducing energy consumption in public buildings, regulating energy losses and greenhouse gas emissions and increasing the country's energy independence.

Habitat Macedonia with support from USAID is implementing a nationwide project to improve energy efficiency in the residential sector. The project will provide funds for minor repairs such as replacing windows and doors for low-income families, which will contribute to improving energy efficiency in the residential sector, and raising public awareness of the importance of investments to save energy and money as well as environmental protection.

The Norwegian Ministry of Foreign Affairs is supporting a project in Macedonia, »Cleaner and More Cost Effective Industry in Macedonia«. The project is aimed at reducing greenhouse gas emissions and developing a more cost efficient energy intensive industry. The project is addressing barriers to project implementation by building local competences, increasing awareness, developing a pipeline of climate projects ready for financing, as well as improving dialogue between the authorities, academia, project developers, industry and financial institutions.

CeProSARD, with support from the Government of Sweden, is implementing the project »Promotion of Sustainable Agricultural Practices, Energy Efficiency and Utilisation of Renewable Energy Sources in Rural Communities in the Republic of Macedonia. The objective of the Agro-energy project is to promote sustainable practices for using renewable energy sources and improving energy efficiency on farms and other entities in rural areas. At the same time, it supports the government in creating policies and strategies in this area.

In order to take into account the fundamental principles of energy efficiency in public procurement, the Energy Agency in accordance with the Law on Energy, and supported by CeProSARD, has adopted Guidelines for implementing energy-efficiency and energy-saving measures in determining the characteristics of goods and services subject to public procurement, and applying energy efficiency and energy saving-related criteria when selecting the best bidder.

The purpose of this guide is to assist the contracting authorities carrying out public procurement, as well as persons responsible for the contracting authorities to consider energy efficiency when making procurement decisions in order to:



- meet demands placed to the government of Macedonia and all public sector bodies under Article 5 of the EU Directive on energy end-use efficiency and energy services 2006/32/EC;
- assist implementation of public procurement procedures when awarding contracts pursuant to the Directive on efficiency;
- assist in efforts to reduce carbon dioxide emissions; and
- help promote conscientious public spending.

In terms of bilateral cooperation in the field of climate change and the Kyoto Protocol, the Ministry of the Environment and Physical Planning has signed a Memoranda of Cooperation with the Italian and Slovenian Ministries of the Environment, as well as the UN (UNDP) Carbon Finance Development Programme.

## 2.4 Energy Saving and CO<sub>2</sub> Reduction Activities

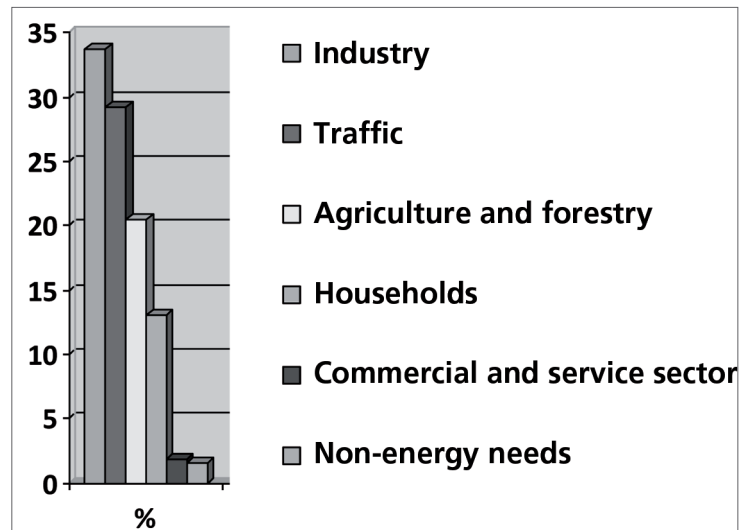
Energy consumption in Macedonia in the period 1990–2001 remained practically unchanged, but after 2001 rapid growth in energy consumption was noted, particularly in electricity consumption.

Macedonia has particularly low energy consumption per capita and extremely high energy consumption per unit of GDP. In 2006, the energy consumption per unit of GDP was nearly 5.5 times greater than in developed European countries. As shown in Figure 4, in the consumption of electricity in 2007 industry accounted for 33.8 per cent, households 29.2 per cent, traffic 20.5 per cent, the commercial and service sector 13.1 per cent, agriculture and forestry 1.8 per cent and non-energy needs 1.7 per cent.<sup>3</sup>

The reason for increased energy consumption in Macedonia is the use of obsolete project technologies and building construction technologies, outdated technology assets and old infrastructure that dramatically increases the inefficient use of energy. Everything points

to the need to implement measures to improve energy efficiency in the production, transmission–distribution and consumption of energy.

Figure 4: Electricity consumption by sector, Macedonia, 2006



The laws, strategies and regulations adopted by the Government of Macedonia (Law on Energy, Energy Efficiency Strategy, First Energy Efficiency Action Plan of the Republic of Macedonia up to 2018, Rulebook on Energy Performance of Buildings – under preparation), envisage the introduction of many energy efficiency measures and the use of renewable energy sources to reduce energy consumption and CO<sub>2</sub> emissions. With the First Energy Efficiency Action Plan, the government introduced the overall national indicative energy-saving target of 9 per cent, to be achieved by 2018.

In accordance with the First Energy Efficiency Action Plan of the Republic of Macedonia up to 2018, the national indicative energy saving targets are set and expressed in ktoe (thousand tonnes of oil equivalent; see table 2).

The construction sector – the residential, commercial and service sector – has great potential for achieving energy savings: the construction of buildings must comply with European directives. Construction of new facilities in accordance with such directives, especially the new EU Directive 2010/31/EU on energy performance of buildings and EPBD II, the Energy Performance of Buildings

3. © OECD/IEA, [2008], IEA Online Database: Energy Balances of Non-OECD and OECD Countries and Energy Statistics of Non-OECD and OECD Countries.



Directive, introduces new and stricter measures on the energy performance of buildings.

Table 2: National indicative energy saving targets

National indicative annual energy saving target for 2018	147.2	
National indicative interim target for annual energy savings for 2012	65.4	
Packages of measures to improve energy efficiency planned for achieving the target by sector	Annual energy savings expected by the end of 2012	Annual energy savings expected by the end of 2018
Residential sector	7.63	40.51
Commercial and service sector	4.96	24.19
Industry	40.96	90.45
Transport sector	12.55	44.63
Total ESD energy savings expected:	66.10	199.78

Source: First Energy Efficiency Action Plan of the Republic of Macedonia by 2018.

The preparation of secondary regulations and the implementation of energy certification is an important beginning for Macedonia, providing short- and medium-term energy saving opportunities and CO<sub>2</sub> emission reduction. The Law on Energy in Macedonia in 2012, pursuant to European regulations, provides for implementation of building energy audits and issuance of certificates or energy efficiency passport for buildings.

Despite the adoption and enforcement of building energy codes to contribute to energy savings in the residential sector under the First Energy Efficiency Action Plan, the following measures are expected to be implemented (see table 3).

According to official data, the dominant forms of energy consumption in households/residential sector are electricity (mainly for heating purposes) up to 52.6 per cent and biomass (firewood) up to 33.3 per cent (2006 data). Liquid fuels and thermal energy for central heating contribute 6.7 per cent. Renewable sources of energy in this sector will contribute to achieving energy savings and reducing carbon emissions.

The contribution of individual energy saving measures in the commercial and service sector is predicted to be as seen in table 4.

Table 3: Measures expected to be implemented under the First Energy Efficiency Action Plan

No.	Title of programme/measure	Annual energy savings expected in 2012–2018 (ktoe)	
1.	Installation of individual heat allocators for Skopje district heating	0.37	1.38
2.	Social housing projects	0.263	0.93
3.	Adoption and enforcement of building energy codes	2.98	8.9
3.1	Electrical appliance and equipment labelling, and energy performance standards	Included in savings accepted in building energy codes	
4.	Replacement of fire wood furnaces with high-efficiency models	0.486	6.4
5.	Establishing information centres and implementing information campaigns on energy efficiency	1.08	7.6
6.	Use of new efficient boilers for individual central heating	0.39	2
7.	Financial support for individuals for EEI investments	Included in other measures	
8.	Use of solar collectors and geothermal heat pumps	0.42	2
9.	Reconstruction of existing buildings in terms of energy efficiency	1.63	11.4
	Total for residential sector	7.63	40.5

Table 4: Contribution of individual energy saving measures in the commercial and service sector, estimate

No.	Title of programme/measure	Annual energy savings expected in 2012 2018 (ktoe)	
1.	Adoption and enforcement of building energy codes	1.15	7.55
2.	Inspections of boilers/air conditioning systems	0.30	1.1
3.	Reconstruction of buildings in the education sector in terms of energy efficiency	0.7	3
4.	Establishing information centres and municipal network, and implementing information campaigns on energy efficiency	0.11	1.71
5.	Energy management and auditing	0.3	2.3
6.	Street lighting projects	0.11	0.92
7.	Electrical appliance and equipment labelling, and energy performance standards	0.1	1.5
8.	Reconstruction of hospital buildings in terms of energy efficiency	1.5	3.61
9.	Use of solar collectors and geothermal heat pumps (GHPs)	0.69	2.49
	Total for commercial and service sector	4.96	24.19

Source: First Energy Efficiency Action Plan of the Republic of Macedonia up to 2018.

## 2.5 Small and Medium-sized Enterprises (SMEs), Infrastructure, Transport and Industry (SMEITI) as a Solid Industrial Base

In terms of infrastructure and transport, the government should continue to implement the National Development Programme, to implement the new Water Law and to provide financial support to public transport companies. A Transport Strategy should be implemented. Besides European corridor development, the government should focus on developing the internal transport network in Macedonia, as well as improving and building environmental and municipal infrastructure (water supply system, wastewater system, wastewater treatment plants and integrated solid waste management).

The industrial sector, especially the export-oriented branches, should be supported. The focus should be on cross-sectoral industries, such as agribusiness. Also, the future role of metallurgical industry, in terms of sustainable development, should be fully assessed. In this regard, the emphasis should be on developing technologies to support sustainable development.

The legal framework and business environment for small and medium-sized enterprises should be improved. Therefore, efforts should focus on quick and simple approval procedures. The current state investment policy is almost entirely geared towards attracting foreign direct investment (FDI), while neglecting domestic potential. Domestic investment stimulation would also make the country more attractive to foreign investment. The highest potential for small and medium-sized enterprises is in the following sectors: tourism, industry (textile, mechanical, automotive, energy and transport, ICT), agriculture (primary production and biofuels) and food processing (canning, wine, cheese, tobacco, food-old recipes, herbs) and crafts (arts, wood-carving, cultural services).

In this sense, it is necessary to foster and support entrepreneurship; implementation of strategies on electronic communications and information society, as well as the benefits of information and communication technology; exploiting modern technological development and research and development; ensuring rational use of energy and other raw materials; and strengthening human resources and realising their potential.

## 3. Perspectives for Green Growth

Green growth means fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies. To do this, it must catalyse investment and innovation which will underpin sustained growth and give rise to new economic opportunities. The economic opportunities lie in new industries and in greening existing ones. Green industry promotes sustainable patterns of production and consumption; in other words, patterns that are resource- and energy-efficient, low-carbon and low waste, non-polluting and safe, and which produce products that are responsibly managed throughout their lifecycle. The Green Industry agenda covers the greening of industries, under which all industries continuously improve their resource productivity and environmental performance. It also aims to create green industries that deliver environmental goods and services in an industrial manner, including, for example, waste management and recycling services, renewable energy technologies and environmental analytical and advisory services.<sup>4</sup>

### 3.1. Resource Efficiency

In Macedonia, resource usage is primarily based on petroleum, natural gas and coal. Macedonia is import dependant on oil as a primary resource in the economy.

Electricity production is based on coal sources as natural resources; the share of renewable energies is primarily based on electricity production from hydropower. The hydropower plants in Macedonia reached their maximum production in 2010 when there was excess electricity production of 1,037,831 MWh (+90.5 per cent) of the estimated production at the beginning of the year. This resulted in 1 million tonnes of coal savings and a 22 per cent decrease of electricity imports in 2010 compared to 2009. The savings were utilised in investments in improving current energy production capacities to increase their economic efficiency in energy production. Consumption of the major industrial producers for 2012 is estimated to be 18,741,314 kWh per year.<sup>5</sup>

4. UNIDO Green Industry, Policies for Supporting Green Industry, 2011.

5. Decision for approval of maximum revenues and prices for energy services supply with electricity for the tariff consumers of EVN Macedonia AD Skopje for 2012.



Table 5

Petroleum	2006	2007	2008	2009	2010
Production /total oil supply (thousand barrels per day)	-0.05133	-0.11623	-0.11623	-0.11623	-0.11623
Total petroleum consumption (thousand barrels per day)	19.62611	20.18912	18.71932	20	19
Crude oil distillation capacity (thousand barrels per cal day)	50	50	50	50	50
Consumption of residual fuel oil for bunkering (thousand barrels per day)	0	0	0	0	N/A
Crude oil proved reserves (billion barrels)	0	0	0	0	0
Total imports of refined petroleum products (thousand barrels per day)	5.59047	2.73085	4.7311	NA	NA
Total exports of refined petroleum products (thousand barrels per day)	7.40951	5.3106	7.70641	NA	NA
CO2 emissions from the consumption of petroleum (million metric tons)	2.89808	3.02446	3.14593	2.99612	NA

Source: International energy statistics.

Table 6: Consumption of the major industrial producers, Macedonia, 2012

Electricity	2006	2007	2008	2009	2010
Total electricity net generation (billion kilowatt hours)	6.671	6.159	5.975	6.482	NA
Total electricity net consumption (billion kilowatt hours)	6.783	7.141	7.264	6.733	NA
Total electricity installed capacity (million kilowatts)	1.54	1.54	1.54	1.54	NA
Total electricity imports (billion kilowatt hours)	1.795	2.491	2.733	1.438	NA
Total electricity net imports (billion kilowatt hours)	1.795	2.491	2.733	1.438	NA
Total electricity exports (billion kilowatt hours)	0	0	0	0	0
Electricity distribution losses (billion kilowatt hours)	1.683	1.509	1.444	1.187	NA
Gross heat content of hydroelectric power (btu per kilowatt hour)	9919	9884	9854	9760	9760

Source: International energy statistics.

Table 7

Renewable	2006	2007	2008	2009	2010
Total renewable electricity net generation (billion kilowatt hours)	1.634	1	0.832	1.257	NA
Total renewable electricity net consumption (billion kilowatt hours)	1.634	1	0.832	1.257	NA
Total biofuels production (thousand barrels per day)	0	0.05	0.01	0.01	0.01
Total biofuels consumption (thousand barrels per day)	0	0	0.01	0.01	0.01
Gross heat content of hydroelectric power (btu per kilowatt hour)	9919	9884	9854	9760	9760

Source: International energy statistics.



Table 8: Register of producers of electricity from RES\*

	Name of the plant	Type of plant	Name	Date of inclusion	Nominal power [kW]
1.	Sieto 1	Photovoltaic	Sieto LLC, Skopje	12.05.2009	10.2
2.	Ohrid 2	Small HPP	SHPP Letnicki izvori LLC, Skopje	01.10.2009	350
3.	Dabnishte	Small HPP	Dikom Ltd v. Vatasha, Kavadarci	17.12.2009	32
4.	Petro M	Photovoltaic	Petro M LLC, Skopje	14.06.2010	49.720
5.	Geo-Link Group	Photovoltaic	Geo-Link Group Ltd. Skopje	15.06.2010	49.720
6.	Ohrid 3	Small HPP	SHPP Letnicki izvori LLC, Skopje	04.06.2010	229
7.	Belica 1	Small HPP	SHPP Gorno Belichki izvori LLC, Skopje	27.07.2010	995
8.	Belica 2	Small HPP	SHPP Gorno Belichki izvori LLC, Skopje	27.07.2010	996
9.	Ohrid 3	Small HPP	SHPP Gorno Belichki izvori LLC, Skopje	21.07.2010	117
10	Mavis	Photovoltaic	Mavis LLC, Shtip	10.12.2010	250
11	loc. Old treatment plant Dovledzik	Small HPP	Hydroenergo water Project, LLC Bitola	15.10.2010	400
12	Photovoltaic plant ALFA PARK	Photovoltaic	Alfa Engineering Ltd Radovish	25.02.2011	49.7
13	Integral	Photovoltaic	Integral Ltd Tetovo	21.04.2011	49.9
14	SHPP Drugovo	Small HPP	Studencica Small Hydro LLC Skopje	15.04.2011	600
15	Foton	Photovoltaic	Foton, Bosilovo	29.04.2011	11.50
16	MEGA Solar	Photovoltaic	Germijan, Bitola	27.05.2011	996.7
	total				4497.8

\* Energy Agency, Republic of Macedonia.

The energy balance report<sup>6</sup> for 2010 for Macedonia includes total primary production of 1.615.629 toe of total primary electricity production; 56.2 per cent is gross domestic consumption, 2,875,440 toe. The biggest final energy consumers are industry, at 28.8 per cent, households, at 29.5 per cent and transport, at 25.3 per cent. Final consumption by sector is:

- Final non-energy consumption 35,405 toe
- Final energy consumption 1,670,861 toe (of which 525,088 toe belongs to industry, 460,880 to transport and 538,117 to households).

The share of electricity produced from renewable energy resources refers to energy production from hydropower and biodiesel production. Biodiesel is mostly put on retail fuel markets and used for transportation.

The contribution also includes production by registered producers of energy from renewable energy by year. There are 16 registered producers of renewable energy in Republic of Macedonia producing a total of 4497.8 Kw energy. At the moment, only legal persons may be registered as producers of energy from RES in Macedonia. That is an additional obstacle to the stimulation of individual initiatives to invest in RES and obtain the status of energy producer from RES.

Green industry and green enterprises in Macedonia have started to develop the national market and national competition over the past ten years. The development of a green economy might be integrated in existing business sectors in Macedonia, such as agriculture, forestry and fishing, manufacturing and processing industry, construction, electricity, gas, steam and air conditioning supply, water supply, sewage, waste management and remediation activities and transportation.

6. Energy balance 2010, State Statistical Office of the Republic of Macedonia.



Table 9: Number of active business entities by sector of activity according to the National Classification of Activities NKD Rev.2 and by number of persons employed, 2011

Sector	Total	%	Number of business entities by number of persons employed					
			01)	1–9	10–19	20–49	50–249	250 +
Total	73 118	100.0	6 674	60 620	2 754	1 698	1 187	185
Agriculture, forestry and fishing	2 963	4.1	231	2 631	34	27	38	2
Mining and quarrying	176	0.2	30	98	21	15	8	4
Manufacturing	8 155	11.2	550	6 070	655	496	331	53
Electricity, gas, steam and air conditioning supply	98	0.1	48	37	2	4	4	3
Water supply, sewage, waste management and remediation activities	283	0.4	26	181	21	21	27	7
Construction	4 400	6.0	403	3 512	272	150	57	6
Wholesale and retail trade; repair of motor vehicles and motorcycles	27 468	37.6	1 755	24 509	769	326	97	12
Transportation and storage	6 380	8.7	259	5 811	182	91	31	6
Accommodation and food service activities	4 313	5.9	215	3 738	261	79	18	2
Information and communication	1 419	1.9	290	999	65	35	23	7
Financial and insurance activities	420	0.6	79	284	13	15	19	10
Real estate activities	450	0.6	98	316	19	12	4	1
Professional, scientific and technical activities	5 369	7.3	480	4 706	119	51	13	-
Administrative and support service activities	1 319	1.8	329	855	51	44	24	16
Public administration and defence; compulsory social security	203	0.3	8	29	38	51	51	26
Education	986	1.4	59	431	47	155	287	7
Human health and social work activities	3 246	4.4	37	2 925	82	66	118	18
Arts, entertainment and recreation	1 213	1.7	430	650	53	44	31	5
Other service activities	4 257	5.8	1 347	2 838	50	16	6	-

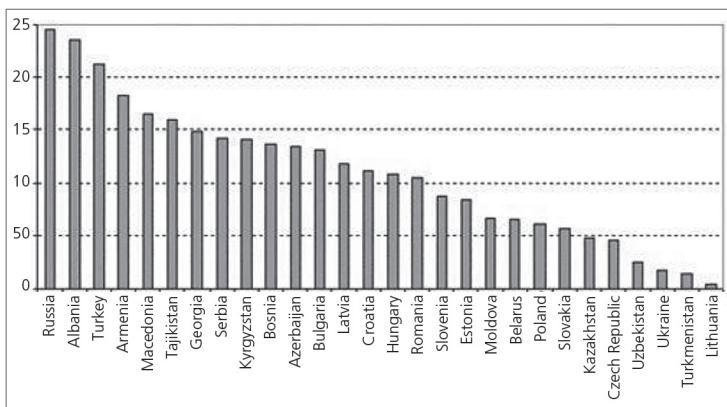
Source: Statistical Yearbook 2011, statistical office of Republic Macedonia.

To date, these sectors have contributed significantly to the Macedonian economy, including by providing jobs . Agriculture, one of the dominant sectors in Macedonia, is still not fully resource efficient. Key factors in this sector are irrigation systems management and mitigation of and adaptation to climate change. At the moment, Macedonian farming is not integrating adaptation

methods to increase productivity because the necessary investment would be high. Implementation of optimal adaptation practices is not yet fully in place. The mitigation measures are not undertaken by farmers since their awareness is still too low. The water capacity required for BAU is limited according to the studies made by the World Bank.

On the other hand, the need for adaptation to climate change is urgent in this sector. Increasing temperatures, decreasing rainfall and climate variability are among the impacts already being observed in Macedonia, and they are expected to further intensify. Macedonia is one of the countries in the ECA most vulnerable to climate change. The country's current emissions per unit of GDP are approximately twice the EU15 average, with the energy sector being the largest emitter. Besides the energy sector, mitigation efforts must include industry, solid waste, agriculture, forestry and land use change, and the transport sector.

Figure 5: How countries are likely to experience increases in climate extremes by the end of the 21st century



Source: Baettig et al., 2007.

These parameters are also influencing the construction sector, which has started to reform in response to the regulations on energy efficiency in buildings.

In addition, waste management is undergoing development as properly functioning waste management systems are lacking. In 2010, the total quantity of deposited waste on all landfills was 521,952 (m<sup>2</sup>) and the total area of landfills was 2,592,482 (m<sup>2</sup>). It is particularly important to point out that there are approximately 1,000 unlicensed municipal landfills, especially in rural areas. According to the State Statistical Office, the total amount of collected municipal waste in Macedonia in 2010 was 545,763 tonnes. The amount of municipal waste was 721,507 tonnes. The annual amount of generated municipal waste per person in 2010 was 351 kg, or 0.9 kg per day. Import/export of waste in 2009 was dominated

by manufacture of basic metals; with regard to imports, the share of this activity amounted to 38 per cent, while with regard to exports it was 43 per cent. In exports, a large share also belonged to the activity »other mining and quarrying«, at 28 per cent.

Separation and usage of both solid and liquid waste are not functional, according to modern waste management principles. This means that the available resources, including recycling and waste reuse, are not fully used.

Most registered vehicles in Macedonia are passenger cars, followed by freight vehicles. Their number continually increased from 2006 to 2010, while the number of special vehicles and buses increased 2009 to 2010. Unfortunately, in total passenger transport in 2010, road passenger transport dominated with 74.2 per cent in comparison to other modes of transport. The remaining 25.8 per cent belongs to bus transport (23.5 per cent) and railway transport (2.3 per cent). In total freight transport in 2010, road freight transport dominated with 89.0 per cent in comparison to railway transport, whose contribution was only 11.0 per cent. The biggest pollution of the environment originates from road freight.

There is potential for the establishment of an integrated transportation system since Macedonia already has infrastructural and human resources, albeit in need of upgrading and reconstruction. There is also a need to establish new infrastructural projects that will enable convenient and green transport in the country.

The industrial sector as a result of an increase of electricity prices is starting to invest in alternative energy sources and energy savings in industrial processes. Such attempts are made by those able to invest in adapting production processes to energy saving. Existing borrowing facilities support those interested in investing in improvements in energy efficiency.

EBOR's WebSEFF<sup>7</sup> credit line, implemented in Macedonia by three commercial banks and Macef, has supported 15 projects totalling over 4.4 million euros. Printing houses (four) are most likely to save energy in the years ahead. The most frequently utilised measures as part of energy efficiency projects include processing equipment modernisation, replacement of boilers, efficient steam

7. See: <http://www.webseff.com/?p=1291>

systems and central heating, as well as wall insulation, windows and doors replacement. The three renewable energy projects – two in trading and one in the baking industry – have made their energy saving projections based upon the installation of geothermal heat pumps (GHP), while one company, in addition to energy efficiency measures, will be installing solar thermal collectors for sanitary water heating.

Annual energy saving with these investments is estimated at 3 million euros, while the average return on all energy efficiency investments is over about three years and for RE projects a little over four years. This number will fall significantly when taking into account the 15 per cent or 20 per cent EU cashback incentive on all projects. These investments marked the companies as pioneers in investing in energy efficiency and RES, opening up new possibilities and increasing the competitiveness of Macedonian products both domestically and, more important, in the wider region. To sum up, these pioneers come from the printing industry, metallurgy, transport and logistics, confectionary, super markets/retail, baking industry and chemicals. However, the possibilities for savings are limitless in current circumstances of old equipment and industrial facilities.

There are resources that are not yet being fully utilised to enable green growth in Macedonia. An integrated framework is essential for green growth and resource efficiency. The greening of industries requires effective and coordinated governance regimes to champion and support the implementation of green industry policies and initiatives. A clear government commitment is needed, with supportive leadership throughout the public sector.

Green growth in the Republic of Macedonia has recently been introduced within the framework of efforts by the World Bank with regard to Macedonia's Green Growth and Climate Change Analytic and Advisory Support Programme. The World Bank project is an umbrella programme of analytical work and non-lending technical assistance. Its main objectives are to support the government in assessing the economic costs and benefits of a shift to greener growth, taking into account projected climate change, prioritising for implementation actions identified by the National Strategy for Sustainable Development (NSSD) and supplemented by the Programme's recommendations. The Bank's support for green growth seeks to bring about sustainable economic growth with

fuller consideration of climate change and environmental quality in the long run. Specifically, the Programme addresses challenges identified by the National Strategy for Sustainable Development, endorsed by the Government in 2010: job creation, inclusive growth, EU accession, adaptation to climate change, mitigation of greenhouse gases, policy reforms and public investments. The programme includes analysis and modelling and advisory services that will support the government and the National Council for Sustainable Development.

The analyses and modelling are built on existing tools and knowledge gathered by others, including the government, academia, NGOs and donors. The goal is to assess key sectors' roles in a green growth strategy – including energy, agriculture, water, transport and urban areas – and to integrate sectoral analyses into a green growth macroeconomic model to simulate the overall impact on GDP, growth, employment, international trade and fiscal variables. The macroeconomic modelling may, among other things, also draw on analyses using the EFFECT, MAC and HEAT tools. Part of the work under this component will also generate a baseline or »business-as-usual« scenario. The advisory services and support to the government will be based on the results of Component 1, and will cover advice on implementation of the existing strategy for sustainability, fostering better policy on green growth and climate change issues, assisting government agencies with specific technical or policy issues related to green growth, and providing overall coordination undertaken by both components.

This is expected to be a flagship project in the Bank's Europe and Central Asia (ECA) Region, aiming to set a good practice example of how to conduct a green growth assessment for a country. The aims of the programme are as follows: provide the government with valuable analytical information by integrating sustainability and green growth into the government's main economic agenda; inform government policy; facilitate knowledge exchange with new conceptual frameworks (for example, government officials will learn to produce green growth analyses in one or two key sectors); foster broader awareness, participation and consensus-building around green growth issues in Macedonia; influence the Bank's and other partners' programmes going forward; develop a methodology and product that can be replicated in the Balkans and elsewhere in ECA, combining the economics of adaptation and mitigation; and

contribute to the improvement of Macedonia's long-term competitiveness and resilience to climate change.

The banking sector provides products to support investments in green growth. European investment banks provide loans for projects related to investments to energy. The EBRD provides loans for industrial energy efficiency and renewable energy integration within the WeBSEFF credit line. USAID provides grant mechanisms for small and medium-sized enterprises for energy efficiency and renewable energies, as well as loans for improving the energy efficiency in residual buildings. National banks provide ECO credits for energy efficiency interventions for legal entities and private persons.

### 3.2. Sectors of the Economy with the Potential to Create Green Growth

According to international standards and the ILO's proposed classification of green jobs the Macedonian economy has the potential to start considering some employment under this heading. The following sectors are driving the potential for green growth and therefore green jobs at the moment:

1. construction; 1. forestry; 3. production of clean energy – including solar panel production; 4. agriculture; 5. research institutions and institutes in cooperation with industry; 6. industry in general; 7. transport.

The industrial sectors that at the moment are making a substantial contribution to enhancing energy efficiency are construction, agriculture (mostly fruit and vegetable production), forestry and the heating and cooling industry. In addition, industry is working to improve its operations to conserve and restore the environment, in accordance with statutory environment requirements. In general, the law obliges industry to develop mitigation measures based on studies of their functioning related to EIA and SEA procedures. Most economic actors are obliged to carry out environmental impact studies. The main production facilities are subject to A or B integrated environmental permits or adjustment permits with an adjustment plan. The permits regulate all emissions from production processes and all measures that have to be undertaken to reduce emissions. These regulations are in accordance with EU requirements under the IPPC, EIA and SEA directives, transposed into national environmental law.

The basis for this are EIA studies on new infrastructure projects, SEA for strategic documents (in relation to the development of areas such as agriculture and tourism) and IPPC for larger industrial capacities to develop an integrated approach to all emissions.

The low level of renewable energy producers in Macedonia provides potential for further strengthening and new establishment. Efforts to enhance renewable energy production are in the phase of development and establishment both at the regulatory and the implementation level. Potential is dependent on the low level of awareness among economic actors. The low number of qualified experts to guide industry in improving efficiency and reducing negative impacts on the environments is another obstacle. The increase in production costs related to investments in renewable energies in production systems and energy efficiency would impose a burden on the economy in its efforts to become green. The lack of subsidies and available credit lines or even pay-as-you-save principles in the country are the main obstacles to green growth. The potential in all industrial sectors remains unutilised. Modest attempts to improve energy efficiency and green production processes are being made in agriculture. Industrial sector support will be provided through USAID over the coming years.

### 3.3 Growth Rates, Employment Effects and Impacts on the Country's Innovation Potential

Economic growth has been increasing in Macedonia in recent years (see table 10).<sup>8</sup> Estimated economic growth in Macedonia according to macroeconomic analysis is shown in table 11.

High inflation is a sign of macroeconomic imbalances. It reduces economic growth, thereby reducing the means available for achieving sustainable development goals. The past decade has been characterised by a relatively low inflation rate, with average annual growth of 2.3 per cent.

8. Data not available for 2011 on UNCTAD website.



Table 10: Economic growth rates

GDP by type of expenditure and value added by kind of economic activity, annual. US dollars at constant prices (2005) and constant exchange rates (2005) in millions					
	2006	2007	2008	2009	2010
Gross domestic product (GDP)	6287.989	6674.647	7005.156	6940.692	7062.495
Final consumption expenditure	6072.732	6461.854	6980.816	6722.043	6660.415
Household consumption expenditure (including NPISH)	4971.391	5372.745	5772.832	5501.185	5490.39
General government final consumption expenditure	1108.58	1105.584	1222.455	1228.685	1181.979
Gross capital formation	1379.229	1685.849	1776.498	1749.017	1750.412
Gross fixed capital formation	1379.229	1685.849	1776.498	1749.017	1750.412
Changes in inventories	..	..	..	..	..
Exports of goods and services	2858.32	3194.674	2992.527	2508.128	3069.661
Imports of goods and services	4029.531	4678.497	4716.81	4010.093	4415.54
Total value added	5335.897	5670.847	5925.648	5924.698	6078.329
Agriculture, hunting, forestry, fishing	658.7347	639.3088	675.5152	693.4344	724.4476
Industry	1481.291	1642.54	1651.406	1533.706	1544.968
Mining, manufacturing, utilities	1146.236	1296.312	1324.213	1192.11	1156.054
Manufacturing	908.1341	1044.668	995.1337	853.9931	876.1884
Construction	335.0554	346.2282	327.1926	341.5961	388.914
Services	3202.521	3392.083	3614.145	3725.196	3839.355
Wholesale, retail trade, restaurants and hotels	918.3941	980.3948	1043.953	1094.482	1119.075
Transport, storage and communications	522.6717	577.4817	647.6738	640.4268	648.6654
Other activities	1761.455	1834.206	1922.518	1990.287	2071.615

Source: Growth rates according to UNCTAD, UNCTADstat.

Table 11: Estimated economic growth

Basic macroeconomic indicators	2006	2007	2008	2009	2010	2011	2012	2013	2014
Real sector									
<b>GDP at market prices</b>									
real growth rate	5.0	6.1	5.0	-0.9	1.8	3.5	4.5	5.0	5.5
in million USD	6,561	8,162	9,835	9,319	9,143	10,296	11,059	11,893	12,861
in million EUR	5,231	5,965	6,720	6,677	6,905	7,401	7,949	8,549	9,244
in million PPS	14,594	16,212	17,255	17,273	-				
<b>GDP per capita</b>									
in EUR	2,564	2,919	3,283	3,253	3,360	3,595	3,855	4,140	4,469
in PPS	7,153	7,933	8,430	8,415	-				
Gross capital formation, % of GDP	21.5	24.6	26.8	25.9	23.3				
Industry, real growth rate	2.6	12.6	2.4	-10.7	-2.2	7.0			
Inflation (CPI), average	3.2	2.3	8.3	-0.8	1.6	3.9	2.5	2.5	2.5
GDP deflator	3.3	7.4	7.5	0.7	1.6	3.6	2.8	2.4	2.5

### 3.4 Employment

According to the State Statistical Office, and in accordance with the preliminary data of the main annual structural business indicators on enterprises in the non-financial business sector, in 2009 there were 55,654 active business entities with 300,945 employees.

The largest proportion of enterprises in the non-financial sector are in the trade sector (49.7 per cent), with 28.3 per cent of total employees. These enterprises generated a turnover of 327,068 million denars, which is 44.9 per cent of the total. The manufacturing sector accounts for 14.1 per cent of active enterprises, with 34.2 per cent of total employees and 25.2 per cent of total turnover. The largest share of total value added at factor cost was achieved by enterprises in trade (26.9 per cent), followed by manufacturing (25.2 per cent) and transport (17.0 per cent). The smallest contributor to total value added was hotels and restaurants (1.9 per cent). The size structure of enterprises was dominated by enterprises with up to 9 employees (92.8 per cent), with 33.6 per cent of the total number of employees and 26.9 per cent of value added. The contribution of large companies to value added was the largest (37.1 per cent), even though they have only 24.2 per cent of employees.<sup>9</sup> The data do not include the grey economy. The most important sector with regard to green jobs is waste management, with approximate 5,000 people working in plastic recycling (see table 12).

The unemployment rate is predicted to fall by 3.1 per cent. This estimate also includes the increase in green jobs within the framework of the government's strategic objectives with its green economy commitment within the pre-accession economic programme 2012–2014 (see table 13).

The economic growth indications and predictions use standard development methods transposed to existing state measures to promote innovation, especially among SMEs. Technology flows are insufficient for development and innovation, however. Ready financing and business skills are also needed. There must be adequate protection for intellectual property, and adequate incentives for entrepreneurial drive. Critical to a culture of innovation

Table 12: Employment by sector of activity in the Republic of Macedonia:<sup>10</sup>

	2006	2007	2008	2009	2010
TOTAL	570 404	590 234	609 015	629 901	637 855
Agriculture, hunting and forestry	114 485	107 433	119 498	116 601	121 521
Fishing	292	284	251	67	250
Mining and quarrying	3 861	5 093	6 680	4 253	4 964
Manufacturing	123 066	126 193	128 953	126 779	124 282
Electricity, gas and water supply	15 955	15 636	15 516	15 296	15 043
Construction	43 203	38 006	39 381	40 749	40 953
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	73 015	82 791	86 553	96 761	96 206
Hotels and restaurants	19 034	17 486	19 117	21 193	21 522
Transport, storage and communication	30 000	35 461	37 726	38 300	35 909
Financial intermediation	7 081	9 041	7 739	8 654	8 907
Real estate, renting and business activities	15 376	15 909	16 298	19 560	21 058
Public administration and defence, compulsory social security	39 343	41 409	42 227	44 471	46 415
Education	33 394	34 367	33 615	37 433	38 862
Health and social work	32 584	32 947	32 906	35 905	35 959
Other community, social and personal service activities	18 290	24 714	21 008	22 133	23 939
Private households with employed persons	464	1 415	733	1 103	1 408
Extraterritorial organisations and bodies	962	1 869	814	644	656

are small and medium-sized enterprises (SMEs) which in recent years have proved to be the engines of economic growth and the principle source of new employment around the world. Their ability to exploit new technologies and to respond quickly to changing market needs gives SMEs a pivotal role in the success of the economy. At the moment there are active programmes to promote SMEs supported by the EU Instrument for Pre-Accession Component I. Most of them do not specifically support green innovation products for the national and global

9. Source: State Statistical Office, National Business Statistics 2009, 29 August 2011.

10. Source: State Statistical Office.

Table 13: Estimated unemployment rate

Basic macroeconomic indicators	2006	2007	2008	2009	2010	2011	2012	2013	2014
Social sector									
Population (mill)	2.040	2.043	2.046	2.052	2.055	2.058	2.061	2.065	2.068
Net wage									
Nominal growth	7.3	7.9	10.4	24.0	3.0	1.4	4.4	6.0	7.0
Real growth	4.1	5.6	1.9	25.0	1.4	-2.4	1.9	3.5	4.5
Gross wage									
Nominal growth	8.0	4.8	8.7	14.1	1.0	1.2	4.1	5.4	6.5
Real growth	4.8	2.5	0.4	15.0	-0.6	-2.6	1.6	2.9	4.0
Unemployment rate (ILO)	36.0	34.9	33.8	32.2	32.0	30.8	29.5	28.4	27.1
Employment growth	4.6	3.5	3.2	3.4	1.3	3.0	3.0	3.0	3.5
Productivity growth	0.4	2.6	1.7	-4.2	0.5	0.5	1.5	1.9	1.9

markets. There are no integrated green economy support schemes in the existing measures that would drive and support green growth innovations. However, the Innovation Centre recently established with USAID support may integrate and stimulate innovations in a green growth direction.

### 3.5 Green Products and Technologies

Macedonian industry lacks green products and technologies in terms of certification. The only green certification in the country is within the framework of agriculture and the provision of organic agricultural products. There is no green or eco product label in Macedonia compliant with European and international standards for green products.

The industrial sector, forced by increasing energy prices and statutory requirements with regard to the environment and energy efficiency is making only modest efforts with regard to developing green products.

Some SMEs have identified the potential in the sector and now there are approximately 100 SMEs working in the green economy and marketing green products. This includes agricultural products, solar panel production and energy efficiency materials production, as well as product-related services, such as assembling solar panels and construction technologies that improve the energy efficiency of buildings.

However, some products are either imported or only assembled in the country. There are no official data on the type and quantity of production in these sectors or on pioneering attempts.

Green jobs can be generically defined as the direct employment created in the different sectors of the economy and through related activities which reduce environmental impact, ultimately to a sustainable level. This includes »decent« jobs that help to reduce the consumption of energy and raw materials, decarbonise the economy, protect and restore ecosystems and biodiversity and minimise the production of waste and pollution.

It is very difficult to obtain an assessment of green jobs potential due to the lack of properly and comparably disaggregated data available in and for Macedonia. Attempting to carry out an assessment with the basic economic profile according to the latest tool developed by the ILO one finds that data are missing and that the available data are not in compliance with the required parameters (GDP per sector vs. employment) concerning structuring the economic profile of each sector separately, specifically with regard to share of GDP and GDP growth rates.

Income analysis is difficult due to the lack of relevant data as required by the model for estimating green jobs in ILO handbooks.

By using the previous methodology on the available data, we can estimate current green activities as follows:

Activities that help to green particular sectors:

- Construction sector – Improvement of energy efficiency in the construction of new and the improvement of old buildings by integrating energy-efficient ecological materials in an environmentally friendly way.
- Forestry – Improvement of forest management systems, including improvements in fire protection systems and fire intervention. Activities related to the increase and preservation of current forest capacities.
- Energy sector – production of clean energy – Activities related to investment in integrated management systems, biomass and biogas production and use for different purposes. Solar panel production – the sector is



Table 14: Macedonia's basic economic profile by sector

Economic profile			Environmental economic links			
	Share of jobs	Share of GDP	Resource use	Mgmt./mitigation	Periphery activities	Environmental quality (including adaptation)
TOTAL	637 855					
Agriculture, hunting and forestry	121 521	724,4476	Water, land, minerals, soil Organic farming	Mining, energy sector pollution control & waste management		Organic farming, sustainable forestry, rehabilitation of quarries, reforestation, etc.
Mining and quarrying	4 964	1156,054				
Manufacturing	124 282	876,1884				
Electricity, gas and water supply	15 043	n/a	Fossil fuels, renewable sources	Smart grids, smart meters, energy from waste		Air protection Protection of soil and water quality
Construction	40 953	388,914	Sustainable materials	Energy-saving materials, eco-construction		Flooding
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	96 206	1119,075		Transport logistics and efficiency	Green products and services	
Hotels and restaurants	21 522		Tourism-related use of water, waste management and air pollution related to transport			
Transport, storage and communication	35 909	648,6654	Transport-related use of water, air and land			
Financial intermediation	8 907	n/a	Access to finance	Access to finance	Green credit lines	
Real estate, renting and business activities	21 058	n/a			Consulting, advice and planning	
Public administration and defence, compulsory social security	46 415	n/a		Waste and resource management Land management & nature protection		Environmentally related activities natural risk management (adaptation)
Education	38 862	n/a		Waste and resource management/nature protection		Environmentally related activities natural risk management (adaptation)
Health and social work	35 959	n/a		Waste and resource management/nature protection		Environmentally related activities natural risk management (adaptation)
Other community, social and personal service activities	23 939	n/a		Waste and resource management/nature protection		Environmentally related activities natural risk management (adaptation)
Private households with employed persons	1 408	n/a		Waste and resource management/nature protection		Environmentally related activities natural risk management (adaptation)
Extraterritorial organisations and bodies	656	n/a				



Table 15: Environmental performance indicators by sector, Macedonia:

Sector	Core environmental related activity	Resource use	Energy efficiency	Abatement and mitigation	Adaptation resilience [?]
Agriculture	Organic agriculture, water efficient agriculture	Pesticide free	Limited energy usage	Decreased carbon emissions	
Industry and manufacturing	Energy efficiency, renewable energy use	Fossil fuels decrease Renewable sources emissions free	Limited energy usage, clean energy use	Reduction of GHG, industry emissions	Finance
Electricity, gas and water supply	Renewable energy production, gasification and efficient water supply systems using separate water ( industrial and drinkable)	Fossil fuels decrease Renewable sources emissions free, decrease of distribution losses	Reduction of fire wood and mazut usage	Reduction of GHG and other emissions	Finance
Construction	Energy efficient materials production, skills	Fossil fuels decrease	Fossil fuels limited energy use	Decrease of emissions	
Forestry	Sustainable forest management including fire protection control systems	Fossil fuels, renewable sources	Limited energy usage	Reduction of GHG and other emissions	
Transport and communication	Sustainable and integrated transport systems	Fossil fuels	Fossil fuels use	Reduction of emissions	Finance
Waste management	Integrated waste management systems	Soil, water degradation	Fossil fuels for transport	Reduction of GHG and other emissions	Finance
Financial intermediation	All environmentally undertaken activities				

active at the moment, but requires additional skill development and easy access to finance.

- Agriculture – greening agriculture by introducing best agricultural practices and enhancing organic production. R&D – establishment of active cooperation between R&D and industrial needs and services.
- Industry in general – Investments in energy efficiency improvements and renewable energy resource usage in industrial production.
- Transport – Integrated transport management and introduction of green transport, including the development of transport infrastructure, efficient transport use and bio fuels usage in energy and retail markets. Introduction and measures for supporting green and clean energy drive vehicles.

- Green activities that cut across a number of different sectors:

These activities include integrated industrial and residual waste management, recycling systems and further waste, including the relevant labour inputs from manufacturing, professional services, transport and other services. Greening the value chains of sectors that overlap in energy supply interventions, energy efficiency improvements and waste management.

Since estimated employment growth is 3.5 per cent the estimated potential for green jobs development in the best case is a maximum of 1 per cent across all sectors.

The main economic obstacles to green growth in Macedonia are likely to be the following: green finance market development in terms of the price of available financial products; subsidy schemes that are not yet fully



Table 16: Labour market interventions with regard to green activities in Macedonia

Sector	Green economic activity	Economic issues	Social issues	Impact of green jobs
Agriculture	Soft measures	Organic growing methods; soil conservation; water efficiency and conservation	Employment, income, decent work, poverty reduction	Substitution
Industry and manufacturing	Soft measures	Energy efficiency including industrial cogeneration	Public health, quality of work, decent work	New jobs and transformation
Electricity, gas and water supply	Soft and hard investment measures	1. Solar photovoltaic and thermal, wind energy, biogas/biomass gasification, micro-hydro power, biofuels, gasohol, geothermal, river current 2. Power grid efficiency and substitution/ management/smart grids and distributed technologies	1. Employment, income, decent work 2. Transition for workers across sectors and enterprises	1. New jobs 2. Transformation
Construction	Soft measures	Buildings efficiency/green energy efficiency buildings	Transition for workers across sectors and enterprises	Transformation and new jobs
Forestry	Soft measures	Sustainable forest management	Employment, income, decent work, poverty reduction	New jobs
Transport and communication	Hard and soft measures	Eco-efficient public transportation and transit transportation Hybrid and clean fuel vehicles	Transition for workers across sectors and enterprises Inclusion of marginal social groups	1. Transformation 2. Transformation
Waste management	Hard measures and soft measures	1. Waste management and recycling 2. Water sanitation and water New jobs/distribution efficiency	Employment, income, decent work	1. Transformation 2. New jobs
Financial intermediation	Soft measures	Green-focused banking	Transition for workers across sector	Substitution

integrated into the economy; debt; inflation; global economic crises; full implementation of relevant national regulations and strategies yet to be developed and implemented in the wake of the World Bank green growth programme; limited investments in human capital development and qualification schemes concerning new skills development; capacity development of training providers and their integration in the national qualification system.

In addition, there are also non-tariff and tariff barriers, such as subsidies to traditional energy sources, regulatory and legal barriers, lack of infrastructure and the usual investment risks.

## 4. Role of Politics and Society

### 4.1 Role of the State in Green Growth and Environment

Since independence, the Republic of Macedonia has shown a strong commitment to building a stable political and economic system, together with a legal system that will enable integration in the European Union and in the broader international community.

One of the biggest challenges in environmental policy is the establishment of an optimal balance among the economic, social and environmental dimensions of development, which entails increased use of economic instruments in order to protect the environment.

The Republic of Macedonia prepared a National Strategy for Environmental Approximation in order to achieve the optimal route for the approximation process in 2008

with support from the European Union within the Cards Programme for 2005.

The National Strategy for Environmental Approximation, based on prioritised EU legislation, international agreements and government priorities, is a comprehensive framework, with related costs, for the legal transposition and technical implementation of all 10 environmental categories: horizontal legislation, water management, air quality, waste management, industrial pollution control and risk management, nature protection, forests, chemicals, genetically modified organisms and noise.

The main goal of the National Strategy for Environmental Approximation (NSEA) is to recommend to the government of the Republic of Macedonia the most appropriate and suitable approach to meeting the complex obligations of the EU environmental acquis and at the same time to contribute to Macedonia's sustainable development.

Several other important strategic policy documents in various environmental sectors have been adopted, clearly defining the government's environmental policy (for example, Vision 2008, the National Strategy for European Integration, the National Environmental Action Plan). In December 2006, the Ministry of the Environment and Physical Planning (MoEPP) adopted a new administrative and organisational structure in accordance with the individual environmental sectors/areas corresponding to the obligations imposed by the approximated legislation for efficient fulfilment of the new competences and responsibilities. Attention is being given to capacity-building and technical staffing.

The main responsibility for implementation of the environmental legislation lay on the MoEPP, but other ministries also have environmental-related responsibilities (the MAFWE, MoE, MTC, MoH, MoF, MoIA). Clear differentiation between responsibilities is crucial to avoid overlapping of competences between government institutions. Local Self-Government Units (LGSUs)/municipalities have several responsibilities, such as local strategic planning, monitoring, inspection/enforcement, registration/licensing, data collection, reporting, and public information and consultation), but human and financial resources and knowledge are lacking, and the institutional set-up at local level needs to be strengthened as soon as possible.

The business community has the responsibility to carry out self-monitoring and reporting of emissions, prepare policy documents, obtain and maintain licenses/permits for operation, respond to monitoring and mitigation plans, provide public information, data collection and report collected environmental information to the responsible institutions. Setting technical standards, accreditation of laboratories, inspection and certification are the responsibility of the Institute for Standardisation and the Institute for Accreditation. Academic institutions are mainly responsible for providing technical assistance to government institutions. Some laboratories have the equipment and trained personnel needed to carry out environmental and product quality monitoring, as well as to carry out research. The role of professional associations is to provide technical inputs to the public information and consultation process, to support the regulation drafting process with advice on practical implementation and during the process of setting technical standards. The environmental NGOs representing the public have a very important role in public consultation processes, but public participation is still at an early stage.

In March 2012, a National Council for Sustainable Development was established. The main role of the Council is to ensure implementation of the activities defined in the Strategy for Sustainable Development, in other words, development of the national economy in accordance with the basic principles of green growth.

## 4.2 Political Regulations

In general, both existing and draft national environmental legislation needs to be amended and secondary legislation needs to be prepared and adopted to complete the legal transposition. Definitions, allocation of responsibilities, main principles and general obligations are best included in primary legislation. An appropriate legal basis should be included in the national environmental legislation, which will enable the adoption of secondary legislation. It is suggested that annexes in the EU legislation as well as detailed procedures be dealt with through secondary legislation. Due account should be taken to avoid conflicts or overlaps with other existing legislation. It should in each case be considered whether secondary legal acts should remain as Rulebooks or should be issued as Decrees.

A short-term priority for horizontal legislation is the amendment of the Law on the Environment, and secondly, the inclusion of the appropriate legal basis in the Law to provide the legal basis for the adoption of secondary legislation. The transposition of directives dealing with environmental assessment, information and public participation are to be given high priority. Environmental liability is a medium priority.

With regard to air quality, amending the current Law on Ambient Air Quality and the Law on Environment (climate change issues) is a short-term priority. Rulebooks will finalise the transposition of the framework directive and the first and second subdirectives. A Rulebook on Ozone Depleting Substance Management will complete implementation of the Montreal Protocol and the EMEP Protocol is still to be ratified. Other short-term priorities are the adoption of the National Plan for Ambient Air Protection, ratification of the Protocols to the Convention for Long Range Trans-boundary Air Pollution and Rulebooks to deal with monitoring and reporting issues on ambient air quality, the form and content of a national plan for ambient air protection and emission limit values from mobile sources. As regards the Pollutant Release and Transfer Register Protocol, a special unit for keeping registers and cadastres was established in April 2007.

As regards chemicals, changes will be needed in the areas of evaluation, classification and labelling of chemicals and the reverse burden of proof that lies with the producer will have to be taken into account. As the industry falls in the class of downstream users, the effects of implementing REACH should be carefully assessed before adopting legislation. It is important to provide the relevant institutions with the necessary adjustment period, training and awareness. The short-term priority is the adoption of the Law on Chemicals that will provide further transposition of EU chemicals legislation. The Law needs to accommodate the issues that need to be included in the primary legislation.

With regard to nature protection, full transposition of the directives dealing with habitats and wild birds is a priority and requires amendments to the existing Law on Nature Protection and the Law on Hunting. Secondly, an appropriate legal basis should be included in the two Laws to enable the adoption of secondary legislation. A link between the two laws must be provided and a thorough legal review undertaken to avoid duplication that

might jeopardise legal certainty. Short-term priorities are to amend the Law on Nature Protection and harmonise it with the Law on Misdemeanours in order to introduce direct charges along with the Law on Hunting. The adoption of a Decree will enable better alignment with the provisions of the CITES Convention and enable its proper implementation. Medium-term priorities are the adoption of secondary legislation to enable full transposition of the Nature Protection legislation, as well as an amendment of the Law on Forests to enable proper implementation of the monitoring of forests.

When it comes to noise, the institutional approach to noise approximation will have to be decided on before the final adoption of the Law on Environmental Noise. The legal framework should comprise guidelines for national certification of conformity, for noise emission labelling programmes as well as test procedures, including the identification of certified institutions for performing tests. Among the important short-term priorities is the final adoption of the draft Law on Environmental Noise. An appropriate legal basis should be included in the draft Law that will enable the adoption of secondary legislation, which is a medium-term priority.

The short-term priorities with regard to waste management are changes and amendments to the Waste Management Law and the enacting of by-laws. Consideration should be given to providing a legal framework allowing for amendments to legislation, and to environmental permits. In the short term, priorities include the adoption of a programme dealing with illegal dumps. In order to implement the Law on Waste Management, the National Waste Management Strategy and Plan will be adopted. The foreseen secondary legislation covers a wide range of Rulebooks dealing with waste issues in general, hazardous waste management, waste oil management, PCB / PCTs management, landfills, and waste import / export. Medium-term priorities cover actions that will enable transposition of several waste stream directives (packaging and packaging waste, waste of electrical and electronic equipment, batteries and accumulators, motor vehicles and waste incineration). Amendment of the Law on Waste Management will harmonise provisions found in the Law on Misdemeanours in order to introduce direct charges.

Concerning water quality, the adoption of the draft Law on Water Management is essential, which should clear-



ly set out the legal framework, the principles for water management and the responsibilities of competent authorities, as well as regulate water quality objectives, emission control issues and monitoring and reporting obligations. A distinction should be drawn between the provisions to be included in the Law and the provisions to be included in secondary legislation.

With regard to the economy there is a need for regulations on subsidy schemes for green projects. In addition, introduction of the relevant instruments on local level is required to stimulate development on a small scale. Methods for green growth modelling are needed, but they are already part of the World Bank project.

#### 4.3 The role of International/ European standards and regulations in environmental policies

Macedonia as a country with candidate status is obliged to harmonise its laws with the EU *acquis communautaire*.

The obligation to harmonise legislation with the EU *acquis* has been incorporated in Article 68 of the Stabilisation and Association Agreement. Article 135 of the new Rules of Procedure of the Assembly of the Republic of Macedonia stipulate that the draft laws harmonising legislation with the EU *acquis* should contain information relating to the original acts of the European Union with their full title, number and date, along with a statement on harmonisation status. When these laws go through parliament, they are given a European flag label to distinguish them from other acts.

With a view to ensuring successful approximation and consistency, coordination and clear monitoring of legal approximation, a methodology was adopted in 2000 for the harmonisation of the laws and technical regulations of the Republic of Macedonia with those of the European Union.

In accordance with the methodology, the harmonisation process is divided into four stages:

1. Preparatory stage – establishment of the necessary institutions for realising the process and a series of technical activities, including the distribution and presentation

of European legal acts in particular areas and presentation of harmonisation principles in general.

2. Analytical stage – translation of the necessary European legal acts into Macedonian and their incorporation in the National Programme for the Adoption of the *Acquis Communautaire* in line with the previously defined priorities.

3. Transposition – operational elaboration of the new legislation in line with the previously defined plan. At this stage the actual approximation of the Macedonian legislation with the EU *acquis* is achieved. National and EU experts have to prepare new draft laws or propose amendments to the existing laws and by-laws in order to establish compatibility between the legal order in the Republic of Macedonia and the EU *acquis*.

4. Implementation – not only the adoption of the new laws or amendments to existing laws, but also their adequate implementation and management of their effects via the existing institutional infrastructure.

#### 4.4 Social, Cultural and Political Obstacles to the Creation of a Low-carbon Economy and the Creation of Green Jobs

The Macedonian economy needs improvements in general. However, green growth offers possibilities for creating and entering markets with new green products and services provided from Macedonia. The prospects for green growth in Macedonia are positive as a result of the establishment and functioning of the National Council for Sustainable Development. The Council intends to increase green innovations and green jobs. Although short-term economic stability and growth are the current priorities, the choice for green growth must be made now in order to shape Macedonia's development path for the future. If the government is proactive it will be able to reduce the cost of greening the national economy. Policymakers must adopt green instruments in order to encourage Macedonian society to shift in this direction. The instruments will also provide solutions for the upcoming problems concerning rising energy prices and economic stability. The problems that other countries have experienced with economies like that of Macedonia may be overcome with such policy interventions.

Concerning the social dimensions of green growth, action is needed to ensure a positive social impact and to avoid a negative one. The obstacles likely to arise when it comes to distributing the gains and costs of transformation within the social structure and institutions concern how to change business and consumer behaviour, how to strengthen the role of all social actors in representative, negotiation and decision-making processes. Interventions in socioeconomic dialogue must be an integral part of green growth strategies and measures in order to ensure transparency, cohesion and benefits for all. Green growth enforcement must include the priorities of equality, safety, social protection and social freedom. Social inclusion, demographic issues, including migration, good governance and policy creation, and income diversification in rural areas and regions, all these priorities are already targets of the National Strategy for Sustainable Development up to 2030.



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