National Human Development Report – Montenegro

Resource Efficiency and Sustainable Human Development

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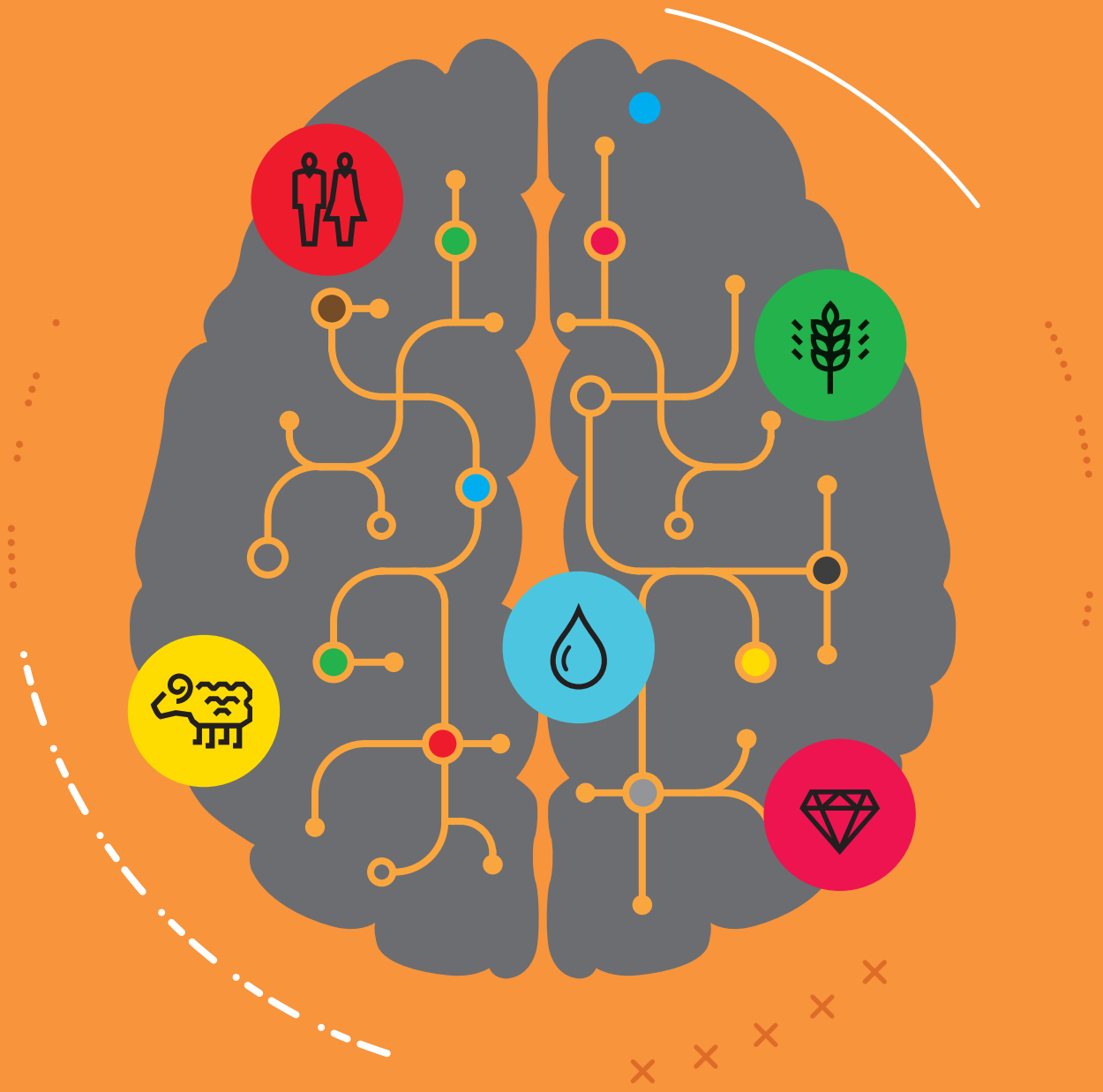

2014

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Appreciation and acknowledgments:

Many institutions and individuals provided their constructive contribution to the development of this Report and we would like to mention some: Siniša Stanković, Ivana Vojinović, Marko Čanović, Jelena Knežević, Bosiljka Vuković, Marija Mijušković and Aneta Milutinović from the Ministry of Sustainable Development and Tourism, Dragica Sekulić from the Ministry of the Economy, Biljana Gligorić NGO Expeditio, Jelena Marojević NGO Green Home, Andrey Ivanov and Dr. Stamatios Christopoulos from the UNDP Regional Centre for Europe and the CIS;

We are grateful for cooperation to all the line ministries and line institutions, to MONSTAT, civil society organizations, to the representatives of academia, to the UN and other international agencies in Montenegro.
We owe special appreciation to all who took part in public discussions of the Report.

Peer review: Elena Danilova Cross, Mihail Peleah and Ben Slay, UNDP Regional Centre for Europe and the CIS

Translation: Jelena Pralas and Azra Kosovac
Edited by: Peter Stonelake
Photo credit: Saša Popović, Aleksandar Jaredić, Duško Miljanić
Graphic design, cover page and layout: Dokukino, Belgrade
Print: AP Print, Podgorica
Printed in Podgorica, Montenegro

First edition: 2014

A catalogue record for this book is available from the Central National Library of Montenegro, Cetinje;

ISBN 978-9940-614-08-9

COBISS.CG-ID 25834512

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By the United Nations Development Programme (UNDP) in Montenegro
UN Eco House, Stanka Dragojevića bb, 81 000 Podgorica, Montenegro

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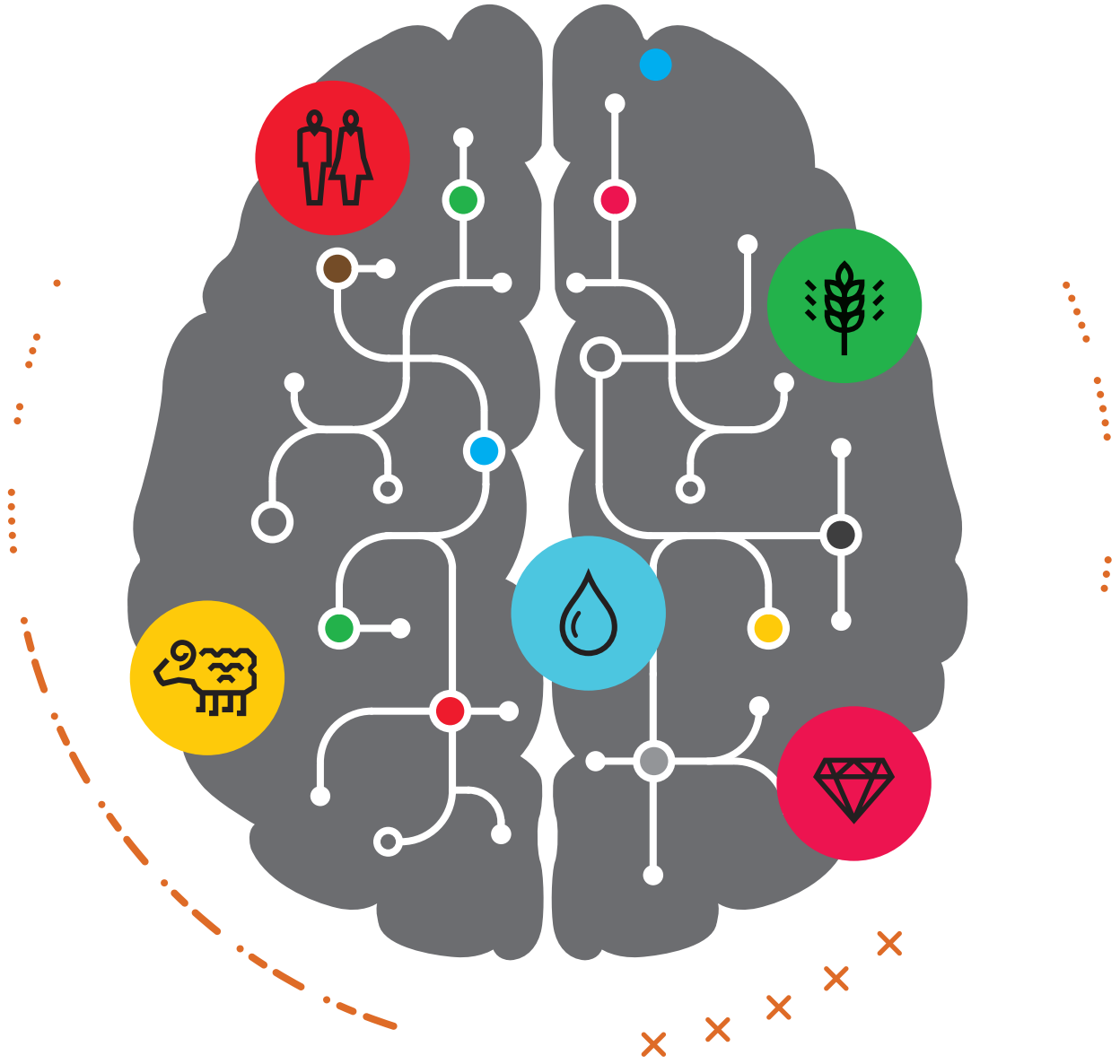

2014

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Abbreviations

AHDI	Affordable Human Development Index
APEE	Action Plan for Energy Efficiency
BIOFIN	Biodiversity Finance Initiative
CAMP	Coastal Area Management Plan
DE	Domestic Extraction
DMC	Domestic Material Consuption
DMI	Domestic Material Input
EHDI	Extended Human Development Index
EREP	European Resource Efficiency Platform
EW-MFA	Economy Wide Material Flow Accounts
FAO	Food and Agriculture Organisation of the UN
GDP	Gross Domestic Product
GEF	Global Environment Facility
GFN	Global Footprint Network
GHG	Greenhouse Gas
GNI	Gross National Income
GPP	Green Public Procurement
HDI	Human Development Index
HDRO	Human Developmetn Report office
HLP	High Level Panel
ICZM	Integrated Coastal Zone Management
IEEP	Institute for European Environmental Policy
IHDI	Inequality-Adjusted HDI
IPCC	International Panel on Climate Change
IPP	Integrated Product Policy
MDD	Montenegro Development Directions
MONSTAT	Statistical Office of Montenegro
NSDS	National Sustainable Development Strategy
OECD	The Organisation for Economic Co-operation and Development
RBEC	UNDP Regional Bureau for Europe and the Commonwealth of Independent States
RP	Resource Productivity
SCP	Sustainable Consumption and Production
SDG	Sustainable Development Goals
SDNP	Sustainable Development Networking Programme
SERI	Sustainable Europe Research Institute
TEEB	The Economics of Ecosystems and Biodiversity
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environemnt programme
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organisation
WTTC	World Travel and Tourism Council
WWF	World Wildlife Fund

FOREWORD

For almost a decade now, UNDP Montenegro through its Human Development Reports has been drawing the attention of the country's policy-makers and civil society to Montenegro's socio-economic development. The reports have stimulated national debates and resulted in many initiatives promoting and strengthening human development. Through these reports we have offered focused perspectives and analysis of national circumstances and strategies for both economic growth and the advancement of human development. The aim of these reports has been to bring together human development facts, influence national policy and mobilize various sectors of the economy and segments of society. It introduces the human development concept into the national policy dialogue – not only through human development indicators and policy recommendations, but also through a country-led and country-owned process of consultation, research and report writing. As an advocacy tool designed to appeal to a wide audience, the report can catalyze public debates and mobilize support for action and change.

In line with one of the main priorities and "driving" forces of the Europe 2020 agenda, and being aware of the need for a change in development trajectory, during the consultative process of the report's preparation, the Montenegrin Government reasserted its vision to become an "ecological state" and move towards a resource-efficient economy.

Resource efficiency means sustainable management and use of resources, throughout their lifecycle (from extraction, transport, transformation and consumption, to the disposal of waste). In plainer words, it means finding ways of producing more with fewer inputs and less impact and consuming differently, to limit the risks of scarcity or pollution. Moving towards a growth path which will have the dual benefit of stimulating the growth needed to provide jobs and wellbeing for its citizens and of ensuring that the quality of this growth leads to a sustainable future will require the country to tackle these challenges and turn them into opportunities. Preparing the Montenegrin economy for this transformation in a timely, predictable and controlled manner will enable it to further develop its wealth and wellbeing, whilst reducing the levels and impact of its resource use.

Resource management is 'basically common sense' – who, after all, wants to be ineffective in managing resources? We believe that environmental and economic interests can work together and contribute to the same objectives, rather than appear as opposing parties when deciding on the priorities of Montenegro and its society.

The report explains what it takes for Montenegro to reach a resource-efficient, greener and more competitive economy as per Europe 2020 with a strong positive and sustainable human development impact and it is a result of the analytical efforts to define a resource-efficient development agenda on the basis of the potentials, existing obstacles and limitations. The Report contains the proposal of policies and actions necessary to achieve the shift to a more resource-efficient, greener and more competitive economy that would be fully harmonized with the key priorities of the European Union and that would be fully in the function of promoting human development.

Past development patterns brought prosperity to Montenegro and its citizens, but through intensive and often inefficient use of resources. The role of biodiversity, ecosystems and the services they provide has been largely underestimated, costs of generating waste and pollution often were not reflected in prices and it is becoming increasingly evident that markets and public policies need to be improved in order to cope with rising demand and competition for strategic resources such as minerals, soil, water and biomass.

Ensuring a sustainable development path in Montenegro would mean making appropriate choices and finding compromises (trade-offs) between competing priorities (for example, energy security as opposed to the preservation of biodiversity, water resources and air quality) and ensuring the transformation of the economy in a way which makes possible a gradual transition towards achievement of European targets, competitiveness, permanent decoupling of economic growth from the use of resources and environmental impacts and keeping the promise to be an ecological state.

We hope this report will inspire decision makers in Montenegro on the way forward to shape a common response in terms of translating its findings into concrete action while contributing to a real change on the ground.

Rastislav Vrbensky
UN Resident Coordinator
UNDP Resident Representative to Montenegro

Executive summary

Human development is a development pattern that puts people as its ultimate objective. People's wellbeing – and not the achievement of a high level of gross domestic product – is the ultimate purpose of human development.

HUMAN DEVELOPMENT AND SUSTAINABILITY

The core topic of this report is resource efficiency – an issue of increasing significance from a human development perspective. Human development should be sustainable because it emphasizes the importance of paying the same kind of attention to future generations as to the current one so that the fulfilment of the current population's needs will not compromise the ability of future generations to meet their own needs. Unless a development pattern is not sustainable, it is not genuine human development.

The challenge of sustainability of human development is becoming increasingly acute. On one hand, there are positive changes in improving sustainability, as the public attention and policy focus are becoming more explicitly focused on the implications of GHG emissions and climate change. On the other hand, there are some negative effects to sustainability trends, such as degradation of biodiversity, natural resource depletion, or piling up waste stocks that natural ecosystems cannot otherwise contain. Humanity is reaching (and in some cases has passed) crucial natural planetary boundaries and, unless the entire concept of development is reconsidered, the hypothetical scenarios for a collapse may indeed materialize.

The report defines "sustainability" as the ability to meet the needs of the present generations without diminishing the opportunities of the next generation to enjoy the same (or a better) quality of life and the benefits of enjoying nature as the current (and the previous) generations have. So far, the development patterns of most countries have not followed a sustainable path and, while progressing in human development, most countries are also increasing their environmental footprint, which entails a broader impact on the society (and not just CO_2 emissions). It also suggests that, for a sustainable development to materialize, people need to identify and adopt strategies for maintaining the capacity to provide non-declining wellbeing in a non-extensive way (achieving the desired wellbeing through different technological paths). Resource efficiency is a crucial element of such strategies.

The report introduces for the first time in Montenegro the Domestic Material Consumption (DMC) indicator and elaborates a number of possible scenarios related to different policy options. Optimizing material consumption is particularly important for a small country with a fragile ecosystems still rich in biodiversity such as Montenegro. The authors however go beyond the technical dimensions of the DMC indicators and put the issue in the broader context of quantifying sustainability and thus informing the policy-making process.

Although significant progress in defining sustainability has been made, there are major challenges in its measurement and monitoring. Currently, there are a number of approaches to measuring sustainability in use: the World Bank's "Adjusted Net Savings", or "Genuine Savings" – the performance of capital stock of all forms of capital monitoring the investment in them, their depreciation and the depletion of a number of natural resources; greening the Human Development index, and others.

Another approach is measuring the "ecological footprint" which estimates the impact of human activity. Montenegro's footprint comes close to its biocapacity, which demonstrates that it is possible to achieve both a high level of human development, while also maintaining a low level of environmental impact. Montenegro also appears to be the only country in the Mediterranean basin to have improved the proportion between biocapacity balance and production footprint between 1961 and 2007.

The report takes a novel approach and applies the idea of "Affordable Human Development Index (AHDI)" to the country context. This is an index of the level of human development that individual countries can afford to maintain, given their economic, environmental, social and political performance.

FINDING THE BALANCE BETWEEN ECONOMIC GROWTH AND SUSTAINABILITY

Growth is needed to meet the needs of the expanding population. But it also needs to be balanced so that it is maintained within the sustainable development path. How can that balance be found?

Various concepts and approaches to economic development that guarantee the stability of the natural environment in the long term are being promoted globally and include a green economy, resource efficiency, a circular economy, sustainable consumption and production. The report introduces these concepts and it claims that resource efficiency is indispensable in that context, as past development patterns brought prosperity, but through intensive and often inefficient use of resources.

Montenegro expressed its commitment to the idea of an ecological state that includes the concept of cross-generational equity, i.e. the obligation not to deprive future generations of the right to benefit from an equally high-quality environment and the resource base that the current ones have. The country has some key achievements but in most cases they go hand-in-hand with unresolved challenges:

- A programme for biodiversity that recorded pressures and examples of degradation has been introduced. However it lacks sufficient data on the status of and trends related to species diversity.
- A decrease in the level of some of the key pollutants in the air in urban areas of Montenegro has been achieved. The technologies used in industrial and energy plants, however, remain inefficient and polluting, generating high emissions in the environment.
- Awareness of the negative long-term implication of over-construction is improving but there are still obvious cases of excessive construction at the expense of valuable agricultural land, territories with high biodiversity, as well as territories important for their potential touristic value. The lack of precise indicators to measure land use makes it even more difficult to prevent over-construction.
- The territory covered in forest has increased, but incomplete data and the incomplete system for monitoring and control of changes in the field make it difficult to identify existing hot spots and implement a rapid response
- Some progress in improving marine water quality has been achieved but marine resources are still exposed to various pressures and pollution from untreated communal wastewaters, waste, ports, marinas, shipbuilding/ refurbishment of ships, vessels and industry. Water quality in all locations outside of the Bay of Kotor is mostly of good to medium quality except for Ulcinj (in Mala plaža and Port Milena) where the quality of water is mostly poor.

Were the international principles of a green economy and the European focus on resource efficiency adopted as key policy frameworks in Montenegro? An analysis of national policies concludes that the concept of a circular economy is far from being implemented in Montenegro, and that the efficient use of resources has not been directly integrated into Montenegrin policies and regulations. However, there are some positive developments. Issues such as stimulation of innovations and productivity, mitigation of the impacts of economic growth on the environment, sustainable management of natural resources and governance improvements are integrated into the development vision formulated in the *National Sustainable Development Strategy (NSDS)*. The recently adopted national development plan – *Montenegro Development Directions (MDD) 2013–2016* defines the priorities and measures for a total of 18 policy areas, giving prominent position to the development of a green economy as a horizontal topic and undergirding

the connections and compatibility of the MDD with the strategy **Europe 2020**. The National Environment Policy advocates the rational use of natural resources, protection of ecosystems (and their adequate valuation) and the implementation of the polluter/user-pays principles.

The inefficient use of natural and other resources (particularly energy and water) and a low level of technological development appear as major challenges to sustainable human development. Only an insignificant share of the generated waste is recycled and reused. In 2008, the Montenegrin economy used 1.7 times more energy than the Croatian one to produce one unit of GDP. This is almost three times as energy-intensive as the EU economy.

Montenegro made positive progress in regards to the EU energy and climate policy targets. The share of renewable energy sources out of final energy consumption is already 29%, while the national goal is set at 33% by 2020. Significant reductions in energy intensity and GHG emissions have been made.

Available data on the impact of agriculture on the environment has shown both positive and negative trends, including an increase in the territory used for organic production, but also a general increase (in spite of the decline in the last observed year) in the consumption of mineral fertilizers and a significant increase in the consumption of plant-protection products in the period between 2005–2011. The consumption of plant-protection products was assessed on the basis of imported quantities and in 2011 it was 1.6 times larger than in 2005. In 2011 the surfaces used for organic production made up 0.6% of the total agricultural land.

SECTOR-SPECIFIC CHALLENGES

The report goes beyond the introduction of basic concepts and addresses a number of sector-specific challenges for resource efficiency in Montenegro.

Agriculture is extremely important and it is expected to ensure a stable and high-quality supply of food, reduce the trade deficit, encourage the development of other sectors (like tourism), develop conditions for a better quality of life for the rural population, etc. Within the analyses conducted in the process of preparation for Rio +20, agriculture has also been recognized as one of the priority sectors for greening the economy. Key opportunities for increasing efficiency in agriculture lie in technological improvements, transfer of knowledge and information about the ways to preserve the fertility of the land, expansion of organic agriculture, diversification of the sources of income in rural areas and development of an efficient food industry sector.

Tourism (along with agriculture and energy sectors) is the sector with the most significant opportunities for greening of the economy. Key issues for resource efficiency in tourism include long-term preservation of the attractiveness of destinations (protection of natural and landscape values) with careful planning and development of new capacities, efficient tourism capacities (particularly from the aspect of the use of water and energy) with the implementation of new technologies for the heating and cooling of buildings, raising the quality of services with the reduction of impact on the environment (pollution control, particularly wastewater treatment), ensuring a higher degree of waste recycling, development of environmentally friendly forms of tourism, increasing the use of local food products in the tourist offer, etc.

The **Construction and housing industries** in Montenegro both have significant potential to generate environmental savings. Although precise data on the status of thermal insulation of the housing units in Montenegro do not exist, it is estimated that as many as 70% of the residential buildings need adaptation to increase energy efficiency. This estimate is based on the fact that a significant amount of the total number of about 316,000 dwellings are located in collective housing units built in the 1960s and 1970s. These buildings are characterized by neglected and

run-down external constructions - facades and (flat) roofs, as well as old internal installations.

The **energy sector** is a major challenge – and an opportunity for sustainable development. Energy consumption in buildings can be reduced through the introduction of energy-efficient design and construction, the implementation of certification of buildings, the use of construction materials and products that improve the energy characteristics of buildings, appropriate maintenance and reconstructions of buildings, etc. Further incentives are needed so that the positive trends in this sector (like the increased use of insulation on new and existing buildings) are stimulated, and a basis for achieving the ambitious EU targets and standards is created.

Large amounts of energy can be saved through adequate infrastructure and urban planning. Although the principles and requirements of energy efficiency are established in the relevant legislation, the current planning practices in Montenegro still do not generate adequate solutions for their integration into the spatial and urban plans. Sustainable towns is one of the key themes in the document The Future We Want (adopted at the Rio +20 summit). It is not only savings in energy that are important for resource efficiency in the construction industry. Recycling of construction waste, use of environment-friendly materials (that meet the sustainability criteria) and improved design of buildings are also extremely important.

Transport is another sector that can contribute to resource efficiency (i.e. sustainable transport). However it will require modernization of its vehicle fleet, as well as further development of the transport infrastructure, including ports and marinas. It will also require faster introduction of vehicles with low emissions and new technologies/ alternative fuels, better control of the quality of fuels, the promotion of environmentally-friendly forms of transport and the implementation of instruments for minimizing the negative environmental impacts of transport (including standards, impact assessments, economic instruments etc.).

THE POLICY RESPONSES

Against the background of the sector-specific challenges the report provides examples of policies that might produce positive results in terms of resource efficiency exist in Montenegro. These examples include projects and initiatives aimed towards using cleaner technologies, growing investment in research and development, stimulating efforts to introduce recycling, increasing energy efficiency, developing environmental indicators, harmonisation with EU law, etc. However, good sporadic examples and experience are not sufficient.

Decoupling the use of resources from economic growth appears as a major challenge for resource efficiency and should be reflected in state policies. One immediate area is shifting the burden of taxation from labour to activities that degrade resources and damage the environment. This shift may even result in creating new jobs. Moreover, the experience of countries that joined the EU during the last decade show that revenue generated from environmental taxes and charges (disbursed, for instance, through environmental funds) can make a significant contribution to meeting European standards.

Proper valuation of natural capital and ecosystem services is another policy priority. However it is not widely implemented in Montenegro. As a result, ecosystem services, clean air and water continue to be treated as free resources, while charges for the exploitation of natural resources often do not cover the full costs incurred to the environment and society as a result of these activities. Moreover, there were no efforts to integrate the value of natural resources (or the damage resulting from degradation or pollution) into the calculation of national wealth, nor into companies' business results. One of the core principles of the European policy on resource efficiency – getting the prices right – is either not properly integrated into Montenegrin laws and policies, or is not applied at all.

Consistently implementing the *polluter/user-pays* principle is needed. Montenegro's environmental policy and the Law on Environmental Protection lay down this principle, while the basis for the use of economic instruments (first and foremost, pollution charges) has existed since 1997. However, these instruments are not well designed and not properly and consistently implemented, therefore they do not provide the appropriate incentives for behaviour change and transition to more efficient and less polluting production patterns.

Reducing and gradually abolishing environmentally harmful subsidies is a logical continuation of the polluter/user-pays principle. Such subsidies deeply distort the system of economic incentives and disincentives so that unsustainable production may look profitable, while subsidizing environmental damage with public resources. Phasing out environmentally harmful subsidies is one of the measures for which there is broad international consensus.

Finally, **introducing procurement rules in the public sector that will include clear requirements for environmental sustainability** may boost the chances of environmentally efficient options. More comprehensive measures aimed at raising consumer awareness on choosing products with lower environmental impacts and improving waste management practices could be implemented.

Efficient use of resources is a horizontal issue that cuts across a number of sector policies – from ones on natural resource management, to science and research, statistics, fiscal policy, environmental and land use (spatial planning), to policies in economic sectors such as agriculture, energy, transport, the construction sector, etc. Setting proper targets and defining relevant indicators for monitoring progress against these targets is critically important for translating policies into practical results.

All the measures suggested to increase resource efficiency have important implications for poverty and quality of life. For example, reducing energy subsidies, which currently channel benefits to more wealthy consumers and implicitly encouraging inefficient consumption, are welcome. At the same time such measures need to be taken in a package with targeted support for poor households to prevent them falling deeper in poverty.

LOOKING INTO THE FUTURE

In the last part of the analysis the report makes an assessment of the future resource productivity within five scenarios for Montenegro. The report team concludes that scenario 4: "Moderate reduction in the use of resources" emerges as an optimal one. It envisages an active and ambitious natural resource management policy in Montenegro. Within this scenario, Montenegro would by 2020 achieve an absolute reduction of 20% in the use of material resources compared to the average value recorded in the period 2005–2012. Resource productivity would grow at the average annual growth rate of 7.5% which corresponds to the average annual growth rates of 7.1% recorded in the period 2005–2012. In this scenario, resource productivity in 2020 would increase by 60% compared to the average resource productivity in the period 2005–2012. A considerable decrease is also recorded in DMC per capita which amounts to 4 tCO_2/cap in 2020.

Finally, the report puts resource productivity analysis and the possible scenarios in the broader context of improving energy efficiency and decreasing CO_2 emissions. These are seen as inseparable from improving resource efficiency. Applying the modelling approach similar to the one used in the case of domestic material consumption, three possible scenarios for GHG emissions were developed: two currently on the "policy drawing boards" and one based on target values determined in the EU policies: reducing GHG emissions by 20% by 2020 and by 40% by 2030 (compared to 1990 levels). The brief analysis suggests that neither of the two is acceptable if we assume that Montenegro will be part of the EU by 2030.

HOW TO GET THERE?

All this allows the authors to draw a number of important conclusions and policy-relevant recommendations. The report concludes that the development outcomes are important – but equally important is the way progress is achieved and the price paid for it. In many cases the current level of human development is unaffordable and has been achieved running on debt – financial, ecological, demographic. Too often the bill for the well-being of current generations is passed on to the next. This is why adding the "affordability" perspective to human development analysis and policies is critically important for achieving sustained and sustainable human development.

Montenegro is a country with huge potential for following a sustainable development path. It also has a policy commitment in that regard with the claim of being an "ecological state". The evidence presented in this NHDR suggests that despite significant progress made in achieving these goals, there is still a long way ahead.

Resource efficiency is an important means for achieving the goal of sustainable human development – and fulfilling the pledge to an "ecological state." The policy frameworks for promoting it exist, both at the international and the national level. What has to happen to achieve it is a series of bold actions that include:

1. Consistent implementation of adopted regulations and plans is crucial for further development of Montenegro in general, as well as for the improvement of resource efficiency. In addition, better coordination between different policies, strengthening the information base and further development of indicators for measuring sustainability of development and for monitoring progress are necessary.

2. In order to capitalize on spontaneous improvements made in the previous period and to continue positive trends (for example, decoupling GDP growth from energy consumption, amount of generated waste, GHG emissions, etc.), carefully designed targeted measures for increasing efficiency and reducing environmental impact are required.

3. National climate policy should be formulated in line with the EU targets and energy policy should be aligned with it accordingly; solutions that considerably drive the country away from the EU targets should not be promoted.

4. Changes to the subsidizing policy and state aid are crucial for efficient use of resources, competitiveness and achievement of environmental targets; a plan for phasing out harmful subsidies is necessary. At the same time, economic/market-based instruments should be developed and used so as to ensure that prices for resource use and the costs of pollution properly reflect the value of resources being depleted and/or degraded as a result of pollution. The possibilities of carrying out green tax reform should be explored.

5. It is extremely important to develop and use the system of incentives for clean and efficient production processes and activities, and to provide proper support for research and innovation.

6. Urgent improvements in the spatial planning system (rational use of space, limiting expansion of built-up areas, particularly if these fail to provide significant effects), waste management (waste separation, recycling) and water management (integrated management, rational consumption) are a condicio sine qua non for resource efficiency in Montenegro.

7. Protection of arable land and improvement of environmentally friendly forms of agricultural production are extremely important for efficient use of resources.

8. Resource efficiency and sustainable development will not be possible unless biodiversity and ecosystem services are properly valued and their value integrated into the balance sheets and measures of economic success from micro to macro levels.

9. Proper control of air, water and soil quality and appropriate measures to prevent pollution directly contribute to the productivity of the economy (amongst other things, by preserving human health); lack of implementation of environmental standards results in considerable costs to society in both the EU and Montenegro.

10. Robust data and monitoring systems are important in that regard. Testing and implementing sustainable human development indicators and monitoring different aspects of sustainability are important elements of the roadmap towards keeping the promise of being an ecological state.

All these would require bold reforms in crucial sectors of Montenegrin economy and will have their cost. The cost may be high in the short term thus a renewed determination and stepped-up efforts are also needed from all the stakeholders. But there are many potential benefits from the development of a resource-efficient economy. Those that are particularly relevant for Montenegro, given its current level of development, include growth and new jobs, competitiveness, improvement of the quality of life by preserving the quality of the environment and contribution to the stability of the economy. Even though detailed analysis of the potential effects of implementation of

Photo: Aleksandar Jaredić

certain resource efficiency policies (*ex-ante* analyses) are unavailable, according to the existing estimates, the improvement in energy efficiency in the housing stock alone would stimulate investment, create new employment opportunities and result in significant energy savings.

The core topic of the report is resource efficiency – a topic of huge importance from a human development perspective. The link between resource efficiency and human development goes through sustainability, but not only that. Improvement of resource efficiency may come about in various ways affecting different dimensions of human development – poverty, consumption, employment, access to basic services, and gender roles. All these aspects are important and deserve distinct in-depth analyses (or even NHDRs). In that regard the authors hope that the current report will be a starting point for further research and public debate on these issues.

CHAPTER 1

Setting the scene. Resource use, human development and sustainability

1.1 Human development and sustainability

Human development is a development pattern that puts people as its ultimate objective. People's wellbeing – and not achieving a high level of gross domestic product is the ultimate purpose of human development. Its major assumption is that money (and material affluence in general) matter but there are other things in life that are equally important. As Mahbub ul Haq eloquently put it, "the central thesis of these reports [HDRs] is that it is people who matter – beyond the confusing maze of GNP numbers, beyond the curling smoke of industrial chimneys, beyond the endless fascination with budget deficits and balance of payments crises – it is people who matter. People must be at the centre of our development debate – what really counts is how they participate in economic growth and how they benefit from it." (Haq 1992: 1)

Human development is about expanding people's choices. These choices are diverse but the most fundamental ones are the opportunities to: lead a healthy and long life, to be educated and to achieve a decent standard of living. Other choices may include: freedom of expression, association and movement, as well as social justice and protection against discrimination based on various criteria (racial, religious or ethnic origins, gender or poverty status) and the ability to influence decision making and contribute to the life of a society. People's choices are affected by a wide range of factors, like individual values, skills and abilities, a country's economic and political environment, access to education and health services as well as international development. Regardless of individual preferences, people would like to live in an environment where they can develop their full potential and lead productive, creative lives in accordance with their needs and interests.

In the course of the last 24 years the operational definition of human development has been changing but its core message remains the same: human development is more than economic wealth; it entails other equally important areas of human life that are not reflected in the indicators of economic output – of which GDP is just an imperfect proxy. The evolution of the concept of human development took place in parallel with a gradual shift towards higher awareness of the role and significance of sustainability in the development process – not just environmental sustainability but also demographic, financial, resource-based sustainability, etc. Abundant historical evidence exists to prove that societies with social and economic imbalances are not sustainable in the long run.

Human development should be sustainable as it emphasizes the importance of paying the same kind of attention to future generations as to the current one so that fulfilment of the current population's needs does not compromise the ability of future generations to meet their own needs. Human development is about enabling people to lead long, healthy, educated and fulfilling lives and sustainable human development is about ensuring that future generations can do the same. Human development, if not sustainable, is not true human development.

The anniversary of the global HDR published in 2010 reflects this evolution and defines human development as "the expansion of people's freedoms to live long, healthy and creative lives; to advance other goals they have reason to value; and to engage actively in shaping development equitably and sustainably on a shared planet" (UNDP 2010). This definition reflects the multiple choices that we as individuals and societies are facing on a daily basis. These include the choice of living our life according to certain values while still passing on the planet to our children in at least as good a shape as we inherited from our parents. Sustainability

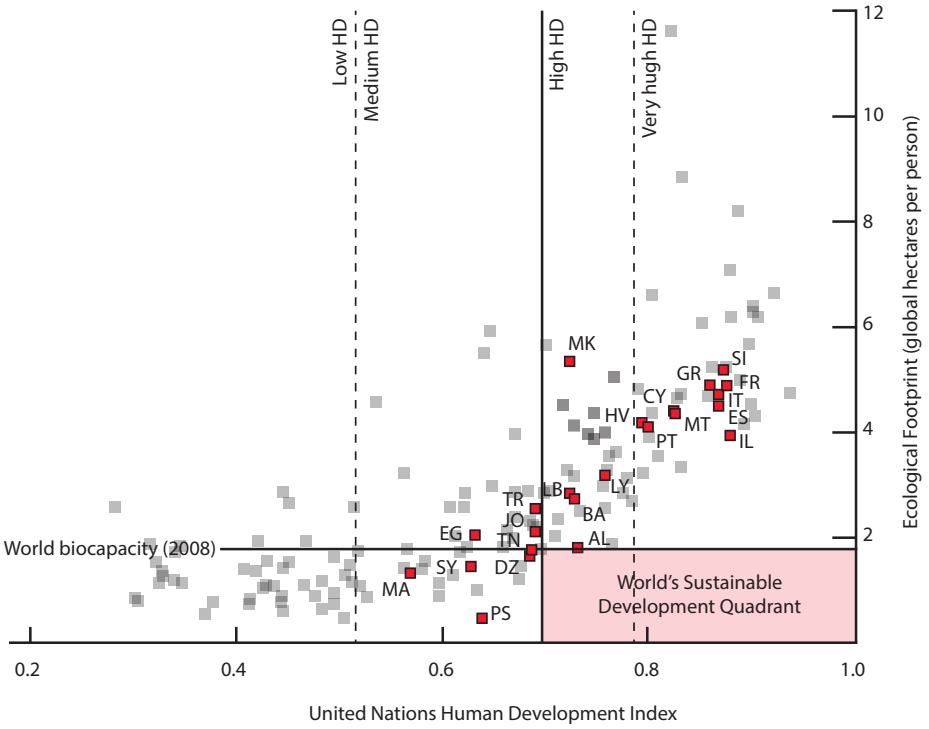

Figure 1-1:
HDI and ecological footprint of consumption globally

Source:
HDRO and Global Footprint Network.

of human development choices was not on the agenda a few decades ago but it has been prioritized, now that it is becoming clear that the accumulated impact on our ecosystems seems to be exceeding the planet's capacity to regenerate.

1.1.1 DEFINING SUSTAINABILITY

What is "sustainable"? How to operationalize it? This report follows the approach taken by the Brundtland Commission in 1987 and defines "sustainability" as the ability to meet the needs of the present generations without diminishing the opportunities of the next generation to enjoy the same quality of life and the benefits of enjoying nature as the current generation (and the previous one) have done. In other words, "sustainable" means development that people – each of us individually and mankind in general – can sustain without depleting the physical, environmental, human and economic capital we have. Applying economic jargon, it would mean the ability to "maintain the capacity to provide non-declining wellbeing over time" without ruining the environment (Neumayer 2004). Or adding an inter-generational perspective, it is a development that is not at the expense of someone else – the environment or future generations. This is a pattern societies can afford financially, environmentally and politically.

The development patterns of most countries so far have not followed a sustainable path. Figure 1-1 shows clearly that while progressing in human development, most countries are also increasing their environmental footprint, which entails a broader impact on society (and not just CO2 emissions). It also suggests that for sustainable development to materialize, people need to identify and adopt strategies for maintaining the capacity to provide non-declining wellbeing in a non-extensive way (achieving the desired wellbeing through different technological paths). Resource efficiency is a crucial element of such strategies.

1.1.2 MEASURING SUSTAINABILITY

We should measure what we care about—if we care about the economy, we measure GDP; if we care about people, we measure the Human Development Index (HDI). These metrics are not perfect, but they are widely used as practical approximations of measured realities. These are relatively clear and well established concepts and measures, unlike "sustainability", which is a relatively new concept in development. How should we measure it?

The challenge comes from the fact that sustainability is not just about maintaining the environment. For "true sustainability", two other pillars are needed apart from the environmental one – economic sustainability (the ability of societies to generate jobs, to produce goods and services to meet the needs of the increasing population) and social sustainability (the particular decisions need to be socially acceptable, both in terms of environmental justice, political realities and community voice). These three pillars of sustainable development – environmental, economic and social – are closely interlinked and should be pursued in unison as part of a coherent package of green economy policies and measures (UNECE, UNDP 2012: 93).

Although significant progress has been made in defining sustainability, there are significant challenges in measuring and monitoring it. This is particularly the case in sustainable human development. Two specific challenges include: 1) quantifying "sustainability" robustly and 2) integrating the two aspects of development – the "sustainable" and the "human".

One way of approaching the first challenge is to define appropriate indicators for the different pillars. A problem however arises when drivers (processes contributing to the phenomenon) and the outcomes (the ultimate result) need to be clearly distinguished. For that purpose the so-called "capital approach to sustainable development" can be applied. It looks for a balance between different categories of capital (financial, produced, natural, human and social) and the interactions between them (UNECE 2009: 48-54).

Sustainability is seen as a dynamic category that needs to account for both stocks and flows monitored through a System of Integrated Environmental and Economic Accounts (UNECE 2008: 68-73). The interaction and possible mutual substitution of different forms of capital is also the criterion for differentiating between "weak" sustainability (when different forms of capital are seen as mutually substitutable and what matters is the overall "capital stock") and "strong" sustainability (when maintaining the capital stock on each form of capital is required).

Seen from the outcome perspective, a number of approaches exist. One is the World Bank's "Adjusted Net Savings" or "Genuine Savings". It monitors the performance of the capital stock of all forms of capital, monitoring the investment in them, their depreciation and the depletion of a number of natural resources. If Genuine Savings is negative, it means the country is on a non-sustainable development path.[1]

A number of approaches focus on "outcome-level estimates of unsustainability" assessing the environmental damage of human activity (associated with the welfare maximization function). The most prominent in terms of publicity and most advanced in terms of policy mechanisms is the level of CO_2 emissions. With all its negative implications in regards with warming the planet, this is not the only (or maybe even the main) indicator of anthropogenic impact because it focuses on only one dimension of the latter. A more comprehensive approach is based on the concept of "natural boundaries" estimating the anthropogenic pressures on the planet and defining "tipping points" for each of the nine vital "Earth processes". Besides climate change (reflected in CO_2 emissions and an energy imbalance at the Earth's surface), these are ocean acidification, stratospheric ozone depletion, atmospheric aerosol loading, biochemical flows (phosphorus and nitrogen cycles), global freshwater use, land-system change, biodiversity loss as well as chemical pollution. For each of the processes a tipping point is defined beyond which changes are uncontrollable (Rockström et.al. 2009).

[1] The measure is however skewed in favor of highly developed countries, where investment in human and man-made capital outweigh the depreciation of capital (Neumayer 2003).

Another "outcome level estimate of unsustainability" is the "ecological footprint" estimating the impact of human activity (both consumption of natural resources and discharged waste that needs to be absorbed by the eco-systems (GFN 2010). The ecologic footprint is a robust (un)sustainability measure that brings individual activities under a common denominator – the area of the land necessary to produce the resources and absorb the waste stock reflected in "global hectares." It is one of the most robust estimates of the comprehensive implications of human activity outlining the trade-offs between different dimensions of sustainability, different agendas ("brown" and "green" agendas) or between meeting the needs of the present or of the future generations.

The second challenge (integrating "sustainable" and "human" into "sustainable human development") is not less problematic. Throughout its 20+ years' history, the HDI has experienced a number of methodological adjustments (Kovacevic, 2011). Calls for "greening" the HDI re-appear periodically (particularly intensively in the wake of the 1992 Rio Earth Summit and two decades later). In 1992 the team of the Sustainable Development Networking Programme of UNDP proposed HDRs to include indicators on "sustainable development" (SDNP, 1992) not prescribing, however, specific methodologies to be followed. Armenia did that in 1996, adding a fourth component to its national HDI but this example was not followed globally for a number of reasons (UNDP Armenia 1996).

A number of attempts to incorporate environmental and resource-consumption dimensions into the HDI have been undertaken. One of the first was "greening the HDI" adding another – fourth – dimension reflecting the status of the environment. The approach was tested in 1994 but was later dropped for various reasons. Shreyasi Jha (2009) and De la Vega and Urrutia (2001) proposed a modification of the HDI reflecting environmental unsustainability through penalization or adjustment of the income component of the index. The approach behind the "environmentally sensible HDI" proposed by Morse (2003) was similar – adding to the sum of the HDI the value of "integral environmental indicator", an averaged indicator of the environmental state of the country and of the environmental evaluation of human activities. Another approach was taken by HDRO in 2012 in its attempt to develop a "Sustainability-Adjusted Human Development Index" (in the wake of the Rio+20 Summit in 2012). The index imposes a loss function on a country's human development achievements reflected in the standard HDI (penalizing for non-sustainability). Its departure point is also the idea of "planetary boundaries" but for simplicity only CO_2 emissions are taken into consideration as a proxy of the non-sustainable development path with each country receiving the value of its loss function on the basis of its emissions per capita and their closeness to the "planetary boundary" (Pineda 2012).

All the attempts for integrating the sustainability and human development dimensions however have one common trait: they address in various ways the unsustainability outcomes integrating the environmental implications (damage) into the HDI. They do not reflect how the respective level of development was achieved (in a sustainable or an unsustainable way). This was the area addressed by the team of experts at the Bratislava Regional Centre of the UNDP who developed in 2012 an "Affordable Human Development Index (AHDI)" – an index of human development that individual countries can afford, given their economic, environmental, social and political performance. They add a fourth (environmental) component and then adjust the value of each indicator of the index for the unsustainability of the way it has been achieved. The proposed approach follows the same logic that is behind the inequality-adjusted HDI in which the "potential" level of the indicator is penalized for inequality distribution in each dimension to achieve the "actual" level accounting for inequality. In the AHDI case, the "potential" level of human development is penalized for unsustainability to achieve the "sustainable HDI" (Ivanov, Peleah 2013).

1.2 The human development profile of Montenegro

1.2.1 HUMAN DEVELOPMENT INDEX

Countries' trajectories in human development are unique and comparisons among countries require in-depth analysis that would take into consideration the country's priorities, values and history. The following discussion only presents some general trends and compares Montenegro's HD performance vis-à-vis other European countries. The analysis is based on the international data collected by the UNDP Human Development Report Office in New York.

Montenegro's HDI value for 2013 is 0.789—which is in the high human development category—positioning the country 51st out of 187 countries and territories. Between 2005 and 2013, Montenegro's HDI value increased from 0.750 to 0.789, an increase of 5.3 percent or an average annual increase of about 0.64 percent. The rank is shared with the Bahamas.

Table 1-1 reviews Montenegro's progress in each of the HDI indicators. Between 1980 and 2013, Montenegro's life expectancy at birth increased by 1.7 years, mean years of schooling decreased by 0.1 years and expected years of schooling increased by 2.1 years. Montenegro's GNI per capita decreased by about 15.9 percent between 1990 and 2013.

Montenegro's 2013 HDI of 0.789 is above the average of 0.735 for countries in the high human development group and above the average of 0.738 for countries in Europe and Central Asia. From Europe and Central Asia, countries which are close to Montenegro in 2013 HDI rank and to some extent in population size are Latvia and Lithuania, which have HDIs ranked 48 and 35 respectively (see Table 1-2). From the neighbouring countries of the former Yugoslavia Croatia is the closest in ranking (47).

1.2.2 INEQUALITY-ADJUSTED HDI (HDI)

The HDI is an average measure of basic human development achievements in a country. Like all averages, the HDI masks inequality in the distribution of human development across the population at the country level. The 2010 HDR introduced the Inequality-Adjusted HDI (IHDI), which takes into account inequality in all three dimensions of the HDI by 'discounting' each dimension's average value according to its level of inequality. The IHDI is basically the HDI discounted for inequalities. The 'loss' in human development due to

Table 1-1: Montenegro's HDI trends based on consistent time series data and new goalposts

	Life expectancy at birth	Expected years of schooling	Mean years of schooling	GNI per capita (2005 PPP$)	HDI value
1980	73.7	—	—	—	—
1985	74.4	—	—	—	—
1990	75.5	—	—	17,483	—
1995	75.9	—	—	6,826	—
2000	74.9	—	—	10,245	—
2005	74.1	12.9	10.6	11,233	0.750
2010	74.4	15.0	10.5	13,633	0.784
2011	74.6	15.0	10.5	14,241	0.787
2012	74.7	15.2	10.5	14,710	0.787
2013	74.8	15.2	—	14,710	0.789

	HDI value	HDI rank	Life expectancy at birth	Expected years of schooling	Mean years of schooling	GNI per capita (PPP US$)
Montenegro	0.789	51	74.8	15.2	10.5	14,710
Latvia	0.810	48	72.2	15.5	11.5	22,186
Lithuania	0.834	35	72.1	16.7	12.4	23,740
Croatia	0.812	47	77.0	14.5	11.0	19,025
Serbia	0.745	80	74.1	13.6	9.5	11,301
FYR Macedonia	0.732	84	73.9	13.3	8.2	11,475
Bosnia and Herzegovina	0.732	86	76.4	13.6	8.3	9,431
Europe and Central Asia	0.738	—	71.3	13.6	9.6	12,415
High HDI	0.735	—	74.5	13.4	8.1	13,231

Table 1-2: Montenegro's HDI indicators for 2013 relative to selected countries and groups

inequality is given by the difference between the HDI and the IHDI, and is expressed as a percentage. As the inequality in a country increases, the loss in human development also increases. When Montenegro's HDI (2013 in 0.789) is discounted for inequality, the HDI falls to 0.733, a loss of 7.2% due to inequality in the distribution of the dimension indices. This is a much lower loss than in Croatia (11.2%), Latvia and Lithuania (both with 10.6 percent losses due to inequality), Serbia (a loss of 10.9%), FYR Macedonia (a loss of 13.6%) or in Bosnia and Herzegovina (a loss of 10.6%). The average loss due to inequality for high HDI countries is 19.7 percent and for Europe and Central Asia it is 13.3%. The Human Inequality Coefficient for Montenegro is equal to 7.1% – also one of the lowest in the region.

	IHDI value	Overall Loss (%)	Overall Loss (%)	Human inequality coefficient (%)	Inequality in life expectancy at birth (%)	Inequality in education (%)	Inequality in income (%)
Montenegro	0.733	7.2	7.2	7.1	7.6	2.5	11.3
Croatia	0.721	11.2	11.2	11.1	5.2	10.4	17.6
Latvia	0.725	10.6	10.6	10.3	7.6	3.6	19.8
Lithuania	0.746	10.6	10.6	10.4	6.6	6.1	18.6
Serbia	0.663	10.9	10.9	10.9	8.5	10.7	13.5
FYR Macedonia	0.633	13.6	13.6	13.3	7.6	10.6	21.8
Bosnia and Herzegovina	0.653	10.6	10.6	10.4	6.7	5.2	19.2
Europe and Central Asia	0.639	13.3	13.3	13.2	14.7	8.6	16.9
High HDI	0.590	19.7	19.7	19.3	10.7	17.4	29.9

Table 1-3: Montenegro's IHDI for 2012 relative to selected countries and groups

Photo: Aleksandar Jaredić

1.2.3 SUSTAINABILITY OF HUMAN DEVELOPMENT SEEN THROUGH THE LENS OF ENVIRONMENTAL FOOTPRINT

The ecological footprint is the estimate of the impact on the natural environment of the urban and industrialized way of life. It is increasingly being used for measuring sustainability of human activity – and development patterns. It is the area of biologically productive space required for producing the resources and eco-services needed for a person to maintain his or her lifestyle. Measured in global hectares, the ecological footprint illustrates to what extent a country (or a city or an individual) lives a lifestyle that allows the Earth to regenerate the renewable resources withdrawn and absorb the shocks from human activity. At roughly the end of the 1990s, human consumption began outstripping what the planet could reproduce and currently humanity needs one and a half planets if it is to sustain the consumption model it runs today. Given global trade links, the footprint measured by production (what the environmental implications of the goods and services produced are) is different from that measured by consumption. Many countries import (and consume) goods and services that have been produced (and have left their respective environmental impact) elsewhere.

Of course, huge differences between countries exist. The general trend however is that "a higher level of development goes hand in hand with a higher ecological footprint". The 'contradiction' between human development and sustainability (measured in terms of ecological footprint) is clearly visible in the case of the countries of Central and Eastern Europe (Figure 1-2). The figure also shows that this association and the linkages are not that straightforward and simple. Countries with similar HDIs (like Estonia, Slovenia, Slovakia and Hungary) have substantively different footprints and, conversely, in countries with similar footprints (Slovakia, Poland, Bulgaria and Turkmenistan) the HDI varies substantially.

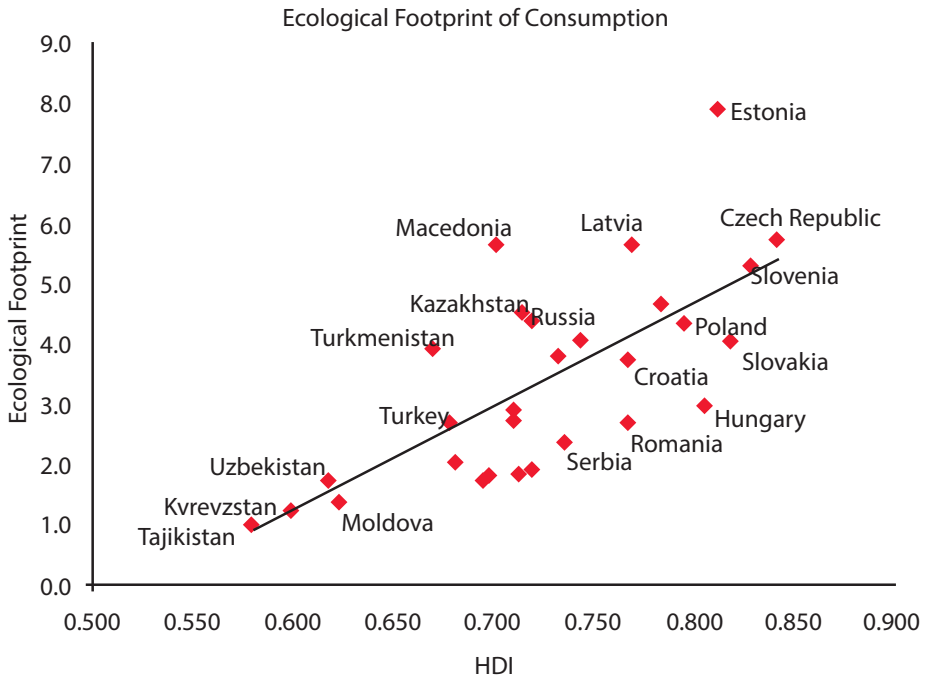

Figure 1-2:
HDI and ecological footprint of consumption in the region

Sources:
HDRO and Global Footprint Network

Montenegro is missing from this picture because until recently no data was available on its environmental footprint, with the first estimates being from 2012(GFN 2012). With all the caveats of missing data (and assuming the volume of CO_2 emissions per capita are similar to those of Bosnia and Herzegovina), Montenegro's ecological footprint comes close to its biocapacity (GFN 2012: 57). It makes Montenegro quite a unique case – certainly in the Mediterranean basin. It demonstrates that it is possible to both achieve a high level of human development and maintain a low environmental impact.

Montenegro also appears to be the only country in the Mediterranean basin to have improved the proportion between biocapacity balance and production footprint between 1961 and 2007 (Figure 1-3). Data is not yet available regarding the ecological footprint of consumption but in accordance with the global trends showing increased material consumption and ecological footprint it would be reasonable to assume these trends have also been seen in Montenegro. Globalization introduced an additional dimension of inequality – between developing and developed countries with the latter "exporting" their ecological footprint with outsourced material production to the former. This is visualized in Figure 1-4 which shows a much steeper deterioration of the proportion of biocapacity/ecological footprint of consumption than the proportion of biocapacity/footprint of production. Despite all the caveats the message is clear: it is possible to achieve a high level of human development in a sustainable way, at a low environmental cost.

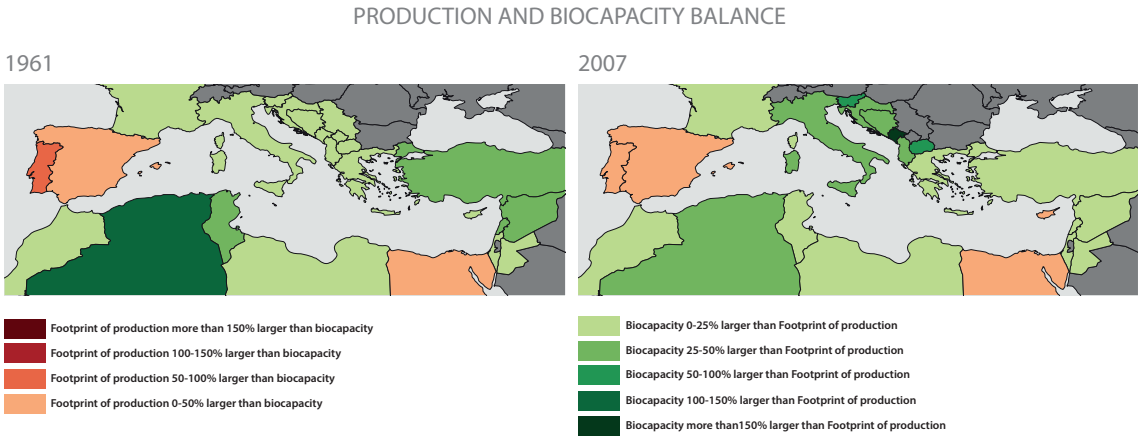

Figure 1-3: Production and bio-capacity balance

Source: Global Footprint Network (2012). Mediterranean Ecological Footprint Trends.

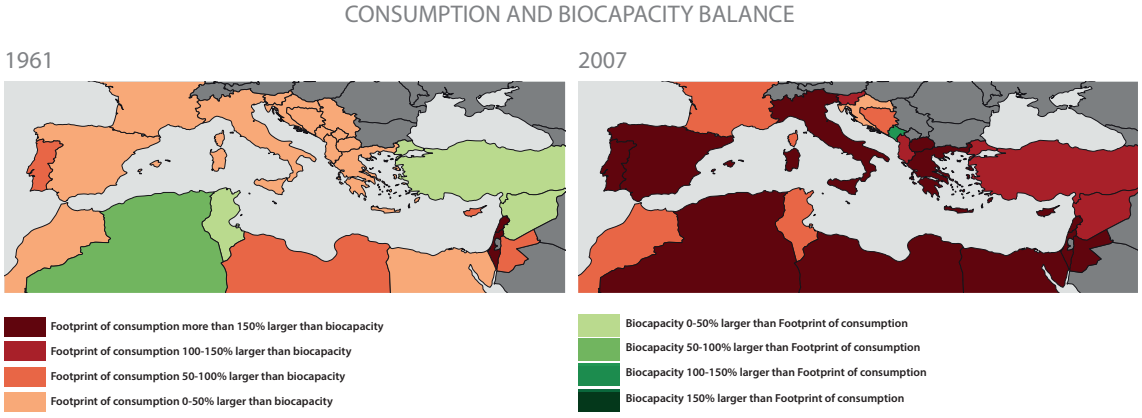

Figure 1-4: Consumption and bio-capacity balance

Source: Global Footprint Network (2012). Mediterranean Ecological Footprint Trends.

1.3 Resource management and the concept of the "circular economy"

The concept of the circular economy emerged in the last decade of the last century as a response to the need to find a balance between economic growth, necessary to meet the needs of the expanding population, and the increasing need to stick to a sustainable development path. It originates from the industrial ecology paradigm and at its core is the idea of circular

(closed) flows of materials through multiple phases. It builds on decades of gradual understanding of the increasing anthropogenic effect of human activity and its planetary limits.

One of the first milestones in that regard was the report of the Rome Club *Limits to Growth* published in 1972 that focused global attention on the negative impacts of economic activity on the natural and social environment, applying computer models to integrate various parameters (population growth, production, consumption of resources, stocks and flows of waste, etc.) into a number of scenarios outlining what different options of action or inaction might result. That document and its subsequent supplements (disputed and often fiercely rejected) clearly stated that development paths of the use of resources, economic activity and social welfare have to start diverging, and particularly that these three paths should all have inverse divergence in relation to environment pollution. These types of divergence are known as the process of decoupling of impacts.

Efficient resource management is one of the important building blocks of the circular economy. Thus, understanding the principles of this concept and the possible ways of mainstreaming it are crucial for adopting a sustainable path of socio-economic development (which, in the case of Montenegro, means keeping the pledge for an "ecological state").

1.3.1 THE CONCEPT

The "circular economy" is a fast growing field of applied economics bringing economic processes closer to the logic of natural life cycles. In the common understanding of the economic cycle, resources are seen as available goods that are not used yet.[2] These goods need human activity to gain value and turn into commodities and they do so in the process of economic activity. However, taking into account the product's lifecycle and the technological processes applied, it is clear that this approach to defining the notion of resource is neither comprehensive nor accurate.

The concept of the circular economy, in its broadest sense, is a replica of the functional optimisation of the flow of matter and energy as seen in nature and the characteristics of living organisms (see Angilletta, Sears 2011: 653–661). At the basis of this concept lies a holistic approach, i.e. the need to reflect on the problem of the organization of economic activity in a broader context, with the intention to optimize the overall man–nature–society system, not only its individual elements.

Today the global economy still follows a linear pattern of production and consumption: resources are used for production; production results in products; after their life cycle the products become waste and as such are disposed in the environment. This model, known as take–make–dispose model is presented in Figure 1-5.

Figure 1-5: Traditional (linear) model of economic activity

This simple pattern of organizing economic activity has shown to have great power in generating new value and reducing poverty, but it reached its limits in the conditions of enormous depletion of natural resources. David Palmer-Jones, the chairman of the E*nvironmental Services Association (ESA)*, stated: "The linear economy simply cannot ensure growth which could sustain the growing living standard of the global fast-growing population."

The traditional linear approach to industrial production proved to be unsustainable in a number of aspects:

- It relies on the current availability of resources, without taking into account their future scarcity;
- It is susceptible to price instability and market oscillations;
- It does not adequately factor in environmental pollution at the local and global levels.

[2] A focus on natural resources is of essential importance for efficient resource management. Given the specific focus of this chapter, it does not discuss other forms of resources, like human resources.

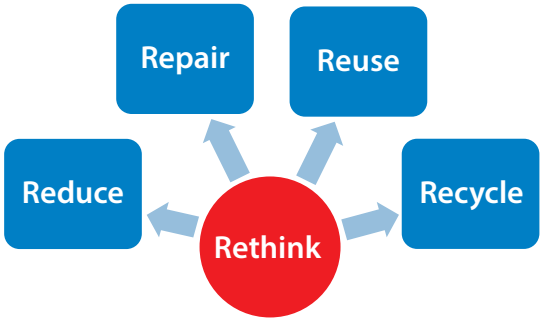

Figure 1-6: 4R approach to treating waste

To address these shortcomings, the linear model of economic activity was transformed into the circular one, on the basis of the 4R approach (Figure 1-6).

The effects of the circular economy for the environment, economy and human beings pay off in the long run

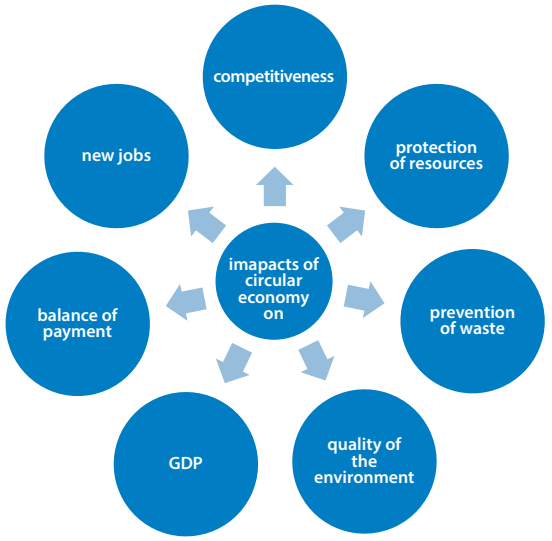

Figure 1-7: Impact of the circular economy

and undoubtedly lead to a higher level of sustainability in the future. Figure 1-7 presents the multiple positive impacts of the implementation of the concept of the circular economy.

1.3.2 CLASSIFICATION AND THE ROLE OF RESOURCES

In the traditional understanding of economic processes, resources are used to produce a product which passes on parts of its value during its life. After the expiry of this lifecycle the value of the product is zero and the product is depreciated and written off in accountancy terms. But in the new approach to resource management termed cradle-to-cradle, after the end of its lifecycle the product still retains significant potential for generating new value if used in a different production cycle in which it is a resource and not waste. This is the starting assumption of the circular economy logic, which perceives the depreciated commodity as a potential resource and brings the economic processes closer to the natural lifecycles and their "zero waste" logic. It is worth noting that the entire concept of "waste" is a human invention – in nature, every output of particular metabolic process is an input for another one.

Resources can be classified along various criteria. These criteria can be natural, economic and combined. Figure 1-8 presents different forms of natural resources classified according to their renewability (Milanović et.al. 2008: 61).

The "permanent" resources (continuous or inexhaustible) are always available, regardless of the form of human activity exerted on them. Their inexhaustibility is what makes their exploitation particularly attractive and challenging. The "renewable" resources have the power of regeneration, under the condition that the intensity of their use does not exceed the capacity (the pace) of their regeneration. Therefore, the use of these resources can be limited in time, in spite of their renewability.[3] "Non-renewable" resources are limited in nature in terms of quantity. The process of geological formation is so lengthy that seen from the point of view of the life presence of humanity on this planet, their regeneration is purely hypothetical. Therefore, the sustainable management and protection of this type of resources poses the greatest challenge in the long run from a resource management perspective.

[3] This classification is only conditional since it is not possible to draw clear lines between renewable and non-renewable resources

Renewable and non-renewable resources are each, in their own way, limited: renewable resources are limited due to the mismatch of the rate of their regeneration and the rate of their use, while non-renewable resources are limited in their quantity and quality.
The basic feature of resources is their scarcity. It is frequently interpreted in its most narrow meaning – in terms of the physical availability of resources. However, apart from the limited physical availability of the materials, scarcity has a geopolitical dimension (trade barriers can hinder trade in materials) and an economic dimension (limitations in the supply chain, problems in the distribution or problems related to the imperfections of the market). Scarcity also refers to the quality of resources, in terms of their substantial structure or energy contents, which increases or reduces the potential benefits of the resources. The qualitative dimension of resources can be observed also from the aspect of environmental or social circumstances (for example, the level of air pollution or the level of soil fertility).

In an article that focuses on the typology of resource scarcity, J. Bell and a group of authors (Bell, John E. et.al. 2012: 158–166) warn that managers are finding it increasingly difficult to ignore the impact of the reduced renewability and increased scarcity of resources on the supply chain. Although technology and substitution have undoubtedly reduced (or rather postponed) the scarcity of natural resources in the past, the pressures that come from the use and degradation of the resource base lead to a situation where most of the natural resources move from the category of "renewable" to "non-renewable" and from the category of "available" to that of "scarce" (Figure 1-9).

Janez Potočnik, European Commissioner for Environment Protection, offers a succinct explanation of why we still use resources in an inefficient manner and why radical change is needed: "we are locked into systems, infrastructures, policies and habits that were designed for days when resources and ecosystems were not under such threat… Don't misunderstand resource efficiency. It is not just about making our resources go a little further

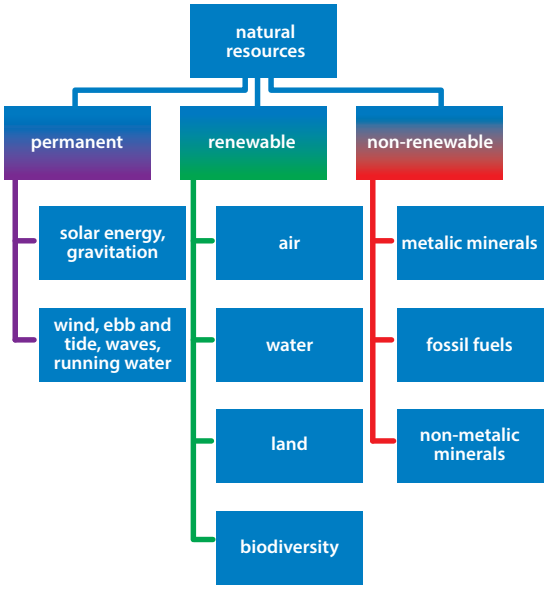

Figure 1-8: Classification of natural resources

– this would be underestimating the level of change needed, it would be just delaying the inevitable. It is about making our resource use sustainable, so that we can stay within the Earth's limits in the long term" (Potočnik 2011: 2-3).

As stated in the document The Awake Consumption Guide, resource efficiency is about the use of resources in a sustainable way – producing more with less input and with the lowest possible impact on the environment (European Commission 2012a: 4). Using economic jargon, we can say that efficiency in the use of resources means the economical use of resources, and respect for the natural and social environment where the use is taking place. Similarly, the EC communication titled "A resource-efficient Europe, a flagship initiative under the Europe 2020 Strategy" explicitly identifies, among other measures, the need of "a genuinely consumption-based, sustainable materials management or a 'circular economy', and

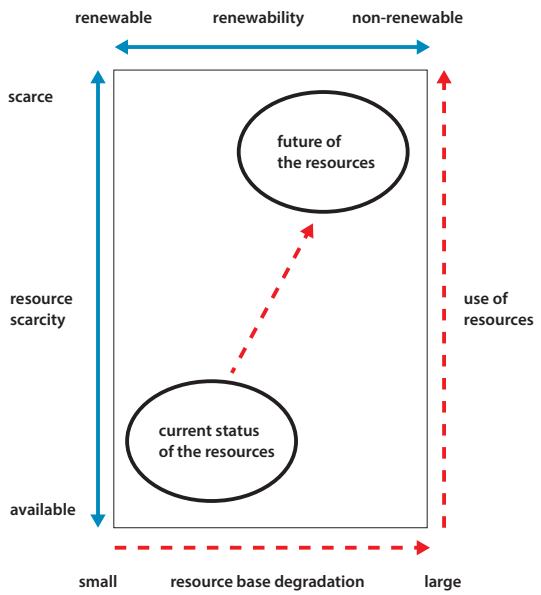

Figure 1-9:
Natural Resources Scarcity Status

Source:
A Natural Resource Scarcity Status, J. Bell at al.

where waste becomes a resource, more efficient use of minerals and metals will result" (European Commission 2011: 14).

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The report *Unleashing the Power of the Circular Economy* prepared by IMSA Amsterdam (Kok et.al. 2013) analyses three forms of decoupling of impacts (Figure 1-10).

Generally speaking, there are two ways to implement the processes of decoupling of impacts:

- to guide economic activity, on both the national and global levels, to a lower use of natural resources with a simultaneous reduction of negative impacts on the environment through "closing loops" and applying the logic of natural ecosystems as models of industrial activity (a classical example is the Kalundborg industrial district in Denmark);
- to introduce and promote concepts of wellbeing, alternative to the concept of gross domestic product as the sole measure of human progress. These are concepts clustered around the understanding that economic activity is not reflected only in the output of the economy, but also through alternative indicators, and that factoring in the real (direct and indirect) implications of economic activity will encourage the decoupling of the impacts of economic growth on social welfare.

1.3.3 THE OBSTACLES

The benefits of the circular economy may be clear but its implementation and operationalization in practical terms is not straightforward or easy at all. The experiences of various countries like Denmark,

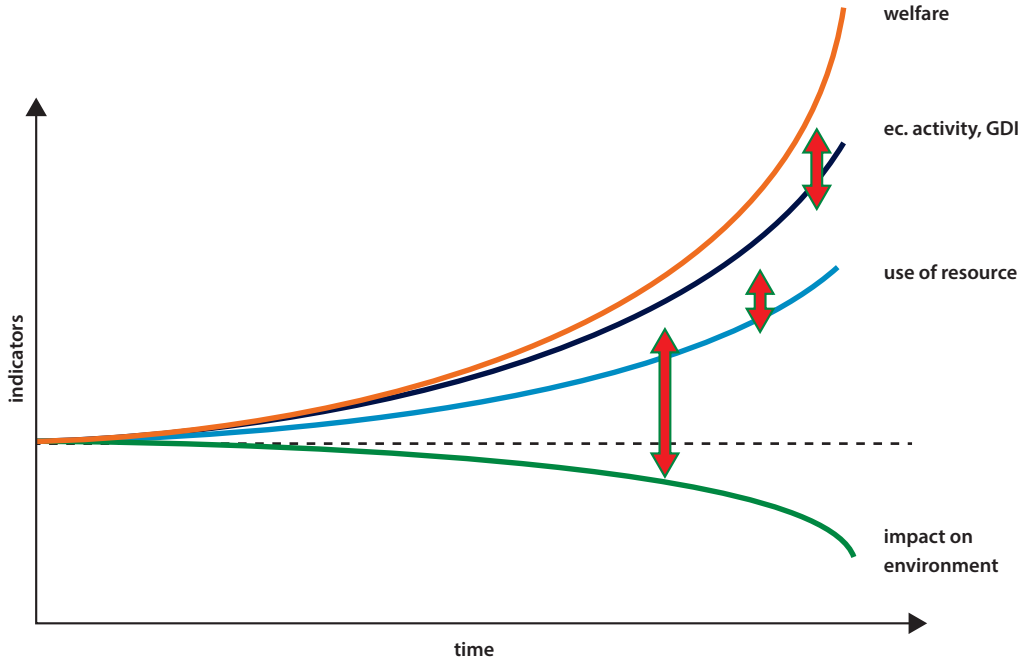


Figure 1-10:
Stylized presentation of decoupling of impacts

Source:
Unleashing Power of the Circular Economy, IMSA Amsterdam

Sweden, Germany, Japan, and increasingly China, identify a number of problems and obstacles that need to be addressed to successfully implement the model of the circular economy:

Incoherent concept. As some scholars rightly say, there is still no unified consensus-based opinion on what the circular economy actually is and how it can actually be achieved.[4] It is believed that development of the concept of the circular economy and its basic elements that would be understandable to everyone would help to accept the concept more generally, which would, in its turn, encourage cooperation and prevent confusion (Preston 2012: 4).

Inadequate policies. In order for the market to allocate resources efficiently in a circular economy framework, all the externalities of economic activity need to be factored in the prices of resources and energy – and respectively, in the process of the good and services produced. Bold policy decisions are needed for that but they are not popular because they would inevitably mean increased consumer prices. Consumers are voters too and not surprisingly resource-inefficient products remain economically more affordable, albeit environmentally unsustainable.

Low awareness. The concept of the circular economy may be intuitively appealing but it requires non-linear thinking and some basic proficiency in different fields of science and research. Similarly to "industrial ecology", it is not just integrating traditional (linear) industrial design and environmental preservation. It entails cross-cultural skills and multi-disciplinary competence.[5] These high expectations for the institutions of the system are rarely matched by appropriate knowledge and experience in the state bodies, business and citizens.

Unstable market of recycled products. Combination of limited demand and expensive extraction of marketable recycled products leads to the situation

[4] Comment by Julie Hill, president of the Green Alliance's Circular Economy Taskforce in the CEP seminar Thursday Evening Policy Seminar (http://bit.ly/1tRG8ea)

[5] Metaphorically speaking, the probability of a person being open to the concept of the circular economy is higher if he/she has read in his/her young (formative) years Ernest Callenbach's "Ecotopia" or "The Limits to Growth" – or has simply spent some time in a village with an old-style farm and has had the opportunity to witness and understand the circularity that nature has mastered.

that the market of recycled products is more unstable than the market of goods, which means high risks for potential investors. High risks, in their nature, demand higher rates of return, and if they cannot be achieved, then investment in managing recycled products stops being opportune.

Varying characteristics of recycled products. Flows of waste are heterogeneous and their composition is subject to changes due to the changes in the consumption and production patterns. This can be very demanding from the point of view of management, since plants and machines are efficient within certain composition limits. The volume of waste can also be very unpredictable and it can become uncorrelated with economic performances.

Transition costs. Although assessments confirm that savings made through the circular economy are large on a macro-level, the costs of transition of a company from a linear to circular economy can still significantly increase their operation costs. On one hand, they can present a barrier to the existing businesses and, on the other, they can discourage potential investments in the infrastructure of the circular economy

Lack of enthusiasm in consumers. Consumers have an extremely important role in the process of implementation of the circular economy. They drive demand and demand largely determines the pattern of the supply (resource efficient or inefficient). Their attitudes to the ecological characteristics of the products and production processes influence their choices and ultimately give a financial value to the efficient use of resources. Problems may arise from two sources – unawareness of the full implications of non-sustainable production and the higher cost of sustainable choices compared to non-sustainable ones. Unfortunately, people are often willing to voice their support for consumption of sustainably produced products but are less enthusiastic to bear increased costs of their choice.

In analysing Montenegro in the context of sustainable development as a comprehensive concept that includes all other views of the future growth and development, we have to take into account all the aspects of efficient management of natural resources that the concept of the circular economy is based on. Efficient use of resources and the adoption of the principles of the circular economy present the preconditions for smart development and raising the level of competitiveness of Montenegrin economy while reducing its impact on the environment. They are the means that can help Montenegro achieve its goal of becoming an ecological state and joining the European Union.

Photo: Duško Miljanić

CHAPTER II

Natural capital and ecosystem services in Montenegro: challenges and opportunities

The economy of every country is directly or indirectly conditioned by the scope and quality of its natural resources. A resource-efficient economy (and the circular economy in particular) is one where economic growth and development are achieved not at the expense of the value, diversity and quality of natural capital. In order to ensure preservation of the natural capital in the long run, it is necessary to manage natural resources in a sustainable way. This chapter will discuss the status of natural resources in Montenegro (i.e. development opportunities that they provide) and the key challenges in the management of these resources from the point of view of resource efficiency and reduction of the impact on the environment.

The stated policy vision of the social and economic development of Montenegro as an ecological state is rooted in the principles of sustainable development. As a political vision, this commitment fully corresponds with the growing level of awareness of the need to protect natural resources and to reduce the intensity of their use relative to the economic growth rates of the country and, in the broader sense, relative to human development. The commitment to the idea of an ecological state also includes the concept of cross-generation equity, i.e. the obligation not to deprive the future generations of the right to benefit from an equally high-quality environment and the resource base as the current ones have. The commitment was reconfirmed in 2012 in the document prepared in advance of the Conference on Sustainable Development in Rio de Janeiro in 2012.[6]

In the conclusions of the Report on the National Consultations on the Post-Millennium Development Goals – *The Montenegro We Want*[7], the environment is identified as one of the most significant advantages and opportunities of the country. However, it was also noted that the potentials of the environment are not only inefficiently used, but also being rapidly destroyed.

2.1 Ecosystem services

Ecosystems provide a broad range of goods and services that the welfare of people and opportunities for economic development largely depend on. The ecosystem services include soil formation (regarded as the most important and the so-called supporting ecosystem service upon which all other processes depend), nutrient cycling, primary production, water and air regulation, climate regulation, a variety of cultural services and many others. Ecosystem products include food, fibre, fuel, genetic resources, medicines, etc. Figure 2-1 illustrates the different combination of services provided by major ecosystems and Figure 2-2 visualizes the linkages between the categories of services and the aspects of human wellbeing (and the strengths of those linkages).

The development of a resource-efficient economy faces the challenge of public and businesses attitudes that perceive and use ecosystem services and products as if their supply was unlimited. This challenge is linked to the fact that these goods and services are not properly valued in the market (but are mainly taken for granted and used as "free" goods). Therefore, ecosystems are frequently excessively used, degraded and polluted, which has a negative impact on the long-term sustainability of human activities and resilience to external stresses. According to estimates throughout the last 50 years, about 60% of the ecosystem services on Earth have been degraded[8].

In spite of certain deficiencies and limitations in the approaches[9] that are applied in assessing the value of ecosystem services, these methods have become a constituent part of policy development and they have been advocated both at the level of the EU and at the global level (for example, in the implementation of the UN Biological Diversity Convention, among others). They are also part of many programmes implemented

[6] Government of Montenegro. (2012). Ecological State Montenegro +20.

[7] Olivera Komar and Pavle Gegaj. The Montenegro I Want – Report on the National Consultations in Montenegro about post-millennium development goals, April 2013

[8] Quoted in the EU Roadmap.

[9] A number of scholars, for example, dispute the ethical basis for the assessment of the economic value of biodiversity and ecosystem services advocating the view that ecosystems have an essential intrinsic value that cannot be measured by market categories and thus remain excluded from the economic calculus. They think that "putting the price tag" on ecosystem services is justified if it leads to the protection of these resources, but at the same time they warn of the danger of misuse or even abuse of such assessments.

Figure 2 – 1 Ecosystems and Some Services They Provide

Different combinations of services are provided to humans from the ecosystems represented here. Their ability to deliver the services depends on complex biological, chemical, and physical interactions, which are in turn affected by human activities.

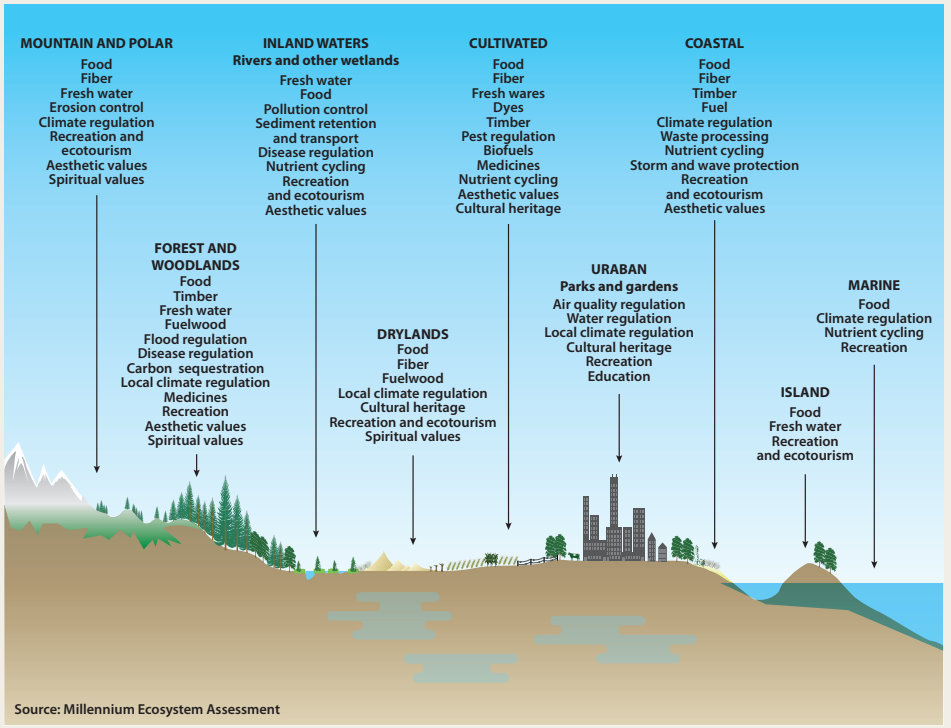


Figure 2-1: Ecosystems and some services they provide

Source: Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Opportunities and Challenges for Business and Industry. World Resources Institute: Washington, DC, p. 3.

by the UNDP such as BIOFIN and the Poverty–Environment Initiative.

Montenegro does not have precise and systematic data on the condition of its ecosystems because the programme for biodiversity monitoring has been in place for a relatively short period of time (since 2000) and it does not provide a full assessment of the ecosystems' status and trends. Nevertheless, significant pressures and examples of degradation have been noted, and the most vulnerable ecosystems identified include forest vegetation (due to permanent exploitation), coastal (due to the transformation of natural habitats into constructed areas) and water ecosystems (due to different forms of pollution, which reduces their productivity)[10].

Integration of the value of services provided by ecosystems into the processes of decision making and in recording the results of the economic activities (both at the micro and macro level) is not taking place at a sufficiently high level. Furthermore, the assessments of the potential impact of certain plans and projects on the environment often neglect the value of biodiversity and benefits from using the ecosystems (since the estimations of these values are rare and have just started being used in the last couple of years), whereas purely economic aspects often have primacy in valuation. In the long run, this can lead to significant deterioration of the ability of ecosystems to continue providing the same quality and scope of services and products. The examples of ecosystem services

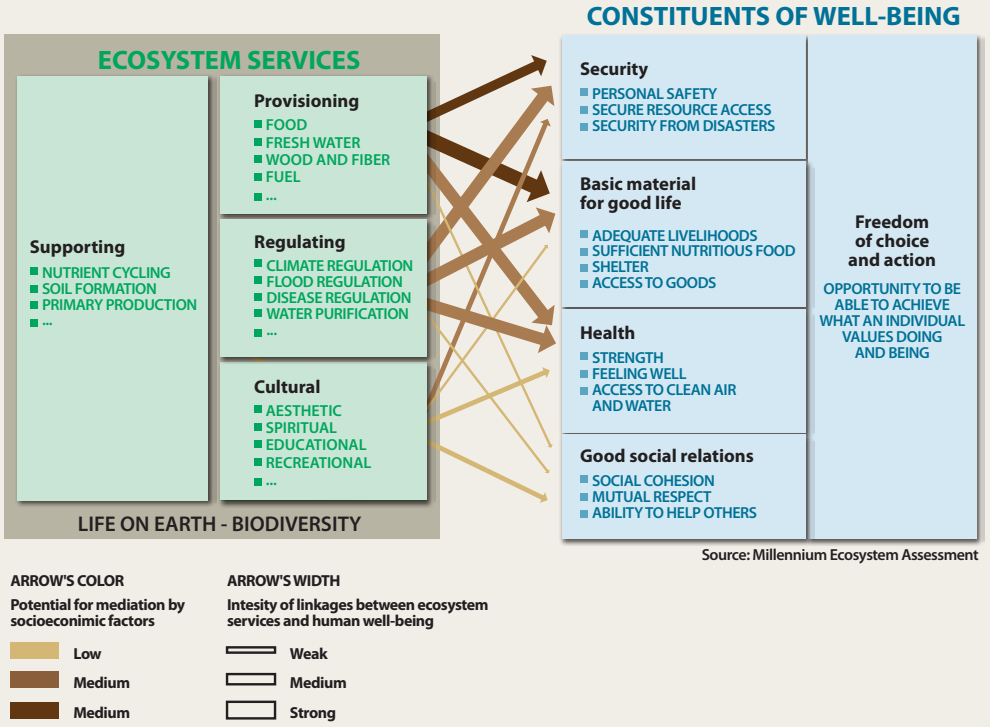
[10] National Biodiversity Strategy 2010 - 2015

Figure 2-2: Linkages between ecosystems and human well-being.

Source: Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Opportunities and Challenges for Business and Industry. World Resources Institute: Washington, DC, p. 3.

Figure 2 – 2 Ecosystems and Some Services They Provide

This Figure depicts the strength of linkages between categories of ecosystem services and components of human well-being. It includes indications of the extent to which it is possible for socioeconomic factors to mediate the linkage. For example, if it is possible to purchase a substitute for a degraded ecosysytem service, then there is a high potential for mediation. The strength of the linkages and the potential for mediation vary according to the specific ecosystems and region. In addition, other factors – including other environmental factors as well as economic, social, technological, and cultural factors – influence human well-being. Ecosystems are in turn affected by changes in human well-being.



Source: Millennium Ecosystem Assessment

valuation in Montenegro include the WWF Study from 2005 on the values of the River Tara, the assessment implemented by Arcadis Ecolas and IEEP in 2007 on the benefits of harmonization with the EU *acquis* in the field of the environment (Ten Brink et al 2007), the UNDP study from 2011[11] and the recent (2013) assessment[12] carried out within a GEF/UNDP project. The 2011 UNDP study dealt with protected areas, and has shown that biodiversity and ecosystems in Montenegro are, among other things, a very significant economic category: the value of tourism, recreational and other activities related to the use of the resources of the protected areas and the value of services they provided for water supply and protection of basins were assessed at about €68 million in 2010 (about 2.2% of GDP or €106 per capita). The assessment, however, is not adequately applied in practice since investments in the protection and management of the protected areas are still significantly lower than necessary and since biodiversity in general (as assessed in the *Analysis*[13] of the National Council) is exposed to strong pressures and decline.

[11] National Biodiversity Strategy 2010 - 2015; UNDP Montenegro, The Economic Value of Protected Areas in Montenegro, Podgorica 2011.

[12] Emerton, L., Montenegro: the economic value of biodiversity and ecosystem services, 2013, technical report prepared under the GEF/UNDP project National Biodiversity Planning to Support the Implementation of the CBD 2011-2020 Strategic Plan in Montenegro.

[13] National Council on Sustainable Development, Analysis on the Achievements and Challenges of the Ecological State: 20 Years of the Ecological State of Montenegro, 2011

Box 2-1:
Valuation of services provided by protected areas in Montenegro: UNDP study 2011

In 2011, the GEF project for development of a sustainable system for financing protected areas in Montenegro (implemented by the UNDP in cooperation with the competent ministry), supported the preparation of the study for assessing the economic value of the system of protected areas with the goal of strengthening argumentation for increasing public expenditure to establish new protected areas and manage the existing ones. The study was carried out by the ISSP in cooperation with international experts.

The Study *The Economic Value of Protected Areas in Montenegro* showed that biodiversity and ecosystems generate significant economic value that is manifested in several sectors and activities. In calculating the total economic value that is generated in the system of protected areas, the study primarily assessed the services provided by national parks in areas such as tourism, fishing, recreation and water sports, as well as other economic activities and sources of revenues. Moreover, services of supplying drinking water, protecting river basins and protection against floods were also assessed.

The value of the activities related to the use of resources of Montenegro's national parks and the value of services provided by these areas in terms of water supply and protection of basins was assessed at about €68 million in 2010. In the same year, the expenditures for financing protected areas were at a level of about €2 million. The study concluded that such a level of funds is insufficient for adequate management. If such practice continues, significant losses for Montenegrin economy and population could emerge in the long run. If, on the other hand, the option of "investing in natural capital" was chosen instead of the option of "continuing with the current practice of insufficient investments in protected areas", the assessments showed that permanent and growing added value would be ensured for the economy and population with total benefits of over €1.5 billion in the next 25 years.

A more comprehensive attempt to value the ecosystem services in Montenegro is presented in the report The economic value of biodiversity and ecosystem services published in 2013 within another GEF/ UNDP project. The baseline value of the selected biodiversity and ecosystem services in Montenegrin economy was assessed at €982 million (Table 2-1). The services of provision of products (wild edible species, foodstuff, wood biomass and energy) contributed about €169 million or 17% of the total value; services of regulation and maintenance (fertility of the cultivated land, pollination, protection of catchment areas and coastal area, carbon sequestration) contributed €276 million or 28%; while the category of cultural services (landscape and recreation in nature) contributed €537 million or 55% of the total value.

The gross value of the production of the overall Montenegrin economy amounted to €5.24 billion[14] in 2011, meaning that the gross value of the ecosystem services that could be valued was almost one-fifth of this amount. At the same time, the value of the mentioned ecosystem services was 2.3 times as high as the gross value of the production in agriculture, forestry and fishery (amounting to €425 million).

One of the milestones along the EU Roadmap is that by 2020, the natural capital and ecosystem services should be properly valued and included in the balance sheets by both public administration and businesses.

[14] Monstat, Annual Yearbook 2012.

2.2 Biodiversity

Montenegro has the characteristics of a mountainous and Mediterranean country and thus a very high biodiversity. According to the abundance of plant and animal species and diversity of its ecosystems, Montenegro is one of the leading countries in Europe[15]. About 20% of the total flora is represented by endemic and sub-endemic plants. Four hundred and ten plant species and 428 animal species are protected on the grounds of their rarity and vulnerability status. The national network of protected areas currently covers about 9% of the territory. Natura 2000 – the network of habitats and species important for protection at the European level – is still not defined.

Data on the use of biological resources is still not comprehensive and informative enough to provide the answer to the question of whether these resources are used in a way that is sustainable in the long run. It is obvious, however, that some of the species are excessively exploited and that management of natural resources is mostly not based on sustainability models, which has a negative impact on biodiversity. The key forms of jeopardizing of biodiversity (recognized in the National Strategy) include: degradation of habitats (due to the uncontrolled exploitation of gravel and sand, uncontrolled logging, urbanization and development of infrastructure, particularly in the coastal region; uncontrolled hunting and fishing and the picking of edible and medicinal plants, mushrooms and forest fruits; the spread of invasive species; as well as soil, water and air pollution. It is difficult to make any assessment of the status and trends related to species diversity in Montenegro since the necessary data is not available. For example, there are no red lists or books of species, while data on the condition of populations of selected species is available only in short-term series. The available data shows both positive (stable trends or increases) and negative changes (declines in the population of the monitored species like, for example, in amphibians and certain species of birds in 2011)[16].

The European goal is to halt the loss of biodiversity and degradation of the ecosystems by 2020 and to rehabilitate the damages inflicted on biodiversity wherever it is feasible. In the long run, achieving the European goals for preserving biodiversity in Montenegro would ensure the extended ability of the natural environment to support economic development and a high quality of life for the people. It is therefore necessary to ensure that biodiversity is adequately targeted in the process of rendering development decisions.

2.3 Water

In Montenegro there are significant differences in the distribution and abundance of water resources – including dry karst areas but also areas abundant in surface and ground waters. Generally, with its average annual outflow of 624 m^3/s, the territory of Montenegro falls within the scope of areas that are rich in water. Research on ground water has been irregular and limited in scope.[17] Data on the impact of climate change on water resources mostly comes from global and regional studies that estimate that the future availability of water will be significantly reduced while the intensity and frequency of floods will increase.

The quality of water in Montenegrin rivers, measured by the index of water quality, had a positive trend in the period from 2009 to 2012. Thus, in 2012 about 30% of the watercourses were very good, 45% good and 25% poor quality. The most polluted watercourses are the Vežišnica and Ćehotina on the territory of Pljevlja, and the lower Zeta and Morača on the territory of Podgorica municipality, as well as the Ibar near Bać and the Lim near Bijelo Polje[18]. Data on the status of water bodies according to the provisions of the Framework Water Directive is still not available.

Water is used in households, industry, for electricity generation, as well as for tourism and recreation. Large irrigation systems cover less than 3,000 ha out of the total 51,000 ha of irrigable agricultural land[19]. The total amount of water withdrawals for the supply of settlements is 107 million cubic metres per year. In the pe-

[15] National Biodiversity Strategy 2010–2015

[16] Source: draft of the *Indicator-Based Report on the State of Environment*, Environment Protection Agency, 2013

[17] *The First National Communication of Montenegro to UNFCCC*, 2010; the source of the data in the paragraph above is the document *Vodoprivredna osnova Republike Crne Gore*, 2001 (Water Resources Basis of the Republic of Montenegro).

[18] The index is calculated on the basis of 10 parameters of the physical, chemical and microbiological quality of water, i.e. their aggregation into a composite indicator. The source of the data is the *Indicator-Based Report on the State of Environment.*

[19] Data of the Ministry of Agriculture and Rural Development

Photo: Duško Miljanić

riod of 1999 to 2008 there was an 18% increase in the withdrawn quantities. The quantity of water that is used in industry (including the energy sector) and for irrigation has been declining in the last five years[20]. According to data from the Ministry of Sustainable Development and Tourism, losses in the water supply network in urban settlements in 2012 were 57% with a slight decline in comparison with previous years.

In order to ensure sustainable water resource management, Montenegro has to overcome a number of problems, including the irrational and inefficient use of water that is, for example, manifested in significant losses in the water supply system, consumption of water for purposes other than those intended, absence of significant recycling, i.e. reuse of water, etc.; insufficient infrastructure for wastewater treatment (the sewerage system and wastewater treatment plants); poor control of various pollution sources[21] and of exploitation of materials from the water beds; inadequate protection from floods and erosion; weaknesses in the information systems (including the non-existence of a unique national water information system); and capacities for preparation of future river basin management plans.

The instruments for water management and incentives for efficient use of waters are not sufficiently developed[22] and they are not applied in a way that would ensure their long-term sustainability. The abundance and mostly good quality of surface waters in the country are usually taken for granted and the process of development planning implicitly assumes their inexhaustibility. Therefore no deliberate efforts are being made to factor in the scarcity of these resources and damages that they could undergo due to various actions in the system of assessment and approval of de-

[20] The source of data on the abstracted and used water is MONSTAT (Statistical Yearbook 2011).

[21] Level of treatment of the communal wastewater is very low (only about 10% of the population is connected to the treatment plants), discharge of industrial water is poorly controlled and there is also pollution from agricultural activities.

[22] Like, for example, plans for managing catchment areas, taxes and fees for using water resources, etc.

velopment projects. In the long run, this approach can lead to degradation of the resource basis, particularly in combination with the effects of climate change.

Available information indicates that climate change will have significant implications for the availability and use of water resources in the entire region. In the fourth IPCC report, for example, it is stated that since the mid-21st century flows of rivers in South-East Europe and the potential for electricity generation are expected to decrease significantly (the projected decline ranges from 20% to 50% depending on the region)[23].

[23] International Panel on Climate Change (IPCC), Climate Change 2007: Synthesis Report

Other countries' experience has shown that significant improvements in managing water resources and rationalization of consumption can be achieved by adequate implementation of various economic instruments. A report on the steps that are being undertaken in the EU with a view to greening[24] asserts that there are both negative and positive examples in the Member States in the field of implementation of the Framework Water Directive and the use of prices that cover the full costs of using water resources (environmental, social and economic). Many countries have been using effective measures for more efficient water use (the experience of Cyprus presented in Box 2-2). Denmark, the Czech Republic, Slovenia and Latvia, for example, use complex instruments that cover water abstraction fees, measures of consumption, fees for use of water and discharging of waste water into surface waters, green water tax and penalties for using water resources without permission.

[24] Fedrigo-Fazio, D., Withana, S., Hirschnitz-Garbers, M., and Gradmann, A., Steps towards greening in the EU, Monitoring Member States achievements in selected environmental policy areas – EU summary report prepared for DG Environment, Brussels, 2013

The EU Roadmap emphasizes that many European river basins and waters have been altered due to water withdrawal, melioration measures and dams, which have frequently resulted in a poor water quality with significant negative effects on the environment, possible negative impacts on health, as well as with limitation of space for natural habitats. It is estimated that about 20% to 40% of European water is being unnecessarily used and that, through technological improvements only, the efficiency of using water can be improved by 40%. Another key goal is to keep the total abstraction of water by 2020 at the level of less than 20% of the available water resources. Rational use of water resources and preservation of their good status (or when necessary – improving it) are significant for the resource efficiency and sustainable development of Montenegro.

Box 2-2:
Water use tax in Cyprus

As a country with insufficient water resources, Cyprus introduced in 1984 a water tax with a progressive rate (which depends on the quantity of the water used). The goal of this tax was to rationalize water consumption and to collect funds for the construction of water infrastructure. The way in which this tax was implemented changed significantly in 2004 and these changes were successful in stimulating users to reduce water consumption. Water consumption per capita in the period from 2004 to 2008 declined from 192 to 109 m3; in 2005 about €25.5 million was collected via the water tax and, according to available estimates, these revenues covered 62% of the total costs of maintaining the water management system (an increase from 45% in 2001).[25]

[25] Ecorys, The role of market-based instruments in achieving a resource efficient economy, report prepared for DG Environment, 2011

2.4 Air

Air quality has a direct impact on the health of people, the condition of the ecosystem and on agriculture. Air pollution comes mostly from industrial emissions, the energy sector, transport and fuel combustion in households. In comparison to 2009, air quality in the urban areas of Montenegro has improved for some of the key pollutants – sulphur dioxide, nitrogen dioxide, and ground-level ozone (SO_2, NO_2, O_3). The exception is particulate matters (PM_{10}) where a certain deterioration is recorded. High concentrations and a large number of values above the average permitted daily values of PM_{10} are most frequent in industrial and urban zones during the heating season. In the period from 2009 to 2012 the average annual concentration of PM10 was above the permitted level in Nikšić and in Pljevlja[26]. The highest concentrations and the largest number of exceedances of the permitted average daily concentrations were recorded in Pljevlja. The number of exceedances has significantly increased in Podgorica in the last two years. However, the increase was particularly high in Nikšić and Pljevlja. There are no studies and no information about the concrete impact of the increased concentrations of certain polluting matters on health and there is no assessment of the total damage the economy suffers due to air pollution (including, for example, the costs of treatment, the costs of absence from work, etc.).

The technologies used in the industrial and energy plants in Montenegro are inefficient and polluting, generating high emissions in the environment. An additional problem is the large number of inefficient small emission sources such as individual furnaces and heating systems. Implementation of regulations and economic instruments to ensure a shift to technologies and processes with lower emissions is slow, while delays are justified mostly for economic reasons. The negative impacts of transport on air quality are increasing (due to an increase in the total number of vehicles and a large number of old, inefficient ones as well as the use of fuel of an inappropriate quality, etc.).

Air pollution is not just a Montenegrin problem, it is a significant challenge in the EU, particularly when it comes to PM, NO_2 and O_3, whose concentrations frequently exceed the required standards in more densely populated areas. It is estimated that current concentrations of particulate matter in the ambient air cause some 348,000 premature deaths annually in the EU (WHO 2006: 89). Estimates also suggest that the economic losses occurring from work days lost due to airborne diseases caused by polluted air are higher than the investment necessary to mitigate air pollution.[27] At the same time, there are countries that are successfully dealing with the problem of air pollution, including Denmark, Finland, Ireland and Luxemburg where in some of the years no exceedances of the PM_{10} limit values were recorded.[28]

2.5 Land use and soil

A long-term goal of the European policy is to reduce land take (for residences, industry, infrastructure, etc.) to zero km^2 of land a year by 2050. Today's value is more than 1,000 km^2/year. Land is one of the most important resources for further development, thus land degradation and the irrational use of land (particularly its most valuable parts) have been recognized as significant problems in several analyses that dealt with these issues in Montenegro[29]. Development of the land policy and land-use (spatial) planning are, as a rule, where compromises are made between different social and economic needs and the need to protect the environment. Even though there are currently no precise indicators to measure how efficiently land is used[30] in Montenegro, there are obvious cases of excessive construction (both regulated and illegal) at the expense of valuable agricultural land, territories with high biodiversity as well as territories important for their potential touristic value.

In the realm of high demand and high market prices of land which have characterized one of the development stages of the Montenegrin economy, the country failed to implement adequate instruments of land policy that would have ensured its rational use, particularly in the coastal regions. Analysis done within the Coastal Area Management Plan (CAMP) showed the opposite to be the case: spatial plans for the six coastal municipalities

[26] The source of the data is the Indicator-Based Report on the State of the Environment.

[27] Source: The EU Roadmap and related analyses

[28] Fedrigo-Fazio, D., Withana, S., Hirschnitz-Garbers, M., and Gradmann, A., 2013

[29] Devastation of space (and/or unplanned and illegal construction, particularly in the most valuable locations like the coastal area and the protected areas) are rightfully emphasized in the Analysis about 20 Years of the Ecological State as a significant problem, and it is not in line with the European land policy and goals of the EU Roadmap which aim at slowing down the spread of constructed surfaces.

[30] Land-use efficiency could be expressed, for example, as the ratio between the space taken up by new construction and the increase in GDP, the standard of living or reduction of poverty.

planned disproportionately large surfaces (in relation to the density of population and the surface of the constructed areas) to be used for further constructions. These areas would be sufficient to ensure residential premises for about 800 000 people and new touristic opportunities with more than 350 000 beds. The ratio of the total surface and the planned construction land in the coastal municipalities exceeds by far the similar indicators in other countries suggesting that it is far beyond sustainable levels. For comparison, 15.5% of the total territory of the six coastal municipalities in Montenegro is taken up by construction areas, while in the coastal districts in Croatia this indicator ranges between 4.0% (Dubrovnik-Neretva County) and 7.1% (Split-Dalmatia County)[31].

The CAMP analysis (see Box 2-3) underlines that planning of construction areas that are several times larger than necessary is a form of irrational use of valuable and non-renewable spatial resources and that it has numerous negative consequences, including:

- dispersed construction that requires a much longer transportation network and more expensive communal infrastructure for the construction land
- unnecessary consumption of other categories of

[31] Ministry of Sustainable Development and Tourism and UNEP/MAP, CAMP Montenegro: Summary of the Analysis of General Vulnerability, (draft) April 2013

Box 2-3:
Coastal Area Management Programme (CAMP): support for rational spatial planning and land use in the coastal municipalities

The CAMP project is implemented by UNEP MAP (Mediterranean Action Plan) in cooperation with the competent Ministry. The project promotes integrated coastal zone management (ICZM) and implementation of the ICZM Protocol to the Barcelona Convention.

An analysis of the general vulnerability of the space was done within CAMP for six coastal municipalities on the basis of the vulnerability of the individual environment segments. The term 'vulnerability of space' means the state of the environment, space, land, or phenomena that can give rise to a negative impact where certain actions are undertaken. It was not only vulnerability that was analysed, but also the existing pollution (threat) of individual segments on the environment. The goal of the analysis was to support the preparation of the Special Purpose Spatial Plan for the Coastal Zone of Montenegro (SPSPCZ) by identifying the most valuable units of the area that should be preserved from any future degradation, i.e. the parts of the area where it is favourable or unfavourable to plan certain activities or .

In this process, a broad range of data on the state of the environment in the coastal area was assessed in detail, including data on flora and fauna, air quality, the status of agricultural land, the status and quality of the land and sea water, noise, etc. The analysis included the processes of erosion, seismic hazards, the impact of climate change and other factors. All the assessments are presented on the maps, and thus it is easy to use the results in the process of spatial planning.

Analysis of the spatial plans that are currently being implemented and of the real extent to which the area has been developed (based on orthographic photographs from 2011) showed that the construction areas are largely disproportionate, relative to the population size and tourist capacities. As much as 46% of the surface of the 1-km-wide coastal belt has been planned for development. In countries like Italy, France and Spain this figure is much lower (on average about 30%). Under the presumption that the density of the population in these areas will be 45-60 residents/ha, some 600-800,000 more people could live in the construction areas envisaged in the existing spatial plans. Reserves within the touristic zone and touristic residences amount to about 4,600 ha, which would enable the construction of about 270,000 new beds if the minimum density is 60 beds/ha (or over 350,000 new beds if we apply the more frequent standard of 80 beds/ha).

The CAMP analysis concluded that this kind of approach represents irrational use of the valuable and non-renewable spatial resources in the coastal area, resources that are of essential importance for their touristic and natural value.

land, particularly valuable agricultural and forest land and areas with high biodiversity
- higher costs for energy and fuel, i.e. stronger pressure on the environment

In this case the policy goal operationalized through spatial plans was clear – to respond to short-term market signals and high demand for construction land rather than to preserve a resource base for long-term sustainable development. Benefits from the preservation of spatial resources (including the natural and landscape values of the space) include the stability of the ecosystems and the services they provide, development of tourism, productivity of constructed areas, reduction of the costs of urban development, preservation of the potentials for development of agriculture and other sectors. A high-quality system of spatial planning (as a systemic mechanism based on law) is the key sustainable development mechanism which can prevent a permanent reduction in the visual, economic and other values of the space due to degradation and irrational land use.

Preservation of fertile soil and of its quality is also an important condition for further development. Data from the programme of monitoring soil pollution in the selected locations shows that the status of the content of hazardous and damaging matter is satisfactory. Increased concentrations of pollutants in the soil are mainly due to inadequate disposal of communal and industrial waste or emissions of exhaust gases from transport and deposition of harmful substances from exhaust gases near major transport routes. Monitoring of land fertility for the period 2004–2012 showed that the contents of organic matter on average did not decline and that it ranged from 2.8% to 3.8%. Significant pressure comes from the processes of erosion that have been registered within 300 torrential rainstorms, where the amount of transported erosion rose to over two million cubic metres annually. As a consequence, barren land appears, causing significant disturbance to the hydrological balance (increasing the risk and severity of floods). Work on regulating torrents has so far included mainly technical measures, while biological measures are rarely applied.[32]

In its *Analysis of Achievements and Challenges of the Ecological State*, the National Sustainable Development Council warned that the most important and most urgent challenge concerning land is to adopt efficient measures to prevent the further degradation of agricultural (particularly arable) land and of areas with valuable landscapes. In addition, the further conversion of land into construction areas should be prevented. Montenegro also needs measures to increase its agricultural land stock through cultivation of land that currently cannot be cultivated and through melioration, protection from erosion and floods, as well as through a high-quality programme for the development of rural areas.

2.6 Minerals and metals

Out of all metallic mineral raw materials, red bauxite deposits and lead-zinc ore deposits are the most important. Red bauxite reserves that can be used in the production of aluminium are located in the central part of the country and they are assessed at about 21 million tonnes. Reserves of the lead-zinc ore are mainly located in the mountain area of Ljubišnja and Bjelasica (Šuplja stijena and Brskovo mines) and they amount to over 34 million tonnes.

Non-metallic mineral raw materials are gaining importance in the economies of the majority of developed countries thanks to the accelerated technological developments, but their use is in its initial stages in Montenegro. Out of the total number of 13 types of identified non-metallic mineral raw materials that are economically significant (including various types of stone, brick clay, marl cement, white bauxite, dolomite, barite, bentonite, quartz sand, etc.) 10 have been used so far.

As for energy sources, Montenegro uses coal. Investigation of the potential for the use of oil and gas is planned. In the deposits of the Pljevlja basin, reserves of lignite (a low-energy and inefficient fossil fuel) have been assessed at about 215 million tonnes, while the balance reserves of brown coal in the Berane basin have been assessed at about 25 million tonnes.[33]

[32] Data from the Ministry of Agriculture and Rural Development

[33] *Montenegro in the 21st Century – in the era of competitiveness*, Montenegrin Academy of Arts and Science, Podgorica, 2010, Vol. 73, Book 1, p 50

Photo: Saša Popović

With the current pace of exploitation[34], envisaged construction of planned thermoelectric power plants and the current use of technologies, high quality reserves of bauxite and coal could be exhausted in several decades. The negative impacts on the environment caused by the use and processing of the mineral raw materials constitute a significant problem as well as the fact that devastated areas are rarely rehabilitated or not rehabilitated at all. Concessions for the use of certain raw materials mostly do not reflect the real costs associated with the use of these resources and, as certain international studies have shown (details in the Chapter 4.2), the exploitation of lignite is significantly (directly or indirectly) subsidized.

Sustainable management of materials, i.e. efficient use of minerals and metals is not subject to particular attention in the Montenegrin economy. In European policies the use of these resources is controlled via measures aimed to reduce the influence of products during their lifecycle, prevent the generation of waste, recycle and reuse, encourage research and innovation, etc. The impact of the economic crisis and changes in the structure of the economy (for example, a decline in industrial production, particularly in the resource-intensive industry of metals paralleled with the expansion of services) in the last five years have significantly reduced the consumption of metallic and non-metallic raw materials both in absolute terms and in relation to GDP. In spite of that, it is particularly important to develop and apply adequate instruments that will encourage resource efficiency in the existing industries in the long run and create an adequate framework for the development of efficient new activities.

[34] Exploitation of lignite ranged in the last decade from 1.2 to 1.9 million tonnes annually (the exception was 2009 when less than 1 million tonnes were produced. Since 2000 on average more than 600,000 tonnes of red bauxite has been extracted annually, however in 2009 a dramatic decline occurred (only 50,000 tonnes in 2009 and about 160,000 tonnes in 2011).

2.7 Forests

According to forest areas as a proportion of national territory, Montenegro is at the very top in Europe: according to the data of the National Forest Inventory, 59.9% of Montenegrin territory is covered by forests and 9.8% is forest land. Data shows that the territory covered by forest has increased recently, which is to a large extent due to the spontaneous spread of forest vegetation on agricultural land, but also thanks to the programme of forestation. It is difficult, however, to reliably assess the state of affairs of Montenegrin forests because data is incomplete and the system for monitoring and control of changes in the field is inadequate. In spite of the incomplete information, it would be safe to say that deforestation on a large scale has so far been avoided but certain forest areas have been degraded and depleted by planned or illegal logging. These include forest areas on sharp slopes, which contributes to erosion and problems with floods. Other significant problems are forest fires and tree diseases.

According to data from MONSTAT, in the period 2003–2011 logging was at the level of about 450,000-630,000 m^3 annually (the lowest average gross mass was recorded in 2009). In the structure of the produced assortments, technical and industrial wood dominate with an average share of 52%, while wood for heating represents on average about 30% of the total mass of wood cut. The share of wood waste is slightly under 20%. The existing data shows that, in relation to the increase of forests areas, this volume of exploitation is within the range of sustainability, but questions such as "is such exploitation efficient?" or "what are the effects achieved by current patterns of timber use?" remain open. It is worth reminding that the efficiency of timber use is low, characterized by a low processing rate and insufficient use of the "waste" that amounted to more than 80,000 m^3 in 2010. Another open question is to what extent the statistics are adequate and to what extent they reflect the real situation in the field, since there are still some examples of uncontrolled and unplanned logging.

Improvements to the information base (National Inventory of Forests, Forestry Information System) and the introduction of better instruments and procedures for planning and managing forests are only some of the current initiatives and programmes conducted in this sector aimed at the establishment of a system of sustainable forestry. The development of science and research in forestry is very important for sustainable management, particularly in relation to climate change and the adaptation of forests, the use of biomass as a source of renewable energy, the interaction of forests and water, ecological reconstruction, improvement of the health of the forests and development of a management system which would target all the values of forests, the ecological technologies in forestry, etc. Forests are very important in the context of climate change – on one hand as a sink for CO_2, and on the other as an ecosystem vulnerable to changes of climate parameters.

2.8 Marine resources

The sea and coastal area are among the most important resources that Montenegro has and constitute the basis of economic activities, such as tourism, navigation, shipbuilding, fishing, and aquaculture, They also have the potential for developing certain economic activities that are currently non-existent in Montenegro – biotechnology, exploitation of living and non-living components of the sea for pharmaceutical purposes, exploitation of minerals, oil, gas, energy, etc.

The internal water and territorial sea of Montenegro cover a total surface of about 2,450 km^2, while the continental shelf is around 3,890 km^2 in area. According to the existing spatial plans, the total length of the seacoast is about 288 km (105 of which in the Bay of Kotor) while the islands' coastlines are about 26 km long. The coastal area (in line with the provisions of the Barcelona Convention and its Protocol on Integrated Coastal Zone Management) is defined as the territory of the six coastal municipalities.

The scientific assessment of the resources for marine fishing is conducted within the *National programme for monitoring the condition of demersal and pelagic resources*, and within the international projects (FAO Adriamed, Meditas and Medias)[35]. It is the obligation of Montenegro to report to the General Fisheries Commission in the Mediterranean about the assessments, which also constitute

[35] However, the last two *Reports of the European Commission on the Progress of Montenegro in the Process of Accession (for 2012 and 2013)* emphasize the limited progress in managing fish resources, including the lack of assessment of the biological state of the fish stock in line with EU legislation.

the basis on which the annual number of sea commercial fishing licences is proposed. Generally speaking, the fish stock of the Mediterranean, and of the Adriatic Sea is close to the point of overfishing and more attention has to be dedicated to its preservation. The registered catch of sea fish was rather modest in the last couple of years and it ranged from 500 to 600 tonnes per year. Shellfish farming has an annual output of about 250 tonnes, while production in fish farms is about 100 tonnes.[36] Although the official data shows that the catch and farming of fish and shellfish are at a rather low level, there are still examples of unsustainable fishing and increased pressures on the environment (mariculture, for example, contributes to the deteriorated water quality in the Bay of Kotor).

The sea is also important for biodiversity. Important coastal and maritime communities and habitats in Montenegro include sand dunes, coastal and inland wetlands, as well as underwater sea grasses (P*osidonia oceanica, Cymodocea nodosa*). There are still no protected marine areas, although preparations are in progress in several locations, particularly near the island of Katič (between Petrovac and Sutomore).

Marine ecosystems provide several important services. The report of the Blue Plan[37] that focused on identification of the ecosystem services in the Mediterranean concluded that the total benefits in 2005 amounted to over €26 billion. The assessment was made for three basic types of services of the marine ecosystems: provisional (production of food of marine origin), cultural (leisure and recreational activities) and regulatory services (regulation of climate, mitigation of coastal erosion and absorbing/degrading of waste water and waste).

Montenegrin marine resources are exposed to various pressures and pollution from untreated communal wastewaters, waste, ports and marinas (which, as a rule, are not sufficiently equipped to manage the impacts on the environment and to accept waste from vessels), from shipbuilding/ refurbishment of ships, vessels and industry. Available assessments[38] of the water quality based on the trophic index value[39] show that the water in all locations outside of the Bay of Kotor is mostly of good to medium quality except for Ulcinj (in Mala plaža and Port Milena) where the quality of the water is mostly poor. The quality of water in the Bay of Kotor is medium to poor. In the process of harmonization of its legislation, Montenegro will have to transpose the EU Framework Directive into a Marine Strategy that aims at achieving a good ecological status of the seawater. Its implementation will be rather challenging.

Inefficient use of marine resources occurs due to the insufficient control of pressures (like pollution, overfishing, etc.) but also due to the competing uses of the sea that are not optimized (for example, for navigation and ports, tourism and recreation, mariculture, and protection of biodiversity). The lack of integrated management of marine resources and the lack of application of instruments like spatial planning of the sea currently reduce the possibility to use the potential for *blue growth*[40] properly and to ensure that this segment of Montenegrin natural resources has a significant contribution to make to an efficient and sustainable economy.

[36] Data from the Ministry of Agriculture and Rural Development.

[37] Blue Plan, The economic value of sustainable benefits from the Mediterranean marine ecosystems, 2010, quoted in Commission Staff Working Paper, SEC(2011) 1067 final, Analysis associated with the Roadmap to a Resource Efficient Europe Part II

[38] Ministry of Sustainable Development and Tourism and UNEP/ MAP, CAMP *Montenegro: Summary of the Analysis of General Vulnerability*, (Draft) April 2013

[39] TRIX index measures the level of eutrophication of the sea water on the basis of the contents of chlorophyll, total inorganic nitrogen and total phosphorus. Depending on the level of this index, waters are classified into four categories: water of very good quality or oligotrophic water (value of the index 0–4), water of good quality or mezotrophic water (4–5), water of moderately good /medium quality or eutrophic (5–6) and water of poor quality or extremely eutrophic (6–8).

[40] *Blue growth* or growth based on various marine sectors is in the focus of the EU Integrated Marine Policy (IMP) that deals with horizontal issues that are important for the sea and activities related to the sea. Along with the blue growth, IMP deals with the issues of data and knowledge about seas, marine spatial planning, integrated monitoring of the marine processes and strategies of the sea basins.

Photo: Saša Popović

CHAPTER III

Policy frameworks for improving resource efficiency

The natural environment and resources[41] create conditions for sustaining life on planet Earth. Air, water, minerals and metals, soil and plants and animals, ensure the production of food, raw material and energy and all these resources create the basis for development and prosperity. Ample analyses, however, show that the global patterns of the use of resources, production, consumption and generation of waste are unsustainable. Total demand for resources is growing at a concerning speed due to the increase of our population and the improvement of the standard of living. In the 20th century the size of the global population increased roughly four-fold, consumption of fossil fuels increased about 12 times, consumption of water nine times; the extraction of ore and minerals 23 times and overfishing as much as 35 times[42]. The use of resources creates an increasingly strong pressure on the environment and results in global warming, pollution, degradation of ecosystems and biodiversity. The efficient use of resources that are available to us is imperative not only because they are limited, but also because their excessive use poses a great threat to the environment.

The concept of the circular economy that was presented earlier is not the only one that is used in interpreting the issue of a sustainable economy and development in general. On the one hand, resource efficiency is an approach, which is complementary and linked to the development of a green economy[43]. Sustainable consumption and production can be interpreted as one of the ways to improve the use of resources. Together, they lead to sustainable development. It can be said that there is no green economy without efficient resource use, and no sustainable development without a green economy.

On the global level, i.e. in the processes that take place within the system of the United Nations, more attention is dedicated to the concept of a green economy (and sustainable consumption and production) while European policies, particularly recently, are more dedicated to the concept of resource efficiency. Each of these policies and the related documents recognizes the need to transform the economy in order to ensure sustainable development within the limits imposed by the environment (which is one of the basic demands of the circular economy).

3.1 International level

3.1.1 GLOBAL PROCESSES

The need to transform the global economic system towards sustainability, greening and/or efficient use of resources significantly influences global debates on development and presents one of the key topics that international, national and local bodies, organizations of civil society, the business sector, the research sector and politics intensively deal with.

Celebrating twenty years after the first summit in Rio in 1992 (where the concept of sustainable development was practically launched) the **UN conference Rio +20** ended with an agreement on the outcome document titled *The Future We Want*. This document confirms the dedication of the UN Member States to achieve sustainable development and emphasizes (in the common vision) that the eradication of poverty, change from unsustainable and promotion of sustainable consumption and production patterns and protection of natural resource basis for economic and social development are the key goals and fundamental requirements of sustainability. The Future We Want recognizes the importance of the efficient use of resources as one of the ways to achieve a transition to a green economy and to ensure sustainable development (Box 3-4). In adopting it, the countries committed

[41] According to the definitions used by the *Roadmap for Resource-Efficient Europe* (COM(2011) 571), **resources** include everything that is input for economy: metals, minerals, fuels, fish, timber, water, agricultural land, clean air, biomass, biodiversity, space and sea. **Resource efficiency** is the way to get more with less. It increases aggregate economic value by more productive use of resources during their life cycle. Efficiency requires that resources be used in a sustainable way, within long-term limits of the planet. This also means minimizing of the impact that using one resource has on the others, including the environment

[42] Data from the Analysis for Preparation of the Roadmap for Resource-Efficient Europe, part I (Commission Staff Working paper SEC(2011) 1067 final, Analysis associated with the Roadmap to a Resource Efficient Europe, Part I).

[43] There are various approaches to defining a "green economy". The United Nations defines it as one that results in "improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities". Simply put, a Green Economy is "low carbon, resource efficient and socially inclusive" (UNEP 2011). Towards a Green Economy, Pathways to Sustainable Development and Poverty Eradication, p. 16. The problem arises of how to operationalize this broad definition and factor in both direct and indirect environmental implications.

We acknowledge that a green economy in the context of sustainable development and poverty eradication will enhance our ability to manage natural resources sustainably and with lower negative environmental impacts, increase resource efficiency and reduce waste. (Item 60);

We recognize the importance of adopting a lifecycle approach and of further development and implementation of policies for resource efficiency and environmentally sound waste management. We therefore commit to further reduce, reuse and recycle waste (3Rs) as well as to increase energy recovery from waste with a view to managing the majority of global waste in an environmentally sound manner and where possible as a resource (a part of Item 218).

Box 3-4:
References to resource efficiency in The Future We Want

themselves to strengthening their efforts aimed at the implementation of the policies, plans, programmes, projects and actions for sustainable development.

Another global process that will contribute to the articulation of the framework for efficient and/or sustainable use of natural resources and that will impact national policies is also taking place under the auspices of the UN and deals with the definition of post-2015 global development goals that will be applied after the expiry of the deadline for achieving the current Millennium Development Goals. The definition of the new global development agenda is subject to a broad consultation process and it is becoming more certain that the new goals will be defined as **Sustainable Development Goals (SDGs)**. The recently published **High-Level Panel (HLP) Report**[44] (the HLP is one of the bodies that work within the UN on the definition of SDG proposals) recognizes that the global community faces the growing challenge of resource scarcity and underlines the need for more sustainable and more efficient production. The HLP's set of post-2015 development goals includes sustainable management of natural resources (taking into account their value and the value of biodiversity). The report also encourages the integration of social and environmental issues in the system of accounting economic results, both at the national level and at the level of companies. The HLP also thinks that a shift to sustainable consumption and production is needed and believes that the driving forces for change will be technology, innovation in the product design, detailed guidelines for the implementation of appropriate policies, education and behaviour change. Box 3-5 presents some of the most relevant messages of the High-Level Panel Report.

[44] Report on the Post-2015 Development Agenda composed by the High-Level Panel of eminent experts published in May 2013. The original title of the report was *A New Global Partnership: Eradicate Poverty and Transform Economies through Sustainable Development – The Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda*

Protection and preservation of our planet's resources is not only the right thing to do – it is of essential importance for the lives and welfare of people.

The standard measure of progress used is the Gross Domestic Product (GDP), while at the level of a company the profit is used. These measures do not include the value of natural resources. Exploitation of natural resources (depletion of the resource basis) or generation of pollution are simply not represented within the measures of economic progress, although it is absolutely clear that growth and welfare are closely related to them.

Box 3-5:
HLP report on the Protection and Recognition of the Value of Natural Resources

3.1.2 EUROPEAN POLICIES

The efforts to protect natural resources, increase efficiency in their use and develop an economy with low carbon emissions have for some time been the key determinants of EU policies. Goals and measures for implementation of such efforts are defined in the numerous strategic documents and are supported by the complex set of regulations that regulate the European economy, society and management of the environment. The EU frequently acts as the global leader in the environment and climate change policy, which does not have any negative impact on the efficiency and competitiveness of its economy – it is actually the exact opposite.

To put it in a nutshell, resource efficiency is interpreted in the EU policies as using the scarce resources of the planet in a sustainable way with the minimization of environmental impact. It ensures the **generation of more i.e. of higher value with less input.**

The Strategy ***Europe 2020***[45] presents the basis for achieving smart (with more effective investments in education, research and development), sustainable (shift towards the low carbon emission economy) and inclusive growth (with a strong emphasis on generating new jobs and poverty reduction). Five key goals of this strategy are related to: employment; research and development, climate change and energy sustainability[46]; education; and combating poverty and social exclusion.

One of the seven Key Initiatives of the Europe 2020 Strategy is *A Resource-Efficient Europe*[47] that aims at supporting the shift to a resource-efficient economy with low carbon emissions in order to:

- improve economic performances with lower use of resources;
- identify and develop new opportunities for economic growth and more innovation which would increase the competitiveness of the EU economy;
- ensure security in supply of necessary resources; and
- continue combating climate change and limiting the environmental impact of the use of natural resources.

The document states that achieving a resource-efficient Europe requires technological improvements, significant changes in the energy, industrial, agricultural and transport systems and changes in the behaviour of producers and consumers. The document also underlines the need to include the resource efficiency requirements into the broad scope of policies and to develop a set of tools that will enable policy makers to monitor the achieved progress and to improve the process. The development of a resource-efficient Europe requires a mix of policies that will use synergies and make adequate trade-offs (achieve compromises) in case of competing priorities in various areas. Examples of policies that function in synergy, i.e. policies where compromises should be achieved (as identified in the document *A Resource-Efficient Europe*) are presented in Box 3-6.

Roadmap to a Resource Efficient Europe[48] (hereinafter referred to as the EU Roadmap) elaborates strategic issues identified in the Key Initiative and the need to transform the economy, focusing on the natural capital and ecosystem services, key sectors, and the way to conduct the process of transformation and monitoring. The document gives an outline of the structural and technological changes needed by 2050 and contains targets and milestones/ indicators that should be achieved by 2020. It envisions that by 2050 the EU economy will grow in a way that respects resource constraints and planetary boundaries, thus contributing to global economic transformation. Part of the vision is also that by 2050 the EU economy will be competitive, inclusive and will provide a high standard of living with much lower environmental impacts. The aim is to manage all resources sustainably, from raw materials to energy, water, air, land and soil while reaching climate change milestones, protecting and restoring biodiversity and the ecosystem services it underpins.

[45] COM(2010) 2020 final, Europe 2020: A Strategy for Smart, Sustainable and Inclusive Growth

[46] Concrete tasks related to this goal include: (a) reductions of the GHG emissions by 20% (or, if possible even by 30%) in relation to 1990 value as the baseline; (b) 20% of energy produced from renewable sources; and (c) an increase in energy efficiency of 20%..

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[48] COM(2011) 571 final, Roadmap to a Resource Efficient Europe

Synergies	Trade-offs/compromises (in case of competing priorities)
Implementation of measures in the areas of climate change and energy efficiency can improve energy security.	Using "green" vehicles reduces the use of fossil fuels but increases demand for electricity and rare/ limited raw materials.
Taxes and subsidies for using energy or other resources can bring about changes in behaviour and lead to more efficient consumption, but they can also contribute to the reduction of taxes on labour, which can encourage the generation of new jobs and economic growth.	Land used for food production can "compete" with the land used for energy purposes, and they both can compete with the land used to support biodiversity or to provide ecosystem services.
The growing level of recycling reduces the demand for primary raw materials and helps to reuse valuable materials and to reduce energy consumption and GHG emissions.	Materials for improving insulation can significantly reduce the amount of energy necessary for heating buildings but their production can be more energy-intensive.
Improvement of product design can reduce demand for energy and raw materials and make the products more durable and easier for recycling; the improved design also stimulates innovations and creates business opportunities and new jobs.	Desalination can be a solution to the problem of water supply but it can also increase the consumption of fossil fuels and GHG emission.

Box 3-6:
Examples of synergies to be used and compromises to be achieved in the policies for resource efficiency

The targets are related to the products and changes in consumption patterns, transformation of waste into a resource, research and innovation, elimination of environmentally harmful subsidies, giving appropriate signals through prices (including externalities) and re-orientation of the tax burden, natural capital and ecosystem services (including biodiversity, minerals and metals, water, air, space and land, and sea resources), key sectors[49] (production and consumption of food, construction of buildings and infrastructure, and transport) and the way of conducting the process (cooperation, investments, indicators, etc.)

Potential **benefits from the improved resource efficiency** that are identified in the EU Roadmap and the related analyses include: increased productivity (through a reduction of the costs of businesses); growth and generation of new jobs (due to a faster pace of technological and organizational changes); benefits for the environment and resilience (better management of resources can, for example, lead to the reduction of carbon emissions, which leads to stronger resilience to the effects of climate change); and macro-economic stability (through the reduction of uncertainty in supply and instability of the market, and also through tax reform which resource-efficient policies can support).

The efficient use of resources is closely connected to several other areas of EU policies. **SCP (Sustainable Consumption and Production)** policies deal with several areas (e.g. sustainable food, sustainable buildings, etc.) and assume the use of the instruments

[49] The EU Roadmap deals with "value chains", i.e. flows in the economic systems from consumers through mediators to suppliers of raw materials.

Photo : Saša Popović

like eco and energy labels, eco design, EMAS – the Eco-Management and Audit Scheme, green public procurement, action plans for technologies in the area of the environment, etc. Generally speaking, SCP policies help businesses to use their potentials to the largest extent to transform challenges in environment preservation to economic opportunities, ensuring at the same time a better supply to the consumers. The key effort is to improve the overall impact of the products on the environment during their life cycle, in order to encourage demand for better products and the production technologies and to help the consumers make informed decisions. **Integrated Product Policy (IPP)** is complementary to the SCP policies and it aims at minimizing degradation of the environment during the production, use or disposal of products; IPP contributes to the reduction of degradation by monitoring all stages of the lifecycle of products and by acting in the stages when action can produce the strongest effects. The goal of the **2005 Thematic Strategy on Sustainable Use of Natural Resources** is to reduce resource-related impacts on the environment and to do that in a growing economy.

Great importance is also attached to the **Thematic Strategy on Prevention and Recycling of Waste** (2005) which has set the long-term goal of the EU becoming a recycling society that strives to avoid the generation of waste and uses waste as a resource. The strategy has defined key actions that were to be implemented in order to modernize the then legal framework and to promote the prevention of the generation of waste, its re-use and recycling, with disposal of waste being only a last resort.

Implementation of these policies and strategies is supported by a large number of directives and other regulations from different parts of the EU *acquis*, whereas environmental legislation represents one of the most comprehensive and most complex segments. Some of the regulations that are most relevant for the issues of resource efficiency are the Framework Waste and Water Directives (and related directives), the Directive on the Ambient Air Quality, regulations in the area of climate change, directives on birds and habitats, the Marine Strategy Framework Directive, the Directive on Industrial Emissions, directives on

chemicals and many others. The relevant regulations in the field of energy, agriculture, transportation, taxation, competitiveness, statistics, etc. are also relevant.

3.2 National-level policies

The concept of the circular economy is far from being implemented in Montenegro and the efficient use of resources has not been directly integrated in Montenegrin policies and regulations so far, except, to a certain extent, in the National Development Plan from 2013[50]. Questions related to resource efficiency and reduction of the negative impacts of the use of resources on the environment are, however, subject to the attention of several general and sectorial policies, strategies and plans adopted in the recent past.

Issues like stimulation of innovation and productivity, mitigation of the impacts of economic growth on the environment, sustainable management of natural resources and governance improvements are integrated into the development vision formulated in the ***National Sustainable Development Strategy (NSDS)***. This strategy defines priority tasks for several areas that are important for the use of natural resources (including sustainable management of water, air, land and forest resources, protection of biodiversity and coastal area, energy efficiency, protection of the environment, etc.), thus setting the foundations for adopting and implementing the resource efficiency measures in Montenegro.

The recently adopted national development plan – ***Montenegro Development Directions (MDD) 2013–2016*** defines the priorities and measures for the total

[50] If resources are taken in their broad meaning (i.e. if on top of those taken directly from the nature we take into account energy as well), an exception is also the area of energy efficiency which is the focus of relevant strategic documents and plans and which is based on the Law on Energy Efficiency.

Effective management of natural resources is not just an economic challenge – it has direct human development implications because it prevents resource-related conflicts. This is why the EU and the UN produced the Toolkit and Guidance for preventing and managing land and natural resource conflicts. It is designed to inform and support countries looking to safeguard human development – now and in the future – by improving the governance of natural resources.

Throughout this work three broad lessons have emerged:

Enabling environmental matters. Enacting and implementing freedom of information laws, empowerment of citizens to understand and claim the benefits they are entitled to and help them exercise their rights

Institutions play a key role. Capacity of the institutions which negotiate contracts on natural resources use and collect taxes, monitor and oversee integrity, is vital.

Technology has the potential to transform the national natural resource sector – but in order to achieve sustainability, technological change needs to be more transparent and accountable. Science and technology are also essential to facilitating and investing in a country's ability to add value to production chains linked to natural resources. In doing so they are important to help propel a wider base of economic growth, job creation and more durable prosperity.

Box 3-7:
Preventing conflicts over resources

Source:
http://bit.ly/1svtV3A

Box 3-8: Montenegro Development Directions 2013–2016: vision

In 2016, Montenegro aims to become an institutionally developed country, basing its socioeconomic development on competitiveness, efficiency and developed human capacities. An objective is to base its economic development on knowledge, efficient valorisation of important natural resources and improved productivity, while adhering to principles of preserving the environment. Close cooperation between the public, private and civil sectors should be established with equal opportunities for all citizens.

of 18 policy areas, giving a prominent position to the development of a green economy as a horizontal topic and underlying the connections and compatibility of the MDD with the strategy Europe 2020. The vision of the MDD is presented in Box 3-8.

This vision is rooted in the concept of sustainability, efficiency, competitiveness i.e. productivity of the economy and development of human resources. Tourism, the energy sector, agriculture and rural development, and industry are considered priority sectors for economic growth and development. Differences in the approach of the MDD (as a plan that should ensure the transition to a more resource-efficient economy) and the EU Roadmap can be seen, inter alia, if one compares the visions of these two documents: while the MDD puts emphasis on the efficient valorization of resources, the European resource efficiency policy is undoubtedly focused on the necessity to preserve the resource basis.

The National Environment Policy advocates rational use of natural resources, protection of ecosystems (and their adequate valuation) and the implementation of the polluter/user-pays principle. It is complementary to the NSDS but it does not have any significant impact on the development of sectoral policies (the integration of environmental issues into sectoral policies is still assessed as insufficient in most of the available analyses). *The Regional Development Strategy* establishes criteria for assessing the levels of development of the local self-government units and it defines guidelines and mechanisms for balanced regional development. One of the goals set in the strategy is to improve conditions for sustainable use of natural resources, applying low-carbon-emission technologies and developing communal infrastructure (with particular support for the areas that lag behind).

The targets confirmed[51] in the *National Waste Management Strategy 2013–2018* (Draft from March 2013) and their achievement (e.g. recycling and reuse of at least 50% of paper, metal, plastic and glass from households and other sources, i.e. at least 70% of non-hazardous construction waste by 2020) would significantly improve resource efficiency in Montenegro. The results achieved so far in the implementation of the principles and requirements contained in the EU hierarchy of waste, however, suggest this will be a serious challenge.

The *National Biodiversity Strategy with the Action Plan 2010–2015* includes the following basic principles (derived from the UN Convention on Biodiversity) that are important for resource efficiency:

- Protection of biological diversity is the key segment of nature protection in Montenegro and is based on an ecosystem approach;
- Biological diversity is the basic value and key resource for the further development of Montenegro;
- The further development of Montenegro depends on the capacity and productivity of the ecosystems; etc.

This strategy is complementary to the NSDS. The results of the implementation of the principles that it is based on, particularly when it comes to the implementation of

[51] The goals were originally set in the Law on Waste Management and the relevant secondary legislation.

the ecosystem approach, are not at a satisfactory level (an update to this strategy is in progress).

The *National Strategy on Air Quality Management* defines goals and priority measures for achieving/preserving the quality of air as a resource that is very important both for the development of the economy and generally for the well-being of people. Implementation of the measures envisaged in this strategy can contribute to the efficient use of resources.

A number of strategies in the economic sectors include sustainable resource management among their general goals but they do not manage to elaborate fully the measures and commit to the operationalization of such approaches in an adequate manner. It is quite similar in the field of spatial planning, where integration of sustainable development requirements is present at the level of guidelines, but not always in formulating solutions in planning documents, which in the end leads to inadequate protection of the space.

On the occasion of the twentieth anniversary of the adoption of the *Declaration on Ecological State,* the National Sustainable Development Council published in 2011 the **Analysis on the Achievements and Challenges of the Ecological State: 20 Years of the Ecological State of Montenegro.** The document assesses the key achievements and weaknesses in the implementation of the declaration and contains recommendations for overcoming the obstacles currently in the way of progress towards sustainable development. Its findings can be interpreted as a response to the question to what extent national policies are implemented in practice and to what extent they have contributed to the progress on the path to the efficient use of resources.

On the basis of the conducted analysis, the National Council concluded that, in spite of significant progress in the development of legislative and institutional frameworks (as well as some concrete achievements, like extension of the network of protected areas, rehabilitation of "hot spots", etc.), in the last 20 years Montenegro has missed the opportunity to implement the constitutional commitment to become an ecological state. At the same time it is emphasized that the country should remain committed to that goal and that in the future strong support should be provided for the development of a green economy, i.e. for a change in the system of consumption and production patterns towards sustainability.

As for the priority areas, the Analysis document defines that the key challenges to accelerating the progress towards sustainable development include:

- sustainable use of space;
- solid waste and wastewater management;
- protection of biodiversity, preservation of resilience and stability of ecosystems and the rational use of water and forests;
- energy efficiency in all sectors (particularly construction and transportation) and orientation towards new, alternative energy sources (except for water sources, in particular the use of solar and wind energy).

In the process of harmonizing the national legislation with the European legislation, the requirements whose adequate implementation should lead to a more efficient use of minerals and metals, water, biomass, land, sea resources, etc. are transposed at an accelerated pace. Alignment with EU policies and adequate implementation of the relevant regulations present a significant challenge for Montenegro. Both the analysis of the National Council and other available analyses (such as the annual Progress Report of the European Commission) emphasize that a particular obstacle in the efforts to achieve sustainable development goals is the poor implementation of the adopted policies and laws[52].

3.3 Sector-specific challenges for resource efficiency in Montenegro

Generally speaking, the Montenegrin economy is characterized by an inefficient use of natural and other resources, particularly energy and water, and by a low level of technological development. Only an insignificant

[52] See, for example, the Progress Report for 2013, p. 38 where there are assessments of anticorruption policy, p. 49 for the assessment of the implementation of legislation in the field of waste management, etc. The Progress Report for 2012, *inter alia*, deals with the weaknesses in the implementation of the rule of law (p. 20) in the context of development of a favourable business environment and invited (p. 58) to effective implementation of legislation on the project and strategic environment impact assessment. The same report also emphasizes (on the page 4 of the conclusions) that it is necessary to pay particular attention to the rules on state aid, particularly in the sensitive sectors.

share of the generated waste is recycled and reused. Apart from the negative impacts on the environment, this reduces the competitiveness of the economy.

Analyses done within the national preparations for Rio+20 have shown that, for example, in 2008 the Montenegrin economy used 1.7 times more energy than the Croatian economy to produce one unit of GDP, while in comparison to the EU economy, the Montenegrin economy was almost three times as energy intensive (488 ten tonnes of oil equivalent – per one million Euros of GDP expressed in Euros in 2000, while the EU 27 average was 169 ten). Trends in energy consumption in recent years (which we will discuss in more detail in section 3.3.1) certainly contributed to the narrowing of this gap. However, energy efficiency remains one of the primary issues of sustainable development of the Montenegrin economy. The economic crisis and the growing share of services in the structure of GDP (two characteristics of the recent period) have certainly contributed to the lower use of materials in industry and construction. The issue of resource efficiency is still important, particularly since many technologies that are used are old and inefficient. In addition to the targeted efforts to increase resource efficiency, Montenegro has to define and implement adequate climate change measures, as well as measures for the optimization of the use of land and water resources and make special efforts in order to achieve the goals regarding waste separation and recycling.

Energy efficiency and reduction of GHG emissions are some of the key EU priorities and important elements of the European strategy for increasing resource efficiency. In the period 2000–2010, the EU reduced the energy intensity of its economy by more than 14% reaching the level of 149 tonnes per one million Euros of GDP. GHG emissions have been reduced by more than 10% in comparison to 1990, while in the same period the EU economy grew by 40%. Recycling became standard practice for businesses and households across the EU. On average about 40% of solid waste is reused or recycled, while in some Member States recycling rates exceed 80% .[53]

In this chapter we discuss whether the state of affairs in the priority development sectors is in compliance with the requirements of the resource-efficient and competitive economy (and whether it leads to the achievement of the goals of the ecological state), i.e. whether the current development policies can be described as steps made in the right direction on the European Roadmap.

3.3.1 ENERGY

The trends in the key energy indicators differ depending on the source of the data used. Thus, for example the data from the *Indicator-Based Report on the State of the Environment* show the reduction in the primary energy consumption by about one-fifth in the period from 2000 to 2010, while the draft *Strategy for development of the energy sector in Montenegro by 2030* suggests that gross domestic consumption of energy in 2010 was about 13% higher than in 2000. For the purposes of this study, both sources were used. The trends in energy use and decoupling of GDP and energy consumption trends in this chapter are based on the data from the *Indicator-Based Report on the State of the Environment*, while the scenarios outlined in chapter 5.3.1 are based on the data series from the Energy Development Strategy.

According to the *Indicator-Based Report on the State of the Environment*, the country experienced in the last decade a decline in the primary consumption of energy[54] of about 21% (from 1,285 ktoe in 2000 to 1,017 ktoe in 2011). The structure of total consumption in 2011 was dominated by fossil fuels with 72% (coal 42% and oil derivatives 30%), while renewable sources (domestic production of electricity from hydroelectric power and biomass) made up 15%. The remaining 13% was mostly imported electricity.[55] Natural gas is not used since it is not extracted in the country and there is no infrastructure for its supply and distribution.

The final energy consumption[56] increased by 1% between 2000 and 2011, with a trend of growth until 2007 and a decline since then, so that in 2011 total

[53] Analyses done for the EU Roadmap, published as Commission Staff Working Papers) SEC(2011) 1067 final.

[54] Primary consumption of energy or gross domestic consumption is the primary production of energy (generating energy or energy-generating products from a natural source) + imports

[55] Sources of data in this and the two paragraphs that follow come from the draft of the Indicator-Based Report on the State of the Environment and energy balances..

[56] Final consumption of energy is the energy that is used in the sectors of transport, industry, services, agriculture, public sector and household sector as end-users (without energy that is used for transformation plants).

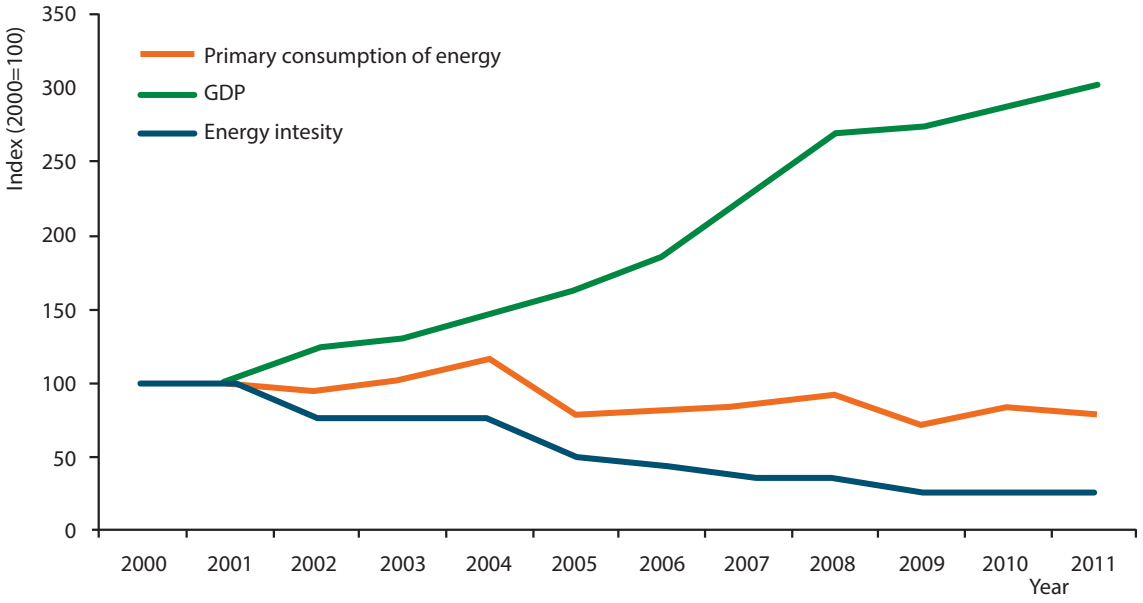


Figure 3-1: Energy intensity in Montenegro in the period 2000–2011

Source: Environment Protection Agency, draft of the indicator-based Assessment on the State of the Environment in Montenegro

consumption reached 664 kten. Significant changes occurred in the structure of consumption: if we compare the beginning and the end of the last decade, consumption in industry dropped by as much as 30% while consumption in the public sector and sector of services grew by 54% and by 25% in households. The most important contribution to the drop in the final energy consumption in industry came from the decline in the production of metals; the sector of metal production is the key industrial consumer of energy in Montenegro.

In the period 2010–2012 consumption of electricity ranged between 3,900 and 4,200 GWh. The share of the Aluminium Plant in the total consumption of electricity in the end of this period reached the lowest level ever (28% or 1,110 GWh). Net import (import minus export) of electricity has lately been at a level of about one-fifth of the total consumption (the exception was 2010 with extremely large volumes of precipitation and production of electricity from hydro sources which was above average; consequently, imports covered only 6% of the total needs).

As we can see in Figure 3-1, Montenegro recorded very positive trends in energy intensity (measured by primary consumption of energy per GDP unit), particularly in relation to the decoupling of the total consumption of energy and GDP growth.

Primary consumption of energy in the observed period was reduced by more than 20%, while in the same period GDP increased three-fold and contributed to a significant reduction in the energy intensity (of almost 75%). In the interpretation of these trends we should bear in mind that the starting point was very low, i.e. that the Montenegrin economy at the beginning of the last decade was extremely energy-intensive, and that the changes in the structure of GDP (a decline in industrial production and an increase in the share of services) alongside very high GDP growth rates in the period before the economic crisis, significantly contributed to the reduction. Taking all these factors into consideration, we cannot reliably say whether the decisive drivers of the positive trends were the targeted measures for increasing energy efficiency[57] or if these were spontaneous improvements. Energy efficiency

[57] The second Energy Efficiency Action Plan for Montenegro for the period 2013–2015 (APEE2) adopted by the Ministry of the Economy in September 2013 notes, for example, that the implementation of the first Action Plan (APEE 1) achieved the greatest success in establishing the legislative framework, and then in preparing and implementing promotional targeted projects for the improvement of energy efficiency and awareness-raising activities. The largest number of measures envisaged for the sector of households were implemented as planned with certain delays; success in the implementation of the measures for the sector of services was not so great, while the achievements in the sectors of industry and transport were rather modest. The most serious problems in the implementation of the energy efficiency policy were insufficient capacities, insufficient cooperation and coordination, insufficient integration and understanding of the issues of energy efficiency and insufficient financial support from the state.

Photo: Saša Popović

therefore remains the key priority for achieving the goals of sustainability and transformation of the economy into a resource-efficient one.

The benefits from the improved energy efficiency are multiple and they include savings, competitiveness of the economy, improved energy security, reduction of the need for new capacities, generation of new jobs, etc. All these elements have direct human development implications. According to a study focusing on the assessment of the job-creation potential in the EU in sectors related to the improvement of resource efficiency, the various forms of technology for the reduction in energy consumption (insulation of residential buildings, use of termal pumps, interventions in the transportation sector) are most promising for generating new employment.[58] The total savings in the final energy consumption that would be achieved by the implementation of the measures defined in the Energy Efficiency Action Plan for Montenegro for the period 2013–2015 are estimated to amount to 14.7 kten. Assessments done by UNDP Montenegro have shown that reconstruction of illegally constructed buildings (the number of which is assessed at about 100,000) to improve their energy efficiency would lead to the generation of 6,200 new jobs (related to carrying out the works and in related sectors), while the annual savings of all forms of energy would be at a level of around 350 GWh (provided that the programme of reconstruction is implemented in the next 10 years).

Air pollution and contribution to the greenhouse effect are the key negative impacts of the use of fossil fuels in the production and consumption of energy. Their intensity depends on the quality of fuel and the type and equipment of the thermoelectric power plants. In 2011, 69% of the total GHG emissions (without certain synthetic gases) came from the energy sector, i.e. from the use of fossil fuels in the thermoelectric power plant in Pljevlja, industry, transportation and households[59]. Earlier data[60] showed that total GHG emissions in 2010 were some 15% lower than in 1990, while on the basis of the updated GHG inventories presented in the draft of

[58] Ecorys, The number of jobs dependent on the Environment and Resource Efficiency Improvements, report prepared for DG Environment, 2012

[59] In the GHG inventory the classification of sectors does not overlap with the standard economic classification so that the energy sector includes all combustion of energy-generating products (both in the sector of generation of energy and in the industry, transport, services and households).

[60] For example from the Report on the Millennium Development Goals in Montenegro 2010–2013

Second National Communication[61] we can conclude that the reduction was much larger (about 26%). Various sources (for example drafts of the I*ndicator-Based Report on the Environment and of the Second National Communication*) contain significantly different historical data on GHG emissions. Differences mostly occur as a result of improvement of the methodology for the assessment of emissions and the availability of data from the energy balances for earlier years.

In its last *Progress Report*[62], the European Commission invited Montenegro to consider the introduction of the obligation to reduce emissions[63] in line with the commitments undertaken by the EU and to start considering its climate and energy frameworks for 2030 in the way in which it is defined in the EU *Green Paper*[64] from 2013.

EU climate and energy policy and their full and timely implementation will have significant implications for our natural resources and their use (primarily for the reserves of lignite and brown coal, air quality, watercourses and land/space). The key goals of these policies (confirmed in the *Europe 2020* strategy) are to increase energy efficiency and the share of renewable resources and to reduce GHG emissions (targets known as 20-20-20). The bases for long-term EU policy in these areas are set in the *Roadmap for moving to a low-carbon economy in 2050 and Energy Roadmap 2050.*[65]. The *2013 Green Paper* sums up the key recommendations derived from the analysis of different scenarios in these documents, namely it directs attention to the following:

- Reduction of GHG emissions in the EU by 40% until 2030 in comparison to 1990 in order to achieve the planned reduction of 80–95% by 2050, which is in line with the internationally agreed target to keep the air temperature increase to below 2°C;
- Increase in the share of renewable energy, improved energy efficiency and "smart" energy infrastructure present as options that are guaranteed to yield no losses;
- setting the target of 30% of renewable energy by 2030;
- substantial investments will be needed to modernize the energy system regardless of de-carbonization, which will have an impact on energy prices in the future.

EU targets by 2030 are currently being agreed upon and it is realistic to expect that they will include the reduction of the greenhouse gasses emissions by 40% in relation to 1990, and at least 27% of energy from renewable sources; the energy efficiency target will be proposed during 2014.

Available indicators show that the results that Montenegro has achieved so far in comparison to the targets of the EU energy and climate policy are encouraging (in spite of the fact that the data from different sources differs to a significant extent). The share of renewable energy sources in the final energy consumption is already at the level of 29%, while the national goal was set to 33% by 2020[66]. Significant reductions in the energy intensity and GHG emissions have been made. This shows that the country is on the right path to achieving and exceeding EU 20-20-20 targets if it implements policies to complement the spontaneous improvements recorded in the last decade and ensure the continuation of the positive trends unless in the future period it adopts counterproductive development decisions.

However, there are some concerning signs, particularly when it comes to development plans. Projections of trends in energy efficiency set in the national strategy[67] (the reduction of energy intensity by around 40% by 2030 compared to the 2010 baseline – from 29,770 to 17,692 MJ per thousand Euros of GDP expressed in Euros from 2000) will not be sufficient to bridge the large gap between the Montenegrin and European economies. If insufficiently ambitious national goals in the field of energy efficiency prevail, that will not only have negative implications for sustainability of the energy sector, but will also contribute to the missing of other opportunities (like reducing energy costs and increasing competitiveness).

[61] Draft of the Second National Communication of Montenegro to the UN Framework Convention on Climate Change (UNFCCC), February 2014

[62] Commission Staff Working Document SWD(2013) 411 final, *Montenegro 2013 Progress Report*

[63] As a country that is not in Annex 1 of the UN Framework Convention on Climate Change, Montenegro currently does not have any obligations to reduce its emissions. However, several times in climate negotiations it did express its position of pursuing European targets.

[64] COM(2013) 169 final, Green Paper: A 2030 framework for climate and energy policies

[65] COM(2011) 112 final, A Roadmap for moving to a competitive low-carbon economy in 2050 and (COM(2011) 885 final Energy Roadmap 2050

[66] Data from the Report on Millennium Development Goals in Montenegro 2010 – 2013

[67] Ministry of Economy, draft *Strategy for Development of Energy Sector in Montenegro by 2030 (Green Book and draft of the White Book)*, 2012. The existing national target adopted in the agreement with the Energy Community is the saving of 9% of the average (5 years average) final energy consumption in the country by 2018.

Plans defined in the national energy strategy[68] and activities that are currently being implemented on the construction of the new thermoelectric power plant in Pljevlja give even more reasons for concern in the context of considering policies that should support the transition to a resource-efficient economy with minimization of the environmental impact and achievement of the long-term goals of the EU energy and climate policy (which in practical terms mean elimination of CO_2 from the energy sector by 2050). The scenario of intensive development of thermoelectric power plants can significantly reduce the chances of strengthening the competitiveness of the national economy, since it is certain that in the EU the financial burden for using fossil fuels will grow (through elimination of the existing subsidies, increasing taxes and carbon prices in the trading of emissions). This will also lead to an increase in fossil fuel prices. As stated above, the lignite that is exploited in Montenegro and that is used in the existing thermoelectric power plant in Pljevlja presents the most inefficient fossil fuel (due to the low calorific value and high emission factors). From the perspective of resource efficiency and environment protection, the continuing use of lignite as fuel is an example of a bad development choice, while when it comes to European policy on de-carbonization of the economy, it represents a choice that will jeopardize the possibility of achieving harmonization with EU standards. (Section 5.3.2 gives more details on the projection of emissions in relation to EU goals.)

[68] Including the construction of new thermoelectric power plants that use lignite with the installed power of around 600 MW by 2030 and doubling of the CO_2 emissions in the energy generation sector that would occur if these plans come true.

On the other hand, the efforts to increase the share of renewable energy sources in the energy mix can add up to increase pressure on water resources in Montenegro and on the biodiversity, i.e. ecosystem services that depend on water. Therefore, it is very important that, in adoption of development decisions, European policies on preservation of habitats and species and on the achievement/preservation of the good status of all waters are taken into account and (in due time) consistently implemented (gradually). Other renewable resources, as a rule, are not considered to a sufficient extent although their potential is important. With appropriate measures and incentives, solar energy, wind energy and biomass energy (along with the energy from small hydroelectric power plants, the use of which is the subject of significant efforts recently) could have a much more important role in meeting the energy needs with smaller negative impacts on the environment than a thermoelectric power plant that uses coal or large hydroelectric power plants. The use of natural gas (although it is a fuel of fossil origin) could also be a good transitional solution in the process of de-carbonization of the energy sector, since the use of gas has a lower contribution to the greenhouse effect than other fossil fuels.

3.3.2 AGRICULTURE

Data from the 2010 Agricultural Census shows that the agriculture and rural development sector generates 8% of the country's GDP and employs slightly more than 98,000 people on 49,000 holdings[69]. For those people, agriculture is their main or an additional occupation. Agricultural land, with a total of 516,070 ha, makes up 37.4% of Montenegro's territory. Pastures contribute the largest share to agricultural land (62%). They are followed by meadows (25%), while the share of arable land is low (9–10%). Due to the insufficient supply of domestic food, a large quantity of food products are imported.

[69] Montenegro Development Directions 2013–2016

Unlike European agriculture, Montenegrin agriculture (as a whole) is not intensive, which contributes to the preservation of the quality of resources and reduces pressure on the environment (with a limited number of cases of excessive pollution from agricultural activities). On the other hand, Montenegrin agriculture is inefficient and uncompetitive[70] due to, among other things, small and fragmented agricultural holdings, insufficient application of modern technology in primary production and processing of food, uncompetitive prices, poorly organized farmers and a lack of solid forms of horizontal and vertical links in the production and processing.

[70] Intensive agriculture can mostly be described as efficient in economic terms, but this does not mean that it is efficient in terms of sustainable use of resources, since it envisages much stronger negative impacts on the environment than extensive agriculture (which is, as a rule, inefficient in economic terms).

The poor infrastructure in the rural areas contributes to the low competitiveness, but has additional negative consequences. It decreases the quality of life and reduces the attractiveness of living and working in rural areas. Thus, addressing these challenges will increase both the competitiveness and human development opportunities alike, triggering a virtuous circle "better opportunities"–"higher attractiveness"–"improved demographic structure of rural areas"–"easier introduction of innovative approaches" like organic farming, energy saving technologies or closed production cycles.

Available data on the impact of agriculture on the environment have shown both positive and negative trends, including an increase in the territory used for organic production, but also a general increase (in spite of the decline in the last observed year) in the consumption of mineral fertilizers and a significant increase in the consumption of plant protection products in the period 2005–2011. The consumption of plant protection products was assessed on the basis of the imported quantities and in 2011 it was 1.6 times larger than in 2005. In 2011 the surfaces used for organic production made up 0.6% of the total agricultural land.[71]

The development of agriculture is extremely important and it is expected to ensure a stable and high-quality supply of food, reduce the trade deficit, encourage the development of other sectors (like tourism), develop conditions for a better quality of life of the rural population, etc. Within the analyses conducted in the process of preparation for Rio +20, agriculture has also been recognized as one of the priority sectors for greening the economy. Key opportunities for increasing the efficiency in agriculture lie in technological improvements, transfer of knowledge and information about the ways to preserve fertility of the land, expansion of organic agriculture, diversification of the sources of income in rural areas and development of an efficient food industry sector.

3.3.3 TOURISM

According to the *Montenegro Development Directions 2013–2016*, tourism is one of the main pillars of the economic development of Montenegro. Revenues from tourism amounted to about €700 million in 2012, when the country was visited by 1.4 million tourists. The World Travel and Tourism Council (WTTC) estimated that in the last few years Montenegrin tourism directly and indirectly generated 17–23% of GDP. According to the World Travel and Tourism Council's assessment, in 2012 the travel and tourism sector's contribution to employment was 17.6% or 29,000 jobs. This contribution is expected to rise to 59,000 jobs by 2023 (31.8% of total employment)[72]. In the period 2000–2012 Montenegro recorded continuous growth of tourism turnover measured by the number of tourists. The number of overnight stays was also on the increase, with smaller oscillations in the last decade. Over 90% of arrivals were connected to the coastal region and to the short summer period (June–September). Thus, for example, a third of all arrivals in 2012 took place in August.[73] The strong seasonality of tourism and the fact that it is dominantly connected to the coastal area increase the pressure on the environment. Tourism influences the quality of the environment since it uses natural and other resources – space, water, fuels, electricity and food – and generates large quantities of waste and pollution.

In the process of national preparations for Rio +20 it was concluded that tourism (along with agriculture and energy sectors) is the sector with the most significant opportunities for greening of the economy. In the future, agriculture and tourism will be integrating closer because of agri-tourism's increasing appeal. Thus, both sectors have a joint stake in greening the economy and both need to adapt for that matter. Making high quality domestic organic products available in the traditional tourist destinations in Montenegro would increase the yields from tourism, attracting high-income customers. The potential of agri-touristic and recreational products is also large.

[71] Data from the draft Indicator-Based Report on the State of the Environment

[72] World Travel and Tourism Council. (2013). Travel and Tourism: Economic Impact 2013, Montenegro, p. 1

[73] The source of the data is the draft Indicator-Based Report on the State of the Environment

Key issues important for resource efficiency in tourism include long-term preservation of the attractiveness of destinations (protection of natural and landscape values) with careful planning and development of new capacities, efficient tourism capacities (particularly from the aspect of use of water and energy) with the implementation of new technologies for the heating and cooling of buildings, raising the quality of services with a reduction of the impact on the environment (pollution control, particularly wastewater treatment), ensuring a higher degree of recycling of waste, development of environmentally friendly forms of tourism, increase in the use of local food products in the tourism offer, etc.

3.3.4 CONSTRUCTION AND HOUSING

In the middle of the last decade, the construction industry was experiencing a boom and had the highest growth rate among all sectors of the economy. In 2008 construction made up 6.2% of GDP in Montenegro[74] but its significance exceeds this share because it stimulates growth in other sectors, like the production of building materials, services, the financial sector, etc.[75] *Montenegro Development Directions 2013–2016* identified development goals in the field of the construction industry and housing that, *inter alia*, include improvement of spatial planning, improvement of the quality of construction works and use of sustainable construction products, as well as raising the standards for energy efficiency and use of more energy from renewable sources in residential buildings. *Development Directions* have been based on and are developing further the goals set in the Strategy for Development of Construction Industry in Montenegro by 2020 and Housing Strategy.

Consumption of energy in the sector of buildings, particularly for heating and cooling, is a very important issue in European policies. Since 2010 it is regulated under the revised Energy Performances of Buildings Directive. Along with the obligation to implement the minimum requirements for energy performances of old and new buildings, this Directive requires that, starting with 2012, all new buildings in the EU are constructed in such a way that their emissions are close to zero. The cost-effective potential for savings of energy in the construction of buildings is assessed at 65 Mtoe (megatonnes oil equivalent) by 2020, which is almost sixty-five times as much as the total Gross Domestic Consumption of Montenegro in 2011. In the EU the improvement of the existing housing stock is planned through the preparation of strategies for energy efficiency reconstruction of buildings in line with the requirements of the Energy Efficiency Directive from 2012.

Ample evidence suggests that the Montenegrin construction industry and housing have significant potentials to generate savings. Although precise data on the status of thermal insulation of the housing units in Montenegro does not exist, it is estimated that as many as 70% of the residential buildings need adaptation to increase energy efficiency. This estimate is based on the fact that a significant part of the total number of about 316,000 dwellings are located in collective housing units built in the 1960s and 1970s. These buildings are characterized by neglected and run-down external constructions – facades and (flat) roofs, as well as old internal installations[76]. The analysis done by UNDP Montenegro showed that the phased implementation (spread over 10 years) of energy efficiency measures (adequate insulation of external walls, replacement of windows/doors, roof insulation and insulation of floors) in all illegally constructed buildings would contribute to an increase in GDP of 1.5% per year.

Energy can be saved in buildings through the introduction of energy-efficient designing, construction, certification of buildings, use of construction materials and products improving the energy characteristics of the buildings, appropriate maintenance and reconstructions of buildings, etc. Further incentives are needed so that the positive trends in this sector (such as the increased use of insulation on new and existing buildings) are stimulated and a basis created for achieving the ambitious EU targets and standards.

[74] Strategy for Development of Construction Industry in Montenegro by 2020 (Ministry of Sustainable Development and Tourism, 2010)

[75] Negative environmental impacts evidenced due to the expansion of the construction sector included overexploitation of some natural resources for construction materials (e.g. sand and gravel from water courses), landscape deterioration and similar.

[76] According to the data of the *National Housing Strategy of Montenegro for the period 2011–2020* (Ministry of Sustainable Development and Tourism, 2011), one of the basic characteristics of the housing stock is the fact that it is relatively old (only about 30% has been built in the last 30 years).

A large amount of energy can be saved through adequate infrastructure and urban planning. Although the principles and requirements of energy efficiency are established in the relevant legislation, current planning practices in Montenegro still do not generate adequate solutions for their integration into spatial and urban plans. *Sustainable towns* constitute one of the key themes in the document *The Future We Want* (adopted at the Rio +20 summit).

It is not only the savings in energy that are important for resource efficiency in the construction industry. Recycling of construction waste, use of environment-friendly materials (that meet sustainability criteria) and improved design of buildings are also extremely important.

3.3.5 TRANSPORT

A modern and efficient transportation system can significantly contribute to resource efficiency, competitiveness and sustainability. Large amounts of energy are used in transport, which significantly contributes to climate change, air pollution and related negative impacts on human health and conditions of the ecosystem. Construction of transportation infrastructure also causes negative impacts on space, water and biodiversity.

The Montenegrin transportation sector faces significant difficulties in ensuring the mobility of people, goods and services within the country and towards neighbouring countries. Underdeveloped road networks and the non-existence of highways, problems with an insufficiently developed railway infrastructure and old vehicles, the inefficiency of the transportation system and absence of modern approaches in managing transportation are only some of the problems that are identified in this sector. The configuration of the terrain causes high maintenance costs in the sectors of railway and road transport and development of new infrastructure. Insufficiently developed infrastructure for maritime transport significantly contributes to the pollution of the sea.

The share of railway transport in the total number of passenger kilometres in Montenegro declined in the period 2000–2012 from 52% to 36%. Thus in the last few years road transport has had a dominant role in the transport of passengers, which increases the pressures on the environment. Trends in the cargo transportation are similar to the trends in passenger transport, with somewhat less visible decline in the share of railway transport. The total number of motor vehicles increased from about 128,000 in 2000 to about 194,000 in 2012. In 2012 almost 98% of the vehicles in all categories were over 10 years old; 56% of the vehicles used oil as fuel, 43% used gasoline, while a very small number of vehicles used liquid petroleum gas.[77]

An integrated approach, as well as significant efforts and funds will be needed to develop the transportation system oriented to resource efficiency (i.e. sustainable transport) since it will require modernization of the vehicle fleet and further development of the transport infrastructure, including ports and marinas. It will also require faster introduction of vehicles with low emissions and new technologies/alternative fuels, better control of the quality of fuels, promotion of environmentally friendly forms of transport and implementation of instruments for minimizing the negative environmental impacts of transport (including standards, impact assessments, economic instruments etc.).

3.3.6 INDUSTRY AND ENTREPRENEURSHIP

In the last two decades, Montenegro has faced a significant decline in industrial production (which includes the extraction of ore and stone, generation of electricity, gas and water, and the processing industry). The share of industry in GDP in the last few years has dropped to about 10%. According to the assessments given in the draft *Strategy for Development of the Processing Sector*[78], the industrial sector today is characterized by two key elements: low productivity and poor competitiveness. The draft strategy emphasizes the necessity to change the concept of the development of the processing

[77] Source of data: Indicator-Based Report on the State of the Environment

[78] Ministry of the Economy, draft Strategy for Development of the Processing Industry 2014–2018, December 2013

industry and to create conditions for development of small and medium-sized enterprises. The document also notes that the processing industry has significant development potential and that its efficiency and competitiveness will in the future depend on the continuous implementation of technical and technological innovations in the production processes and innovations in the management processes.

The guidelines that are defined in the existing strategic and planning documents and that refer to industrial development are summed up in the draft of the *Second National Communication*. They are very important for development of resource efficiency. The following actions are necessary for the improvements in the industry (in general, and particularly in the processing industry):

- modernization of the existing and development of new knowledge-based and innovative industries that will use domestic resources and will adhere to environmental protection standards;
- modernization of production, increase in the degree of finalization of products, introduction of new technologies, quality and environmental management systems together with the changes and improvements of the product range;
- incentives for investing in cleaner industry and increasing energy efficiency;
- development of entrepreneurship, small and medium-sized enterprises, technological and industrial clusters; etc.

A recent study prepared for the European Commission Directorate General for Environment[79] has shown that the prices of energy and tradable emission permits have strongly pressured energy-intensive industries (for example, production of cement and copper) to improve their efficiency. Policies and legislation in the field of air, water and waste have had similar effects. The study also concludes that significant employment growth cannot be expected in these (conventional) industries. However, a large employment potential is expected in new industries (in areas like energy efficiency and environmental protection). The findings of this analysis are also relevant for Montenegro where energy-intensive industries (e.g. production of aluminium and steel) can hardly compete with producers from the EU which operate under a stricter regulatory environment and have significantly improved their efficiency. Prospects for new employment in these industries are minimal.

Gradual adoption and implementation of the EU policy on products is also important for the industrial sector in Montenegro. Among other things (within the lifecycle assessment) it includes optimization of technological processes aimed at reductions in the generation of waste, more efficient use of inputs and lower production of by-products, reduction in the energy and water losses, lower GHG emissions, etc.

3.4 Links between economic sectors and resources

Table 3-1 provides an overview of the key issues (challenges and possibilities) in the use of natural resources and environmental management (including waste) in the context of resource efficiency and sustainability in the key development sectors in Montenegro. The issues that should be given priority due to their importance for development of the resource-efficient economy are highlighted and bolded. Potential opportunities are underlined to ensure their visibility in the table.

[79] Ecorys, The Number of Jobs Dependent on the Environment and Resource Efficiency Improvements, report prepared for DG Environment, 2012

	Energy sector	Agriculture	Tourism	Construction industry and housing	Transport	Industry and entrepreneur-ship
Ecosystem services and biodiversity	- pressures on biodiversity and ecosystems are stronger when energy sources are exploited and electricity generated; adequate mitigation measures are needed - value of biodiversity and ecosystem services are underestimated in development energy plans	- development of agriculture does not necessarily lead to degradation of the ecosystems - good agricultural practice contributes to preservation of biological and landscape diversity - control of collection of wild species to be used as food	- increased pressure on ecosystems (particularly of coastal and protected areas) due to the increased number of visitors and construction of new tourism capacities	- degradation and destruction of ecosystems in order to extend urban areas	- pressures on the ecosystems from transportation include air pollution, destruction and fragmentation of habitats through transport infrastructure and spread of invasive species (in marine navigation)	- inefficient technologies result in a larger degree of pollution and significant pressures on biodiversity - using of the ecosystem services and the damage that is inflicted on them should be valued in an adequate way and integrated in company costs
Water	- modification of watercourses for energy plants jeopardizes the good status of water - the target for increasing the share of renewable energy sources should be achieved by an adequate mix (not only focusing on hydro-power sources) with the smallest	- use of fertilizers and pesticides pollutes water - efficiency in the use of water in agriculture should be increased (particularly in the context of climate change) - adequate water management contributes to the reduction of erosion and floods	- increased quantities of waste water - it is possible to make significant savings of water through adequate planning and construction of tourism capacities	- consumption of water for water supply to settlements is irrational (losses, use for other purposes) - promotion and encouragement to use efficient appliances are needed	- it is necessary to reduce pollution from marine navigation	- better control of industrial water pollution is required - stimulate rational use and recycling/ reuse of water in industry

Table 3-1: Points of contact between economic sectors and the environment: problems and opportunities in the context of resource efficient economy

	Energy sector	Agriculture	Tourism	Construction industry and housing	Transport	Industry and entrepreneur-ship
Air	- air pollution, negative impact on human health - energy sector as the key GHG emitter; use of lignite and obsolete technologies that are used now	- adequate practices can reduce GHG emissions from agriculture	- contribution to air pollution (through increased emissions due to the transporting of tourists)	- it is necessary to reduce GHG emissions from the sector of buildings and housing	- transport is a significant GHG emitter; the fact that vehicles are old and that there are a small number of cars with low emissions and good fuels contributes to the emissions - transport contributes with increased concentrations of PM, O_3, NO_2	- technologies that are used in industry are characterized by a high degree of emissions in the air - exceedances of concentrations of certain polluting matters are most frequent in industrial zones (impact on health)
Land use	- taking up of space for development of energy infrastructure; Montenegro should aspire to rational solutions	- preservation of fertile land with adequate measures of land policy - efficient agricultural practices reduce spatial requirements	- pressures on space due to tourism capacities - reduction of the long-term attractiveness of destinations due to the damage to spatial values	- irrational spread of construction land leads to degradation of space and loss of natural surfaces and surfaces for other purposes - rational planning contributes to the reduction of infrastructure and transport costs etc.	- taking up of space for development of transport infrastructure	- planning industrial zones and locating capacities can contribute to the reduction in the consumption of energy and resources
Soil	- land pollution by disposal of matters that are emitted from the energy sector	- increase in the use of fertilizers and plant protection products reduce land quality - development of organic production is a significant opportunity	- taking up of agricultural land by tourism capacities	- loss and fragmentation of agricultural land due to the spread of urban zones	- pollution of the land registered in the vicinity of transport routes	- pollution of the land registered in the vicinity of industrial plants

	Energy sector	Agriculture	Tourism	Construction industry and housing	Transport	Industry and entrepreneur-ship
Fossil fuel	- consumption of low-calorific-value lignite, high emissions and low efficiency of transformation - limited explored reserves of fossil fuels, the existing plans can lead to rapid exhaustion of reserves	- increase of energy efficiency in food production - use of local products whenever possible in order to reduce consumption of energy in the transport of food products	- minimization of the consumption of fossil fuels in tourism through rational planning of accommodation capacities and implementation of new technologies for heating and cooling (including, for example, solar collectors for water heating) - promotion of green forms of transport in locations that are attractive for tourism	- projecting buildings in such a way as to reduce energy consumption - gradual introduction of standards for buildings with zero energy consumption, reconstruction of the existing buildings	- it is necessary to reduce dependence on fossil fuels (new technologies in cars, encouraging types of transport where no fossil fuels are used, or if they are used they have lower emissions)	- stimulation of innovation and technology that rely on fossil fuels to a lesser extent; energy efficiency in industry
Other minerals and metals	- use of materials for the reduction in energy consumption - current processes of exploitation and production of minerals and metals have high energy intensity	- improvements can be made in packaging of food in order to make recycling possible	- use of environmentally friendly materials in the construction of buildings in tourism	- use of environment-friendly materials in the construction industry in general	- in planning, construction and maintenance of the transport infrastructure the use of materials should be carefully considered	- technologies and management processes should be improved in order to improve efficiency in the use of materials

	Energy sector	Agriculture	Tourism	Construction industry and housing	Transport	Industry and entrepreneur-ship
Forests	necessary improvements in the use of biomass for energy - forest management aimed at increasing GHG sinks	- optimization of the land use for forestry and agriculture	- adequate forest management, particularly in the existing and potentially protected areas, for the preservation of the attractiveness of destinations	- increased efficiency in cutting trees and producing timber for construction	- minimization of the impact of transport/ transport infrastructure on forests	- increased efficiency and level of finalization of wood-processing products - minimization of the impact of industry on forests - adequate integration of the value of forests into the fees for using them
Marine resources	- protection of landscape values in the coastal area in the process of the development of the energy infrastructure - marine spatial planning to ensure protection of the sea and marine resources during exploration of reserves and construction of transmission facilities	- elimination of damaging fishing methods - control of pollution from mariculture - control of pollution from agriculture in the coastal area	- reduction of pollution of the sea from tourism/ development of wastewater treatment plants - reduction of pollution from cruisers and stricter sanctioning of discharge of bilge water into the sea	- reduction of GHG emissions from the sector of buildings and housing and contribution to the reduction of negative impacts on the sea - control of the spread of constructed surfaces on the coastline	- control of pollution from maritime navigation - introduction of marine spatial planning	- reduction of pollution that comes from industry

	Energy sector	Agriculture	Tourism	Construction industry and housing	Transport	Industry and entrepreneur-ship
Waste	- start to the use of biodegradable waste for energy generation - ensuring of energy recovery from waste that cannot be recycled	- composting of bio waste and its use in agriculture - impact on the reduction of waste and recycling by using adequate packages	- separation and recycling of waste generated in tourism	- recycling or reuse of construction industry waste	- recycling end-of-life vehicles	- reduced quantities of waste generated in industry

CHAPTER IV

Horizontal policy challenges for resource efficiency in Montenegro

In addition to the sector-specific dimensions of resource efficiency and sustainability addressed in the previous chapter, there are several critical horizontal cross-sectoral issues that have to be explored. They include proper valuation of natural capital, phasing out harmful subsidies, setting parameters for sustainable consumption driving sustainable production, and finally – waste management. A separate – though no less important – area is the monitoring of the infrastructure needed to follow and assess progress in regards to resource efficiency as well as progress in human development. Progress in these areas would drive the country closer to achieving the targets set in the Europe 2020 Strategy and, in addition to being environmentally friendly, also stimulate growth, create new jobs and improve the overall level of human development.

4.1 Valuation of natural capital

Despite the methodological constraints and ethical considerations, the traditional values of biodiversity and ecosystems (such as keeping the natural balance and maintaining conditions favourable for life) are nowadays increasingly assessed through the economic lens[80]. Shifting the burden of taxation from labour to activities that degrade resources and damage the environment may result in creating new jobs. Moreover, the experience of countries that joined the EU during the last decade (including Croatia) show that revenue generated from environmental taxes and charges (disbursed, for instance, through environmental funds) can make a significant contribution to meeting European standards. Factoring the value of ecosystems' services into the economic calculation provides a more comprehensive and nuanced justification of the need to protect habitats and species (and natural capital in general) and helps to lay the foundation for development of a resource-efficient economy.

As mentioned earlier, valuation of natural capital and ecosystem services has not been widely implemented in Montenegro. The process of decision making on development priorities has often neglected this kind of information. As a result, the ecosystem services, clean air and water continue to be treated as free resources, while charges for exploitation of natural resources often do not cover the full costs incurred to the environment and society as a result of these activities. Moreover, there were no efforts to integrate the value of natural resources (or the damage resulting from degradation or pollution) into the calculation of the national wealth, nor into companies' business results. One of the core principles of the European policy on resource efficiency – *getting the prices right* – is either not properly integrated into Montenegrin laws and policies or is not applied at all.

Environment policy and the Law on Environment Protection lay down the *polluter/user-pays* principle, while the basis for the use of economic instruments (first and foremost, pollution charges) has existed since 1997. However, these instruments are not well designed and not properly and consistently implemented, therefore they do not provide the appropriate incentives for behaviour change and transition to more efficient and less polluting production patterns. The situation with user fees, concessions, etc. is similar – they do not provide sufficient incentives to ensure efficient use of natural resources such as water, materials from watercourses and forests.

Energy prices in the period 2000–2012 grew considerably, which, in addition to other factors, had a positive impact on reducing the energy intensity. While charges for water supply, wastewater discharge and treatment (in cases when treatment is provided), waste collection and disposal also grew, they still have not reached a level which would stimulate rational use of water and ensure the funding needed for necessary

[80] Examples of European and global studies addressing the issues of the economic values of biodiversity include the Millennium Ecosystem Assessment from 2005, The Economics of Ecosystems and Biodiversity (TEEB), interim (2008) and synthesis (2010) report, a study prepared for the European Commission in 2008 by Braat, L. and ten Brink, P. (eds.)., The Cost of Policy Inaction: the case of not meeting the 2010 biodiversity target, etc.

Photo: Saša Popović

infrastructure. The rise in energy prices and utility services costs increases household spending and creates incentives to achieve resource efficiency targets, but there is a need to mitigate the impacts of price increases on vulnerable population categories.

Economic/market-based instruments are widely used across the EU Member States and can make a considerable contribution (in parallel with the regulatory instruments) to the implementation of the environmental policy. Particularly interesting experiences and results in the EU have been recorded when using instruments focused on water consumption, pesticide tax, charges for using non-metallic mineral raw materials, charges for tree preservation, deposits on beverage containers, a plastic bag tax, water pollution tax and taxation of natural resources. Denmark and the Netherlands are the EU countries with the broadest range of bases for levying taxes and charges that place strong emphasis on taxation of pollution and use of resources. Environmental taxes and charges have been part of the Danish system since the 1970s. These instruments have recently generated €8–10.5 billion in revenues per year which approximately accounts for 4% of GDP. Danish green taxes are designed to influence behaviour and lead to making more sustainable choices by all the stakeholders in the society and economy. Based on the results, these instruments are considered to be successful (which is, for example, proved by the reduction in using pesticides and packaging and by some other positive trends as well).[81]

There have been no attempts so far in Montenegro to try to carry out green tax reform in which there is a partial shift of the tax burden from labour to the activities that lead to damaging the resource basis and pollution. In light of the successful EU experiences in this area, it would be beneficial to explore the arguments for and against adopting a similar approach in our country. Amongst other things, the analysis could provide an answer to the question of how many new jobs could be created by reducing total labour taxes, which would be compensated by phasing out environmentally harmful subsidies and increasing taxes, as well as by consistent application of the polluter/user-pays principle – and how many of those jobs would qualify as "green".

[81] Ecorys, The role of market-based instruments in achieving a resource-efficient economy, report prepared for DG Environment, 2011

4.2 Phasing out environmentally harmful subsidies

Environmentally harmful subsidies deeply distort the system of economic incentives and disincentives so that unsustainable production may look profitable, while subsidizing environmental damage with public resources. Phasing out environmentally harmful subsidies is one of the measures for which there is a broad international consensus.[82] It would contribute to redirecting public funds towards sustainable activities and stimulate the use of more advanced and more efficient technologies, encouraging behaviour change.

Subsidies lead to an artificial reduction in the prices of resource use and distort pricing signals, while they also deter businesses and consumers from more efficient behaviour and use of technologies that would be cost-effective in the absence of subsidies. Table 4-1 was produced for the purpose of the TEEB report[83] (taken from SEC(2011) 1067 final) and provides an overview of assessments of total subsidies in several sectors, illustrating the gravity of this barrier for the development of a resource-efficient economy globally. In other words, the table shows funds spent globally on unsustainable purposes which have, to quote the World Bank and FAO report on the need to reform subsidies in fisheries sector, sunk into the sea.

These subsidies are paid from government budgets and thus aggravate macro-economic imbalances, increase the tax burden or even prevent investment in alternatives, which would generate higher growth, nurture innovation, and improve social outcomes. Environmentally harmful subsidies lead to an increase in the amount of waste, emissions, exploitation of

[82] Numerous international organizations, primarily OECD and the World Bank, have dealt with analysis of environmentally harmful subsidies.

[83] The Economics of Ecosystems and Biodiversity for National and International Policy Makers, Chapter 6: Reforming subsidies, 2009

Table 4-1: Estimates of total subsidies in selected sectors of the economy

Source: Analysis associated with the Roadmap to a Resource Efficient Europe, Part I, SEC(2011) 1067 final

Sector/region	Region and/or amount of subsidies (source)
Agriculture, OECD	US$261 billion per year, 2006–2008 (OECD)
Biofuels	US, EU and Canada, US$11 billion in 2006 (Global Subsidy Initiative, OECD)
Fisheries, globally	US$15–35 billion (UNEP)
Energy, globally	US$500 billion per year (Global Subsidy Initiative) US$310 billion in 20 biggest countries outside the OECD area in 2007 (IEA)
Transport, globally	US$238–306 billion per year, of which US$173–233 billion is for environmentally harmful subsidies (EEA)
Water, globally	US$67 billion per year, of which US$50 billion is for environmentally harmful subsidies (Myers and Kent)

Box 4-1: Environmentally harmful subsidies - the case of KAP

The Aluminium Plant (KAP) in Podgorica is an illustrative example of how environmentally harmful subsidies work. KAP has practically been subsidized, either directly or indirectly, ever since its opening – for example by consuming electricity at below market prices, or by not paying for the costs of the pollution and environmental degradation (i.e. the enterprise was given the possibility to not invest in environment protection measures and technologies) that it causes. The reasons for subsidizing the company included preventing worker layoffs, or the importance of the aluminium industry in the economic system of the country and in foreign trade, etc. Recently, direct subsidizing has been also been received through the state aid mechanism. Environmentally harmful subsidies and deviation from the fundamental principle of an efficient economy (paying the right prices for resources and internalization of costs resulting from pollution and other negative environmental impacts) have not helped KAP in the long term to improve its performance. This is the reason why the factory is today on the verge of being shut down. KAP operates with highly inefficient technology that consumes vast amounts of energy and raw materials and causes excessive pollution and waste production. There is also a need to address the negative environmental effects of factory operations by funding clean-up measures from public sources. Besides this, the fiscal risk is also considerable, as is the risk of causing disturbances to public finance due to the different ways in which this factory is subsidized.

resources or negative impacts on biodiversity. The OECD study[84] showed that removing fossil fuel subsidies could reduce greenhouse gas emissions by 10% by 2050. Interestingly enough, G-20 leaders recognized that fossil fuel subsidies are harmful and agreed to phase them out and rationalize them in the medium term, while providing targeted support for the poorest[85].

Regional analysis of fossil fuel subsidies in the Western Balkans published by the UNDP Regional Bureau for Europe and the Commonwealth (RBEC)[86] identifies the challenges that Montenegro will face in both, harmonization with the European policy framework for climate and energy, as well in its endeavours to become resource-efficient, competitive and ultimately a sustainable economy and an ecological state. According to the analysis, fossil fuel subsidies in Montenegro are the highest in the Western Balkans region, with the exception of Kosovo, and they account for 10–11% of GDP (as opposed to 5–6% in Croatia or 7–9% in Serbia). The following are messages communicated through the UNDP report which are extremely important for resource efficiency:

- production of fossil fuels in the region is inefficient, taps low-quality resources and lacks economies of scale;
- subsidies facilitate the continued use of uncompetitive technologies and resources as well as unsustainably high employment levels;
- key effects of fossil fuel subsidies in the Western Balkans are the control and moderation of the cost of fossil fuel extraction, their processing, their delivery and finally, allowing distribution of rent from uncompetitive natural resources that are not likely to be exploited under competitive market conditions;
- subsidizing uncompetitive fossil fuels in order to make them competitive prevents market entry for efficient fuels and renewable energy, as well as for more productive technologies;
- most fuel subsidies take the form of delayed environmental subsidies, maintenance, or replacement cost, tax exemptions, or slack collecting.

[84] OECD, Mitigation potential of removing fossil fuel subsidies – A general equilibrium assessment, 2011, quoted in SEC(2011) 1067 final

[85] SEC(2011) 1067 final

[86] UNDP, Fossil Fuel Subsidies in the Western Balkans, 2011

The total amount of environmentally harmful subsidies has never been assessed in Montenegro, nor has this issue ever been given special attention in policy-making processes. However, on the basis of the available partial data it may be stated with certainty that these damages amount to a considerable quantity of funds. Redirecting these funds towards activities that contribute to resource conservation and increased efficiency could lead to accelerated human development. Redirecting sovereign guarantees alone, which were issued to the aluminium production sector (more than €100 million in 2013, only a small share of the total subsidies supporting this industry), towards capital budget or development incentives could have created new jobs or reduced pollution in prioritized sites (for example, by providing support to the construction of a wastewater treatment facility). For resource efficiency, phasing out harmful subsidies is even more important as it provides the right signals to businesses.

The 2012 State Aid Report[87] demonstrates that the lion's share of environmentally harmful subsidies are going to the production of aluminium and steel. The total state aid received by the Aluminium Plant in 2012 alone amounted to over €28 million, while steel production was supported in 2010 and 2011 by almost €36 million. Over the entire period (2010–2012) state aid amounting to around €7 million was provided to support employment, small and medium-sized enterprises and research and development. This figure was roughly a tenth of the aid provided to KAP and the steel production industry. In the same period, environment projects did not receive a single Euro from state aid. Even though no direct state aid has been provided to the mining sector over the last few years, the analysis of lignite production in the region carried out by the UNDP Regional Bureau for Europe and the Commonwealth of Independent States (RBEC) shows that mining is also strongly subsidized by means of other instruments.

Phasing out the environmentally harmful subsidies (and energy subsidies fall into that category) is important also from a human development perspective. Such subsidies are currently channelling benefits to more wealthy consumers and implicitly encouraging inefficient consumption. At the same time such measures need to be taken as part of a package with targeted support for poor households to prevent them falling deeper in poverty.

4.3 Sustainable consumption and production and green public procurement

As mentioned earlier, production patterns in the energy sector and the processing industry, as well as the ways in which natural resources are exploited may not be characterized as sustainable, since obsolete, resource-intensive and emission-intensive technologies prevail. A similar condition (involving predominantly unsustainable patterns) also exists in terms of consumption, since product specificities related to environmental impacts are not usually a decisive factor that influences consumers' choices (to a certain extent, the energy labels of products are an exception).

The public sector is a significant consumer of goods and services. Procurement rules are a powerful tool that can directly impact consumption patterns. The inclusion of clear requirements for environmental sustainability in the procurement rules and criteria can be a powerful incentive in promoting sustainable production. Basic legal provisions governing enhancement of green public procurement do exist, however they still do not play a significant role in refocusing public expenditure towards green products. Public expenditure accounts for 40–50% of GDP, while capital expenditure amounts to up to 10%[88] and contracted public procurement accounts for 12–19% of GDP. This means that "green" public procurement may lead to sustainable consumption of products and lower negative environmental impacts.

Sustainable consumption and production in the EU is encouraged through the improvement of products and processes with regard to the environment and social affairs (by applying the social responsibility concept for the latter), encouraging the use of improved products/

[87] Commission for the Control of State Aid, Annual Report on State Aid in Montenegro in 2012

[88] Ministry of Finance of Montenegro, Macroeconomic and Fiscal Indicators for the Period 2006–2013

processes by businesses and consumers, green public procurement (with the aim of having 50% of public expenditure on green products and services) and development of eco-innovations and environmentally friendly technologies. According to the 2010 WRAP report[90], implementation of a number of resource efficiency strategies (in production and consumption) that would produce better results (for example, waste reduction and recycling, sustainable building, efficient use of the existing infrastructure, food waste reduction, public procurement, etc.) could considerably reduce GHG emissions, the use of non-fossil fuels and water, as well as the ecological footprint of the United Kingdom. The reduction of material consumption that would result from the implementation of these strategies by 2020 was estimated at around 15% per year, while water abstraction would be reduced by 6% and the ecological footprint by 5–7%. In an earlier study, the reduction of GHG emissions resulting from the implementation of these same strategies was estimated at 10% by 2020.

Raising consumer awareness about choosing products with lower environmental impacts and making public procurement green are significant and often untapped opportunities in the area of consumption. Further application of the concept of social responsibility can also make a considerable positive contribution.

4.4 Managing waste

Waste management is one of the pillars of the circular economy. Montenegro is far from achieving a "zero-waste" economy but it has some important opportunities that can be pursued. The effectiveness of existing policies and the results achieved so far are not satisfactory yet. Recycling and reuse are at an extremely low level. Waste disposal generates significant negative impacts on the environment – around 45% of the produced municipal waste ends up in illegal or unregulated waste disposal sites (Figure 4-1). Other types of waste (construction, industrial, etc.) are disposed of in environmentally unfriendly ways as well. The establishment of a system for managing specific waste flows (for example vehicles, electrical and electronic devices) that are of particular relevance for reuse and recovery of raw material is still at an early stage. The latest *Progress Report*[91] emphasizes that new investments are needed for waste separation and recycling. The targets set for recycling are quite

[90] Report of the British think-tank addressing the issues of substantial changes aimed towards having better environment was prepared in cooperation with the Stockholm Environment Institute and Durham University. Full title of the report is: WRAP, *Securing the future – the role of resource efficiency,* 2010

[91] Commission Staff Working Document SWD(2013) 411 final

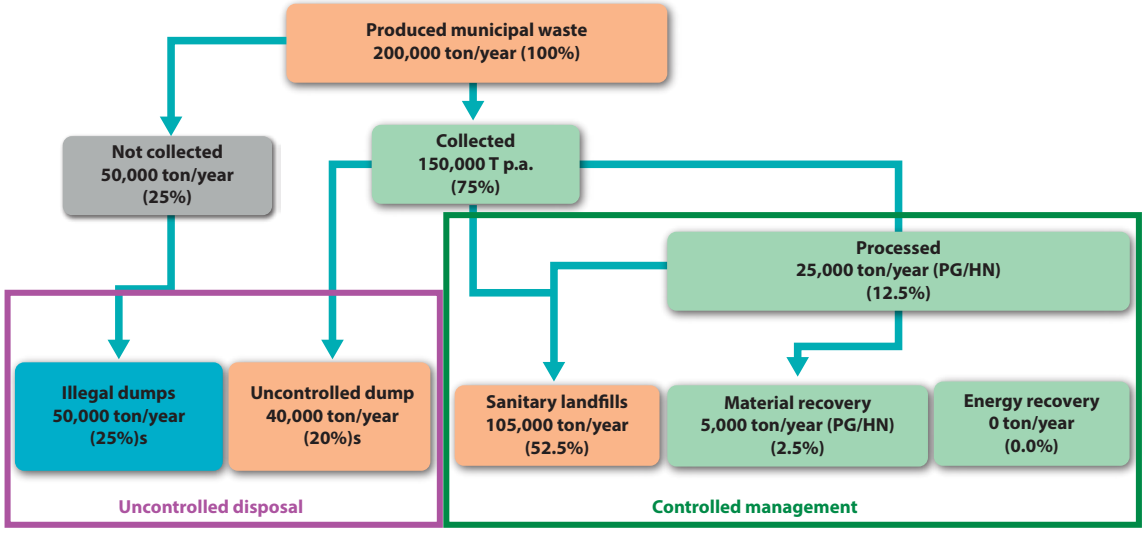


Figure 4-1: Estimates of current municipal waste flows in Montenegro

Source: Draft National Waste Management Strategy – March 2013

ambitions (for example, recycling and reuse of at least 50% of paper, metal, plastics and glass from households and other sources by 2020) but, given the progress that has been made so far and with estimated recovery of materials amounting to 2–3% of the total municipal waste produced, these targets will be difficult to achieve. Fundamental changes are needed in order to come closer to the achievement of EU targets and practice.

[92] The source of data is the Report on Environmental Status on the basis of Indicators

Earlier national strategies and waste management plans were prepared mostly on the basis of the estimated amount of municipal waste, because the data on actually generated amounts were not available. The methodology for collection and aggregation of data on municipal waste has been improved over the last few years and MONSTAT's data is available now. According to this data, in the period 2010–2012 the annual amount of generated municipal waste ranged between 280,000 and 330,000 tonnes. The lowest amount was recorded in 2012 when 1.2 kg of municipal waste was generated per capita per day[92] (which is somewhat lower than the EU average of 1.4 kg per capita per day). Even though it is not possible to attribute recorded changes to actual improvements (as they may be due to methodological adjustments), the trend is positive and it also shows there is a decoupling from (moderately growing) GDP. Decoupling the produced amount of waste from GDP growth is extremely important for resource efficiency and sustainability.

[93] European Commission. (2012). Assessment of resource efficiency indicators and targets. Final report.

4.5 Improving resource efficiency indicators and progress monitoring frameworks

Efficient use of resources is a horizontal issue that cuts across a number of sector policies – from ones on natural resource management, to science and research, statistics, fiscal policy, environmental and land use (spatial planning), to policies in economic sectors such as agriculture, energy, transport, the construction sector, etc. Setting proper targets and defining relevant indicators for monitoring progress against these targets is critically important for translating policies into practical results. The report of the European Commission, DG Environment, on the use of resource efficiency indicators and targets suggests using three groups of indicators (of resource use, of environmental impact and socio-economic indicators) and suggests a framework for a set (or basket) of indicators for resource use and their associated environmental impacts. This basket of indicators was used as a basis for proposing a corresponding set of targets for the EU in 2020 and 2050.[93]

Examples of policies producing positive results in terms of resource efficiency exist in Montenegro. These examples include projects and initiatives aimed towards using cleaner technologies, growing investment in research and development, efforts to introduce recycling, increased energy efficiency, developing environmental indicators, harmonisation with EU law, etc. However, good sporadic examples and experience are not sufficient. In order to ensure transition to a resource-efficient economy and the decoupling of economic growth from resource consumption and negative environmental impacts over time, it is necessary to fundamentally change the way in which policies are created and implemented. Robust data on the status of the environment and adequate indicators providing a long-term perspective are necessary. It is also extremely important to monitor closely the effects of policies and to modify these in case it turns out that they do not lead to the attainment of the set targets. International experience (and particularly the example of the EU) shows that there is a wide scope of policies and measures available for ensuring the efficient use of resources, for example getting the prices right, phasing out or reducing environmentally harmful subsidies, green tax reform, sustainable public procurement, stimulating innovation, technical standards and eco-design, valuation of natural resources and ecosystems and their adequate presentation in national accounts, developing indicators, establishing partnerships, developing knowledge and competences, strengthening scientific and research endeavours, etc. All these policies need reliable monitoring frameworks.

Setting clear targets is another area where data and indicators are needed. Without targets, policy action and public support are difficult to align. In the recommendations entitled *Actions for a Resource Efficient Europe* published in June 2013 by the *European Resource Efficiency Platform*, eight areas related to resource efficiency growth nexus were formulated aimed at creating growth and new jobs through new business models that are sensitive and incentivized to improve energy efficiency. Attaching true value to the resources and providing clear information and measuring progress is seen as critical both for building the incentives right, as well as for informing policies in support of resource efficiency and transition to a circular economy (Box 4-2). Some of these recommendations will be particularly relevant for Montenegro in its endeavours to implement the Roadmap for Resource Efficiency.

As mentioned earlier, there is a certain level of support for the efficient use of resources in Montenegro (in the form of certain policies, measures and instruments), but there are also examples of unsustainable policies, a lack of implementation of regulations and a lack of application of the set principles. It is encouraging that the number of policies addressing resource efficiency issues and the number of national regulations aligned with the European law is growing. Another positive development is that projects were launched to provide support for small and medium-sized enterprises to introduce cleaner technologies and increase efficiency, even though the coverage of these initiatives is quite low. Basic provisions governing green public procurement are laid down in legislation, while significant room for improvements exists in their practical application.

Box 4-2: Actions for a Resource Efficient Europe – EREP Recommendations

Set objectives, measure and report progress

Targets are essential for guiding action, while indicators are needed to measure progress. Indicators for measuring progress towards said targets should, in addition to carbon, also include three key resources: materials (material productivity, as measured by GDP/Raw Material Consumption), water and land. Particular attention should also be given to ecosystem valuation, identifying the opportunities arising from waste management and recycling and to development of footprint[94] indicators to account for EU imports as well.

Improve information on environmental and resource impacts for decision making

Organizations should measure and report progress in their environmental performance and help develop common methodologies for measuring the footprint of products and services. The EU should work towards a generally accepted binding framework for non-financial reporting by companies. EREP calls on international accounting bodies to address barriers in the accounting system to guide investments to new business models for a more circular economy. The EU, its Member States and business should develop and integrate natural capital accounting methodologies for countries to use in national accounts and for businesses to use over the whole supply chain.

Phase out environmentally harmful subsidies

The EU and Member States should as a matter of urgency phase out environmentally harmful subsidies, with special emphasis on subsidies for fossil fuels and the use of water in agriculture, energy and industry. Special care should be taken to design measures to address the needs of those who are least able to pay higher charges for using resources. The Commission should encourage Member States to shift tax burdens away from jobs towards resource use.

[94] Footprint is used in its literal meaning. Footprint indicators consist of a number of composite indicators that measure impact, i.e. the footprint that certain activities or the overall economy leave on resources or on the environment.

Moving towards a circular economy and promoting high-quality recycling

Further reducing waste, encouraging high-quality waste management and increasing recycling have significant potential for creating jobs and growth. A lot can be achieved through better implementation and promotion of best available techniques. The Commission should review waste management targets and encourage Member States to move to a circular economy with adequate waste collection and processing, high-quality recycling and phasing out landfills.

Improve resource efficiency in business-to-business relations

Inadequate business-to-business information on what resources a product contains and how it can be recycled is hindering resource efficiency. Possible use of a "product passport" (Environmental Product Declaration) should be explored to make such information easily accessible in the supply chain.

Taking forward a coherent, resource-efficient product policy framework

Resource efficiency requires a dynamic fiscal and regulatory framework that gives appropriate signals to producers and consumers to supply and demand products with lower environmental impact. Thus, the EU should adopt a more coherent product policy by consolidating and ensuring consistency among existing instruments (eco-design, eco-label…) and by filling the gaps.

Deliver a stronger and more coherent implementation of Green Public Procurement

In order to operationalize the existing 50% Green Public Procurement (GPP) objective, the EU should develop a systematic monitoring mechanism based on public tenders and establish a European network to standardize approaches and exchange good practice.

Develop instruments for SMEs

In order to take advantage of the opportunities offered by resource efficiency, SMEs need the capacity, skills and improved access to finance. Member States should develop locally tailored support that would combine resource efficiency audits/ consultancy, access to finance and advice, and skills development for SMEs. Specific mechanisms for financing resource efficiency in SMEs should be developed, for example through the European Investment Bank.

On the other hand, it is worrying that there are substantial (given the size of economy) environmentally harmful subsidies which enable the *status quo* in inefficient production and consumption patterns and tie up public resources that could be used in a much more efficient and sustainable manner in the long term. Also, it is worrying that there is an insufficient number of effective incentives for increasing efficiency. Instruments for integrated product management and for encouraging recycling are undeveloped and/or ineffective.

The analyses carried out for the purpose of the *Roadmap to a Resource-Efficient Europe* reveal that weak implementation is costly and that consistency in implementation of regulations and other improvements in administration/governance generates multiple benefits. The analysis also makes reference to the results of studies according to which the costs of not implementing environmental legislation in Europe are estimated at €50 billion per year. In addition to the direct costs it generates, weak implementation also creates uncertainty and gives mixed signals, which discourage businesses from investing in resource efficiency.

4.5.1 RESOURCE EFFICIENCY INDICATORS

Resource efficiency indicators are critical in two areas: setting targets for efficient resource use and monitoring progress against the targets. Much can be done in both areas in Montenegro.

Overall, the targets for efficient resource use are not identified and the availability of indicators is far from satisfactory. There are some exceptions, such as targets and indicators identified in other sector-specific policies and processes, including energy efficiency, greenhouse gas emissions, reducing losses in public water supply systems, recycling certain types of waste, etc. However, these are not sufficient to contribute to and monitor systemic change needed in the area of resource efficiency. Many of the indicators identified in national regulations and documents are still not monitored in a systematic manner (for example: a set of environmental indicators has been identified, but the majority are still not available on an annual basis).

The EU Roadmap strongly advocates that quantifiable targets be set and that the progress towards their achievement be monitored by means of various indicators, while it also calls for further cooperation between all stakeholders for the purpose of refining the proposed targets and indicators and the inclusion of new ones. The development of the system of targets and indicators of the EU Roadmap is a continuous process that is a subject to constant improvement, starting from the 18 transitional targets/ milestones set for 2020 and their operationalization (to a higher or lower extent) through specific tasks in individual areas and through proposed indicators. The approach defined in the EU Roadmap implies that responding to the need to monitor resource efficiency includes a hierarchy of indicators – starting from one (lead) indicator to several supplementing indicators called the *dashboard indicators*, continuing all the way down to a broad set of thematic indicators for individual issues addressed by the document.

Resource productivity measured by the ratio of Gross Domestic Product to the total Domestic Material Consumption (expressed in Euros/tonne) was selected as the lead indicator.[95] In order to tackle main deficiencies of this indicator (including the fact that the use of resources is measured only on the basis of their weight which does not give a clear picture of their values, rarity or environmental impacts from their use, and the fact that it only measures domestic consumption of resources) it was proposed that monitoring of the lead indicator be complemented by several macro indicators (dashboard indicators) on water, land and carbon. Built-up areas, the water exploitation index (until the situation with the footprint of water resources is improved) and greenhouse gas emissions were proposed as dashboard indicators. It is believed that a combination of these indicators, given the existing deficiencies regarding methodologies and data availability, would be sufficient for monitoring not only the relationship between economic activity and Domestic Material Consumption, but also the environmental impacts and global implications of EU consumption.

The Roadmap and the European Commission were severely criticized by the civil sector due to deficiencies of the lead indicator. It is for that reason that the Roadmap also incorporated recommendations to develop new indicators and improve existing ones as soon as possible, including indicators for natural environmental capital (for example, the landscape potential of ecosystems and degradation of ecosystems that are being developed by the EEA) and environmental impacts of resource use (for example, resource efficiency indicators developed by the Joint Research Centres (JRCs)). The Commission undertook to propose a new lead indicator for natural capital and the environmental impacts of resource use. Another particularly important obligation that the Commission took on is to continue efforts under the "beyond GDP" initiatives in order to ensure the measuring of societal and economic progress more comprehensively and more adequately. For that purpose, efforts will continue to develop a system of environmental accounts, integrate further externalities into national accounting and develop a composite index on environmental pressures.

[95] Ecological footprint, material consumption weighted against environmental impact, etc. were proposed and/or considered as alternatives.

As for the main indicators contained in the EU Roadmap, data on greenhouse gas emissions is currently available in Montenegro. The obligation to monitor the increase in built-up areas is laid down by a relevant piece of regulation (the Decree on the national list of environmental protection indicators) and is feasible (i.e. there are appropriate capacities), but it has not become a regular practice yet. The water exploitation index is also unavailable and the lead indicator of the EU (Resource Productivity) was calculated in Montenegro for the first time (with certain limitations) in the framework of preparation of this report; it has not been integrated into the statistical system yet. As for the set of thematic indicators presented in the EU Roadmap and their availability in Montenegro, Table 4-2 provides an overview of the majority of proposed indicators.

Table 4-2: Selected Thematic Indicators of the EU Roadmap and Montenegrin Documents Envisaging their Monitoring

Area	Thematic indicators from the EU Roadmap	Montenegrin documents envisaging these or similar indicators
Transforming the economy, natural capital and ecosystem services		
Improving products and changing consumption patterns	Percentage of value and number of public procurement contracts containing green public procurement criteria	-
	Number and value of green products purchased for households (alternatively, the share of green products out of total output)	-
Boosting efficient production	Share of companies using environmental footprint, by sectors and by size, in priority sectors	-
	Number of enterprises, by sector and size, receiving advice from national or regional governments concerning improvement of environmental performance	-

Area	Thematic indicators from the EU Roadmap	Montenegrin documents envisaging these or similar indicators
Turning waste into a resource	Total amount of produced waste	Law on Waste Management, sector strategy, List of Indicators
	Total rate of recycling	
	Proportion of waste deposited in landfills	
Supporting research and innovation	Number and amount of allocated funds (€/per year) under European support programmes for research and innovation projects which mainly promote resource efficiency and sustainable environmental management	-
Phasing out inefficient subsidies	Annual value of environmentally harmful subsidies (indicator to be developed)	-
Getting the prices right	Share of environmental taxes out of total taxes and contributions	-
	Total amount of unpaid environmental taxes	-
Ecosystem services	To be developed under the EU Biodiversity Strategy	-
Biodiversity	To be developed under the EU Biodiversity Strategy	National Strategy for Sustainable Development, List of Indicators (size of protected areas)
Minerals and metals	Resource productivity of minerals and metals (GDP/Domestic Material Consumption of minerals and metals)	-
Water	Water exploitation index (until the other indicators are developed)	-

Area	Thematic indicators from the EU Roadmap	Montenegrin documents envisaging these or similar indicators
Air	PM_{10} concentrations in ambient air	Air Quality Strategy, List of Indicators
	Percentage of urban population resident in areas where the PM10 concentration exceeds daily limit values	Air Quality Strategy, List of Indicators
Land and soils	Average yearly land take on the basis of EEA CSI 14 – land take	List of Environmental Indicators
	Soil erosion on the basis of EEA indicators – erosion of soil caused by water	List of Environmental Indicators
Identification of and remedial work on contaminated sites	Share of contaminated sites in which remedial work began in the year before on the basis of EEA CSI 15 – progress achieved in contaminated site management	-
Maritime resources	Number and size of maritime protected areas	National Strategy for Sustainable Development, List of Environmental Indicators
Sectors		
Food	Trends in annual consumption of different meat and dairy products per capita on the basis of ETC/SCP indicator 13.2 EEA	-
Reducing food waste	Proportion of edible food in the waste of households, retailers and hospitality industry	-

Area	Thematic indicators from the EU Roadmap	Montenegrin documents envisaging these or similar indicators
Promoting green buildings	Rate of new buildings with almost zero energy consumption (to be developed)	-
	Energy consumption per m2 for space heating, per dwelling and for entire housing stock, alongside growth in m^2 in living space per capita on the basis of ETC/SCP indicator 16.1 for EEA (to be developed further)	Statistical Yearbook (partly)
Ensuring efficient mobility	CO2 emissions in transport sector	National communications
	Total energy consumption per km driven, as a proxy for energy efficiency in transport	-
	Average CO_2 emissions per km for new passenger vehicles	-
	Pollutant emissions (NOx, VOC, PM) from transport sector (available from the EEA/reporting under the National Emissions Ceilings Directive)	List of Environmental Indicators
Governance – financing resource efficient innovation and investment	Share of total budget spent on environmental measures and resource efficiency	-

As can be seen from Table 4-4, national policies, regulations and statistical system require that a large number of thematic indicators set in the EU Roadmap be monitored. However, the national system has many gaps (when compared with the EU recommendations for monitoring resource efficiency), particularly in such areas as sustainable consumption and production, funding (support for research, subsidies, environmental taxes, support for resource efficiency and for environmental protection), material productivity, food, efficiency and the environmental impacts of transport and the construction sector, etc. One should also bear in mind that the fact that an indicator is determined in the relevant national documents does not necessarily mean it is available, i.e. that the competent authorities calculate it on a regular basis.

Almost every analysis in Montenegro recognizes the weaknesses in terms of data availability in different policy areas. These findings are certainly applicable to resource efficiency as well and they represent/will represent a considerable constraint in formulating and implementing the National Roadmap. It is encouraging that a number of targets relevant for efficient use of resources were identified in the previous period in complementary policies and processes, and that extensive effort has been invested to standardize methodologies and collect reliable data for the purpose of calculating a number of important indicators.

Building on these achievements and upgrading them further, the proposed key indicators for monitoring the condition in the Montenegrin economy concerning resource efficiency and environmental impacts should at least, at the beginning, include the following:

1. Energy intensity
2. CO_2 emissions
3. Number and size of terrestrial or maritime protected areas
4. Water losses in water supply systems
5. Municipal waste recycling rate
6. Built-up areas
7. Water Exploitation Index
8. Share of revenues from environmental tax out of the total revenue generated from taxes and contributions
9. Resource productivity

It is worth mentioning that further efforts (improvement of the data-collection system, capacity building) are needed for the last five indicators so as to ensure their periodic availability. Moreover, further efforts should be made to overcome weaknesses in the data collection and processing system (economic and environmental), foster further alignment with the set of core indicators (CSI) of the European Environmental Agency (EEA) and monitor developments in the EU and globally. In parallel with efforts to improve the availability of indicators, targets should be formulated in the areas where this has not been done so far (for example, land use). Over the next five years, these efforts should allow for significant expansion of the list of indicators and targets relevant for resource efficiency (the expanded list is proposed in framework of the Montenegrin Resource Efficiency Roadmap).

4.5.2 FROM RESOURCE EFFICIENCY TOWARDS DEVELOPMENT SUSTAINABILITY

Improving resource efficiency is a means to achieving the ultimate goal – sustainable human development. As mentioned in Chapter 1, "sustainability" goes beyond the environmental aspects and entails economic and social dimensions. Thus measuring and monitoring resource efficiency should be matched by efforts for integrating individual indicators into a more comprehensive and holistic sustainability measure.

One possible approach in that regard might be the "Affordable Human Development Index" elaborated by the human development team in the Bratislava Regional Support Centre (see Ivanov, Peleah 2013). It adds an additional (fourth) dimension of HDI to reflect the status of the environment but also introduces indicators of "affordability" outlining to what extent the level of human development reached can actually be sustained in the long run.

Comparative data (obtained by using the same methodology) for longer periods as a basis for monitoring and evaluating changes in certain parameters is often unavailable in Montenegro, particularly in the area of the environment. On the other hand, European policies strongly rely, during both the formulation and implementation phases, on quantifiable targets and data on the state and trends of biodiversity, water and air, as well as for other environmental sectors and themes.

With the aim of improving data availability and ensuring compliance with EU requirements, the UNDP provided support to the competent institutions by drawing up the National List of Environmental Indicators on the basis of the DPSIR model (driving forces – pressures – states – impacts – responses) applied by the European Environment Agency (EEA). The list includes indicators on the state of biodiversity, inland waters, sea, soil, air, climate change, as well as the indicators for environmental impact of waste generation, agriculture, fisheries, energy, transport and tourism. The decree which sets out the indicators in each of these categories, the methodology for calculating them, as well as the sources and time schedule of data collection, was adopted in 2013.

The UNDP also supported the Environmental Protection Agency's efforts to produce, in accordance with the Decree and the Law on the Environment, the first environmental status report on the basis of indicators which is a huge step forward in the systematization, availability, comparability (over time and globally) and interpretation of environmental data and trends. The report is also extremely important for resource efficiency as it includes data on the use of natural resources and environmental pressures resulting from various economic activities.

Box 4-3:
UNDP Support for Developing Environmental Indicators

Source:
UNDP Montenegro, project "Capacity building for integration of global environmental commitments in investment/ development decision, http://bit.ly/1p3yo7B

Applying this logic to Montenegro and other countries of the former Yugoslavia reveals a worrying picture. In 2013 (the latest year in which data are available) all the countries were losing a substantial part of their human development achievements to unsustainability. When the fourth dimension is added, the ranking of the countries does not change (Slovenia is in first place, followed by Croatia and Montenegro). However things look different when the "affordability" of the achieved level of development is factored in. The first three places in the ranking do not change (Montenegro still comes third) but Albania moves up to fourth while Serbia falls to sixth.

Table 4-3 shows the values of the respective indicators. As the data shows, in 2013 the value of Montenegrin human development (with environmental aspects reflected in the index) should be discounted by 22% due to the unsustainability of the development outcomes – the same magnitude of "unaffordability loss" as with Croatia.

Table 4-3:
EHDI and AHDI values and ranks of selected countries, 2013

Sources:
HDRO, World Bank "World Development Indicators", own calculations.

2013	Human Development Index		Extended Human Development Index		AHDI Affordable HDI		Degree of unsustainability (EHDI–AHDI)	
	Value	Rank	Value	Rank	Value	Rank	Value lost	% loss
Montenegro	0.789	3	0.813	3	0.625	3	-0.188	23%
Albania	0.717	7	0.749	5	0.558	4	-0.191	26%
Bosnia and Herzegovina	0.730	6	0.742	6	0.429	7	-0.313	42%
Croatia	0.812	2	0.841	2	0.645	2	-0.196	23%
Macedonia, FYR	0.732	5	0.741	7	0.532	5	-0.209	28%
Serbia	0.744	4	0.781	4	0.486	6	-0.296	38%
Slovenia	0.874	1	0.892	1	0.674	1	-0.218	24%

Figure 4-2 shows the changes between 2007 and 2013 in the value of the EHDI, AHDI and HDI, thus outlining the scope of the unsustainability and unaffordability of human development progress. The lower parts of the bars for each year depict the value of the "affordable" HDI, the upper part – the part of the human development index (extended by the environmental dimension) that has been achieved in an unsustainable way. Both values are reflected on the left vertical axis. On the right axis the values of the standard three-dimensional HDI are depicted.

The figure shows that all countries have increased their level of human development, but most of them in an unsustainable way. Only FYR Macedonia has managed to decrease the difference between EHDI and AHDI (the

measure of unaffordability of human development). In all other countries this difference has increased, suggesting that human development progress has been achieved in a way that would be difficult to sustain in the long run.

Table 4-4 provides additional insights into the individual countries' performance. It visualizes the percentage change of the three indices between 2007 and 2013. All countries have improved the value of their standard HDI, although to different extent (the biggest increase was in FYR Macedonia, followed by Albania and Montenegro). All except one improved their EHDI (Serbia stagnated). Only in one case was the increase in EHDI larger that the increase in HDI (FYR Macedonia) and in one case it was the same (Slovenia). This suggests that in most countries registered improvement in human development was achieved in an environmentally unsustainable way. Montenegro also falls into this group, increasing its HDI by 2.3% and EHDI by 1.9%.

When affordability is considered (the ability of the countries to sustain the progress achieved), the picture is even more diverse and the differences deeper. The greatest progress in regards to affordability was achieved by FYR Macedonia, followed by Albania, which increased their AHDI by 8.9% and 1% respectively. All the other countries register regress in that regard, with the largest figure being in Serbia.

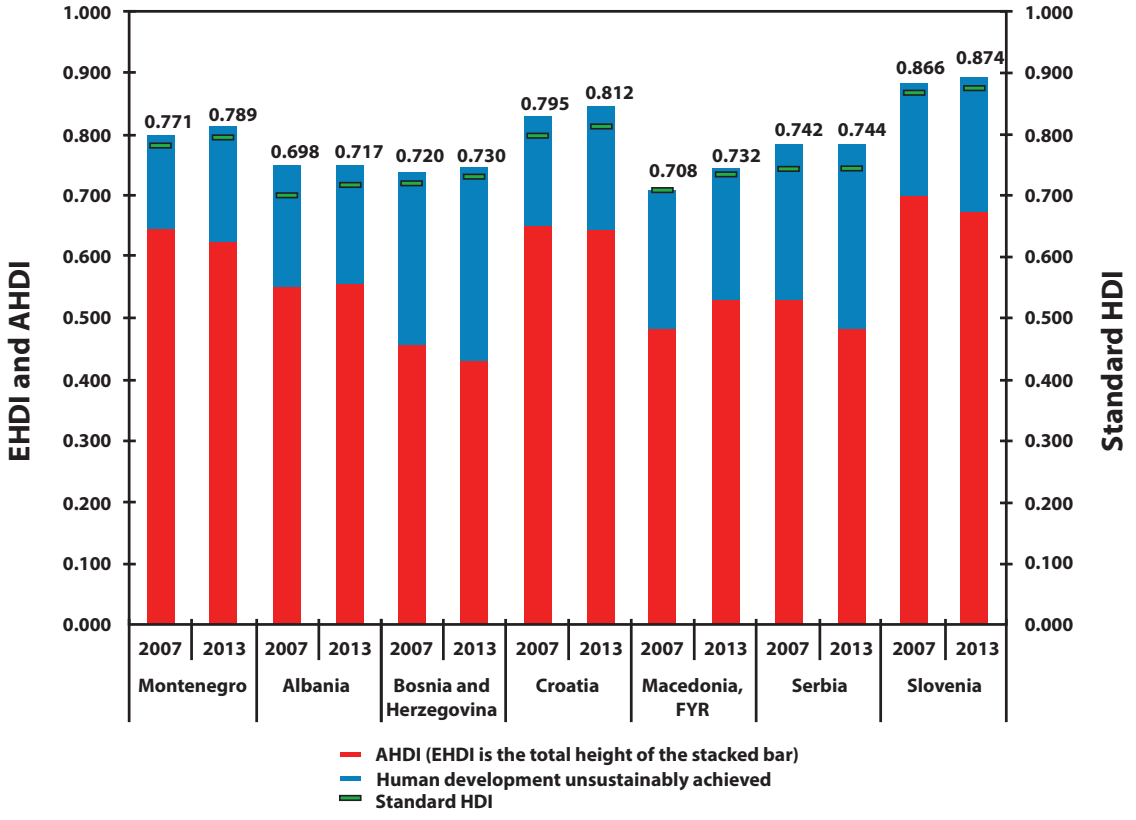


Figure 4-2:
The changes in value of the AHDI, 2007-2012

Sources:
HDRO, World Bank "World Development Indicators", own calculations.

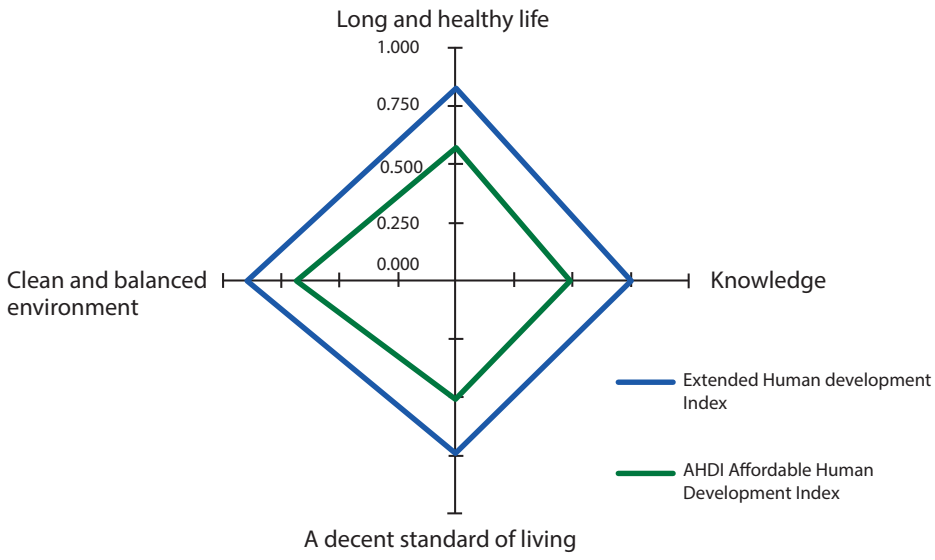
Table 4-4:
Percentage change of different human development measures, 2007–2013

	EHDI	AHDI	HDI
Montenegro	1.9%	-3.5%	2.3%
Albania	2.1%	1.0%	2.5%
Bosnia and Herzegovina	1.0%	-6.2%	1.5%
Croatia	1.9%	-0.8%	2.1%
Macedonia, FYR	4.4%	8.9%	3.4%
Serbia	0.0%	-8.9%	0.3%
Slovenia	1.0%	-4.2%	1.0%

The value of such indices is lower in the rankings they produce but higher in the insights on the processes that lead to a specific value (and consequently their place in the ranking). Figure 4-3 visualizes the areas that contribute to losses in the value of the AHDI, suggesting possible priorities for the future. It shows to what extent the human development progress achieved is genuine and sustainable. In the case of Montenegro, the greatest losses in terms of the sustainability of human development outcomes come in the areas of a healthy life and decent standard of living. Although life expectancy at birth is 74.8 years,

Figure 4-3:
The gap between the "achieved" level of human development (EHDI) and that achieved in a sustainable manner (AHDI) in Montenegro, 2012

Sources:
HDRO, World Bank "World Development Indicators", own calculations.



healthy life expectancy is more than 10 years lower (see Annex 7.2). The unaffordability of standards of living comes primarily from high energy use per unit of GDP (131 kg of oil equivalent per US$1,000 GDP in constant 2011 PPP). Addressing these three areas would improve significantly the value of AHDI bringing it closer to its potential level.

The data presented in Annex 7.2 provides additional insights into the factors behind Montenegro's performance. Between 2007 and 2013 the country declined in Mean Years of Schooling by 1% and as a result its HDI grew slower than it might have done given the increase in GDP per capita of 8% and of Expected Years of Schooling by 7% over the period. At the same time the country managed to decrease air pollution (in PM10) by 14% resulting in the increase of EHDI by 1.9%. The progress however was not affordable in all areas. The increase in GDP (and the material standard of living) should be seen in the context of the increase of the government gross debt (as a percentage of GDP) by 51% and the share of energy from renewable sources declined by 32%. The 10% improvement in the share of the terrestrial and marine protected areas out of the total territorial area could not offset this and the value of the AHDI declined by 3.5% between 2007 and 2013.

The proposed measure is just one of the many possible ones to apply for monitoring the links between sustainability and human development. It is important to have such a measure because otherwise human development will be left as a residual value of other short-term priorities. Such a framework is also appropriate for proper positioning of the sector-specific interventions (like improving resource efficiency) in the long-term holistic perspective that sustainable human concept offers.

Photo: Aleksandar Jaredić

CHAPTER V

Scenarios for the future

The preceding chapters reviewed the situation and natural resource management in Montenegro, the possible links between resource efficiency and sustainable human development and identified the key challenges and opportunities for improving resource efficiency in specific sectors and policy areas. This chapter goes in-depth into one important area of sustainability – resource efficiency reflected in Domestic Material Consumption indicators.

The analysis in this chapter (to the extent possible) targets different potential scenarios which are of relevance for efficient use of resources. Official development documents, MONSTAT data, Tax Administration data and data from individual businesses served as the background for developing them, along with statistical extrapolations of the trends of relevant indicators. The analysis of scenarios is not based on sophisticated statistical software, and the time series of the available data in Montenegro is not sufficiently long to enable reliable conclusions concerning the development of specific indicators. Instead of complex calculations, extrapolated data is compared – wherever possible – with the data from reference scenarios (e.g. for energy) or with the outcomes of other development paths that may be expected to materialize if the currently existing development documents of the EU and Montenegro are implemented.

The scenarios are not intended to "forecast the future". Instead, their purpose is to encourage reflection on possible options and to illustrate the possible outcomes of different policy choices related to the use of specific resources, identify challenges and enable comparison with EU trends. Based on this the scenarios may serve as the basis to propose specific targets and measures to achieve greater resource efficiency in the country (i.e. for drawing up the National Roadmap). In preparing scenarios, attention was focused on resource productivity (i.e. Domestic Material Consumption) as it is both a composite indicator for economic efficiency and a lead indicator of the EU Roadmap, while the energy sector and climate policy projections were developed with the intention to present additional arguments to support the selection of sustainable development options and trade-offs between conflicting targets.

5.1 Domestic Material Consumption

Cost-effective and efficient use of natural resources is key to any sustainable development strategy. Sustainability is directly influenced by the way in which economic activity in a country is organized and by its strategic orientation, sector policies and, ultimately, awareness of the need for sustainable natural resource management. It is very important to focus efforts on decoupling the impact of economic growth from the use of resources on the one hand, and on the existence of the inverse impact of economic growth on environmental degradation on the other.

EUROSTAT developed the *Economy-Wide Material Flow Accounts* – **EW-MFA** as a harmonized accounting tool for material inputs, stock and outputs of the socio-economic system. It refers to solid, liquid and gaseous materials, excluding water and air; while material flows are presented in this system in physical units of measurement (mainly tonnes). MFA follows the logic of the System of National Accounts (SNA) and is compiled based on official statistics, depending on the relevant material category.

The productivity of natural resources within the national economy can be determined using the aggregate Domestic Material Consumption indicator (Domestic Material Consumption – **DMC**), in absolute and relative terms. GDP divided by absolute DMC shows the value of the resource productivity indicator (Resource Productivity – RP). It is therefore very important to monitor in regular statistical reports the DMC and

RP levels and tendencies, both within the national economy and in comparisons (between sectors and/or countries).

The assessment of material flows in Montenegro was conducted following two main objectives:

- To provide a rough estimate of the DMC and of the lead RP indicator, as the GDP/DMC ratio (€/t), identify their trends over time and assess the productivity of the use of natural resources in Montenegro on the basis of the available data.
- To promote, in line with the conditions in Montenegro, the usage of such indicators for informing policy making on the long-term strategies of sustainable human development in the future processes

5.1.1 COMPOSITION AND CALCULATION OF DOMESTIC MATERIAL CONSUMPTION

The materials that provide inputs for DMC calculation fall into four categories:

- **Biomass** – as a group of materials, it includes all the plant-based raw materials derived from nature: all agricultural products and all crop residues, such as straw, hay, biomass for livestock grazing and wood. In the MFA, animal products of domestic agriculture (meat, milk, eggs and farmed fish) are considered to be internal flows within a society, thus not directly derived from nature, since the resource basis (fodder) has already been taken into account once. Contrary to this, animal products originating from hunting and fishing are taken into account as domestic extraction from nature. This group does not include fossil fuels derived from biomass.
- **Fossil fuels** - are minerals generated by plant and animal decomposition in the Earth crust over millions of years and are primarily used to produce energy.
- **Metals** – include mineral materials in a range from ores to the produced metals. Ores are considered to be minerals from which it is possible to extract metals and generate economic benefit.
- **Non-metallic minerals** – are a group of materials which includes construction minerals (e.g. sand and gravel) and industrial minerals (phosphates, salt, etc.).
- **Exports and imports of material** – unlike Domestic Material Extraction, these are calculated by taking into account not only international trade in raw materials, but also products during different stages of processing, such as semi-finished and finished products.

According to EUROSTAT, the indicator Domestic Material Consumption (DMC) is expressed in tonnes per capita (t/per capita). It is defined as the total quantity of the material directly used in the economy and equals Direct Material Inputs (DMI) minus exports (E). The DMI measures direct material inputs into the national economy and equals domestic extraction (DE) plus imports (I). The per-capita calculation uses the population mean (arithmetic mean for the population on 01 January for two consecutive years). The theory of national material flow accounts includes a compilation of all the material inputs in the national economy, changes in the stock of materials in the economy and material outputs directed towards other economies or towards the natural environment. It is worth noting that the term "consumption" in the context of DMC means consumption in the literal sense, rather than final consumption.

Resource Productivity – RP has been selected as the lead indicator out of a set of indicators measuring resource efficiency. It assesses progress in achieving the objectives and targets set in the Europe 2020 strategy, the key initiative on resource efficiency. As mentioned earlier, RP is defined as the ratio between Gross Domestic Product (GDP) and Domestic Material Consumption (DMC), calculated according to EW-MFA. When examining the RP trend over time within a single geographical zone, GDP should be expressed in chain-linked Euros against the reference year (2000 or 2005), using the exchange rate from 2000 or 2005, respectively. In case of comparing the RPs of several countries in a single time interval, GDP should be used according to the purchase power parity standards.

Photo: Saša Popović

5.1.2 METHODOLOGICAL REMARKS CONCERNING CALCULATION OF DMC IN MONTENEGRO

The basis for assessment of material resources in Montenegro was the Global Material Flow Database Technical Report, version 2013.1, published by the Sustainable Europe Research Institute (SERI), Vienna in April 2013.

The assessment of DMC and RP for Montenegro was constrained by a number of factors, namely:

- The period observed (2005–2012) is primarily restricted by the length of available time series on domestic extraction, imports and exports of natural resources in Montenegro. This particularly refers to the records on imports and exports in physical units of measurement and to certain categories of biomass, fossil fuels, metals and non-metallic minerals.
- The 2005–2012 period is characterized by a significant change in trends and the intensity of economic activity in Montenegro caused by the global economic crisis of 2008. The period preceding 2008 did not include ordinary development trends, but was marked by an investment boom and an overheating of the national economy which was not recorded as a global trend, but as a specificity of the transition of the Montenegrin economy.
- Small economies, such as the Montenegrin one, are more vulnerable to external shocks and that is why extrapolation of the economic development trend in a "rollercoaster" scenario is largely unreliable.
- Due to the lack of an adequate system of material flow accounts in the national statistics, it was impossible to obtain complete time series on material flows in the national economy. This had an impact on the scope of data, length of the available time series and the DMC and RP results inevitably leading to an underestimation of the real DMC value,

in both total and per-capita terms, and consequently to an overrating of the RP value for Montenegro.
- Given the above, only a simulation of DMC and RP calculation was carried out for Montenegro for the period 2005–2012, for the purpose of identifying their trends based on the available sample from certain categories of materials. **The calculated data does not reflect the actual levels of the DMC and RP for Montenegro and they should not be used as final values.**

5.1.3 OVERVIEW OF THE CALCULATION OF DOMESTIC MATERIAL CONSUMPTION (DMC) ON THE BASIS OF AVAILABLE DATA FOR MONTENEGRO IN THE PERIOD 2005–2012

According to the available data on material flows in 2012, total material extraction (DE) in the areas of agriculture, mining and forestry in Montenegro amounted to around 2.4 million tonnes. Extraction of fossil fuels (coal) accounted for the majority of this amount – 75.6%, followed by non-metallic minerals (industrial and construction minerals) – 15.1%, while metals and biomass accounted for 4.8% and 4.5% of total domestic material extraction, respectively. Compared to 2005, total Domestic Material Extraction in 2012 dropped by almost a quarter (24.5%), and this drop over the eight-year period was mainly due to the 91% drop in metal extraction, followed by the 28% drop in biomass extraction and approximately 19% drop in non-metallic mineral extraction, while extraction of fossil fuels (coal) rose by approximately 38% during the same period (Table A-1).

The following conclusion may be reached on the basis of available data:
- between 2005 and 2012, Montenegro recorded a one-quarter drop in Domestic Material Extraction;
- coal and industrial and construction materials (non-metallic minerals) accounted for approximately 90% of total Domestic Material Extraction in Montenegro in 2012;
- biomass, as a renewable natural resource, accounted for less than 5% of total Domestic Material Extraction in 2012.

According to the available data, total imports (I) of materials to Montenegro in 2012 (Table A-1) was 1.5 million tonnes. Out of the total imports of materials in the same year, imports of biomass accounted for almost two-thirds (62%), while imports of fossil fuels accounted for approximately 20%, imports of metal accounted for approximately 7%, and non-metallic minerals – 11.5%. Compared to 2005, imports of materials in 2012 increased by 13% in total, driven by the increased imports of biomass (37%) and non-metallic minerals (13%); during the same period, imports of metal dropped by some 39% and that of fossil fuels by more than 10%.

The following is the general conclusion:
- imports of materials increased in the period 2005–2012, while those categories of materials whose domestic extraction was very low compared to the total extraction (biomass and non-metallic minerals) accounted for major share of such imports;
- imports of fossil fuels (oil) increased by one-fifth in the period 2005–2012.

According to the available data, exports (E) of materials from Montenegro amounted to 1.2 million tonnes in 2012 (Table A-1). Out of the total exports of material during that same year, exports of biomass accounted for almost two-thirds (62%), exports of fossil fuels accounted for approximately 6%, while exports of metal and non-metallic minerals accounted for approximately 16%, respectively. Exports of material in 2012 dropped by around 46% compared to 2005. A drop was recorded in all the categories of materials in this period: the biggest one was that of non-metallic minerals (77%), followed by metals (approximately 55%), biomass – 12%, and fossil fuels – approximately 11%.

The following is the general conclusion:
- exports of materials almost halved between 2005 and 2012;
- the share of exports of biomass in total exports equalled the share of imports of biomass out of total imports;
- an enormous decline in exports of non-metallic minerals (more than two-thirds) and exports of metal (more than a half) was recorded.

DMC in Montenegro in 2012 (Table 5-1) amounted to 2.74 million tonnes. Out of the total domestic material consumption during that same year, fossil fuel consumption accounted for some 74%, consumption of biomass and non-metallic minerals accounted for approximately 13% respectively, while consumption of metal accounted for 1.2%. Domestic Material Consumption in 2012 rose by around 16% compared to 2005. There was a drop in domestic consumption of non-metallic minerals (by 1.5 times) and metals (by almost 2 times), while domestic consumption of biomass grew roughly nine-fold and that of fossil fuels by some 30%.

The following is the general conclusion:

- in DMC in Montenegro, consumption of metal accounted for somewhat above 1% in 2012, indicating that the major share of domestic extraction of metals and metal ores did not remain within the national economy, instead it was exported thus resulting in a material drain.
- consumption of non-metallic minerals (industrial and construction minerals) dropped by 1.5 times in the period 2005–2012;
- domestic consumption of biomass in the period 2005–2012 increased almost nine-fold.

DMC per capita is a complementary indicator of the absolute value of DMS, as shown in Table 5-2. This indicator enables comparison of Domestic Material Consumption across countries.

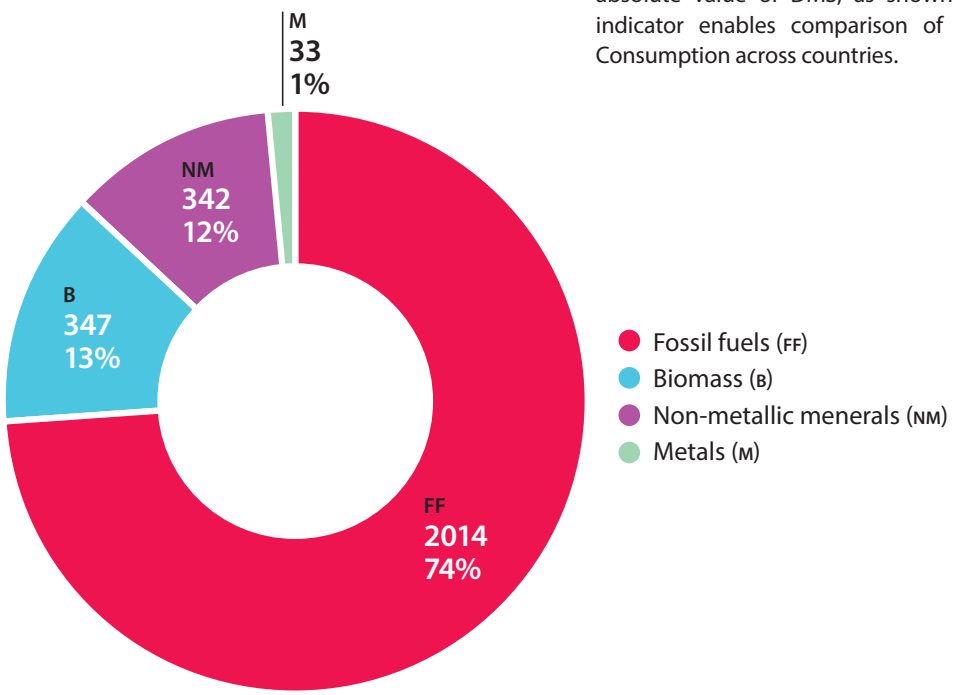


Figure 5-1: Structure of Domestic Material Consumption (DMC) in Montenegro in 2012, in thousands of tonnes (the figures arrive from a simulation exercise)

	Material flow in thousands of tonnes		Change (%)	Share of total flow %	
	2005	2012		2005	2012
Domestic Extraction (DE)	3,129	2,361	–24.5	100.0	100.0
Biomass (B)	146	106	–24.5	4.7	4.5
Fossil fuels (FF)	1,297	1,786	37.7	41.4	75.6
Metals (M)	1,247	113	–91.0	39.8	4.8
Non-metallic minerals	439	357	–18.8	14.0	15.1
Imports (I)	1,327	1,500	13.0	100.0	100.0
Biomass (B)	677	930	37.4	51.0	62.0
Fossil fuels (FF)	331	295	–10.9	24.9	19.7
Metals (M)	166	102	–38.7	12.5	6.8
Non-metallic minerals (NM)	153	173	13.0	11.5	11.5
Exports (E)	2,090	1,125	–46.2	100.0	100.0
Biomass (B)	785	689	–12.2	37.5	61.2
Fossil fuels (FF)	75	67	–10.7	3.6	6.0
Metals (M)	401	182	–54.7	19.2	16.1
Non-metallic minerals (NM)	829	188	–77.4	39.7	16.7
Domestic Material Consumption (DMC=DE+I-E)	2,366	2,736	15.6	100.0	100.0
Biomass (B)	39	347	797.2	1.6	12.7
Fossil fuels (FF))	1,553	2,014	29.7	65.6	73.6
Metals (M)	1,011	33	–96.8	42.7	1.2
Non-metallic minerals (NM)	-237	342	–244.6	–10.0	12.5

Table 5-1: Material Flows Overview (DE, I, E, DMC)

Remarks: The presented values are rounded up; the presented data shows differences as a result of rounding up. The negative value for non-metallic minerals in 2005 is a consequence of the impossibility of calculating precisely the elements DE, E and I in this category of material. Domestic material consumption (DMC) = Domestic Extraction (DE) + Imports (I) – Exports (E).

Estimates of DMP and RP are indicative, and they are based on a certain number of prerequisites in cases of incomplete data, which is why they should be used only for illustration purposes.

Table 5-2: Domestic Material Consumption (DMC) per capita

	Material flow in thousands of tonnes		Change (%)
	2005	2012	
Domestic Material Consumption (DMC)	3.8	4.4	15.8
Biomass (B)	0.1	0.6	500.0
Fossil fuels (FE)	2.5	3.2	28.0
Metals (M)	1.6	0.1	–93.8
Non-metallic minerals (NM)	-0.4	0.6	–250.0

Remarks: The presented values are rounded up; the presented data shows differences as a result of rounding up. The negative value for non-metallic minerals in 2005 is a consequence of the impossibility of calculating precisely the elements DE, E and I in this category of material. Domestic material consumption (DMC) = Domestic Extraction (DE) + Imports (I) – Exports (E).

Estimates of DMP and RP are indicative, and they are based on a certain number of prerequisites in cases of incomplete data which is why they should be used only for illustration purposes.

Table 5-3: Domestic Material Consumption (DMC) and Resource Productivity (RP)

	GDP, DMC, RP		Change (%)
	2005	2012	
Domestic Material Consumption (DMC) in thousands of tonnes	2,366	2,736	15.6
Gross Domestic Product (GDP) in millions of Euros	1,815*	3,149*	73.5
Resource productivity (RP) in €/t	767.0	1,151	50.0

* GDP is expressed in current prices, while the data on GDP expressed in constant prices are used for drawing comparisons by years. The presented values are rounded up; the presented data shows differences as a result of rounding up.

Domestic Material Consumption (DMC) = Domestic Extraction (DE) +Imports (I) – Exports (E).

Resource Productivity (RP) = GDP/DMC.

Estimates of DMP and RP are indicative, and they are based on a certain number of prerequisites in cases of incomplete data which is why they should be used only for illustration purposes.

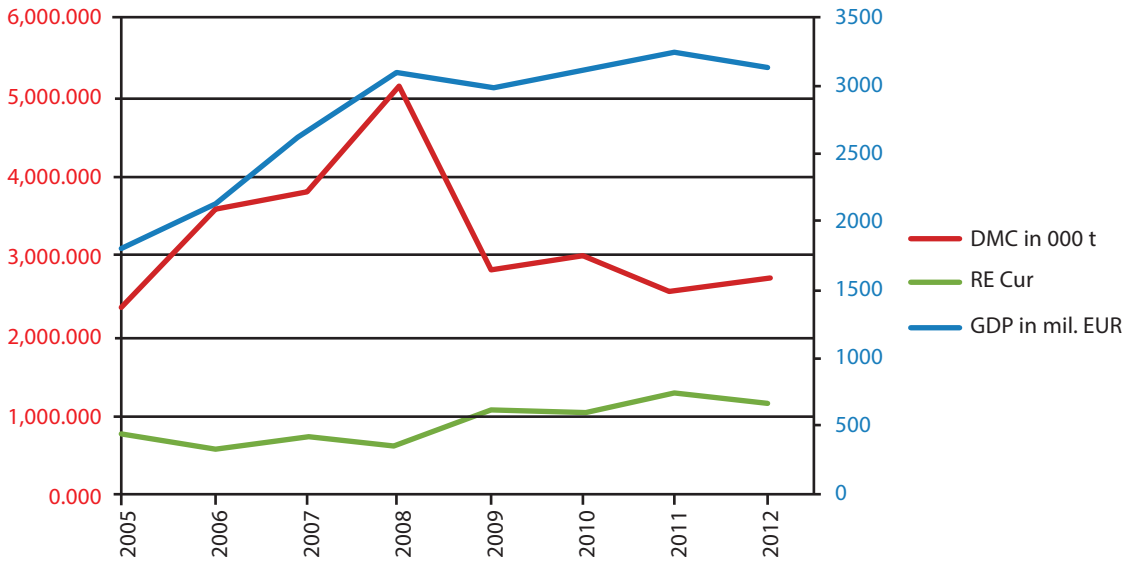


Figure 5-2:
Real GDP, DMC and RP trends in Montenegro 2005–2012

According to the methodology, DMC per capita should be calculated as a relative indicator. However, given the insufficient reliability of the input data used for the calculation, the results presented in Table 5-2 should be treated with caution as indicative illustrations, and should definitely not be considered as final.

Table 5-3 shows RP for Montenegro. This indicator is calculated by relating GDP to DMC, and is expressed in thousands of €/t or €/kg. The RP for Montenegro in 2012 amounted to 1 151 €/t, which is a 50% increase compared to 767 €/t in 2005. Such an impressive increase in RP comes as a consequence of a significantly slower DMC increase (15%) against the GDP increase (73.5%) in Montenegro in the period 2005–2012.

The figure above leads to a conclusion that there are three stages in the real GDP and DMC trends, as well as in their mutual relation (RP) which measures resource productivity:

- from 2005 to 2008 there was evident high real GDP growth, and DMC follows the same pattern. All this is a consequence of the economic boom in this period, while it is also noted that there was no major decoupling in this period. The RE trend was relatively moderate in this period, steadily below 1,000 €/t;
- from 2008 to 2011, annual real GDP growth rates were negative (2009) and were considerably slowed down by the global economic crisis. The level of GDP was maintained due to the service sector, while DMC experienced the rollercoaster effect, a sudden plummet after sudden growth. This GDP–DMC relationship created major decoupling; however it is not the consequence of better natural resource management in Montenegro, but of the sharp decline in material consumption, along with relatively stable GDP trends. This was the reason for the RP breaking the 1,000 €/t ceiling for the first time in 2009;
- in 2011–2012, the worst-case scenario for natural resource management took place: GDP dropped, paralleled by a DMC increase (recoupling). This GDP–DMC relationship resulted in the RP declining to 1,152 €/t in 2012. If these trends continue, there is serious risk of the RP once again dropping below 1 000 €/t, which is a major step back in terms of resource productivity.

[96] Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management, Austrian Federal Ministry of Economy, Family and Youth (ed.): Resource Use in Austria – Report 2011, Vienna, p. 56.

Table 5-4: Scenarios' input data

Use of resources, Montenegro, average 2005–2012	
GDP	
GDP=Gross Domestic Product (steady prices)	€2,713 million
Average annual growth rate of real GDP (2005–2012)	3.5% per annum (pa)
DMC	
DMC=Domestic Material Consumption (000 t)	3,247,959 t
DMC per capita	5.2 t
Average annual growth rate (2005–2012)	2.0% pa
RP (GDP/DMC)	
RP=Resource productivity	835 €/t
Total growth (2005–2012)	56.7 %
Average annual growth rate of RP (2005–2012)	7.1% pa
Population size 2005–2012 2020* 2030*	 625,460 642,352 655,000

* Projections according to the Energy Development Strategy of Montenegro by 2030, Table 18.2.

Estimates of DMC and RP are indicative, and they are based on a certain number of prerequisites in cases of incomplete data which is why they should be used only for illustration purposes.

[97] Bearing in mind the abnormal characteristics of the 2005–2012 period mentioned above, the short time series of some material categories and the insufficient scope of data on them, the analysis of the resource productivity scenario should be seen as a projection of relative DMC, GDP and RP relations. These scenarios, as a pioneering attempt to assess the lead RP indicator for Montenegro, may serve as a rough illustration of the degree of efficiency in the use of natural resources in the national economy. As such, they may serve as the basis for policy directions and for fostering discussion on this issue which is important for future socio-economic profile of Montenegro, while they may also provide insight into the range of options concerning future resource productivity in the country.

A more detailed overview of the trends of certain DMC and RP categories in the period 2005–2012 is provided in tables included in the Annex (Tables A-2a through to A-2f).

5.2 Resource Productivity scenarios for Montenegro

Although some countries, such as Austria, carried out assessments of future RP scenarios in 2011, due to the effects of the global crisis since 2008 they have used only the trends from before 2008 for the baseline scenario, and not later ones.[96] However, such an approach would not be suitable for Montenegro as it experienced abnormally high economic growth rates prior to 2008 (annual real GDP growth higher than 10%) and natural resource exploitation, so that period would not be reliable when designing the baseline scenario.

As highlighted earlier, the 2005–2012 period was characterized by a significant shift in the trend and intensity of economic activity in Montenegro. The country first experienced an abnormal economic growth caused by the investment boom (2005–2008), which was followed by an abnormal economic decline caused by the effects of the global economic crisis (2009–2012). Since the extrapolation of trends in the analysis of scenarios was carried out on the basis of data for the entire period, the interpretation of scenarios raises the issue of the relevance of the input data when projecting future DMC and RP scenarios for Montenegro.

The input data used for the five scenarios is summarized in Table 5-4:

Based on the projections of the input data presented in Table 5-4, five scenarios have been elaborated and analysed below.[97]

SCENARIO 1: (The average values of GDP and DMC in the period 2005–2012 projected on the basis of trends from that same period)			
2020			
Amount:		Growth: total	annually
GDP:	€3,473 million	28%	3.5%
DMC:	3,767,632 t (5.9 t per capita)	16%	2%
RP:	922 €/t	10.3%	1.3%
2030			
Amount:		Growth: total	annually
GDP:	€4,423 million	63%	3.5%
DMC:	4,417,224 t (6.7 t per capita)	36%	2%
RP:	1,001 €/t	19.9%	1.1%
Calculated data do not reflect actual levels of DMC and RP for Montenegro and they should not be used as final values.			

5.2.1 SCENARIO 1: "BUSINESS AS USUAL"

The first scenario assumes that the trends recorded in the period 2005–2012 will continue until 2020 and 2030, with the past trends continuing at average annual growth rates. Under this scenario real GDP is expected to grow by an average of 3.5% annually, which was the average real GDP growth rate in the period 2005–2012. During the eight-year period from 2012 to 2020, real GDP in Montenegro would increase by 28% which matches the average annual growth of 3.5%. Under this assumption the average annual DMC growth rate amounts to 2%, equalling the average annual DMC growth rate in the period 2005–2012; this results in a total DMC increase of 16% in 2020 compared to 2012, or 2% on average per year. RP increases by around 10%, at an average annual rate of 1.3%, while in 2020 it is 922 €/t, compared to the average of 835 €/t in the period 2005–2012.

If these trends continue until 2030, that is eighteen years from 2012, the RP per capita will increase considerably: from 5.2 t/capita (average for 2005–2012) to 6.7 t/capita (2030).

Conclusion: If the trends recorded in the period 2008–2012 continue, the RP in Montenegro is to increase by a total of 10% by 2020, but this is a consequence of GDP growing faster than DMC rather than better quality of resource management. If these trends do not change by 2030, due to the insignificant growth of RP over the subsequent 10 years (2020–2030) those 10 years will have been wasted from the perspective of natural resource management in Montenegro.

SCENARIO 2: The use of resources is frozen at the level of average from the period 2005–2012 (DM2020 = DMC2005–2012)			
2020			
Amount:		Growth: total	annually
GDP:	€3,473 million	28%	3.5%
DMC:	3,247,959 t (5.1 t per capita)	0%	0%
RP:	1,069 €/t	28%	3.5%
2030			
Amount:		Growth: total	annually
GDP:	€4,423 million	63%	3.5%
DMC:	3,247,959 t (5.0 t per capita)	0%	0%
RP:	1,362 €/t	63%	3.5%
Estimates of DMC and RP are indicative, and they are based on a certain number of prerequisites in cases of incomplete data which is why they should be used only for illustration purposes.			

5.2.2 SCENARIO 2: FREEZE THE USE OF NATURAL RESOURCES USE

This scenario assumes that the use of resources, measured by DMC levels in both absolute and per-capita terms, remains frozen at the average level from the period 2005–2012. Constant DMC levels over the following eight-year (2020) and eighteen-year (2030) period are observed against the continued trend of real GDP as recorded in the period 2005–2012 i.e. at an average annual rate of 3.5%.

As a result of these assumptions, the RP trend is in a perfectly positive correlation with the real GDP trend: total real GDP growth until 2020 amounts to 28% (3.5% per year), while RP grows by that same value. Due to the assumed population increase, the DMC per capita drops from the average of 5.2 t/capita in 2005–2012 to 5.1 t/capita in 2020. In this scenario, the main driver of the RP increase from the average of 835 €/t in 2005–2012 to 1,069 €/t in 2020 is the real GDP growth, rather than the quality of resource management.

Comparison between results for 2030 and 2020 clearly shows that the absolute DMC remains the same, while the DMC per capita experiences a slight decline over the ten-year interval. The RP increase of 68% in 2030 is a consequence of GDP growth by that same amount.

Conclusion: This scenario enables us to consider consequences of the requirement not to increase the use of natural resources by 2020 and 2030 any further than the average recorded in the period 2005–2012. RP is in a perfectly positive linear correlation with GDP. There is an absolute decoupling of economic growth from resource productivity. However, freezing the use of resources is not a good strategy for as long as resource consumption fosters country's development,

especially if this generates more value and if negative environmental impacts are carefully managed i.e. if it is ensured that they do not impair considerably the ecosystem stability and resilience.

5.2.3 SCENARIO 3: MODEST RESOURCE PRODUCTIVITY GROWTH

If it is assumed that it is possible to ensure an average annual RP growth rate of 3% per year, that would correspond to an RP increase from 835 €/t (2005–2012) to 1,036 €/t in 2020 (a total increase of 24%), and to 1,286 €/t in 2030 (a total increase of 54%). Since both GDP and DMC are recording an increase, but DMC is rising slower, this scenario reveals a relative decoupling of the relation between economic growth and use of material resources in the country. It is interesting that there is no change in DMC per capita with the increase in population and total output of economy; eight or eighteen years later, DMC per capita would remain equal to the average recorded in the period 2005–2012 of 5.2 t per capita. Until 2020, DMC is growing at an average annual rate of 0.4%; eight years later, this results in a total increase of 3.2%. If this trend continues until 2030, total DMC growth for the eighteen-year period would amount to only 5.8%, which means that it would grow on average by 0.3% per year.

Conclusion: Annual DMC growth rates are considerably lower than the annual real GDP growth rates, although both result in an increase in the figures concerned. This scenario suggests a relative decoupling of economic growth from the use of natural resources. This is a desirable scenario for Montenegro, which may reach relative decoupling by modernizing its economy and formulating explicit policy aimed at reducing resource intensity. This scenario also reveals that an annual average increase in RP of 3% results in rather moderate average annual changes in DMC (0.4% by 2020 and 0.3% by 2030 compared to the average in the period 2005–2012), which leads to the conclusion that this scenario

SCENARIO 3: Resource productivity growth by 3% per year			
2020			
Amount:		Growth: total	annually
GDP:	€3,473 million	28%	3.5%
DMC:	3,352,731 t (5.2 t per capita)	3.2%	0.4%
RP:	1,036 €/t	24%	3.0%
2030			
Amount:		Growth: total	annually
GDP:	€4,423 million	63%	3.5%
DMC:	3,437,774 t (5.2 t per capita)	5.8%	0.3%
RP:	1,286 €/t	54%	3.0%
Estimates of DMC and RP are indicative, and they are based on a certain number of prerequisites in cases of incomplete data which is why they should be used only for illustration purposes.			

is not based on strict and ambitious policies that would intensify the decoupling mentioned above.

5.2.4 SCENARIO 4: MODERATE REDUCTION IN THE USE OF RESOURCES

The target is set in a way that the absolute reduction in the use of resources by 2020 should amount to 20% compared to the average value in the period 2005–2012. This means that DMC will be reduced progressively by 2.5% per year, which would lead to a decline in DMC from 5.3 t/capita (2005–2012) to 4.0 t/capita in 2020 and 2030. Resource productivity growth over an eight-year period (2012–2020) would amount to a total of 60%, while over an eighteen-year period (2012–2030) RP would be doubled, i.e. it would grow by 103.8%.

Conclusion: If Montenegro wishes to improve resource productivity and thus improve resource management the scenario with the target set in this way represents a proper framework. Reducing DMC by a tonne per capita would present an enormous challenge, though it seems more likely that this target will be achieved over an eighteen-year period (by 2030) since an average annual reduction of DMC by 1.1% would be more realistic to achieve. Therefore, scenario 3 does not represent a sufficient framework for making considerable progress in the use of resources in Montenegro; instead that should be done in line with scenario 4.

5.2.5 SCENARIO 5: DRAMATIC REDUCTION IN THE USE OF RESOURCES BY 2050

Conclusion: This scenario sets demanding requirements in natural resource management in Montenegro. By 2050, the value of DMC per capita will be more than

SCENARIO 4: Absolute reduction in the use of resources by 20% compared to the average in the period 2005–2012			
2020			
Amount:		Growth: total	annually
GDP:	€3,473 million	28%	3.5%
DMC:	2,598,367 t (4.0 t per capita)	-20%	-2.5%
RP:	1,337 €/t	60%	7.5%
2030			
Amount:		Growth: total	annually
GDP:	€4,423 million	63%	3.5%
DMC:	2,598,367 t (4.0 t per capita)	-20%	-1.1%
RP:	1,702 €/t	103.8%	5.8%
Estimates of DMC and RP are indicative, based on a certain number of prerequisites in cases of incomplete data which is why they should be used only for illustration purposes.			

SCENARIO 5: Halve the use of resources by 2050 (DMC_{2050} = ½ $DMC_{2005–2012}$)			
2020			
Amount:		Growth: total	annually
GDP:	€6,322 million	133%	3,5%
DMC:	1,623,979 t (2.5 t per capita)	-50%	-1,3%
RP:	3,893 €/t	366%	9,6%
Estimates of DMC and RP are indicative, and they are based on a certain number of prerequisites in cases of incomplete data which is why they should be used only for illustration purposes.			

halved, from an average 5.2 t/capita in the period 2005–2012 to 2.5 t/capita. In that same period, RP would grow by 9.6 times. The challenge remains to compare this scenario for Montenegro with the relevant indicators of countries with long and high-quality traditions which, at this point, have already achieved considerable results in terms of efficient use of resources. This scenario is not unattainable for such countries.

5.2.6 COMPARATIVE OVERVIEW OF THE FIVE SCENARIOS

Table 6-5 summarizes the expected outcomes of individual scenarios for domestic material consumption (DMC) and resource productivity (RP). Comparing them allows for the selection of a targeted scenario for Montenegro.

Judging by the data summarized in Table 6-5, Scenario 4 emerges as the optimal one for a targeted scenario. First and foremost, this scenario envisages an active and ambitious natural resource management policy in Montenegro. By 2020, Montenegro would achieve an absolute reduction in the use of material resources by 20% compared to the average value recorded in the period 2005–2012. Resource productivity would grow at an average annual growth rate of 7.5% which corresponds to the average annual growth rate of 7.1% recorded in the period 2005–2012. Under this scenario resource productivity in 2020 would increase by 60% compared to the average resource productivity in the period 2005–2012. A considerable decrease is also recorded in DMC per capita which amounts to 4 t/capita in 2020.

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5.3 Energy and climate policy

Improving energy efficiency and decreasing CO_2 emissions are inseparable from improving resource efficiency. Applying the modelling approach similar to the

Table 5-5: Different scenarios' outcomes

		Use of resources (DMC)		Resource productivity (RP)		
		t	t/capita	RP in €/t	total	pa
2005-12	SCN 0: Average 2005–2012	3,247,959	5.2	835	56.7%	7.1%
2020	SCN 1: Business as usual	3,767,632	4.9	922	10.3%	1.3%
	SCN 2: Frozen DMC	3,247,959	5.1	1,069	28%	3.5%
	SCN 3: Increase in RP by 3%	3,352,731	5.2	1,036	24%	3.0%
	SCN 4: Reduction of DMC by 20%	2,598,367	4.0	1,337	60%	7.5%
2030	SCN 1: Business as usual	4,417,224	5.7	1,001	19.9%	1,1%
	SCN 2: Frozen DMC	3,247,959	5.0	1,362	63%	3.5%
	SCN 3: Increase in RP by 3%	3,437,774	5.2	1,286	54%	3.0%
	SCN 4: Reduction of DMC by 20%	2,598,367	4.0	1,702	103.8 %	5.8%
2050	SCN 5: DMC reduced by 50%	1,623,979	2.5	3,893	366%	9.6%

Estimates of DMC and RP are indicative, and they are based on a certain number of prerequisites in cases of incomplete data which is why they should be used only for illustration purposes.

one used in the case of domestic material consumption, a number of scenarios of the developments in these areas can be formulated and analysed.

5.3.1 ENERGY EFFICIENCY

Two scenarios can be formulated in this area for Montenegro that are analysed against the background of an "EU extrapolation" scenario – all analysed against the EU 2020 target to reduce energy consumption by 20% (compared to the 2007 projections) by 2020. The process of setting the EU targets in the policy framework for climate and energy by 2030 is on-going, which is why the European Commission put forward the proposal in January 2014[98] for savings of 25% to be generated (by reducing consumption), while the previous European Parliament advocated an increase in energy efficiency of 40%.

The scenario **MNE EXT** represents a linear extrapolation of the data on energy intensity of Montenegro in the period 2000–2010 as specified in the *Energy Development Strategy of Montenegro by 2030*.[99] Even though this is a relatively short period which is also quite specific in terms of the socio-economic factors that had an impact on the energy intensity of Montenegro, extrapolation of the trend might suggest the expected levels of energy intensity in the coming years, and in 2020 in particular, for which the European target to reduce energy intensity by 20% was projected.

The scenario **MNE SRE2030** refers to the projection of energy intensity indicators as set in the *Energy Development Strategy of Montenegro by 2030*. The starting point for assumptions presented in this scenario is that the Strategy envisages the use of coal for electricity generation in the existing power plants and new thermoelectric power plants which, according to the selected reference scenario in the Strategy, leads to the following:

- Thermoelectric Power Plant (TPP) Pljevlja I – 225 MW with an average coal consumption of 1.54 million tonnes/per year and a somewhat lower coal consumption after 2013 equalling 1.44 million tonnes/per year as a result of the improved efficiency of the plant. The power plant operates until the end of the observed period – 2030;
- TPP Maoče – 350 MW starting from 2018, with an average coal consumption of 1.86 million tonnes/per year, operating period: 40 years or until the end of 2057;
- TPP Pljevlja II – 225 MW starting from 2022, with an average coal consumption of 1.56 million tonnes/per year, operating period: 40 years or until the end of 2061;

The scenario envisages intensive construction of new energy facilities (for thermoelectric, hydroelectric and renewable energy), and an increase in consumption of total primary energy from 45 251 terajoules (TJ) in 2008 to 78 253 TJ in 2020 and 98 306 TJ in 2030. Therefore, judging by the reference scenario, total primary energy consumption in Montenegro will double by 2030.

The scenario **EU(27) EXT** represents linear extrapolation of energy intensity in the European Union based on data from the publication Energy Pocket Book 2010. Energy efficiency is presented in toe/MEUR2000 by years, in the period 1990–2007, where the EU(27) GDP is expressed in steady prices from 2000. Extrapolation of this trend led to

[98] COM(2014) 15 final, A policy framework for climate and energy in the period from 2020 to 2030

[99] Table P5-1: Indicators of the Development of Energy Sector of Montenegro: Implementation (1990–2010) and Projection by 2030, on page 33. Data on GDP is presented in thousands of EUR2000, while data on energy consumption is presented in TJ. For the purpose of comparing data series for the indicator Energy Intensity 1 (E1), calculated on the basis of ratio GDPE/GDP, with the relevant series of the EU, conversion of the units of measurement was carried out which is why this indicator is calculated in toe/MEUR2000.

Scenario Mtoe/MEUR$_{2000}$				
Year	MNE EXT	MNE SRE2030	EU(27) ext	EU(27) TARGET
2015	564.7	680.4	141.4	
2020	442.8	646.4	124.0	104.1*
* presented in toe/MEUR2005 and for EU(28), but it may serve as an approximation of relevant data for EU(27) and toe/MEUR2000.				

Table 5-6: Energy intensity scenarios for Montenegro (toe/MEUR2000)

Data sources: draft Energy Development Strategy of Montenegro by 2030 and the EU Energy Pocket Book 2010

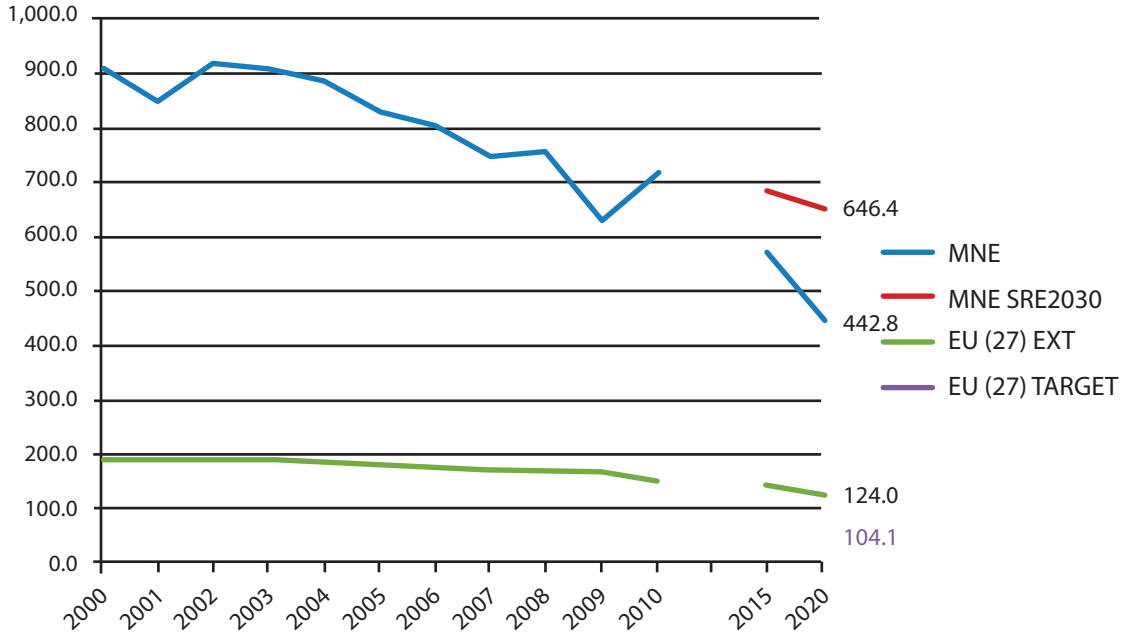

Figure 5-3: Scenarios of energy intensity trends for Montenegro and the EU(27)

Data sources: draft Energy Development Strategy of Montenegro by 2030 and the EU Energy Pocket Book 2010

the generation of data for 2015 and 2020.

The EU(27)TARGET which amounts to 104.1 toe/MEUR$_{2005}$ was calculated on the basis of the projected targeted level of primary energy consumption for the EU (27) equalling 1 474 Mtoe and projected level of the EU(27) DBP equalling 14 164 000 MEUR$_{2005}$.

Several conclusions stem out from extrapolating the data on energy intensity for the period 2000–2010 for Montenegro **(MNE EXT)** and the European Union **(EU(27)EXT)**, and by using reference scenario showing trends of this indicator on the basis of the Energy Development Strategy of Montenegro by 2030 (**MNE SRE2030):**

- If the energy intensity trends recorded in the period 2000–2010 continue, Montenegro will see a decline in the value of this indicator by 50.8% and it will improve its energy efficiency in 2020 compared to 2000 by the same percentage.[100] Judging by the same trends, the European Union will reduce energy intensity by 33%. In 2020, Montenegro's energy intensity will be **3.5 times** as high as that of the European Union which means that, in relative terms, by 2020 there is no actual progress in reducing energy intensity in Montenegro compared to the EU.
- If the reference scenario envisaged by the Energy Development Strategy of Montenegro by 2030 is accomplished, Montenegro's energy intensity in 2020 will reach 646.4 toe/MEUR$_{2000}$, which is 5.2 times as high as that of the European Union in 2020. The relative deterioration in energy intensity of Montenegro compared to the EU is a consequence of ambitious projects in the energy sector which will lead to an increase in primary energy consumption from 45,251 TJ in 2008 to 78,253 TJ in 2020.
- Evidently, judging by the extrapolated trends, the European Union will also not be able to achieve a targeted level of energy efficiency of 104.1 toe/MEUR$_{2005}$ in 2020 as envisaged by the Europe 2020 Strategy. In 2020, its extrapolated energy intensity

[100] One should bear in mind however that the decline in energy intensity in Montenegro was not achieved through conscious and coordinated endeavour to reduce energy intensity but was the unintended outcome of the problems the economy was experiencing that directly reflected on primary energy consumption.

trend is expected to be higher than the targeted one by as much as 19.1%, while the Montenegrin extrapolated energy efficiency trend is 325.3% higher compared to the EU target in that same year.

The analysis of the five scenarios and their outcomes shows that achieving energy intensity target of the European Union by 2020 would require ambitious policies and measures for reducing energy intensity and improving energy efficiency. None of the scenarios currently on the table would get the country even close to achieving these goals.

5.3.2 GREENHOUSE GAS EMISSIONS

As regards GHG emissions, the *EU Roadmap for Moving to a Low Carbon Economy in 2050*, Energy Roadmap 2050 and the latest proposals (by the European Commission and by the Parliament) envisage for total GHG emissions in the EU to go down by 40% by 2030 compared to 1990 (the target set for 2020 is a reduction of 20%). The European Commission invited Montenegro to embark on harmonizing its framework for energy and climate policy with European requirements. On the basis of available data, three possible scenarios for GHG emissions were developed:

- **(1990-2010)ext** – represents an extrapolation of data on total GHG emissions for the period 1990–2010 presented in the draft Second National Communication released in February 2014. In this scenario, projected values for 2015, 2020, 2025 and 2030 were calculated using linear interpolation.
- **TPP Maoče +TPP Pljevlja** II represents a scenario of integrating the capacities of the planned new thermoelectric power plants into the energy system of Montenegro – in 2018 TPP Maoče and in 2022 TPP Pljevlja II. Assessment of their impact on the increase in GHG emissions was presented in the Energy Development Strategy of Montenegro by 2030 and these are included into the projected data for 2015, 2020, 2025 and 2030. Emissions from other sectors are assumed to be at the level presented in the scenario developed by extrapolating the existing data.
- **EU policies** is a scenario based on targeted values determined in the EU policies: reducing GHG emissions by 20% by 2020 and by 40% by 2030 (compared to 1990 levels).

Scenario			
Year	(1990–2010) ext.	TPP Maoče +TPP Pljevlja II	EU policies
2015	4,919.52	5,919.32	
2020	5,624.34	6,876.84	4,445.44
2025	5,391.65	6,559.25	3,889.76
2030	5,627.72	6,511.92	3,334.08

Data sources: draft Energy Development Strategy of Montenegro by 2030 and draft Second National Communication

As can be seen from Figure 5-4, other conditions being equal, commissioning the two new thermoelectric power plants will lead to a considerable increase in GHG emissions: it will result in a considerable increase compared to 1990, while emissions will double compared to the levels recorded at the end of the last decade. This scenario strongly contradicts the scenario of EU policies, which could certainly have a negative impact on the EU accession process and the possibility of keeping up with the Union's climate targets. It is important to emphasize that the overall burden of reducing emissions that the EU took on is not shifted evenly to the Member States through various mechanisms and that adjustments in setting national targets are possible depending on the level of development of a country, but this considerable increase in emissions is hardly acceptable if we assume that Montenegro will be part of the EU by 2030. In addition, there is a question of whether it is appropriate to start operations in the new thermoelectric power plants from the perspective of the overall energy needs of the country, competitiveness of future prices of energy generated in these plants and resource efficiency and sustainability of solutions based on limited non-renewable resources and use of inefficient fuel (lignite). If one bears in mind the long-term EU target of complete decarbonisation of the energy sector (attaining near-zero CO_2 emission) by 2050, the scenario envisaging a considerable increase in capacities of thermoelectric power plants in Montenegro is even less acceptable.

Analyses of benefits arising from the EU policy framework for climate and energy show, for example, that the 20-20-20 targets envisaging a reduction of GHG emissions, use of renewable sources and energy efficiency have played a key role in keeping the jobs of over 4.2 million people across the EU in various eco-activities that have been constantly on the rise, even in a time of crisis.[101] It is believed that the targets projected in *The Roadmap for moving to a low-carbon economy* will generate significant benefits as well. Analyses showed, for example, that by 2020 governments might be able to create up to a million and a half new jobs if they were to use revenues generated from carbon tax and sale of carbon permits to reduce labour taxes. With transition to a low-carbon economy, the EU might spend up to 30% less energy in 2050 compared to 2005. Expected annual savings in fuel costs are estimated at €175–320 billion over the next 40 years.[102]

[101] COM(2014) 15 final

[102] COM(2011) 112 final, A Roadmap for moving to a competitive low-carbon economy in 2050

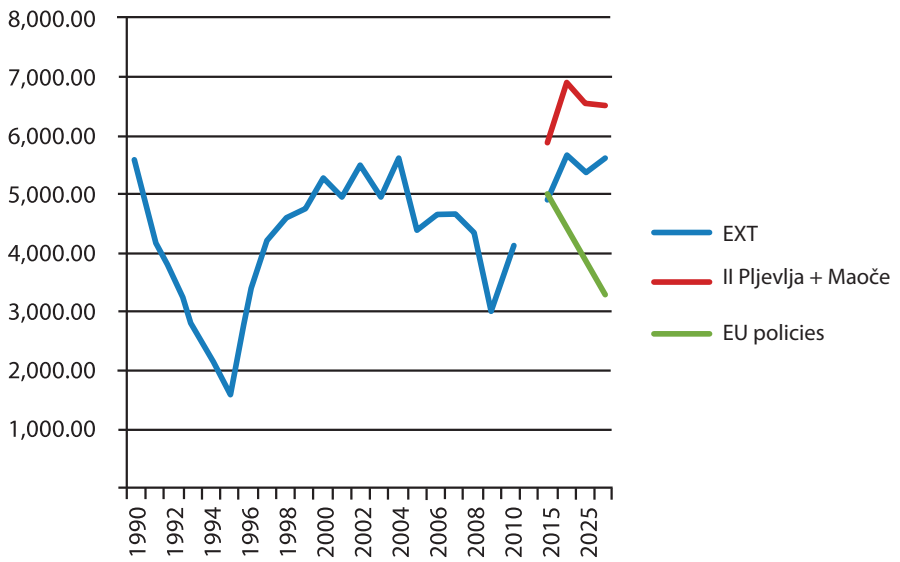

Figure 5-4: Trends in GHG emissions for different scenarios

Data sources: draft Energy Development Strategy of Montenegro by 2030 and draft Second National Communication

Photo: Saša Popović

CHAPTER VI

Conclusions and recommendations

6.1 Main conclusions

In the coming period, sustainability of the process of human development (in environmental, social and economic senses) will be increasingly critical. Governments and communities will have to engage in a difficult endeavour of "achieving more with less". The countries that manage to mobilize material and human resources to achieve that goal will have the competitive edge in the coming decades.

The challenge of the sustainability of development is increasingly acute. Considerable public attention and policy focus is being given to the implications of GHG emissions and climate change – and with good reason. However, equally dangerous trends in biodiversity degradation, natural resource depletion or piling up waste stocks that natural ecosystems are not capable of absorbing, are rarely in the limelight. Humanity is reaching (and in some cases – has passed) crucial natural planetary boundaries and unless the entire development concept is reconsidered, the hypothetical scenarios for a collapse may have a chance of materializing.

Progress in human development should be seen from this angle. It is not just about the development outcomes, the improvement achieved in major human development areas. The way progress has been achieved and the price paid for it matters even more. In many cases the current level of human development is unaffordable and has been achieved running on debt – financial, ecological and demographical. Too often the bill for the well-being of current generations is being passed on to the next. This is why adding the "affordability" perspective to human development analysis and policies is critically important for achieving sustained and sustainable human development.

Montenegro is a country with huge potential for following a sustainable development path. It also has a policy commitment in that regard with the claim of being an "ecological state". The evidence presented in this NHDR suggests that despite the significant progress made in achieving these goals, there is still a long way ahead.

Resource efficiency is an important means for achieving the goal of sustainable human development – and fulfilling the pledge to be an "ecological state". The policy frameworks for promoting it exist, both at the international and the national level. What needs to happen to achieve it is bold action and reform in crucial sectors of the Montenegrin economy that have their cost – and the cost may be high in the short term. A renewed determination and stepped up efforts are also needed from all the stakeholders, especially the key ones. Integrating the requirements set in global and European policies frameworks is another important first step in that regard. This is necessary not for the sake of abstract "compliance" with global conventions and EU regulations which should be transposed into national legislation but for the sake of the future generations of Montenegro. At stake is the preservation of resources and the environment as well as the quality of the country's development. The pace of integration will also depend on how competent we are in successfully following the process.

Based on the analysis of global and EU processes and policies, one may reach the following conclusions which should certainly be borne in mind while formulating and implementing national policies in the coming period:

1. The past development patterns show that economic systems need to be transformed for the purpose of decoupling the use of resources and related negative environmental impacts from economic growth.

Various concepts and approaches to the economic development that guarantee the stability of the natural environment in the long term are promoted globally; the green economy, resource efficiency, the circular economy, sustainable consumption and production are inter-related and complementary and all of these serve the purpose of sustainable human development. Resource efficiency is indispensable in that context since the past development patterns brought prosperity, but through intensive and often inefficient use of resources. The role of biodiversity, ecosystems and the services they provide has been largely underestimated, the costs of generating waste and pollution have often not been reflected in prices and it is becoming increasingly evident that markets and public policies so far have not been able to cope with rising demand and competition for strategic resources such as minerals, soil, water and biomass.

2. Achieving resource efficiency requires integrated approaches, an appropriate mix of policies and instruments, a proper system for resource valuation and measuring economic success, technological change and innovation, behaviour change and an appropriate set of indicators for measuring progress against the set targets.

Montenegrin policies and regulations contain the core elements needed for further elaboration and implementation of resource efficiency measures and instruments, while legal and strategic frameworks are still rapidly changing in the process of alignment with the EU and global policies. However, operationalization and implementation of policies are dissatisfactory. Inadequate implementation of resource efficiency and sustainability requirements in documents and discussions that lead to major development decisions raises serious concerns and might, in the long term, hold back the Montenegrin economy and gear it towards a path of inefficient use of resources.

3. A high level of commitment to sustainable natural resource management exists globally and in particular in the EU where implementation of the concept of resource efficiency and other related concepts is supported by a broad range of policies and regulations. This commitment needs to be translated into adequate national-level policies.

Alignment with the European policy framework for climate and energy, as well as with the European waste management policy where Montenegro is considerably lagging behind in its implementation, is extremely important for the resource efficiency of the national economy. There is also a set of policies on sustainable consumption and production and product management, the implementation of which is at an early stage. Major problems in developing a resource-efficient economy in Montenegro include inadequate valuation of natural capital, subsidizing environmentally harmful and resource-intensive activities, a low level of using technologically advanced solutions, weak implementation of environmental regulations and weaknesses related to statistics and the keeping of records on economic results. Sectors/areas that are critical for resource efficiency include energy, industry, building construction, water management, biodiversity preservation, waste and spatial planning.

Data sources: draft Energy Development Strategy of Montenegro by 2030 and draft Second National Communication

There are multiple benefits from implementing the concept of resource efficiency and these include increased productivity, employment, macroeconomic stability and preservation of vital environmental functions; resource efficiency and economic competitiveness go hand in hand. These benefits however do not materialize automatically and awareness of how the cumulative benefits outweigh the immediate costs is crucial for guaranteeing support from constituencies.

The following are key challenges faced by the Montenegrin society in an endeavour to ensure sustainable development: a) make appropriate choices and compromises (trade-offs) between competing priorities (for example, energy security as opposed to the preservation of biodiversity, water resources and air quality), and b) ensure the transformation of the economy in a way that will enable gradual alignment

Photo: Saša Popović

with and achievement of the European targets, competitiveness, decoupling of economic growth from the use of resources and environmental impacts over time (i.e. long-term sustainability) and keep the promise to be an ecological state.

4. In order to be effective, policies need to be based on evidence. Data and monitoring systems for measuring progress in sustainable human development – and of resource efficiency in that matter – are still fragmentary.

Another barrier to overcome in further efforts to enable the country to develop in the spirit of its Constitutional aspiration and to be able to implement properly European policies as soon as possible (thus considerably improving the resource efficiency of its economy) is a lack of data – that needed to understand the current state, which is generated through appropriate analyses and research activities, as well as that referring to statistics and possibilities of monitoring processes and changes. As for statistics, improvements are evident in many areas (for example, energy balances, greenhouse gas emissions and waste quantity), however gaps, lack of precision and insufficient coverage of certain data categories are still present.

5. Theoretically, the range of possible policy options is broad. In reality however the country faces a quite narrow window of opportunity to switch to a resource-efficient economic model and get closer to the concept of a "circular economy."

The different scenarios presented in Chapter 5 illustrate the quite different development options Montenegro is facing at the moment. Given the data deficits, the scenarios are indicative – but they are also telling. Choices that are made will determine the long-term prospects of the country towards achieving European targets, improving efficiency and economic competitiveness, while preserving the resource basis and generating a number of benefits from resource-efficient and development patterns that are founded on low emissions. The extreme points in a set of development options are to remain with the old and inefficient technologies, while reducing the value of the natural capital on one hand, and sustainable development and achievement of aspirations towards an ecological state and EU integration on the other.

6.2 Key recommendations

On the basis of the analysis and projections prepared for various scenarios, and the comparative experiences of EU countries, the following key recommendations may be given with a view to improving energy efficiency in Montenegro (more detailed proposal for actions for certain resources, sectors and policy areas is presented in the Roadmap below):

1. Consistent implementation of the adopted regulations and plans is crucial for the further development of Montenegro in general, as well as for the improvement of resource efficiency. In addition, better coordination between different policies, strengthening the information base and further development of indicators for measuring sustainability of development and for monitoring progress are necessary.

2. In order to capitalize on spontaneous improvements made in the previous period and to continue positive trends (for example, decoupling GDP growth from energy consumption, the amount of generated waste, GHG emissions, etc.), carefully designed targeted measures for increasing efficiency and reducing environmental impact are required.

3. National climate policy should be formulated in line with EU targets and energy policy should be aligned with it accordingly; solutions that considerably drive the country away from EU targets should not be promoted.

4. Changes to the subsidizing policy and state aid are crucial for efficient use of resources, competitiveness and achievement of environmental targets; a plan to phase out harmful subsidies is necessary. At the same time, economic/market-based instruments should

be developed and used so as to ensure that the prices of resource use and costs of pollution properly reflect the value of resources being depleted and/or degraded as a result of pollution. The possibilities of carrying out green tax reform should be explored.

5. It is extremely important to develop and use a system of incentives for clean and efficient production processes and activities and to provide proper support to research and innovation.

6. Urgent improvements in the spatial planning system (rational use of space, limiting expansion of built-up areas, particularly if these fail to provide significant effects), waste management (waste separation, recycling) and water management (integrated management, rational consumption) are a *condicio sine qua non* for resource efficiency in Montenegro.

7. Protection of arable land and improvement of environmentally friendly forms of agricultural production are extremely important for efficient use of resources.

8. Resource efficiency and sustainable development will not be possible unless biodiversity and ecosystem services are properly valued and their value integrated into the balance sheets and measures of economic success from micro to macro levels.

9. Proper control of air, water and soil quality and appropriate measures to prevent pollution directly contribute to the productivity of the economy (amongst other things, by preserving human health); lack of implementation of environmental standards results in considerable costs to society in both the EU and Montenegro.

10. Robust data and monitoring systems are important in that regard. Testing and implementing sustainable human development indicators and monitoring different aspects of sustainability are important elements of the roadmap towards keeping the promise of being an ecological state.

The potential benefits from development of a resource-efficient economy are many. Those that are particularly relevant for Montenegro, given its current level of development, include growth and new jobs, competitiveness, improvement of the quality of life by preserving the quality of the environment and contribution to the stability of the economy. Even though detailed analysis of potential effects of implementation of certain resource efficiency polices (ex-ante analyses) are unavailable, according to the existing estimates the improvement of energy efficiency in the housing stock alone would stimulate investments, create new employment opportunities and result in significant energy savings.

6.3 Roadmap to a Resource-Efficient Montenegro

The Roadmap to a Resource-Efficient Montenegro sets targets and proposes actions and indicators in the following three areas: 1) horizontal topics and policies (such as: valuation of natural resources, fiscal measures and subsidies; statistics and data availability; measuring economic success; boosting competitiveness; support for research and innovation, etc.); 2) economic sectors; 3) environmental management, including waste. Prioritized issues are given strong emphasis (targets and actions that are shaded).

6.3.1 HORIZONTAL POLICIES AND ISSUES

Area	Targets and actions	Indicators
Valuation of natural resources and measuring of economic success	Target: *By 2020, availability of information about values of natural resources should improve and become progressively integrated into the systems of calculating economic success.*	Scope of concessions awarded for exploitation of natural resources Modifications in the system of national accounts
	Actions: • Improve methodologies for resource valuation • Integrate information about the value of resources into decision-making processes (e.g. those regarding public spending, approval of development projects) • Design concessions for exploitation of natural resources in such a way that they reflect their true value, including the cost of degradation • Keep track of EU trends in terms of modification of national accounts in order to include contributions of natural resources to creating added value in the national economy	
Fiscal measures and subsidies	Target: *By 2020, phase out environmentally harmful subsidies.*	Share of budget spent on environmental measures and resource efficiency Share of environmental taxes out of total taxes and contributions
	Actions: • Identify harmful subsidies and draw up a plan to phase them out • Design measures for providing support for businesses and those parts of the population that might be put at risk as a result of phasing out subsidies (in accordance with EU regulations and practice) • Use state aid to promote resource-efficient activities • Draw up a tax relief plan to stimulate resource efficiency and implement it progressively • Explore feasibility of carrying out green tax reform • Redesign the existing taxes and charges for environmental pollution and use of natural resources, and fully apply these instruments with the aim of drawing Montenegro closer to the average level of revenue generated from environmental fees and taxes in the EU countries by 2020.	

Area	Targets and actions	Indicators
Statistics and data availability	Target: *Build capacity of competent institutions and publish developed resource efficiency indicators.*	Number of available indicators (National List of Indicators, EU resource efficiency indicators)
	Actions: • Develop indicators envisaged by this study and by the National List of Indicators that are not available yet, identify needs and build capacity of institutions to produce the missing indicators • Set quantifiable targets where possible • Monitor development of a set of resource efficiency indicators in the EU and use new indicators as soon as possible • Enhance further the quality and reliability of data, particularly of those on energy consumption, greenhouse gas emissions, water and land use and waste • Build capacity for developing footprint indicators • Improve data availability to all end users, including facilitated access and comprehensibility	
Sustainable consumption and production	Target: *By 2020, promote sustainable consumption and production patterns and make one third of public procurement green.*	Percentage of value and a number of public procurement contracts containing green public procurement criteria Number of enterprises, by sectors and by size, receiving advice concerning improvement of environmental
	Actions: • Specify green public procurement requirements and support their integration into tender processes; set criteria on the basis of which public procurement may be characterized as green • Raise consumer awareness on the options they have about disposal in order to be able to support resource-efficient products and processes • Promote observance of the standards of quality, social responsibility and EMAS in private sector • Keep track of and comply to the European Product Policy	

Area	Targets and actions	Indicators
Supporting research and innovation	Target*: By 2020, double the amount of science and research budget allocations.*	Share of science and research budget allocations out of total GDP Number of awards and amount of funds allocated under the European support programmes for research and innovation projects which predominantly promote resource efficiency and sustainable environmental management
	Actions: • Improve availability and use of national and EU funds for research and innovation • Increase private-sector expenditure • Build the capacity of scientific research institutions • Reinforce the communication between research centres and businesses • Support the use of innovative solutions which reduce resource consumption in production and services	
Boost competitiveness	Target: *Improve ranking on the competitiveness list of global economies by 25%.*	Ranking on global competitiveness list
	Actions: • Improve technologies and cut the costs of using resources; enhance managerial systems; • Increase energy efficiency in industry • Support the development of small and medium-sized enterprises in new, prospective areas (including eco-industries)	

6.3.2 ENVIRONMENTAL MANAGEMENT (INCLUDING WASTE)

Area	Targets and actions	Indicators
Ecosystem services	Target: *By 2020, considerably improve the capacity for the valuation and availability of data on the value of ecosystem services and ensure that such information is integrated into the decision-making processes.*	Number and coverage of studies valuating ecosystem services Number of impact assessments and cost analyses which include ecosystem value
	Actions: • Build the capacity of the national statistical system and of independent institutions to carry out ecosystem valuation • Improve information about the ecosystem status and services • Ensure that information about ecosystem values is integrated into specific development projects (through environmental impact assessments, cost-benefit analyses) • Enhance ecosystem protection financing, possibly through innovative instruments such as charges for ecosystem services • Prepare a programme for remediation of endangered ecosystems	
Biodiversity	*Target: By 2020, halve losses in the water supply systems, improve considerably the information basis for water resources and ensure implementation of the Framework Directive.*	Use of freshwater resources Water Exploitation Index Water loss
	Actions: • Build capacity for implementation of the Framework Directive • By 2020, prepare management plans, properly carry out valuation of water resources, set effective and fair water prices • Coordinate policies on using water resources (agriculture, energy, regional policy) • Improve availability of data and indicators • Set targets for efficient use of water and develop and implement more ambitious and more comprehensive measures to improve efficiency (measuring consumption, reducing the loss in systems, guidelines on reuse) • Better water demand management by applying economic instruments (prices, taxes and charges, eco-labels etc.) • Integrate climate change into the water management system	

Area	Targets and actions	Indicators
Water	Target: *By 2020, halve losses in the water supply systems, improve considerably the information basis for water resources and ensure implementation of the Framework Directive.*	Use of freshwater resources Water Exploitation Index Water loss
	Actions: • Build capacity for implementation of the Framework Directive • By 2020, prepare management plans, properly carry out valuation of water resources, set effective and fair water prices • Coordinate policies on using water resources (agriculture, energy, regional policy) • Improve availability of data and indicators • Set targets for efficient use of water and develop and implement more ambitious and more comprehensive measures to improve efficiency (measuring consumption, reducing the loss in systems, guidelines on reuse) • Better water demand management by applying economic instruments (prices, taxes and charges, eco-labels etc.) • Integrate climate change into the water management system	
Air	Target: *By 2020, improve air quality in the most threatened areas (Pljevlja and Nikšić) and control GHG emissions.*	Air quality in urban areas GHG emissions
	Actions: • Carry out assessment of the damage caused by air pollution (impacts on health and the economy) • Improve control of emissions from industry and transport • Implement measures to improve air quality envisaged by relevant plans and strategies • Set national targets in the area of climate change • Implement measures to reduce GHG emissions (design measures adjusted to the national conditions and implement them)	

Area	Targets and actions	Indicators
Land and soils	Target: *Progressively reduce conversion of land to built-up areas with the aim of reducing land take to zero in the long term; protect arable land.*	Built-up areas Productivity of built-up areas Soil erosion Content of organic matter in soils
	Actions: • Make improvements in carrying out environmental impact assessments related to producing spatial plans so as to ensure optimal land use and trade-offs • Enhance spatial planning to ensure rational use of space, concentration of construction areas and use of reserves in them • Protect arable land and land that is important for preservation of biodiversity against urbanisation and further expansion of building • Implement biological measures (including green infrastructure) in protecting soils against erosion and floods • Develop knowledge and information basis for the purpose of long-term preservation and improvement of the quality (fertility) of arable land	
Minerals and metals	Target: *Reduce raw material consumption and minimize environmental impact resulting from exploitation of minerals and metals.*	Resource productivity of minerals and metals
	Actions: • Carry out remedial work on areas degraded by exploitation of minerals and metals • Ensure that an adequate amount of charges are paid for exploitation of mineral and metal raw materials, phase out subsidies for environmentally harmful activities. • Incentives for research, innovation and introduction of new technologies in the processing industry, construction industry and in other activities with the aim of reducing raw material consumption • Keep track of and comply with the European Product Policy	

Area	Targets and actions	Indicators
Forests	*Target: Sustainable forest exploitation*	Forest cover Scope of forest exploitation Forest fires
	Actions: • Enhance forest management system (knowledge, information, proper valuation of forest resources, integration of climate change issues) • Increase efficiency in wood exploitation (enhance exploitation technologies, develop wood processing chain, use wood waste and foster more efficient forms of biomass use for heating)	
Maritime resources	*Target: By 2030, achieve a good environmental status of marine waters.*	Quality of sea bathing water Mariculture production Number and size of maritime protected areas
	Actions: • Integrated coastal zone management; implementation of the Marine Strategy Framework Directive by 2030 • Preserve the natural and landscape values of the coastal area • Align with the EU Integrated Maritime Policy, introduce maritime spatial planning; promote and support development of innovative business opportunities in maritime and coastal economy (blue growth) • Strengthen the information base and knowledge of processes and changes in the coastal area • Minimize pressures on sea water quality caused by pollutants in waste water, maritime transport and mariculture • Sustainable exploitation of fish stock • Integrate climate change into the coastal management system	
Waste	*Target: By 2025, reduce considerably the amount of final waste disposal.*	Total amount of produced municipal waste Total amount of produced construction waste Recycling rates
	Actions: • Review the set targets of recycling certain types of waste and set ambitious, yet feasible targets • Invest considerably in a waste separation system over the next 10 years, accompanied by appropriate awareness-raising programmes • Identify opportunities and incentives for the development of recycling activities • Stimulate markets for secondary materials and demand for recycled materials • Develop a system for specific waste flow management	

6.3.3 PRIORITIZED DEVELOPMENT SECTORS

Area	Targets and actions	Indicators
Energy	Target: *By 2020, come closer to the level of energy intensity in the EU, by 2030 reach the EU level.*	Share of renewable sources GHG emissions from energy sector
	Actions: • Set ambitious energy efficiency targets and implement targeted measures for the purpose of their achievement • Integrate climate change into energy plans and programmes, plan for alignment with the EU climate policy • Strike a balance in the mix of renewable sources with the aim of minimizing environmental impacts; integrate biodiversity preservation targets and achievement of a good environmental status into energy development plans, programmes and projects • Carry out remedial work on environmental damage caused by activities undertaken in the process of energy generation and consumption	
Agriculture	Target: *Rapid growth of agricultural production with more efficient use of resources and control of negative environmental impacts.*	Consumption of plant protection products Areas used for organic farming
	Actions: • Technological advancements and improvement of efficiency in primary production and food processing • Control the use of fertilizers and pesticides • Increase the size of areas under organic farming • Expand knowledge of and information about preserving soil fertility • Composting and using biological waste in agriculture • Intensify measures and incentives for the development of rural areas	

Area	Targets and actions	Indicators
Tourism	Target: *Raise quality of tourism services, while reducing environmental impact.*	Tourism revenue Number of overnight stays by region,, by type of tourist service and by month
	Actions: • Diversify tourism offer and mitigate pronounced seasonality in tourism industry with the aim of mitigating pressures on the natural environment; develop environmentally friendly forms of tourism • Plan and build new tourist facilities in a way that contributes to the rational use of space, protection of valuable ecosystems and energy and water savings • Reduce pollution (waste and waste water) generated by tourism	
Building and housing	*Target: By 2025, achieve high level of resource efficiency in construction of structures and infrastructure*	Consumption of energy for heating and cooling of space
	Actions: • Allocate funds for enhancement of energy efficiency in building construction (in the government budget, from development loans or by means of alternative financial mechanisms) and develop incentive schemes (reduce VAT rate, guarantees or subsidies for loan interest rates, co-fund capital expenditure in certain investments, etc.) • Progressively harmonize regulations and building standards with the relevant EU regulations and apply them in the new building construction; renovate the existing building stock • Use environmentally friendly materials in the construction sector • Use proper instruments for generating water savings, promote efficient devices	

Area	Targets and actions	Indicators
Transport	*Target*: *Development of the transport system should contribute to resource efficiency, competitiveness and sustainability.*	Structure of vehicles by age and by emission characteristics Energy efficiency in transport
	Actions: • Use new technologies (vehicles with lower emissions, lower fuel consumption, alternative fuels) and promote more environmentally friendly forms of transport; develop and implement incentive measures • Use instruments for minimizing negative environmental impacts of transport • Recycle vehicles after expiry of their lifecycle	
Industry and entrepreneurship	Target: *Increase efficiency and boost competitiveness of industry and small and medium-sized enterprises.*	Quality of industrial waste water Air quality in industrial estates Number of jobs in new (eco) branches and activities
	Actions: • Enhance technologies and management processes in industry: modernize production, increase rates of production of final products, introduce new technologies, quality and environmental management systems, while changing the product range • Incentive measures for resource efficiency and innovation • Implement consistently environmental regulations as an instrument for moving towards cleaner technologies • Integrate pollution damage and environment degradation into costs of enterprises • Improve access to the sources of financing and build capacities (advice, consulting services) of SMEs in order for them to take resource-efficient approaches	

Photo: Saša Popović

CHAPTER VII

Annexes

7.1 References

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Photo: Aleksandar Jaredić

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7.2 HDI profile of Montenegro 2013

- Human Development Index (HDI)

The HDI is a summary measure for assessing long-term progress in three basic dimensions of human development: a long and healthy life, access to knowledge and a decent standard of living.

Table A: Montenegro's HDI trends[103]

Year	Life expectancy at birth	Expected years of schooling	Mean years of schooling	GNI per capita (2005 PPP$)	HDI value
2005	73.7	13.1	10.6	11,233	0.750
2010	74.5	15.2	10.5	13,633	0.784
2011	74.6	15.2	10.5	14,241	0.787
2012	74.7	15.2	10.5	14,260	0.787
2013	74.8	15.2	10.5	14,710	0.789

[103] Human Development Report, Sustaining Human Progress: Reducing vulnerabilities and building resilience, UNDP HDRO, 2014

- Inequality-adjusted HDI (IHDI)

The IHDI is the HDI discounted for inequalities

[104] Human Development Report, Sustaining Human Progress: Reducing vulnerabilities and building resilience, UNDP HDRO, 2014

Table B: Montenegro's IHDI for 2013[104]

	IHDI value	Overall loss (%)	Human inequality coefficient (%)	Inequality in life expectancy at birth (%)	Inequality in education (%)	Inequality in income (%)
2013	0.733	7.2	7.1	7.6	2.5	11.3

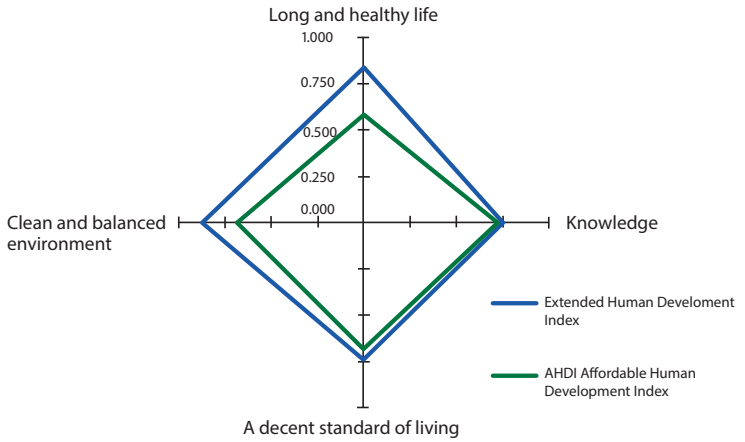
- Multidimensional Poverty Index (MPI), which identifies multiple deprivations in the same households in education, health and living standards

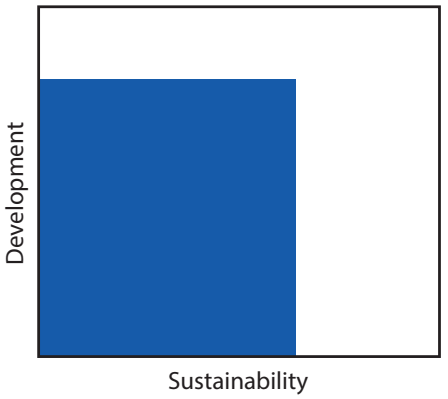
Table C: The most recent MPI for Montenegro

Survey year	MPI value	Head-count (%)	Intensity of deprivations (%)	Population share (%)			Contribution to overall poverty of deprivations in (%)		
				Near poverty	In severe poverty	Below income poverty line	Health	Education	Living Standards
2005/ 2006	0.012	3.0	40.1	1.3	0.5	0.1	63.8	21.0	15.3

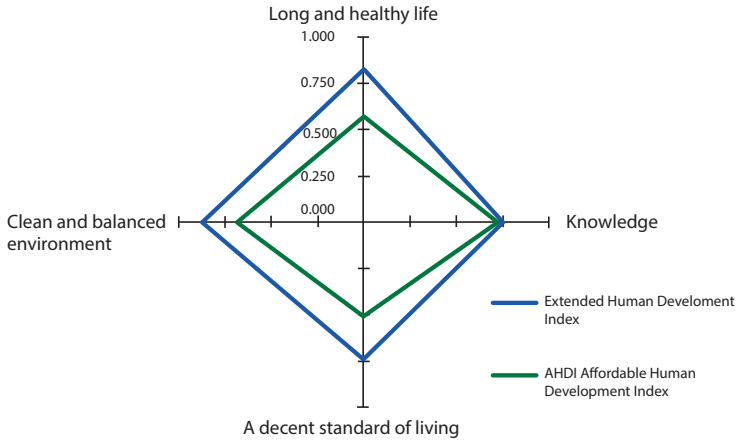
7.3 AHDI profile of Montenegro

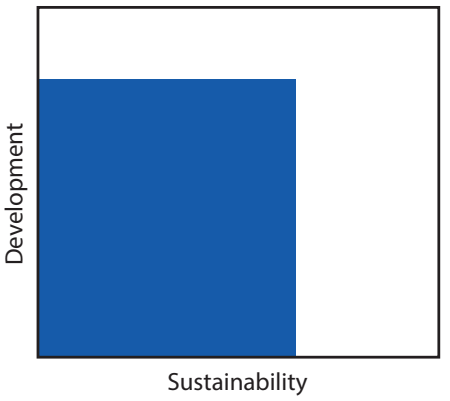
Montenegro	2007
Human Development Index	0.771
Extended Human Development Index	0.797
AHDI Affordable Human Development Index	0.647
% losses due to non-sustainability	19%





Montenegro	2013
Human Development Index	0.789
Extended Human Development Index	0.813
AHDI Affordable Human Development Index	0.625
% losses due to non-sustainability	23%





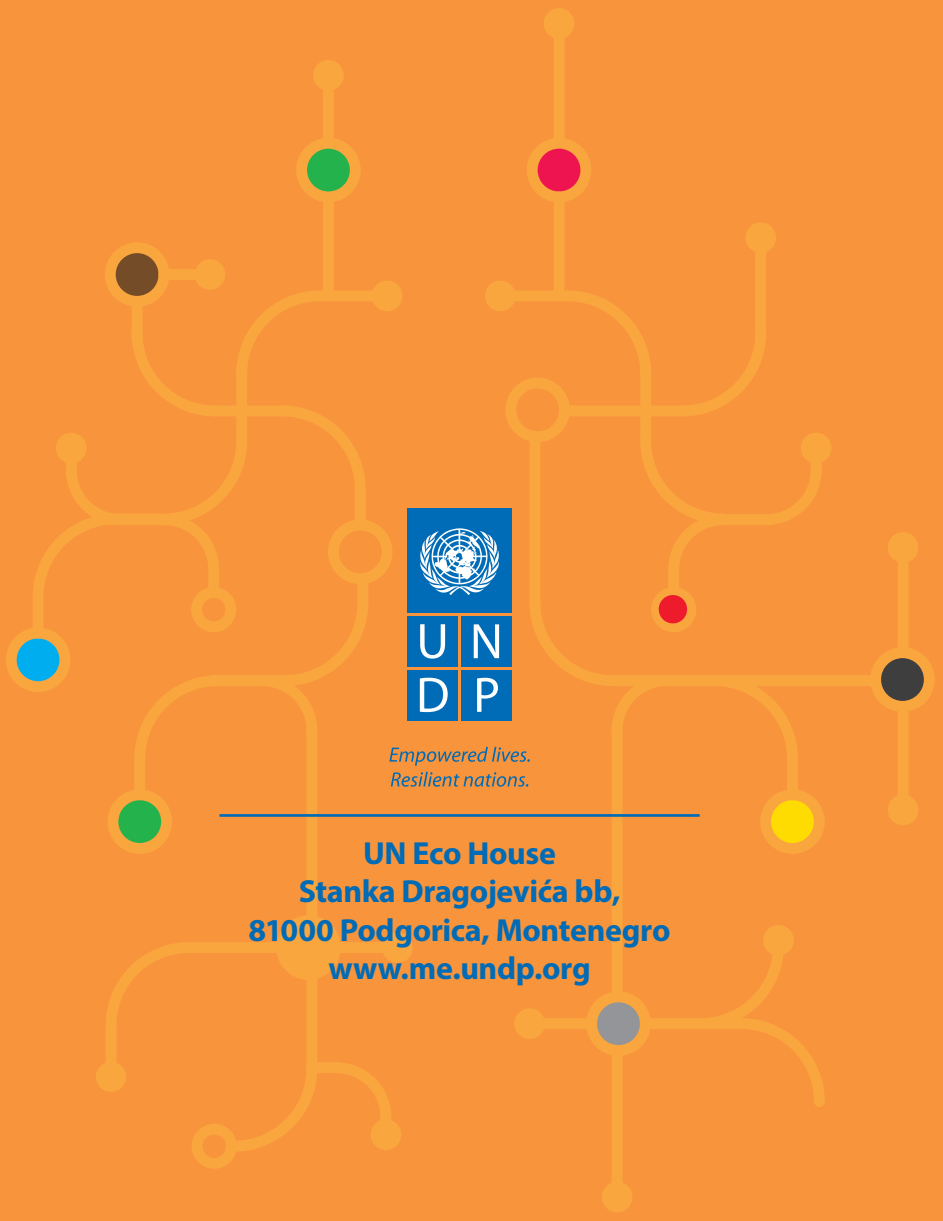
2007	Long and healthy life			Knowledge		
Status	Life expectancy index		0.831	Education index		0,745
	Life expectancy at birth		74.0	Mean Years of Schooling		10.6
				Expected Years of Schooling		14.1
Affordability	Health Affordability		0.666	Education Affordability		0.948
	Healthy life expectancy at birth, years		63.3	Persistence to last grade of primary, total (% of cohort)		97.4
Context	Health expenditure, private (% of GDP)	2.4	2007	Public spending on education, total (% of GDP)	–	2007
	Health expenditure, public (% of GDP)	4.5	2007	HDI Loss due to inequality in education (%)	–	2007
	Health expenditure, total (% of GDP)	7.0	2007	Pupil-teacher ratio, primary	–	2007
	HDI Loss due to inequality in life expectancy (%)	–	2007	Pupil-teacher ratio, secondary	–	2007
	Physicians (per 1,000 people)	2.0	2007	Fixed broadband Internet subscribers (per 100 people)	2.6	2007
	Nurses and midwives (per 1,000 people)	5.5	2007	Internet users (per 100 people)	30.8	2007
	Hospital beds (per 1,000 people)	4.0	2007	Mobile cellular subscriptions (per 100 people)	145.7	2007
	Improved water source (% of population with access)	98.0	2007	Firms offering formal training (% of firms)	–	2007
	Improved sanitation facilities (% of population with access)	90.0	2007			

A decent standard of living			Clean and balanced environment		
			Environment Index		0.881
			Improved water source (% of population with access)		98.0
GNI index 0.		741	Air pollution PM10 (micrograms per cubic meter)		34.1
GNI per capita (USD PPP)		13,500	Forest area (% of base year, 1990)		100.0
			Waste management, Improved sanitation facilities (% of population with access)		90.0
Standards of living Affordability		0.889	Environmental Affordability		0.771
General government gross debt (% of GDP)		27.5	Water withdrawal - Annual freshwater withdrawals, total (% of internal resources)		2.9
Energy use (kg of oil equivalent) per $1,000 GDP (constant 2011 PPP)		132	Terrestrial and marine protected areas (% of total territorial area)		11.5
			Share of energy from renewable sources		59.9
HDI Loss due to inequality in income (%)	–	2007			
GINI index 30.8		2007			
Multidimensional poverty index (%)	–	2007			
Final consumption expenditure, etc. (% of GDP)	108.5	2007	Total Ecological Footprint (global ha per capita)	–	2008
Electric power transmission and distribution losses (% of output)	32.1	2007	Total biocapacity (global ha per capita)	–	2008
			Biocapacity (Deficit) or Reserve (global ha per capita)	–	2008
Informal payments to public officials (% of firms)	–	2007	Bird species, threatened	–	2007
			Mammal species, threatened	–	2007
Unemployment, total (% of total labor force) (modeled ILO estimate)	19.4	2007	Plant species (higher), threatened	–	2007
Unemployment, youth total (% of total labor force ages 15-24) (modeled ILO estimate)	38.6	2007			
CO_2 emissions (metric tons per capita)	3.6	2007			

2013	Long and healthy life			Knowledge		
Status	Life expectancy index		0.843	Education index	0.772	4%
	Life expectancy at birth		74.8	Mean Years of Schooling	10.5	-1%
				Expected Years of Schooling	15.2	7%
Affordability	Health Affordability		0.677	Education Affordability	0.970	2%
	Healthy life expectancy at birth, years		64,0	Persistence to last grade of primary, total (% of cohort)	98.5	1%
Context	Health expenditure, private (% of GDP)	–	2013	Public spending on education, total (% of GDP)	–	2013
	Health expenditure, public (% of GDP)	–	2013	HDI Loss due to inequality in education (%)	2.5	2013
	Health expenditure, total (% of GDP)	–	2013	Pupil-teacher ratio, primary	–	2013
	HDI Loss due to inequality in life expectancy (%)	7,6	2013	Pupil-teacher ratio, secondary	–	2013
	Physicians (per 1,000 people)	–	2013	Fixed broadband Internet subscribers (per 100 people)	–	2013
	Nurses and midwives (per 1,000 people)	–	2013	Internet users (per 100 people)	–	2013
	Hospital beds (per 1,000 people)	–	2013	Mobile cellular subscriptions (per 100 people)	–	2013
	Improved water source (% of population with access)	98.0	2013	Firms offering formal training (% of firms)	–	2013
	Improved sanitation facilities (% of population with access)	90.0	2013			

A decent standard of living		
GNI index	0.754	2%
GNI per capita (USD PPP)	14,710	8%
Standards of living Affordability	0.687	-29%
General government gross debt (% of GDP)	56.8	52%
Energy use (kg of oil equivalent) per $1,000 GDP (constant 2011 PPP)	131	-1%
HDI Loss due to inequality in income (%)	11.3	2013
GINI index 30.8	–	2013
Multidimensional poverty index (%)	–	2013
Final consumption expenditure, etc. (% of GDP)	–	2013
Electric power transmission and distribution losses (% of output)	–	2013
Informal payments to public officials (% of firms)	–	2013
Unemployment, total (% of total labor force) (modeled ILO estimate)	–	2013
Unemployment, youth total (% of total labor force ages 15-24) (modeled ILO estimate)	–	2013
CO_2 emissions (metric tons per capita)	–	2013

Clean and balanced environment		
Environment Index	0.890	1%
Improved water source (% of population with access)	98.0	0%
Air pollution PM10 (micrograms per cubic meter)	29.8	-14%
Forest area (% of base year, 1990)	100.0	0%
Waste management, Improved sanitation facilities (% of population with access)	90.0	0%
Environmental Affordability	0.774	0%
Water withdrawal - Annual freshwater withdrawals, total (% of internal resources)	2.9	0%
Terrestrial and marine protected areas (% of total territorial area)	12.8	10%
Share of energy from renewable sources	45.3	-32%
Total Ecological Footprint (global ha per capita)	–	2008
Total biocapacity (global ha per capita)	–	2008
Biocapacity (Deficit) or Reserve (global ha per capita)	–	2008
Bird species, threatened	12.0	20138
Mammal species, threatened	6.0	2013
Plant species (higher), threatened	2.0	2013



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