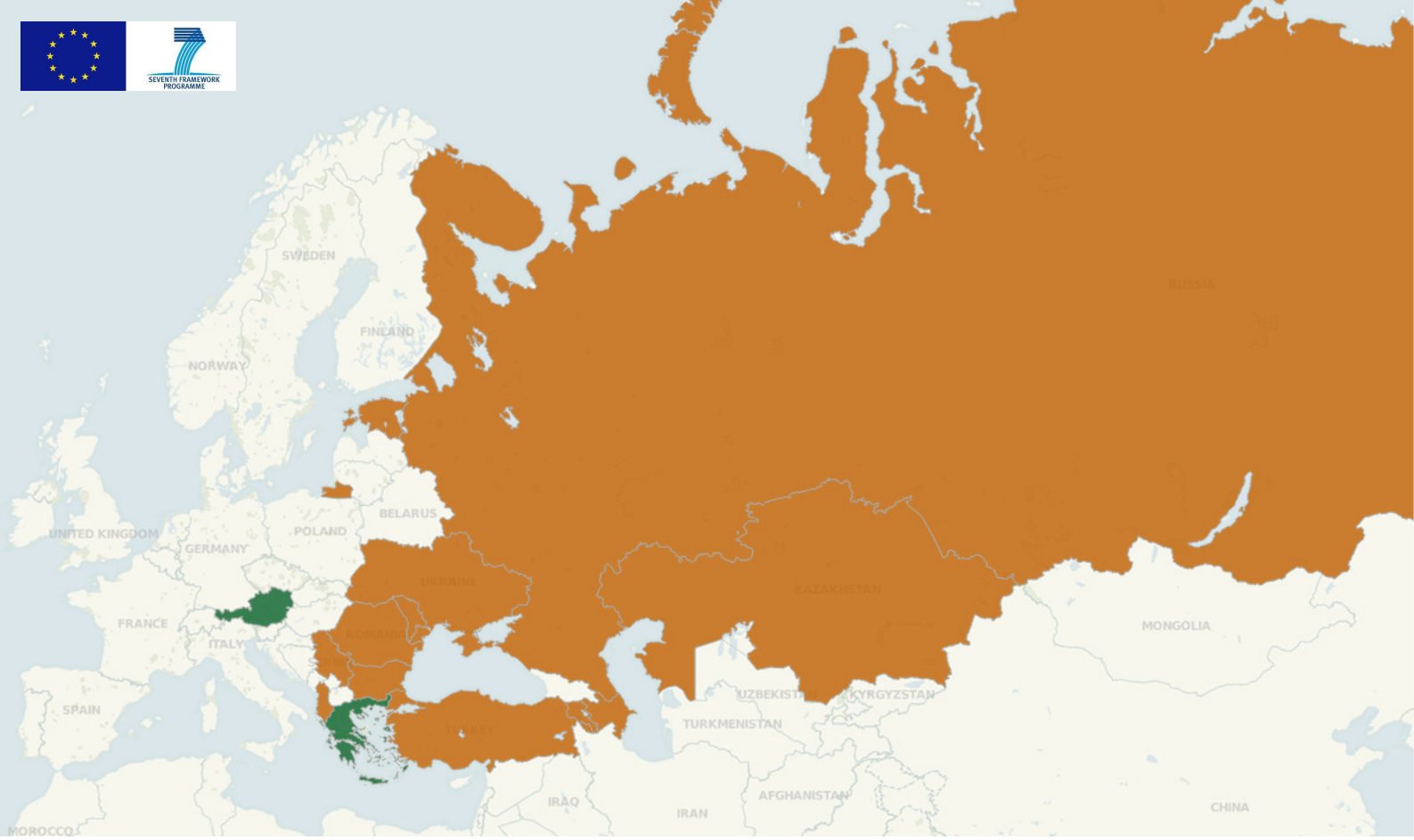


Energy View of BSEC countries 2014

Special Edition on Climate Change policy trends

PROMITHEAS THE ENERGY AND CLIMATE CHANGE POLICY NETWORK

Athens 2014

PROMITHEAS
The Energy and Climate Change Policy Network

"Energy View of BSEC countries: Special Edition on Climate Change Policy Trends" is published in the frame of PROMITHEASnet activities. This edition is based on the reports prepared in the context of PROMITHEAS – 4 EU FP7 project (G.A. no.265182) and its publication was financed by the project as part of its dissemination activities.

PROMITHEAS – 4 is a three (3) - year project, with full title "Knowledge transfer and research needs for preparing mitigation / adaptation policy portfolios". Twelve (12) beneficiary countries (ten from the Black Sea Economic Cooperation (BSEC) region, Estonia and Kazakhstan) developed national policy mixtures regarding their national climate change policies and composed relevant reports, with evaluation of policy mixtures and conclusions.

The national reports of this edition are based on the PROMITHEAS – 4 reports.

PROMITHEAS is an Energy and Climate Change policy network. It aims to promote cooperation between EU and BSEC relevant institutions and through this, to enhance bonds of scientific cooperation, knowledge transfer and dissemination, to contribute in economic issues relevant to its contents and through this, to regional stability and economic development.

The PROMITHEAS network consists of institutions from Albania, Armenia, Azerbaijan, Bulgaria, Estonia, Georgia, Hellas, Kazakhstan, Kyrgyzstan, Moldova, Romania, Russia, Serbia, Turkey, Ukraine and Uzbekistan. It was initially financed through BSEC Project Development Fund and includes twenty five institutions. It covers all the BSEC and most of the Central Asia countries, while it remains continuously open to new participants.

The PROMITHEASnet activities include, apart from the present edition, the publication of the "Energy View of BSEC countries" (with a special edition on Climate Change policies), the scientific bilingual (English – Russian) journal "Euro – Asian Journal of Sustainable Energy Development Policy", a bi-monthly newsletter disseminated to more than 170 countries worldwide, special reports, workshops, seminars, annual international conferences, etc.

Message by the Coordinator of PROMITHEAS-4

Deliberations on the Climate Change combat have entered a crucial period where the human societies have to decide whether they intend to commit themselves in a global effort.

Twenty years of bitter disputes between developed and developing economies over the cost allocation of the effort and short term calculations on the costs and benefits of implementing the necessary policies have made clear that a global challenge cannot be confronted without a global commitment.

Extensive scientific studies, adopted by UNFCCC, show that it is most likely to occur a 3-5^{0}C increase of the mean atmospheric temperature with reference to the pre-industrial era of human history.

If this scenario, which describes the baseline trends, occurs then our societies will be exposed to high risks that will threaten their survival.

Successive scientific reports, underline the need to adapt our economies so as to keep the temperature increase below the 2 ^{0}C level. This is a quite demanding and difficult objective, taken into account the expected increase of human population from 7,2 bln to at least 9,2 bln until the year 2050, the increase of global energy demand and the consequent increase of GHG emissions.

The implementation of a 2^{0}C pathway, starting from 2020, requires the GHG reduction from the expected 56 $GtCO_2e$, according to the Business as Usual (BAU) scenario, to 44 $GtCO_2e$. A gap of 12 $GtCO_2e$ has to be filled as a first step, in a steeper process of reductions for the period after 2020.

Even if the international pledges undertaken in Copenhagen, to reduce GHG emissions to the level of 49 $GtCO_2e$ will be met, a gap of 5 $GtCO_2e$ will remain.

The COP21, Paris (2015), is expected to conclude with some legal document describing the efforts to be undertaken if the Climate Change challenge is to be confronted. If this happens, the period up to 2020 will be spent for the preparatory actions that will allow its implementation for a first period up to 2030, when a global Emission Trading Scheme (ETS) is likely to start functioning.

The concept of the Framework for Various Approaches (FVA), as it has been developed so far, facilitates a decentralized approach reflecting the special conditions that exist in the various parts of the planet but it needs a clear, simple and effective Monitoring, Reporting and Verifying (MRV) allowing the convergence of all efforts.

Countries with developing economies, such as those of Black Sea and Central Asia need not only to agree on certain policies but also to develop the appropriate level of knowledge for their implementation.

A “prompt start” of these countries requires the necessary volume of knowledge and the relevant amount of efforts for the development of the political instruments that will allow them to converge with the efforts of the rest countries.

PROMITHEAS – 4, an EU – FP7 project, has worked for three years in twelve countries from EU, Black Sea and Central Asia with the aim to transfer sufficient

knowledge on Mitigation Adaptation Policy issues, to develop and evaluate relevant policy mixtures and to engage policy and decision makers in a national and regional policy dialogue on these issues.

National reports in all stages of their development were presented and discussed with national authorities while twelve national and one international conference provided the opportunity to all involved stakeholders in national and regional level, to participate in a comprehensive policy dialogue on these issues.

Identified needs and gaps in these thematic areas have provided an understanding on the real potential of the beneficiary countries to participate actively in the post COP21 procedures.

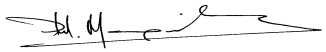
These needs and gaps can be summarized as lack of appropriate data bases, lack of knowledge in implementing the emerging international political instruments and societal gaps in understanding the size and the nature of the challenges.

PROMITHEAS – 4 has trained a group of experts, from all beneficiaries that has the potential to contribute to the efforts of national authorities to cooperate actively with the international community for the implementation of the post COP21 agreements.

It is worth mentioning the strong political support provided by the Permanent International Secretariat (PERMIS) of the Black Sea Economic Cooperation Organization (BSEC) in our communication and dissemination activities towards its member states and the opportunities offered to the PROMITHEAS – 4 partners to present intermediate and final project results in the framework of its scheduled events (ministerial meetings, working groups, task force).

We are also grateful to the related bodies of BSEC, the Parliamentary Assembly (PABSEC) and the Business Council (BSEC BC) for their active contribution to our efforts to disseminate the results of PROMITHEAS – 4 to their members.

The editor



Prof. Dimitrios Mavrakis

Coordinator of PROMITHEAS-4

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Abbreviations

Abbreviation	Full name
AAU	Assigned Amount Unit
ADB	Asian Development Bank
AHP	Analytical Hierarchy Process
AMS	Acronym of combination of AHP, MAUT and SMART
BAU	Business As Usual
BSEC	Black Sea Economic Cooperation organization
BSTDB	Black Sea Trade and Development Bank
CDM	Clean Development Mechanism
CEC	Commission of the European Communities
CER	Certified Emission Reduction
CHP	Cogeneration of Heat and Power
CIS	Commonwealth of Independent States
COP	Conference of Parties
EBRD	European Bank of Reconstruction and Development
EC	European Commission
EE	Energy Efficiency
EEA	European Environmental Agency
EFTA	European Free Trade Association
EIB	European Investment Bank
ENP	European Neighborhood Policy
ERE	Albanian Energy Regulator
ERU	Emission Reduction Unit
ETS	Emission Trading Scheme
EU	European Union
FAO	Food and Agricultural Organization
FDI	Foreign Direct Investment
FITs	Feed In Tariffs
FYROM	Former Yugoslav Republic of Macedonia
GC	Green Certificate
GDP	Gross Domestic Product
GEF	Global Environment Fund
GHG	Greenhouse Gas
GIS	Green Investment Scheme
GWh	Gigawatt-hour
HES	Hydro Energy System
HPP	Hydro Power Plant
ICT	Information and Communications Technologies
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
KP	Kyoto Protocol
kWh	Kilowatt-hour
LEAP	Long-range Energy Alternatives Planning
LHPP	Large Hydro Power Plant
LPG	Liquefied Petroleum Gas
LULUCF	Land Use, Land Use Change, Forestry
M/A	Mitigation/Adaptation
MAUT	Multi-Attribute Utility Theory
MoEAC	Ministry of Economic Affairs and Communications
MoEF	Ministry of Environment and Forestry
MoU	Memorandum of Understanding
MW	Megawatt
MWh	Megawatt-hour

NC	National Communication
NEIA	National Environmental Investment Agency of Ukraine
NPP	Nuclear Power Plant
NRES	New Renewable Energy Sources
OECD	Organisation for Economic Co-operation and Development
OPT	Optimistic
PES	Pessimistic
PJ	Petajoule
PPA	Power Purchase Agreement
PV	Photovoltaics
RCP	Representative Concentration Pathways
RES	Renewable Energy Sources
RES-e	Electricity from RES
SAARE	State Agency for Alternative and Renewable Energy Sources
SEE	South East Europe
SEI	Stockholm Environment Institute
SHPP	Small Hydro Power Plant
SIEPA	Serbia Investment and Export Promotion Agency
SMART	Simple Multi-Attribute Ranking Technique
SUDES	Sustainable Development in the Energy Sector
TES	Thermal Energy System
toe	Tonne of Oil Equivalent
UCTE	Union for the Coordination of the Transmission of Electricity
UN	United Nations
UNDP	United Nations Development Programme
UNECE	United Nations Economic Committee for Europe
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
USD	United States Dollar
VAT	Value Added Tax
WTO	World Trade Organization

Methodology

This edition is based on the National reports of twelve (12) countries concerning the development and assessment of climate change Mitigation/Adaptation policy mixtures in the framework of EU funded project PROMITHEAS-4. A common methodology was followed for the development of these reports.

The general framework of two out of the four Representative Concentration Pathways (RCP) that the Intergovernmental Panel on Climate Change (IPCC) had been working on regarding emission scenarios and possible socio-economic development pathways, that of RCP3-PD and RCP8.5, was taken into consideration for the PROMITHEAS-4 scenarios. These pathways were selected for the following reasons:

- RCP3-PD and RCP 8.5 represent the lower and upper limit of emission scenarios respectively. Their possible socio-economic development pathways lead to these different greenhouse gas (GHG) concentrations in the atmosphere. Under the first pathway global temperature is expected to increase by +2,0-2,4^{o}C, while CO_2 emissions in 2050 need to be reduced compared to year 2000 by -85% to -50% (Hoegh-Guldgerg H., 2010). On the diametrical point, RCP8.5 is expected to lead to a global temperature increase by +4,9 – 6,1^{o}C, while GHG emissions will increase by +90% to +140% until 2050 (Hoegh-Guldgerg H., 2010).
- RCP3-PD requires stringent climate change policies to limit emissions and full participation of all countries (van Vuuren P. Deylef et al., 2011a; 2011b). However, emerging economies argue that they can not proceed in an international agreement for climate change and commit to quantitative GHG emission reduction targets unless the undertaken mitigation efforts secure economic growth and do not halt or restrict their efforts for such a priority. Under this emission scenario, the respective developed Mitigation/Adaptation (M/A) policy mixtures for the emerging economies that participate in PROMITHEAS-4 allowed the understanding of the dynamics of such options.
- RCP 8.5 represents a socio-economic development pathway which is fossil fuel intensive. This pathway fits the situation of the emerging economies of PROMITHEAS-4 since they had in 2009 high fossil fuel energy consumption (as a percentage of total) from 54,1% (Albania) to 99,0% (Kazakhstan)[1].

The three scenarios that were developed were: the Business-As-Usual (BAU), the Optimistic (OPT) and the Pessimistic (PES). RCP 8.5 was used for the development of the PES scenario and RCP3-PD for that of OPT since each one represented the lower and upper limit of emission scenarios respectively. Each scenario assumes a different policy mixture.

The objectives of the BAU scenario were: i) reduction of GHG emissions that the country is able to achieve through its implemented climate change policies (compared to the amount of GHG emissions of a previous year[2]); ii) adaptation of the country to the already observed climate change impacts. The policy mixture for this scenario was structured by the national Mitigation/Adaptation (M/A) policy instruments that were set into force before 31 December 2010. This scenario was served as the reference against which the outcomes of the other two were compared.

The objectives of the OPT scenario were: i) maximum reduction of GHG emissions that the country is able to achieve (compared to those of a previous year or to those of BAU for a certain year in the future) through stringent climate policies; ii) adaptation of the country to mild climate change impacts. It assumes an enhanced M/A policy mixture that the country may implement up

[1] Albania – 54,1%, Armenia – 68,4%, Azerbaijan – 98,2%, Bulgaria – 73,1%, Estonia – 83,4%, Kazakhstan – 99,0%, Moldova – 91,3%, Romania – 76,3%, Russia – 90,2%, Turkey – 89,9% and Ukraine – 80,0%. http://data.worldbank.org/indicator/EG.USE.COMM.FO.ZS.

[2] The availability of the historical data determined the selection of the previous year for each country.

to 2050 by supporting: i) the introduction of efficient technologies in almost all sectors targeting to the maximum reduction of GHG emissions ie maximum exploitation of the national potential in Energy Efficiency (EE) and Renewable Energy Sources (RES); ii) the necessary infrastructure for adaptation towards the minimum – in size and extent - expected climate change impacts. Specifically, this policy mixture consists of: i) the already implemented M/A policy instruments (included in the policy mixture of BAU); ii) the M/A policy instruments that the country had set into force after 1 January 2011; iii) additional measures, stated in national strategic and development plans and possible ones in line with the EU climate change policy that were adjusted to needs and priorities of the examined country.

The objectives of the PES scenario were: i) the minimum reduction of GHG emissions that the country is able to achieve (compared to those of a previous year or to those of BAU for a certain year in the future) through its implemented and already planned climate change policies; ii) the adaptation of the country to unfavorable climate change impacts. This scenario concerns a restricted M/A policy mixture that the country may implement up to 2050 considering minimum exploitation of the national potential in EE and RES and by facing the worse expected impacts of climate change. Only the technological options and the sectors with the highest national potential in EE and the most promising for the country types of RES were taken into account. The policy mixture consists of: i) the already implemented M/A policy instruments (included in the policy mixture of BAU); ii) the M/A policy instruments that the country had set into force after 1 January 2011 (described in OPT policy mixture) and iii) no other additional policy instruments apart from those already decided to be implemented and in line with the EU climate change policy; the EU policy instruments were adjusted to the needs and priorities of the country under this scenario.

For the development of the scenarios, key assumptions about the evolution of the most important drivers were also determined, following a common approach and, in parallel, considering the special characteristics of the examined countries. The time evolution of population was based on projections of the Department of Economic and Social Affairs of the United Nations (UN, 2011) and that of national real GDP was based on projections of the International Monetary Fund (IMF) (IMF, 2012). The use of “GDP real” over “GDP nominal” was preferred for removing the effect of inflation and being able to compare the outcomes among all countries. The growth of total energy demand of a national economic sector was linked to the growth of the real GDP.

The historical data for each country were sought from national and international official sources. The objective was to find data for 1990-2010. Due to the specificity of each country and the lack of data, the time horizon was 2000-2010 for most of the countries. Information and data about national policy instruments were also collected.

For each country a LEAP dataset was prepared representing the energy system of the country along with historical data. The respective assumptions for three scenarios were inserted into the dataset. After running this dataset, results on environmental performance, final energy demand, electricity generation, etc. for each policy mixture were available. LEAP, developed by SEI’s U.S. Center, is an integrated modeling software tool, widely used for energy policy analysis and climate change mitigation assessment (SEI, 2012). The outcomes of LEAP dataset along with official information were used for the evaluation of each one of the three policy mixtures.

Each policy mixture was evaluated for its performance under the criteria/sub-criteria of the AMS method. AMS is developed for evaluating climate policy instruments or relevant policy mixtures and is the combination of three standard multi-criteria methods: the Analytical Hierarchy Process (AHP), the Multi-Attribute Utility Theory (MAUT) and the Simple Multi-Attribute Ranking Technique (SMART) (Konidari and Mavrakis, 2007; 2006). The outcomes of this evaluation indicated the weaknesses and the strengths of each policy mixture and concluded with the most effective policy mixture for each country according to its national framework.

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