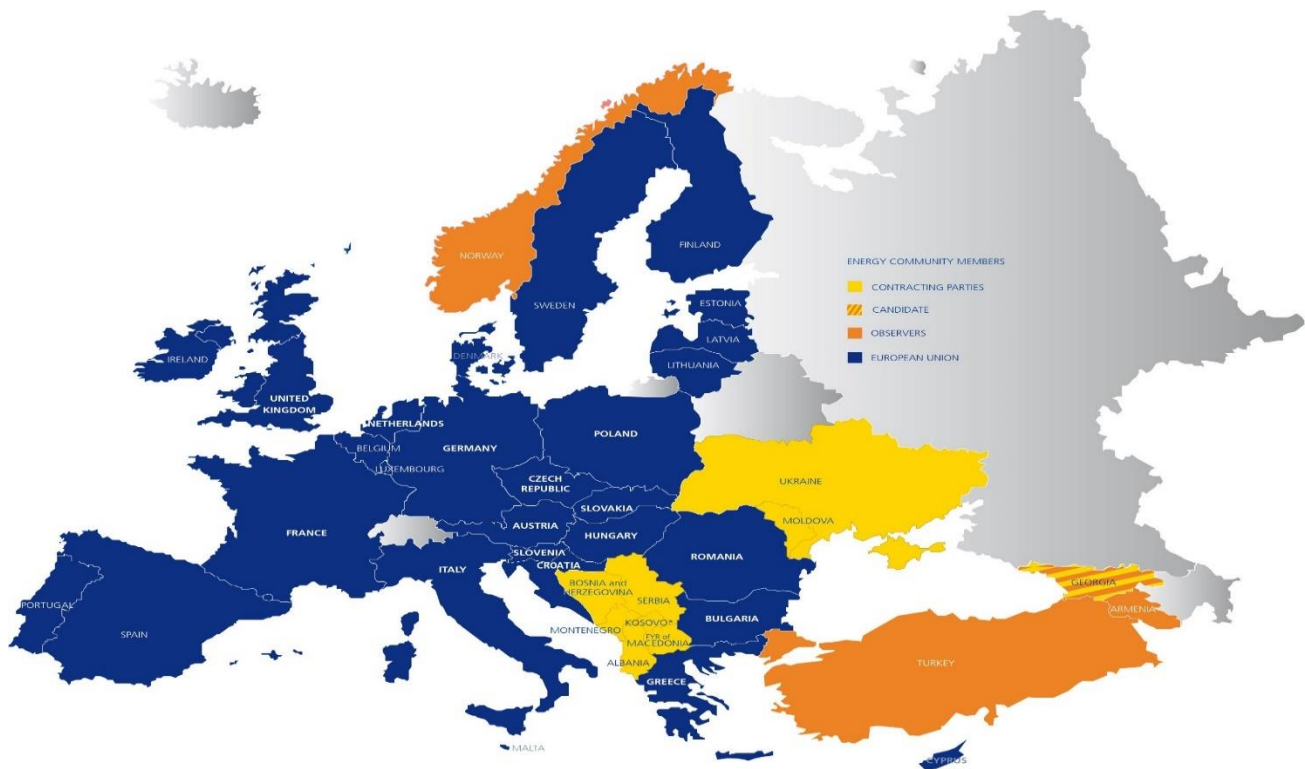




INSTITUTIONAL REFORM OF UKRAINE'S ENERGY SECTOR IN THE CONTEXT OF ITS INTEGRATION INTO THE EU MARKET (FINAL REPORT)



Source: Energy Community

BRATISLAVA/BUDAPEST/PRAHA/WARSZAWA/KYIV

September, 2016

ABBREVIATIONS AND GLOSSARY

Abbreviation	Interpretation
\$2005p	- Dollars at constant exchange rate, price and purchasing power parities of the year 2005
ACER	- Agency for Cooperation of Energy Regulators
bcm	- Billion cubic meters
BER	- Building Energy Rating
CEER	- Council of European Energy Regulators
CHP	- Cogeneration or combined heat and power plant
CNG	- Compressed natural gas
CZ	- Czech Republic, Czechia
CZK	- Czech Krona - Czech national currency
DSOs	- Distribution System Operators
EC	- European Commission
e.g.	- Exempli gratia, for example
EITI	- Extractive Industries Transparency Initiative
Eng.	- Diplomaed engineer
ERO	- Energy Regulatory Office
EU	- European Union
EUR	- Euro
GHG	- Greenhouse gases
GJ	- Gigajoule
ICDT	- International Centre for Democratic Transition, Budapest, Hungary
INEKO	- Institute for Economic and Social Reforms, Bratislava, Slovak Republic
ISEA	- Institute for Social and Economic Analyses, Praha, Czech Republic
GDP	- Gross Domestic Product
GWh	- Gigawatt-hours
HU	- Hungary
HUF	- Forint - Hungarian national currency
km	- Kilometer
koe	- Kilo of oil equivalent (10 ⁻³ toe)
kV	- Thousand volts
kt	- Thousand tons
mcm	- Million cubic meters
mln.	- Million
mMWh	- Million megawatt-hours
mt	- Million tons
MVA	- Million volt-amperes
mtoe	- Million tons of oil equivalent
MW-e	- Megawatt electrical
NGL	- Natural Gas Liquids

Abbreviation	Interpretation
NGO	- Non-Governmental Organization
NKREKP	- National Commission for state regulation in the energy and utilities, Ukraine's National Energy and Utilities Regulator
OCA®	- Software platform
PAUCI	- Polish-Ukrainian Cooperation Foundation, Warszawa/Kyiv
PL	- Poland
PLN	- Zloty - Polish national currency
RES	- Renewable Energy Sources
RF	- Russian Federation
SK	- Slovak Republic, Slovakia
toe	- Ton of oil equivalent
TSOs	- Transmission System Operators
TWh	- Terawatt-hours
UA	- Ukraine
UPS	- United Power System
V4	- Visegrad Group, The Treaty of four countries: Czech Republic, Hungary, Poland, Slovakia

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EXECUTIVE SUMMARY

The energy sector of Ukraine provides to the country 23^d rank in the world and 6th rank in Europe on the total primary energy supply indicator in EIA classification¹. Presented the structure and main characteristics of Ukraine's energy sector as well as the SWOT analysis outline the importance of this essential part of Ukrainian economy for the country, V4 group and Europa as a whole.

In the process of fulfillment of Stage 1 of the Project, the comparative analysis of the quality of governance in the countries under study was conducted. The analysis was made on the World Bank's results of the research project "The Worldwide Governance Indicators" and the adopted data for the estimation of specific governance dimension – "Institutions" of The World Economic Forum's research project for the period from 1996 to 2014 years. The results of the comparative analysis determined that the Ukraine's ranks of governance quality for all indicators of the governance quality, including the dimension of Institutions are being much or even in times lower than the relevant indicators of the V4 countries (Annex 1). This difference primarily indicates the significant, long-term and systemic deficiencies of the institutional development in Ukraine in general and institutional structure of the Ukraine's energy sector in particular. However, the energy sector occupies a significant share of country's GDP and affects upon the decision making virtually all subjects of social and economic relations, ranging from the individuals and households to large corporations, state authorities or even international governmental formations. This, once again confirms the particular relevance of the Project's topic that is also supported by the fact of signing Association Agreement between Ukraine and EU in 2014. Therefore, the institutional structure of the energy sector of Ukraine requires urgent improvement taking into account international experience, including the most positive and acceptable for Ukrainian conditions V4 countries experience. It should be recognized that the institutional structure of the energy sector is a multi-dimensional phenomenon that is characterized

¹ Source: IEA data for 2013.

by not only of the presence of combinations of the governmental, political, public or private institutions in the energy sector and related areas, but also by the allocation of the functions among them. Other dimension, that should be considered, is the values and combinations of the rights and obligations that are regulated by the legislation of the country in energy sector and internal regulations of the institutions themselves.

Taking into account the specific progress of institutional development for the last 2 years, we have concentrated the efforts on identification of the most acute and urgent problems of the energy sector of Ukraine as of February 2016. In order to identify the ultimate causes of escalation of the problems associated with the systemic deficiencies of its institutional structure, we initiated a survey of identification and ranking of the current problems of the branch in terms of their priority. The survey was conducted with the aim of identifying problems and setting priorities to solve them on three levels: at the macro level (the state as a whole); at the industry level (the energy sector); at the level of institutions (enterprises/authorities). The respondents were classified in three groups: private companies; state owned enterprises; state authorities.

The results of the processing of the survey input data, the total - highest and high priority ranks (in percentage, rounded to tenths of a percent) and aggregated for all qualifying groups of respondents were received the following estimations of energy sector's problems (by the 4 thematic categories below):

A. Legislative and Regulatory:

- Improvement of the legislative base of the regulation of the energy sector – 87,6%;
- Improvement of the general legal framework of regulatory policy – 87,5%;
- Improvement of the legal principles and activities of the National Commission, which performs state regulation in the energy and utilities (NKREKP) – 81,3%.

B. Financial and Economic:

- Improvement of fiscal policy and budget process, including decentralization in accumulation funds – 87,5%;
- Improvement of overall tariff policy/ Improvement of pricing system in the energy sector – 81,3%;
- Attraction of investments – 81,3%.

C. Energy Efficiency and Technical Upgrading:

- Improvement the energy efficiency of the buildings (Building Energy Ratings) – 81,3%;
- The reduction of the overall energy intensity of GDP of Ukraine – 75,0%;
- Construction/renovation of the domestic network infrastructure with the purpose of broader physical integration of transport energy networks of Ukraine and the EU – 68,8%.

D. Social and Security:

- Improvement of mechanisms to support the vulnerable categories of the population – 81,3%;
- Fighting corruption at the highest levels of the state governance – 75,1%;
- Achieve EU standards and guidelines of Ukraine for indicators of energy security of the state – 75,0%.

Identification of Ukrainian energy sector problems and determination of their relevance level in the result of the survey was supported by the followed re-classification of the energy sector problems among four listed above thematic categories. In addition, the telephone interviews with the respondents have been done after the survey in order to specify and focusing on formulations the most important deficiencies of the institutional structure of the energy sector in Ukraine. Post survey interviews have exposed such priorities of institutional deficiencies by the categories:

A. Legislative and Regulatory Category:

- Dependence of National Energy Regulator as the result of absence of the National Energy Regulator Law;
- Absence of basic energy efficiency legislation;
- Absence of the electricity market basic law, which complies with EU legislation.

B. Financial and Economic Category:

- Excessive centralization of the energy incomes to the central budget with prejudice to the interests of local budgets;
- Obsolete energy tariffs formation principles which do not provide investments recovery;
- Absence of state agency that promote and secure export-import transactions in energy and other sectors.

C. Energy Efficiency and Technical Upgrading Category:

- Insufficient incentives to implementation of the best energy efficiency practices;
- Insufficient financial resources for thermal modernization of the buildings;
- Absence of the Energy Efficiency Fund as an institution.

D. Social and Security Categories:

- Improvement energy security of the state;
- Improvement the policy of energy tariffs compensation mechanism in order to support the vulnerable categories of consumers;
- Fighting corruption at the all levels of the state governance, at the public and private owned enterprises.

The re-classification above and followed after survey interviews, in our opinion, allow to focus on defining the basic systemic and long-term deficiencies of the institutional structure of the energy sector in Ukraine, which led to escalation of the mentioned problems and identify the causal links between them. Consequently, the summarized results of the survey and interviews could be considered as an appropriate initial

framework for further research on the following stages of the Project. Thus, the major institutional deficiencies today in Ukraine's energy sector are:

- Imperfect legislation concerning to the National Regulator (NKREKP);
- Weak institutional base of the state regulation and imperfect economic and legal mechanisms to ensure the more higher level of energy efficiency and competition in the energy markets;
- Underdevelopment of the governmental institutions for stimulation of domestic and foreign investments and improvement of the investment protection mechanism.

The main conclusion at this stage of the Project is that key players of Ukraine's energy sector have sufficiently consolidated opinion of the necessity of institutional reforming of energy sector.

Obviously, primarily attention should be given to the development initiatives of institutional reform aimed at achieving synergies in dealing with these complex deficiencies. These institutional initiatives, which meet to synergy effect criteria, for Ukraine today are the following:

1. Improvement of legislation regarding to the National Regulator, approval, adoption and implementation of the Law on NKREKP;
2. Development, approval, adoption and implementation of the Energy Efficiency laws;
3. Creation and support of activity of the Energy Efficiency Fund.

The structure, key characteristics and SWOT analysis of Ukrainian energy sector are presented in visual and at a glance format. In order to compare energy sectors and energy efficiency of each of V4 country and Ukraine were used unified indicators: the primary energy supply (structures for 2010 and 2014) and the GDP energy intensity at the constant purchasing power parities (2005) for the period from 2000 until 2014 and thermal energy consumption in housing sector.

Energy security and energy competitiveness of the countries in comparative research for V4 and Ukraine are measured by the possibilities of diversification of energy supply sources, internal potential of country's self-sufficiency with energy resources and possibilities to reduce internal energy dependence. The comparative analysis was done within the structures of the sources of primary energy supply in dynamic for 2010 and 2014. Indicators of primary energy supply were added by the indicators of supply in physical units as well as the import shares with identification of the share in supplying of the strategic energy resources (natural gas, crude oil and petroleum products, solid fuel, electricity).

The experience of V4 countries on their national energy regulators as well as on energy efficiency funds and programmes are based on the special unified frameworks for the analysis. The recommendations, based on the experience of the Visegrad countries in reforming their energy sectors and on a comparative analysis of the key indicators of the energy sectors of the countries surveyed in the process of reforms, were formulated for institutional reform of the energy sector of Ukraine.

That is, in the main institutions of the energy sector and in Ukrainian society as a whole is currently formed a critical capacity required for the qualitative reform of the industry. At the same time, comes the awareness, that the necessary steps of the energy sector reforming should be more strongly and rapidly implemented by the state institutions and, above all, by the Verkhovna Rada of Ukraine for legislative reforms and by the Government of Ukraine for their systematic and consistent implementation.

INTRODUCTION

The relevance of institutional structure to the actual requirements of modern economic and social relationships in civil societies is determined by quality of governance. The analysis of World Bank's research "The Worldwide Governance Indicators"² for the recent 18 years and World Economic Forum's research "The Global Competitiveness Reports" for 2010 and 2014 confirm that Ukraine has stuck in improvement of its governance. Moreover, in dimensions of "Regulatory Quality", "Rule of Law", "Control of Corruption" as well as "Institutions" the successive regress is observed from 2005 while V4 countries demonstrate much more high aggregate indicators of governance than Ukraine. The dramatic changes in value of the dimension "Political Stability and Absence of Violence/Terrorism" for Ukraine from the level of 41 points in 2005 to only 6 points in 2014 have been occurred due to Crimea annexation and military conflict in Donbass³.

The energy sector of Ukraine remains one of the non-transparent parts of the Ukrainian economy and generates quite significant portion of GDP. Moreover, as the sector generates for over 10 bln EUR of annual turnover, it is also a source of large-scale corruption. Thus, Ukraine should consolidate its efforts at all levels of government, business, NGOs, self-regulating organizations and society, aimed at reforming the energy sector while deepening integration into the EU energy market as a key factor of ensuring energy security. In spite of urgent stringent actions needed, the state institutions still act in a slow-paced and ineffective reform process which conducted by:

- inconsistent steps of reform;
- duplication of functions;
- ineffective use of human, financial and other resources;
- insufficient methodological base of preparation of management decisions;
- nepotism and cronyism in appointing or key Government and commercial manager positions.

² www.govindicators.org

³ Annex 1 to this report

If pursued, these issues may lead to disappointment within the society, questioning the last year's political choice and the selected path towards integration into the EU. For overcoming/avoiding these issues, the project seeks to create the preconditions for the formation of a modern market-oriented energy sector institutional structure, which would meet the requirements the Treaty on the Functioning of the European Union, the Treaty Establishing the Energy Community and the EU Energy Packages criteria. The project consists of a comprehensive research study on the V4 energy sectors reform experience per sub-sectors and on the current situation in Ukraine in full correspondence with the directions of the implementation of Sustainable Development Strategy of Ukraine - 2020 approved on 12 January 2015.

The project will identify and propose the most proper ways to reform the institutional framework of the energy sector of Ukraine in order to have a more efficient and sustainable use of energy sources, and a further rapprochement towards the Visegrad countries, and as such towards the EU. The project aims to bring together all the relevant stakeholders, ranging from state institutions, energy industry companies, to the most well established local experts on energy security, with the aim to promote multi-stakeholder dialogues and cooperation. In order to ensure successful results and as such the further ratification of the recommended reforms, the project will include working meetings with the targeted groups, and beneficiaries and a round-table discussion.

The project aims to create the foundation for Ukraine's energy sector institutional reform for deepening its integration into the EU energy market. The Project will study the V4 reforming experience by expertise exchange and exposure to good practices, and elaborate a set of recommendations per sub-sectors on how to reform the institutional framework of Ukraine's energy sector in line with EU standards and criteria. The project's main stakeholders are the Verkhovna Rada, the Cabinet of Ministers of Ukraine, other governmental agencies and authorities; large state- and private owned energy sector enterprises, sectoral business associations.

The research study includes analytical material about identification actual main problems of Ukrainian energy sector and related systematic deficiencies of the existing institutional structure in Ukraine; comparative analysis of key characteristics of energy sectors of Ukraine and V4 countries; proposals to use an applicable positive experience of V4 countries for reforming of energy sectors of Ukraine.

RESEARCH PLAN AND METHODOLOGY

The project intends combinations of approaches at the related steps of study. At the first stage - Desk Research in order to identify main problems of energy sector of Ukraine and related systematic deficiencies of the existing institutional structure of energy sector in Ukraine the survey within wide range of project`s stakeholders with further followed the telephone interviews with them are fulfilled. The energy sector problems are ranked based on the results of survey data processing and followed interviews.

At the second stage of the project – Comparative Research, the levels of energy efficiency and energy security of the countries taking into account of the energy sectors' structures and institutional features of each country under research are provided in the following directions:

- energy efficiency by index of GDP intensity;
- energy efficiency by index of building energy rating (BER);
- energy security levels of the countries by the rates of the import dependence of main energy resources and the shares of energy resources supplying from different sources/countries.

The results of comparative analysis are the background for feasibility of applicable implementation the best V4 practice in reforming of their energy sectors for institutional reform of Ukrainian energy sector.

Finally, at the stage 3 – Elaboration of Proposals the cases and related decisions among each country are observed within proposed directions of institutional reforms, when the changes of institutional structure and basic legislation have the sufficient effect on the changes of energy efficiency and energy security factors. At this stage, the recommendations in institutional reforming of energy sector of Ukraine in the aspects of state governance, institutional structure improvement, role, functions and responsibilities of National Energy Regulator, establishment and functioning of energy efficiency fund, approaches to relevant legislation improvement are proposed.

ENERGY SECTOR OF UKRAINE AT A GLANCE

Structurally, Ukraine's energy sectors consists of two large subsectors: fuel and electric power industry (Figure 1). The fuel subsector is consist of seven main components: natural gas, oil, coal, biomass to fuel, natural gas transportation and storage, crude oil transportation and storage, refinery. The electric power industry subsector is consist of five main components: nuclear, thermal (including cogeneration facilities and block power stations), hydro, other RES, power electricity networks. The main components of the subsectors were classified depending of the type of the energy sources and/or type of business activity.

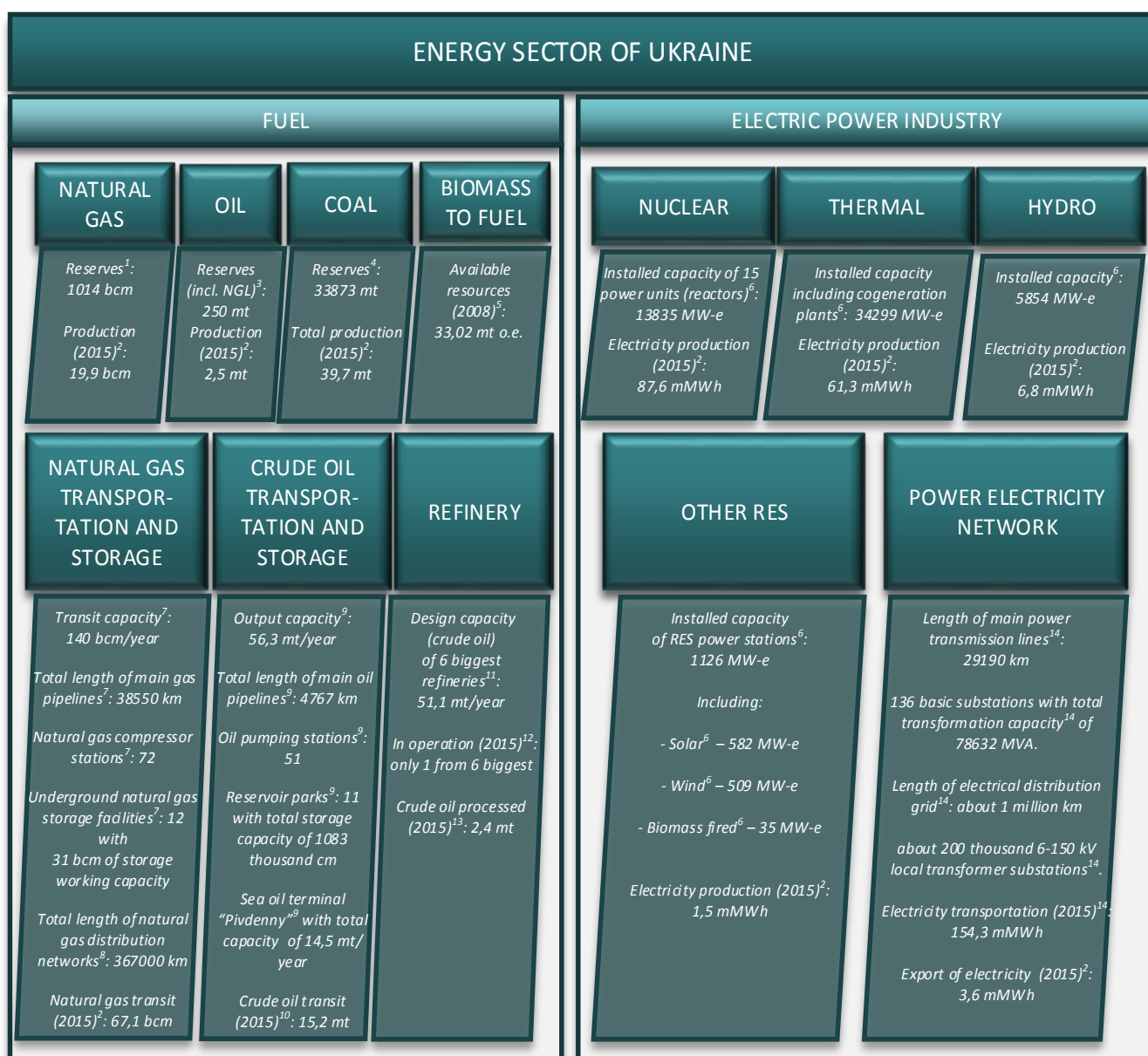
Natural gas in Ukraine is provided by imports and domestic production. The annual volume of gas production ranges from 18 to 21 bcm/year in the past 15 years and almost has not changed in the past decade. About 85% of production is performed by enterprises of governmental sector of economy. The total gas consumption in Ukraine has declined from 57,6 bcm in 2010 to 33,8 bcm in 2015 or by 23,8 bcm (-41,3%). The largest reduction in gas consumption occurred for resent 5 years by industrial consumers from 23,0 bcm in 2010 to 11,8 bcm in 2015 or by 11,2 bcm (-48,7%).

Gas usage for the operating needs of gas producers and system operators has declined by 6% from 3.6 to 3.3 bcm. Operating needs of Ukraine's gas transmission system operator Ukrtransgas are related to the volume of gas transported from the Russian Federation to the EU, Moldova and Turkey. In 2015, the transmitted volumes increased by 4,9 bcm (8%) from 62,2 bcm in 2014 to 67,1 bcm in 2015.⁴

Crude oil production and refining industry of Ukraine have not been refocused in order to implement new technologies, minimize raw material losses, attain European quality standards and increase the export of petroleum products. It has also been planned that investors will provide reconstruction of existing refineries with the necessary volumes of raw materials, but this has not happened due to weak incentives for investments.

The structure of mine assets of state coal mining companies indicates the aging of main assets. About 40% of all mines have been in operation for over 70 years.

⁴ <http://www.naftogaz-europe.com/subcategory/en/GasConsumption>



Sites references to Figure 1:

- Victor Logatskiy and others. - *Natural Gas Recovery in Ukraine: Tax Incentives and Initiatives for Discussion*. Razumkov Centre edition, 2015. – Kyiv, 44 pp.
- Kateryna Markevych and others. - *Energy Sector of Ukraine: Summary for 2015*. Razumkov Centre edition, 2016. – Kyiv, 72 pp.
- Olexandr Alymov and others. - *Economic Development of Ukraine: Institutional and Resources Provision*. United Institute of Economy National Academy of Sciences of Ukraine, 2005. – Kyiv, 540 pp.
- Black Gold of Ukraine: Infographics*. Ukrinform Information Agency. http://www.ukrinform.ua/rubric-other_news/1536886-vidobutok_vugillya_v_ukraini_nini_vedetsya_v_160_shahtah_infografika_1857135.
- Georgiy Geletukha and others. – *Energetic Potential of Biomass in Ukraine*. <http://elibrary.nubip.edu.ua/8102/1/10ggg.pdf>.
- United Energy System of Ukraine: Capacity at the end of 2014*. http://2014.ukrenergo.energy.gov.ua/ukrenergo/control/uk/publish/article?art_id=182509&cat_id=171201
- Data of PJSC Ukrtransgas. <http://utg.ua/en/utg/gas-transportation-system/characteristic.html>
- Data of NJSC Naftogaz of Ukraine.
- Data of PJSC Ukrtransnafta. http://www.ukrtransnafta.com/en/about_company/shema/.
- Interfax-Ukraine Information Agency. <http://ua.interfax.com.ua/news/general/323378.html>.
- Refinery Industry of Ukraine: Condition, Problems and Development Ways*. National Security and Defence Journal, No 3. Razumkov Centre edition, 2006. - Kyiv, 48pp.
- OilNews*. http://oilnews.com.ua/a/columns/Patsient_skoree_mertv_u_ukrainskih_NPZ_perspektiv_net/221279.
- Razumkov Centre's estimation.
- New Energy Strategy of Ukraine Until 2020: Security, Energy Efficiency, Competition*. National Security and Defence Journal, No 1. Razumkov Centre edition, 2015. - Kyiv, 56 pp.

Figure 1. Energy sector of Ukraine in key figures, 2015.

The coal industry remains a subsidized industry. The situation was severely complicated due to military events in the East of Ukraine and destruction of coal industry infrastructure. This leads to imminent closing down of mines, first those that were destroyed or damaged.

Under conditions of the military uncertainty of the future of coal mining in Eastern Ukraine, priority is shifted to the development of Lviv-Volyn coal basin, development of brown coal deposits and combustible shale deposits in Central Ukraine, as well as conducting an independent audit of mine assets and creating an open registry of coal reserves. In 2014-2015, the critical coal imports from the world market to the country have been arranged.

The installed capacity of Ukraine's power stations (including CHP and block stations) is 55114 MW-e at the end of 2014⁵. Installed capacity distribution among the type of generation is as follows: thermal power generation – 34299 MW-e (62,2%), nuclear power generation – 13835 MW-e (25,1%), hydro power generation - 5854 MW-e (10,6%), other RES power generation – 1126 MW-e (2,1%). The electricity production of Ukraine is estimated about 157,2 mMWh in 2015 and was produced by the categories of power generation: 61,3 mMWh (39,0%), nuclear power generation – 87,6 mMWh (55,7%), hydro power generation – 6,8 mMWh (4,3%), other RES power generation – 1,5 mMWh (1,0%).

The total power losses in transmission and distribution networks were occurred by 35,4 mMWh or 22,5% in 2015. The high level of power losses in Ukraine's UPS networks is caused by their long period of exploitation, limited financing of reconstruction, modernization and new construction of transmission and distribution electricity grids.

Wholesale electricity market is only institutionally organized electricity market in Ukraine. At the September of 2016, the current market model of does not foresee existence of a direct bilateral agreements with sector's customers, segments of a balancing market and a market of ancillary services.

⁵ United Energy System of Ukraine: Capacity at the end of 2014.
http://2014.ukrenergo.energy.gov.ua/ukrenergo/control/uk/publish/article?art_id=182509&cat_id=171201

SWOT ANALYSIS FOR ENERGY SECTOR OF UKRAINE

Ukraine's energy sector SWOT analysis is applied in order to distinguish the extent in which an expert estimation of current energy sector status correlates with the actual energy sector problems defined by the respondents of the following survey. In this context, energy sector's SWOT analysis represents most general strengths, weakness, opportunities and threats related to Ukrainian energy sector at the middle of 2016.

Strengths:

- Ukraine is richly endowed by primary energy resources in European dimensions;
- Ukraine as a country has an advantageous geographic location between main suppliers of energy resources and European energy markets;
- Ukraine's energy sector has sufficient bi-directional transporting potential and relevant infrastructure in order to transit and export or import of natural gas, crude oil, coal, power electricity, biomass;
- Ukrainian natural gas transporting system has the significant natural gas storage capacities which can be used for gas supply in peak demand season in Ukraine and Central European countries;
- Ukraine has reserve capacities for electric power generation in order to meet additional internal or external electricity demands;
- Energy sector has quite qualified domestic plants personal and engineering;
- Ukraine's energy sector mainly relays on domestic machinery, equipment and materials.

Weakness:

- Still dependence of several energy resources: nuclear fuel, crude oil and oil products, natural gas;
- Depletion of hydrocarbons reservoirs;
- Not enough geological and survey examination of energy resources and deposits;
- Only low value added stages of nuclear fuel production;

- High extent of obsolescence of energy assets and deep degradation of domestic refinery industry;
- Insufficient legislation, over-regulation and weak governmental institutions which do not provide market competition;
- Temporary losses of several energy infrastructure objects and access to several hydrocarbons deposits.

Opportunities:

- Growth of production convenient and inconvenient energy resources, including hydrocarbons, based on new discovered reservoirs and/or more intensive use of current deposits and resources;
- Confirmation of country's "energy bridge" position between main suppliers and European markets;
- Development of technologies and works with high value added stages of energy resources manufactory, including the elements of nuclear cycle;
- More possibilities and gains based on modernization and reconstruction of energy infrastructure;
- Establishment of natural gas hub based on Ukrainian gas underground storages for Eastern and Central European countries;
- Growth of export potential, especially electricity;
- Utilization of low- or not-used renewable energy sources based on biomass, recycling, solar and wind resources;
- Access to Ukraine's energy market as the one of largest in Europe which has above 42,5 mln. country's residents, metallurgic, chemical and other industries as actual or potential energy consumers.

Threats:

- Sporadic war activities in several east districts of the country;
- Un-predictive Russian military policy in relation to Ukraine;

- Losses of the rates of energy sector development caused by temporary loss of control by Ukrainian governmental over the Crimea and several districts of Donbass;
- Accidents on energetic objects due to probability of diversions or relatively high obsolescence of energy infrastructure;
- Creation of alternative transportation routes of energy resources in order to avoid Ukraine.

Analyzing the list of specified threats inherent to the energy sector, comes the awareness that, in one or another extent, their main source of origin and support is the negative RF factor. Just Russia illegally annexed the peninsula of Crimea, has acted as an ideologue of the war, military resources sponsor and a direct participant of the military conflict in the Donbas, which led to disruption of energy infrastructure. Only Russia consistently uses energy blackmail against to Ukraine and Europe by shut downs of gas deliveries in in January 2006 and in January 2009 and promotes extra energy delivery routes bypassing Ukraine and V4 countries. The definition and understanding of the threats and weaknesses associated with the contemporary status of the energy sector of Ukraine allows preparing the adequate measures for their leveling and mitigation. Essential range of such measures should be provided in the direction of institutional reform of the country's energy sector.

UKRAINE'S ENERGY SECTOR: PROBLEMS RANKING AND INSTITUTIONAL STRUCTURE DEFICIENCIES

Survey concept

The purpose of the survey is identification of the actual problems of energy sector and assessment their priority at the state of February 2016.

The questionnaire of the survey. In order to conduct the survey the form of questionnaire has been designed. The potential problems identification have been allocated among three ranges or levels:

1. Macro-level (national economy);
2. Mid-level or sectoral (energy sector);
3. Micro-level (institution: enterprise, legal entity, NGO, state authority).

In addition, in the form of the questionnaire, the respondents have the possibility to identify independently other potential problems on which level and assess the importance of their solution for the energy sector of Ukraine.

In order to assess the priority of energy sector's potential problems the form of questionnaire provides five ranks of priority:

1. Highest priority;
2. High priority;
3. Medium priority;
4. Low priority;
5. Not a priority.

Priority estimation is carried out by summarizing the values of highest and high priority ranks.

The groups of respondents. The respondents of the survey are the top managers of the energy sector companies as well as the leaders of the state authorities having relevance

to the energy sector, including the main beneficiaries of the Project. The survey respondents are classified among three groups belonging to:

1. Private companies;
2. State owned enterprises;
3. State authorities.

The survey's questionnaire was sent to 37 potential participants of the survey by electronic messages, which were doubled by the mail correspondence with cover letter. The answers were received from 25 respondents, which represented of each groups of the respondents.

The survey also provides consolidated assessment of each potential problem including estimation of the problems' priorities of the classified groups of respondents.

Assessment scale. In the survey, the priorities estimations are based upon percentage scale of assessment. The percent values are rounded to the decimals of percent.

Software package. In the survey is used software platform OCA® - well known in Ukraine domestic computing technology for social and marketing data processing and analyzing⁶.

Survey's results interpretation and analysis

After receiving the completed questionnaires from respondents, we have processed the input material in software package OCA® special module and classify problems on the base of estimation of degree of their urgency solving by means of reforming the institutional structure of the energy sector of Ukraine.

The overall results of the survey are presented in tabular form in Appendix 2 to this report. Increased interest in the analysis of the results raise the following 3 points:

1. Identification the most and least priority problems of the energy sector, consolidated for all groups of respondents

⁶ <http://oca.com.ua/eng.php>

2. Identification the significant differences in the assessment of priorities specific problems of the energy sector by specific groups of respondents
3. Definition of thematic categories with subsequent re-combining the most priority problems and their allocation to one or other thematic categories and establish a causal connection between each thematic category of energy sector problems and deficiencies of its institutional structure, which must be corrected before for all. So, consider these points consistently.

Identification the most and least priority problems of the energy sector, consolidated for all groups of respondents

The ranking of most priority 22 problems, which combined highest and high estimations of the survey at the February 2016, is presenting in the Table 1.

Table 1. The most priority problems of Ukraine's energy sector, consolidated by all group of respondents

Rank	The Statement of the Problems	Rank Value, %	Relative Level
1	Improvement of the legislative base of the regulation of the energy sector	87,6	Mid-level
2	Improvement of the general legal framework of regulatory policy	87,5	Macro-level
3	Improvement of fiscal policy and budget process, including decentralization in accumulation funds	87,5	Macro-level
4	Improvement the energy efficiency of the buildings (Building Energy Ratings)	81,3	Macro-level
5	Attraction of investments	81,3	Mid-level
6	Improvement of overall tariff policy	81,3	Macro-level
7	Improvement of pricing system in the energy sector	81,3	Mid-level
8	Improvement of the legal principles and activities of the National Commission, which performs state regulation in the energy and utilities (NKREKP)	81,3	Mid-level
9	Improvement of the procurement policy for goods and services	81,3	Mid-level
10	Improvement of mechanisms to support the vulnerable categories of the population	81,3	Macro-level

Rank	The Statement of the Problems	Rank Value, %	Relative Level
11	Fighting corruption at the highest levels of the state governance	75,1	Macro-level
12	Improvement of sectoral tax system	75,1	Mid-level
13	Approximation of national legislation to the legislation of the EU countries	75,1	Macro-level
14	The reduction of the overall energy intensity of GDP of Ukraine	75,0	Macro-level
15	Achievement EU standards and guidelines of Ukraine for indicators of energy security of the state	75,0	Macro-level
16	Transition to the standards and regulations of the EU	75,0	Macro-level
17	Construction/renovation of the domestic network infrastructure with the purpose of broader physical integration of transport energy networks of Ukraine and the EU	68,8	Mid-level
18	Implementation of stimulating methods of pricing for the products and services	68,8	Micro-level
19	Improvement of the enterprise's accounting policy and reporting	68,8	Micro-level
20	The introduction of quality standards for the products and services and EU regulations	68,8	Micro-level
21	Fighting corruption at the level of the leadership of public sector bodies and key state enterprises sector	62,6	Mid-level
22	Implementation of industry standards and EU regulations, in particular Network Eurocodes	62,5	Mid-level

Specific attention also deserves a modest assessment of priority of such problems as:

- Privatization of the large state-owned enterprises of the energy sector - 18,8% (mid-level);
- Creation of the municipal (regional) companies-operators of energy networks on the basis of the privatization of state-owned networks and networks built by the private investors – 25,1% (mid-level);
- Wider delegation of regulatory functions of the state to the self-governing industry regulatory institutions/associations – 31,3% (macro-level);
- Wider delegation of regulatory functions from the central Government to the regions – 31,3% (macro-level);

- The need to re-view the results of the privatization of state property, which took place in the period of 1991-2013 years – 37,5% (macro-level);
- Improvement of the corporate governance in the energy sector and in large enterprises, including the introduction of the Institute of independent directors (members of the supervisory boards) – 37,5% (mid-level);
- Improvement of corporate governance, including the introduction of the Institute of independent directors (members of supervisory boards) into public joint stock companies – 37,5% (micro-level).

It seems that the central organs of State power of Ukraine, despite the loud declaration of privatization and decentralization principles, not yet ready really convey the part of his powers nor the share of state property available to regions or private companies. In addition, special attention deserves the consolidated opinion of all groups of respondents about the low priority the appropriateness of re-viewing the results of the privatization of state property, which took place during the 1991 -2013.

Identification the significant differences in the assessment of priorities specific problems of the energy sector by specific groups of respondents

A particular interest for the study represents an identification of significant differences in the assessment of the priorities of some of the energy sector problems by the different groups of respondents. In particular, the results of the survey of such differences are noted in the assessment of the following problems:

1. Implementation of the standards initiative, the transparency of the extractive industries (EITI), %:
 - a. Private companies - 20 (low estimation value);
 - b. State owned enterprises - 40;
 - c. State authorities - 83,4 (high estimation value).
2. Ensuring the effective operation of the National Anti-corruption Bureau, Antimonopoly Committee, %:
 - a. Private companies - 20 (low estimation value);

- b. State owned enterprises - 60;
 - c. State authorities - 83,3 (high estimation value).
3. Implementation mechanism of accelerated depreciation of fixed assets, %:
- a. Private companies - 80 (high estimation value);
 - b. State owned enterprises - 60;
 - c. State authorities - 16,7 (low estimation value).

The differences in the assessments confirm the followings. Firstly, the enterprise sector, especially private production companies in general do not wish to disclose detailed information about their activities according to the EITI standards of transparency. Secondly, the private companies of the energy sector fearful of a newly created National Anti-corruption Agency, expecting from it undue interferences in their activities, it is the same as for authorities of the Antimonopoly Committee. Thirdly, considerable difference in the assessment of the application of the mechanism of accelerated depreciation of fixed assets is explained by the fact that businesses consider such application as additional incentive for investments thanks to the financial resources of the enterprises. The state authorities, on the contrary, expect the threat of reduction of incomes of the state budget, including corporate income tax.

Definition the thematic categories of problems with subsequent re-combination the most priority problems within the defined thematic categories

Systematization of topical and first-priority problems of the energy sector of Ukraine is carried out in order to identify causal links between these problems (consequences) and the largest systemic and long-term deficiencies the institutional structure (factors). Using the data of Table 1 has been classified four thematic categories of problems, each of which was assigned to the three most ratings problems of the energy sector of Ukraine as of February 2016. Thus, the problems structure of the energy sector is presented below:

A. Legislative and Regulatory:

- Improvement of the legislative base of the regulation of the energy sector – 87,6%;
- Improvement of the general legal framework of regulatory policy – 87,5%;
- Improvement of the legal principles and activities of the National Commission, which performs state regulation in the energy and utilities (NKREKP) – 81,3%.

B. Financial and Economic:

- Improvement of fiscal policy and budget process, including decentralization in accumulation funds – 87,5%;
- Improvement of overall tariff policy/ Improvement of pricing system in the energy sector – 81,3%;
- Attraction of investments – 81,3%.

C. Energy Efficiency and Technical Upgrading:

- Improvement the energy efficiency of the buildings (Building Energy Ratings) – 81,3%;
- The reduction of the overall energy intensity of GDP of Ukraine – 75,0%;
- Construction/renovation of the domestic network infrastructure with the purpose of broader physical integration of transport energy networks of Ukraine and the EU – 68,8%.

D. Social and Security:

- Improvement of mechanisms to support the vulnerable categories of the population – 81,3%;
- Fighting corruption at the highest levels of the state governance – 75,1%;
- Achieve EU standards and guidelines of Ukraine for indicators of energy security of the state – 75,0%.

It is obvious, there is hypothesis about causal link between the most relevant problems (consequences), which were classified by the four listed above thematic categories, and

certain systemic deficiencies (causes) of the institutional structure of the energy sector of Ukraine. The major institutional deficiencies today in Ukraine's energy sector are:

- Imperfect legislation concerning to the National Regulator (NKREKP);
- Weak institutional base of the state regulation and imperfect economic and legal mechanisms to ensure the more higher level of energy efficiency and competition in the energy markets;
- Underdevelopment of the governmental institutions for stimulation of domestic and foreign investments and improvement of the investment protection mechanism.

Obviously, primarily attention should be given to the development initiatives of institutional reform aimed at achieving synergies in dealing with these complex deficiencies. These institutional initiatives, which meet to synergy criteria, for Ukraine today are the following:

1. Improvement of legislation regarding to the National Regulator, approval, adoption and implementation of the Law on NKREKP;
2. Development, approval, adoption and implementation of the Energy Efficiency laws;
3. Creation and support of activity of the Energy Efficiency Fund.

The improvement of legislation regarding to the National Regulator and approval, adoption and implementation of the Law on NKREKP aim to make this the main State energy regulatory authority is institutionally, functionally and financially independent from external factors. If these principles will be provided by applicable law, the expected synergies from the National Regulator, firstly due to application of a single methodological base pricing on services and products of the energy markets. Further, consequently the balance of the interests of different categories of producers and consumers of energy market will be achieved, including the interests of most vulnerable categories of consumers.

Synergistic effect of creation and activity of the Energy Efficiency Fund will be achieved by improving efficiency practices in the economy of the country. Thus, the indicators of general efficiency (GDP intensity), and local efficiency indicators (e.g. specific energy values for the maintenance of a separate building) would be enhanced. The Fund's activity involves the creation of a mechanism of concentration and spending the money on measures to increase energy savings and energy efficiency. The Fund will create the incentives to the implementation of such measures on rational use of energy and resources, not only for virtually all categories of consumers as well as for producers of goods and services that provide energy-efficient technologies.

It is expected, that more advanced institutional structure of Ukraine's energy sector will provide the synergistic effect on creation of the incentives for implementation of the best practices of energy efficiency; most safe, stable and diversified of energy sources and, together, will provide more high level of country's energy security.

COMPARATIVE RESEARCH OF V4 AND UKRAINE ENERGY SECTORS

Energy sectors capacity and energy efficiency

The structures and key characteristics of Ukrainian energy sector are presented on the Figure 2. This data confirms essential technical potential of Ukraine's energy sector. However, usually we cannot to applicate pure special technical characteristics or indicators in order to compare the energy sectors' capacities of two countries; especially they have different structure of energy sector's assets. Hardly this task would be easily if we would need to estimate the capabilities of energy sectors of five countries: V4 group and Ukraine. Thus, for energy sectors comparative research we need select more general and universal indicators and provide the possibilities of comparative analysis within the timeline. Obviously, the indicator that meets these requirements is the primary energy supply in universal units – ktoe, is the most appropriate in the sense of comparative analysis for the countries under research. The comprehensive data of the Table 2 with the structures of the sources of primary energy supply for each country as well as the framework of formation other (sectional, derivative and intermediate) co-indicators in the same measurement units give the sufficient and relevant base for comparative research. In order to facilitate visual perception of the comparative research and its results interpretation the figures 2 – 8 based on the data of Table 2 are presented.

The Figure 2 provides the possibility to the estimation of general energy sectors capacity, to distinguish the changes of the energy sectors' volumes in the comparison of 2014 with 2010 and to rank the countries. The most comprehensive energy sector for 2014 is the Ukrainian – 105684 ktoe of primary energy supply. The Polish energy sector is the second and has a bit modest indicator 95793 ktoe. The third place occupies the energy sector of Czech Republic – 41358 ktoe. Hungary and Slovakia are clothing this ranking with relevant indicators 22721 and 15565 ktoe.

Table 2. V4 and Ukraine primary energy supply, 2010 and 2014 ^{1,2,3,4,5} (in ktoe).

Country, year, primary energy sources formation	Coal and other solid fuels	Crude oil and petroleum products	Natural gas	Combustible renewables and waste ⁶	Nuclear	Hydro	Wind and Solar	Non-combustible renewables ⁷	Electrical energy	Heat	Total
Czech Republic, 2014:											
Production	16 847	261	212	3 502	7 843	164	240	0	0	0	29 069
Import	2 861	10 858	5 953	275	0	0	0	0	1 018	0	20 965
Export	-3 655	-2 007	-1	-290	0	0	0	0	-2 420	2	-8 371
International bunkering	0	0	0	0	0	0	0	0	0	0	0
Stock changes	-264	-54	19	-6	0	0	0	0	0		-305
Total primary energy supply	15 789	9 058	6 183	3 481	7 843	164	240	0	-1 402	2	41 358
Czech Republic, 2010:											
Production	20 730	270	200	2 770	7 320	240	90	0	0	30	31 650
Import	2 200	10 600	6 970	120	0	0	0	0	570	0	20 460
Export	-5 200	-1 630	-130	-240	0	0	0	0	-1 860	0	-9 060
International bunkering	0	310	0	0	0	0	0	0	0	0	310
Stock changes	-580	-20	-1 020	0	0	0	0	0	0	0	-1 620
Total primary energy supply	17 150	9 530	6 020	2 650	7 320	240	90	0	-1 290	30	41 740

Continuation of Table 2.

Country, year, concept of the primary energy sources supply calculation	Coal and other solid fuels	Crude oil and petroleum products	Natural gas	Combustible renewables and waste ⁶	Nuclear	Hydro	Wind and Solar	Non-combustible renewables ⁷	Electrical energy	Heat	Total
<u>Hungary, 2014:</u>											
Production	1 588	837	1 437	1 964	4 089	26	82	0	0	0	10 024
Import	1 058	8 897	7 434	177	0	0	0	0	1 641	0	19 207
Export	-447	-3 150	-617	-315	0	0	0	0	-489	0	-5 020
International bunkering	0	-176	0	0	0	0	0	0	0	0	-176
Stock changes	3	-63	-1 274	21	0	0	0	0	0	0	-1 314
Total primary energy supply	2 202	6 345	6 980	1 846	4 089	26	82	0	1 152	0	22 721
<u>Hungary, 2010:</u>											
Production	1 593	1 090	2 234	1 843	4 119	16	150	0	0	0	11 046
Import	1 412	8 559	7 910	117	0	0	0	0	851	0	18 850
Export	-280	-2 783	-186	-82	0	0	0	0	-404	0	-3 735
International bunkering	0	-235	0	0	0	0	0	0	0	0	-235
Stock changes	-6	-89	-146	-1	0	0	0	0	0	0	-241
Total primary energy supply	2 719	6 542	9 812	1 877	4 119	16	150	0	447	0	25 682

Continuation of Table 2.

Country, year, concept of the primary energy sources supply calculation	Coal and other solid fuels	Crude oil and petroleum products	Natural gas	Combustible renewables and waste ⁶	Nuclear	Hydro	Wind and Solar	Non-combustible renewables ⁷	Electrical energy	Heat	Total
Poland, 2014:											
Production	54 033	969	3 726	8 548	0	220	645	20	0	0	68 161
Import	6 249	28 715	9 709	1 638	0	0	0	0	1 161	0	47 472
Export	-10 328	-6 150	-62	-2 475	0	0	0	0	-975	0	-19 990
International bunkering	0	-148	0	0	0	0	0	0	0	0	-148
Stock changes	509	-204	-31	24	0	0	0	0	0	0	298
Total primary energy supply	50 463	23 182	13 342	7 735	0	220	645	20	186	0	95 793
Poland, 2010:											
Production	55 381	744	3 692	6 837	0	251	152	13	0	14	67 084
Import	8 268	29 188	8 909	449	0	0	0	0	543	0	47 357
Export	-11 009	-3 519	-38	-13	0	0	0	0	-659	0	-15 238
International bunkering		-722									-722
Stock changes	2 021	-291	237	-5							1 962
Total primary energy supply	54 661	25 400	12 800	7 268	0	251	152	13	-116	14	100 443

Continuation of Table 2.

Country, year, concept of the primary energy sources supply calculation	Coal and other solid fuels	Crude oil and petroleum products	Natural gas	Combustible renewables and waste ⁶	Nuclear	Hydro	Wind and Solar	Non-combustible renewables ⁷	Electrical energy	Heat	Total
<u>Slovakia, 2014:</u>											
Production	579	12	84	1 165	4 041	362	58	7	0	0	6 307
Import	2 925	6 668	3 956	70	0	0	0	0	1 115	2	14 736
Export	-74	-3 688	-3	-96	0	0	0	0	-1 020	0	-4 881
International bunkering	0	0	0	0	0	0	0	0	0	0	0
Stock changes	-5	-85	-265	5	0	0	0	0	0	0	-350
Total primary energy supply	3 424	2 907	3 772	892	4 041	362	58	13	95	2	15 565
<u>Slovakia, 2010:</u>											
Production	613	210	88	972	3 858	452	6	8	0	0	6 207
Import	3 216	6 840	5 001	41	0	0	0	0	631	0	15 729
Export	-264	-3 429	0	-120	0	0	0	0	-541	0	-4 354
International bunkering	0	-41	0	1	0	0	0	0	0	0	-40
Stock changes	333	39	-85	0	0	0	0	0	0	0	287
Total primary energy supply	3 898	3 619	5 004	894	3 858	452	6	8	90	0	17 829

Continuation of Table 2.

Country, year, concept of the primary energy sources supply calculation	Coal and other solid fuels	Crude oil and petroleum products	Natural gas	Combustible renewables and waste ⁶	Nuclear	Hydro	Wind and Solar	Non-combustible renewables ⁷	Electrical energy	Heat	Total
Ukraine, 2014:											
Production	31 891	2 817	15 022	2 399	23 191	729	134			745	76 928
Import	10 374	8 310	15 720	25					8		34 437
Export	-4 915	-817		-502					-733		-6 967
International bunkering	0	-131									-131
Stock changes	-1 774	509	2 671	11							1 417
Total primary energy supply	35 576	10 688	33 413	1 933	23 191	729	134	0	-725	745	105 684
Ukraine, 2010:											
Production	33 716	3 590	15 426	1 458	23 387	1 131	4			0	78 712
Import	7 793	13 914	29 551	0					2		51 260
Export	-4 820	-4 103	-5	0					-351		-9 279
International bunkering	0	-274	0								-274
Stock changes	1 562	52	10 256	18							11 888
Total primary energy supply	38 251	13 179	55 228	1 476	23 387	1 131	4	0	-349	0	132 307

Data sources to Table 2:

- ¹ Czech Republic: International Energy Agency, author's calculations.
- ² Hungary: International Energy Agency, author's calculations.
- ³ Poland: International Energy Agency, Central Statistical Office of Poland, author's calculations.
- ⁴ Slovakia: International Energy Agency, Statistical Office of the Slovak Republic, author's calculations.
- ⁵ Ukraine: International Energy Agency, State Statistics Service of Ukraine, Razumkov Centre's calculations.
- ⁶ Including solid biomass, biogas, industrial waste, municipal waste.
- ⁷ Including geothermal, wave, tidal, ocean thermal energy sources; excluding hydro, wind, solar.

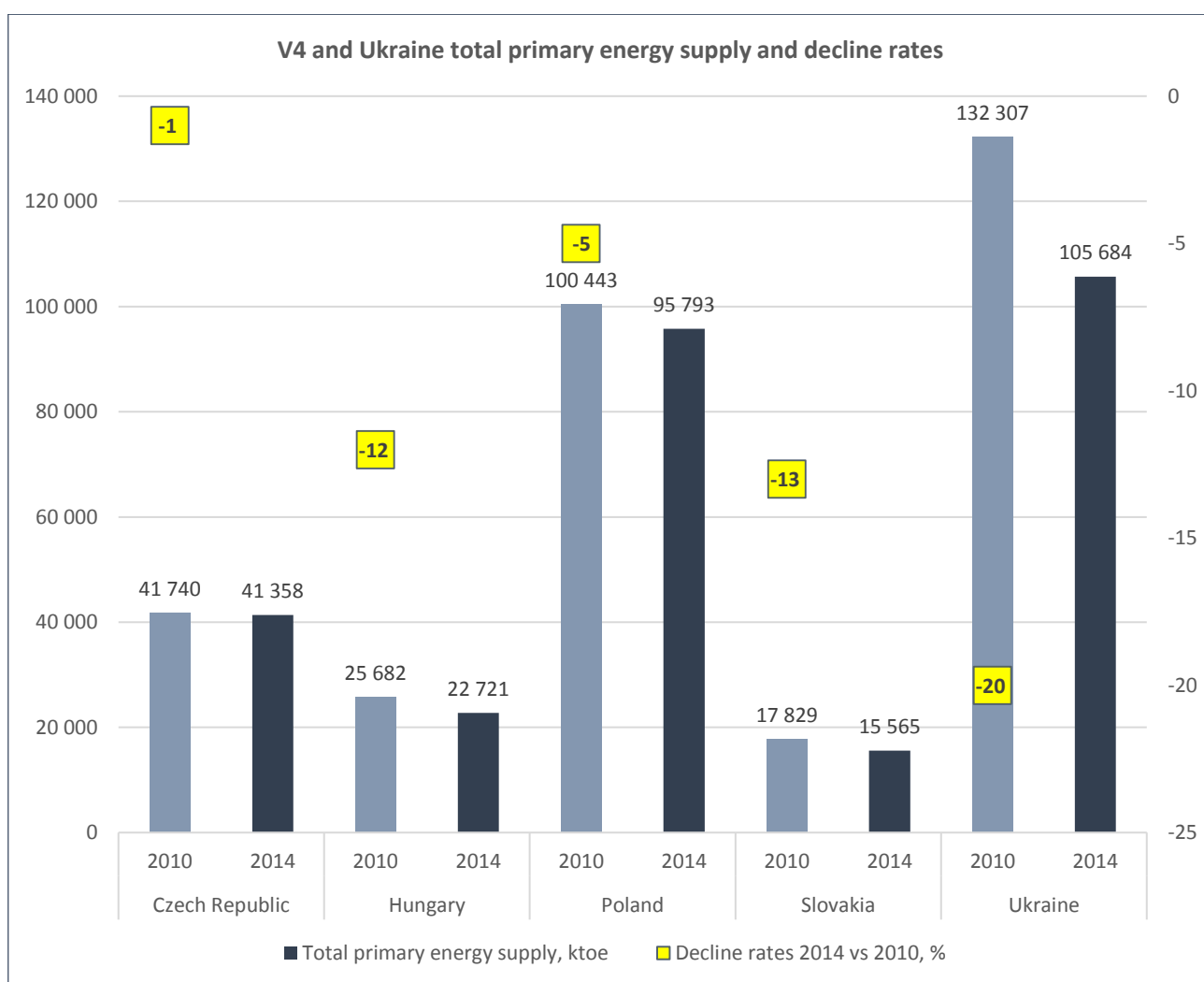


Figure 2. V4 and Ukraine energy sectors capacity at the primary energy supply: 2014 in comparison with 2010.

All countries have reached decline in their primary energy supply in 2014 in relation to 2010. The most reduction was fixed in Ukraine (-20%), moderate drops were done in Slovakia and Hungary (-13% and -12% respectively) and most stable countries for the period 2010-2014 were Poland and Czech Republic (-5% and only -1% respectively). It should be noted the decline for Ukraine was reached mostly by the large shrinkage of the national economy due to annexation of essential part territory (Crimea), military activities in Donbas and huge losses of the industrial, natural and human resources potential of the country in 2014. For V4 the decline of the primary energy supply is mainly explaining by improving the energy efficiency of the economies of V4.

The structures of the primary energy supply for V4 and Ukraine for 2010 and 2014 are presented in the figures 3 – 7.

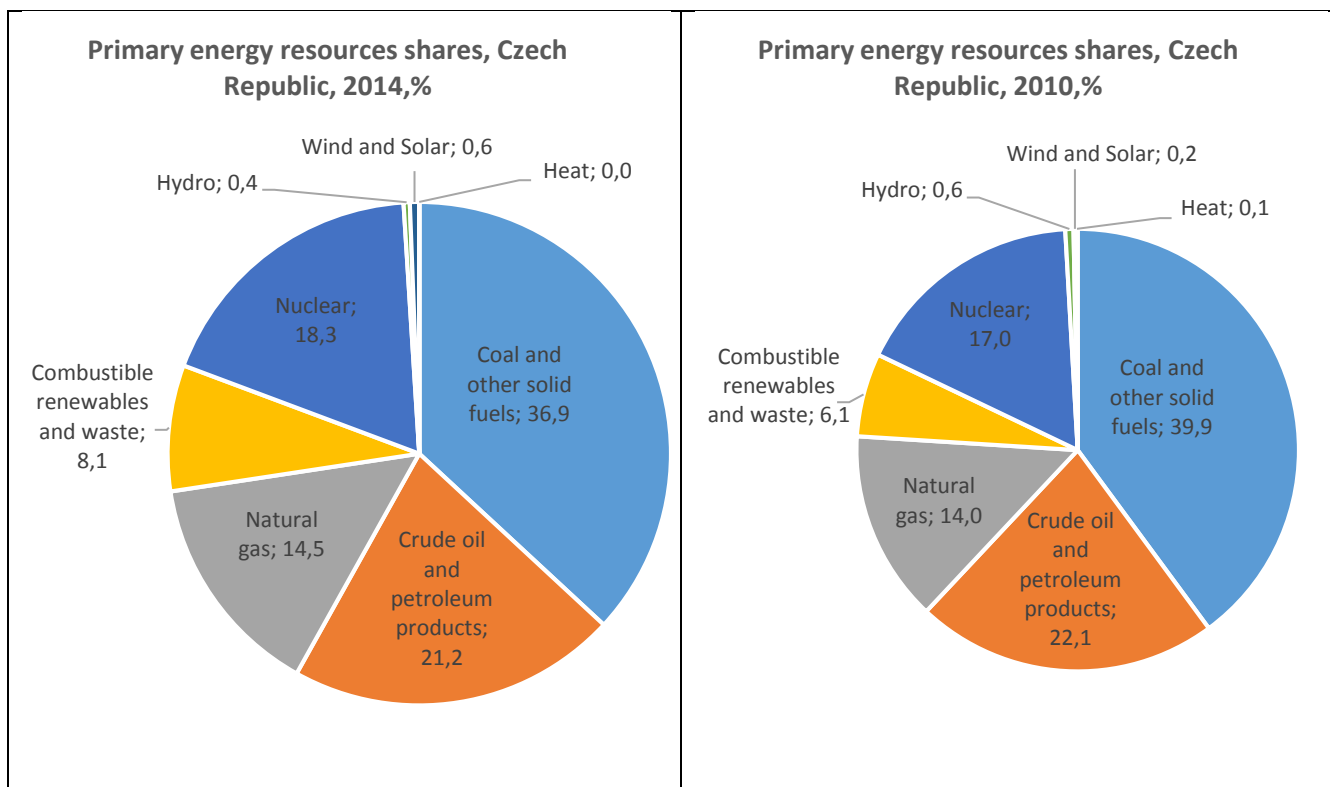


Figure 3. The structure of the primary energy supply for Czech Republic: 2014 in comparison with 2010.

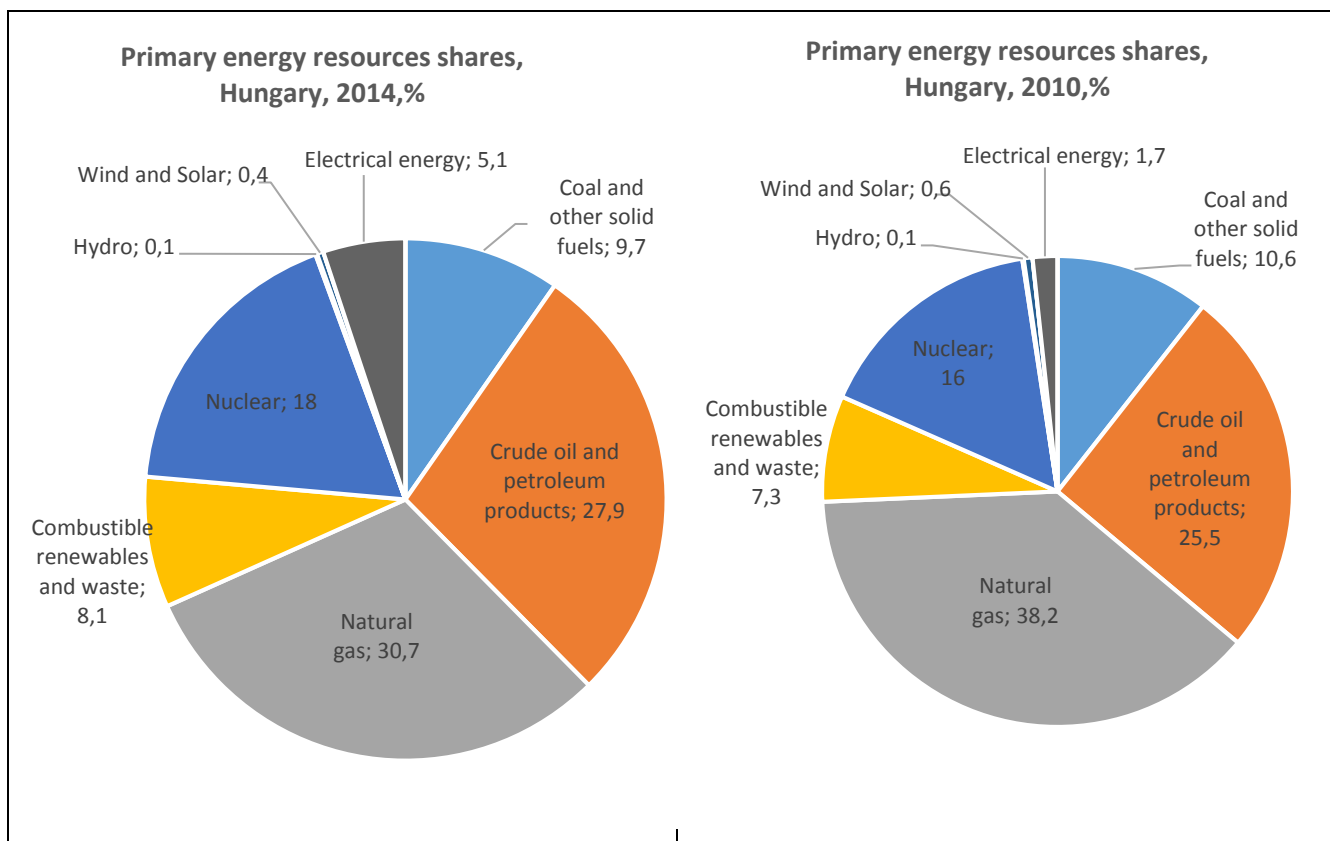


Figure 4. The structure of the primary energy supply for Hungary: 2014 in comparison with 2010.

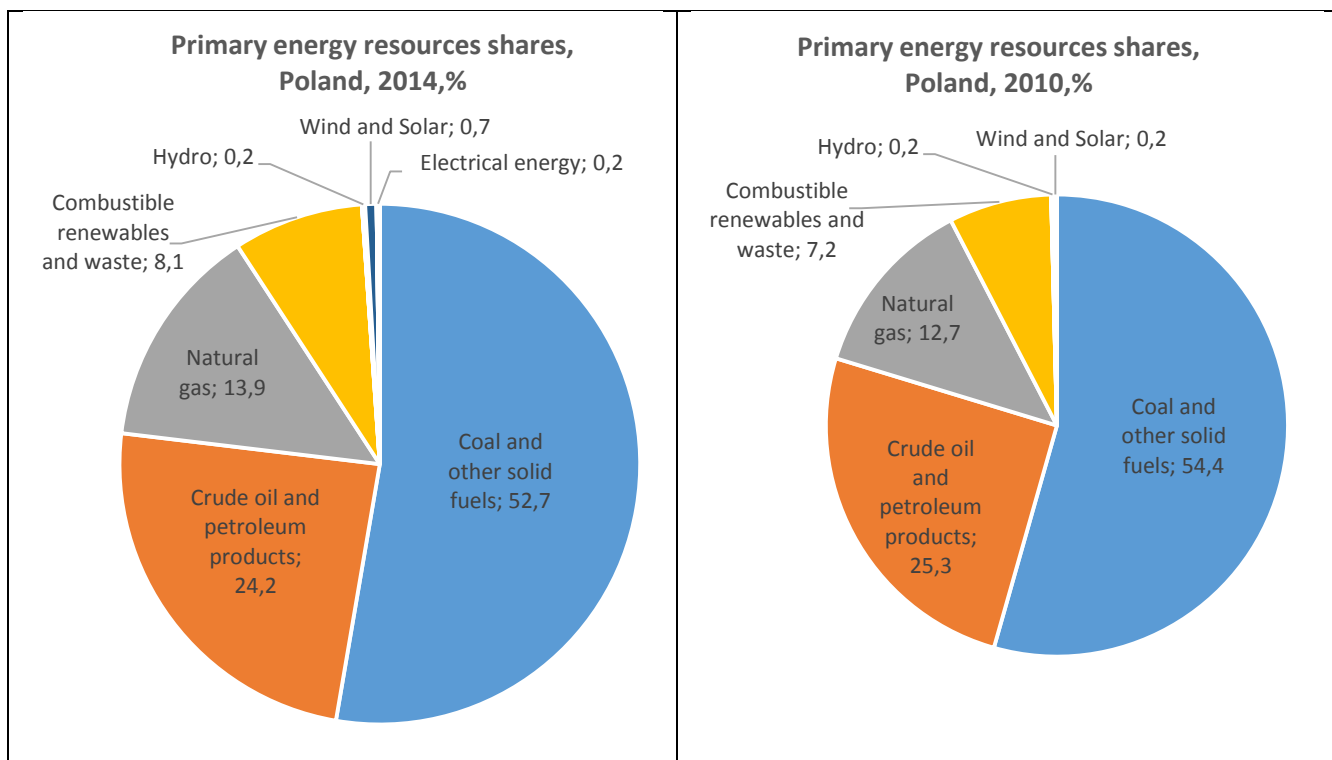


Figure 5. The structure of the primary energy supply for Poland: 2014 in comparison with 2010.

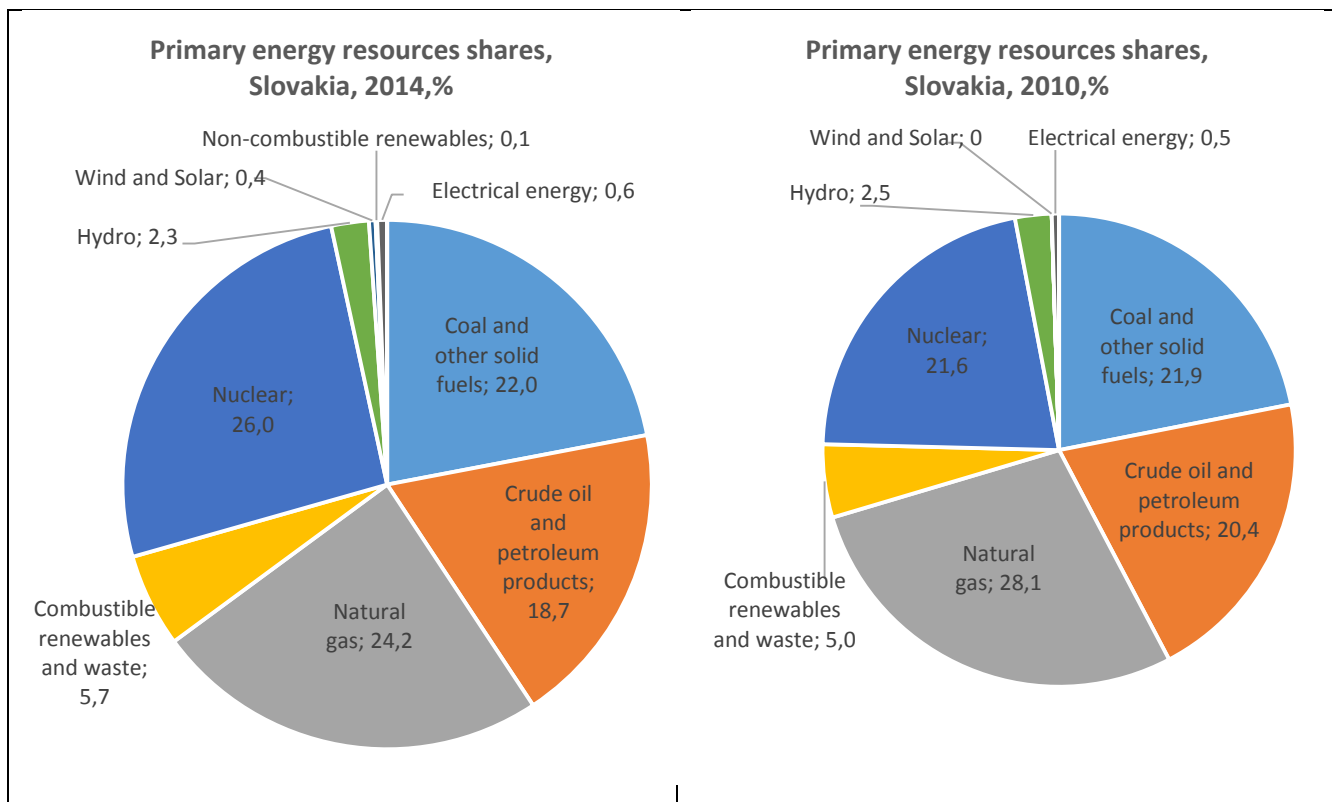


Figure 6. The structure of the primary energy supply for Slovakia: 2014 in comparison with 2010.

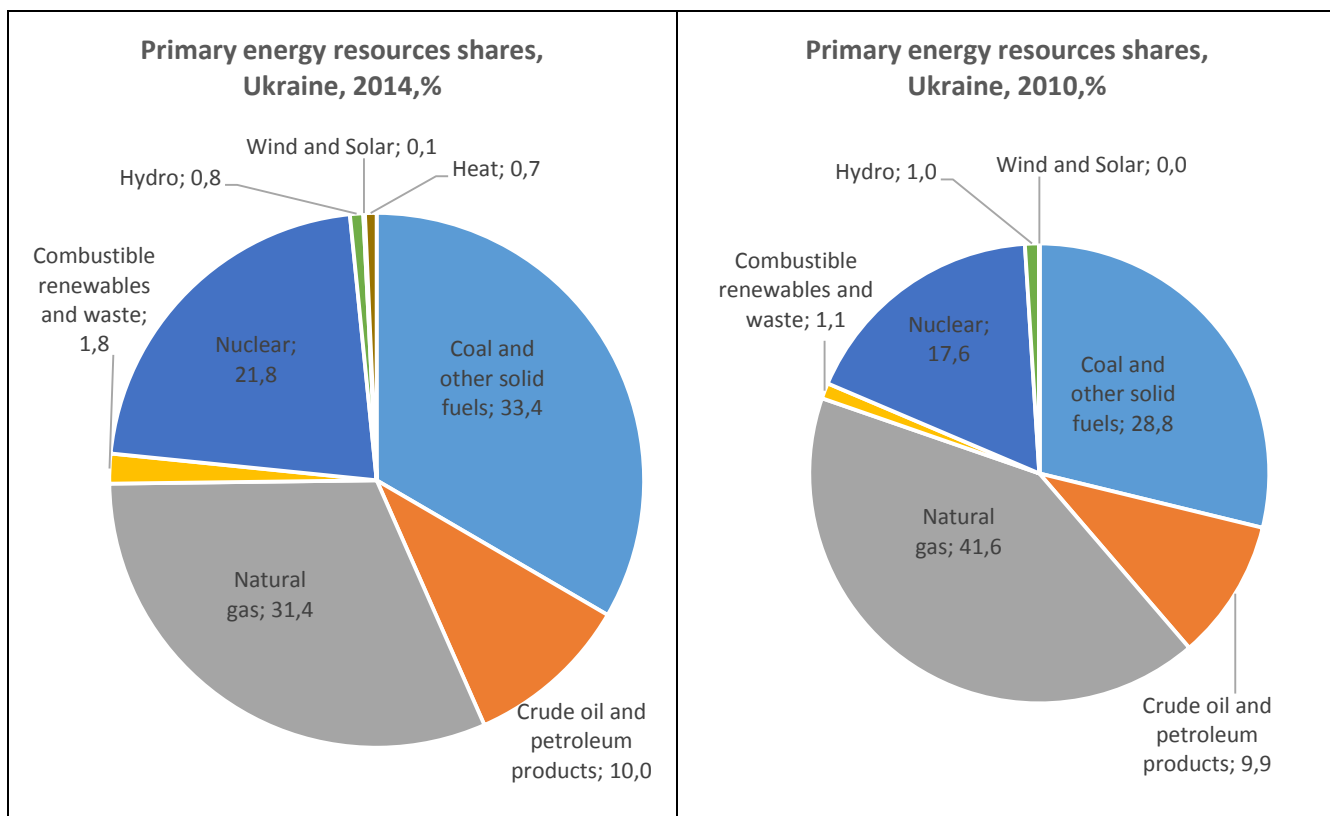


Figure 7. The structure of the primary energy supply for Ukraine: 2014 in comparison with 2010.

For all countries under comparative research, the most significant components in their energy balances occupy three main components: coal and solid fuel, natural gas, crude oil and petroleum products. As far as nuclear energy, only one country - Poland has not nuclear component in its primary energy supply. The nuclear energy occupies significant part in the balance of primary energy supply in other states under research: from 18% in Hungary to 26% in Slovakia. Moreover, the importance of nuclear energy in each of four countries has increased in 2014 with comparison to 2010. But the importance of crude oil and oil products in 2014 comparing to 2010 has decreased in most of V4, excluding Hungary, and stabilized in Ukraine. The share of natural gas from 2010 has slightly increased only in Czech Republic and Poland and decreased in Hungary, Slovakia and Ukraine. The most reduction of natural gas share took place in Ukraine and Hungary: from 41,2% to 31,4% and from 38,2% to 30,7% respectively.

Only two countries among five are net exporters of electrical energy in 2014: Czech Republic and Ukraine. Poland became from net exporter in 2010 to net importer of electricity in 2014.

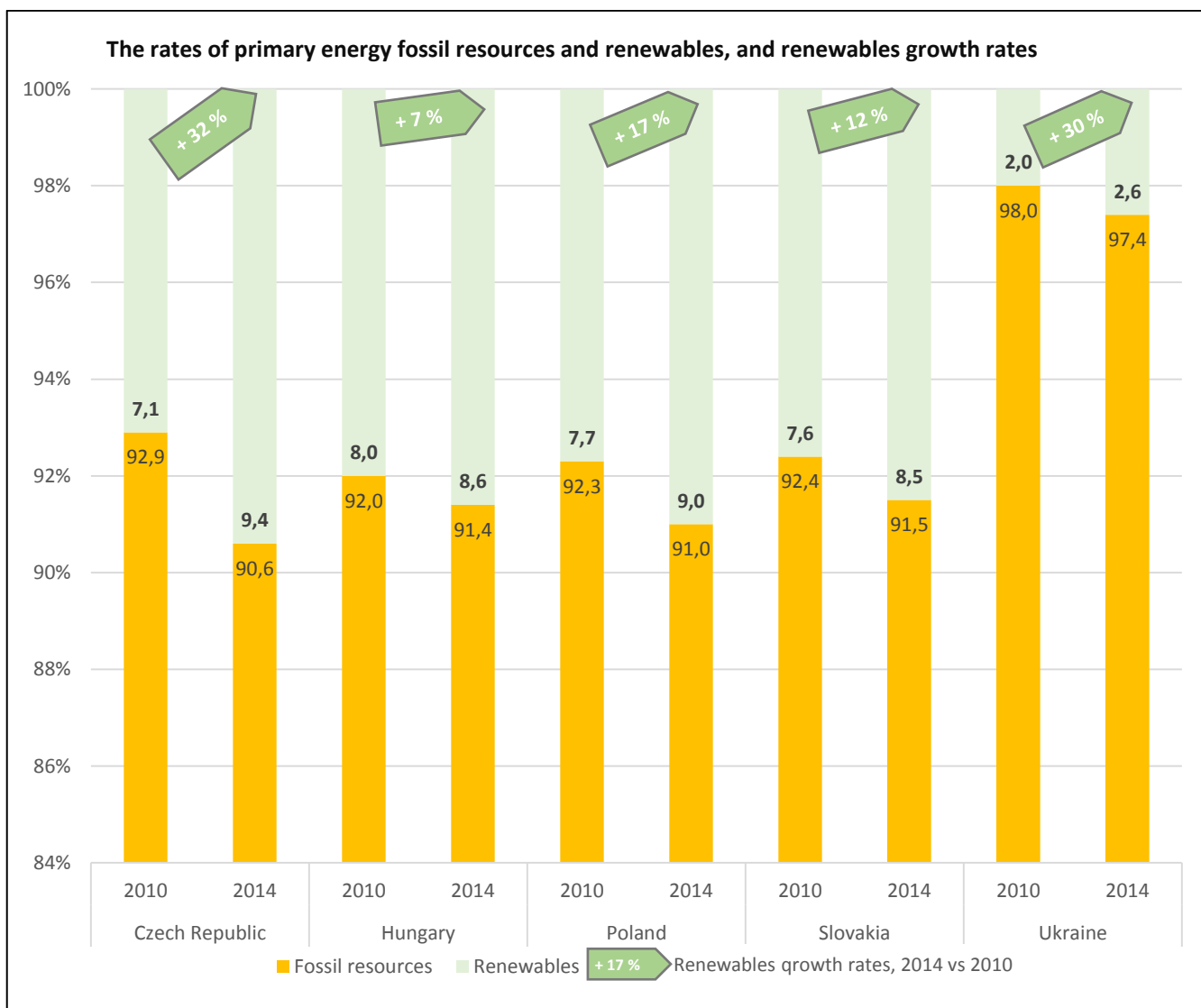


Figure 8. V4 and Ukraine shares of fossil energy resources and renewables: 2014 in comparison with 2010.

V4 and Ukraine are going within a general world's stream and tendency of increasing the shares of renewables in their energy balances. In the aim of the research into the category of "Renewables" were added the values of four sub-categories: "Combustible renewables and waste", "Hydro", "Wind and solar" and "Non-combustible renewables". The last sub-category includes geothermal, wave, tidal, ocean thermal energy sources. In spite of the renewables occupy relatively modest part of the primary energy supply in 2014 for V4 and Ukraine: the highest rate – 9,4% in Czech Republic and lowest rate – 2,6% in Ukraine, the shares of renewables in energy balances of all countries have increased in 2014 comparing 2010. The most growth rates of renewables for that period were achieved in Czech Republic (32%) and in Ukraine (30%).

In order to improve the research by case-based reasoning the comparative analysis should be supplemented by qualitative characteristics. The most general qualitative assessment of the energy component for the economies under research can be provided by usage of the GDP energy intensity indicator at the constant purchasing power parities at 2005 (Table 3).

Table 3. Energy intensity of GDP at constant purchasing power parities (koe/\$2005p)^{1,2,3}

Country / Years	2000	2001	2002	2003	2004	2005	2006	2007
Czech Republic	0,200	0,200	0,190	0,190	0,180	0,170	0,170	0,160
Hungary	0,180	0,170	0,170	0,160	0,160	0,160	0,150	0,150
Poland	0,200	0,200	0,190	0,190	0,180	0,170	0,170	0,160
Slovakia	0,250	0,260	0,250	0,230	0,220	0,210	0,190	0,170
Ukraine	0,630	0,580	0,560	0,550	0,480	0,470	0,420	0,390

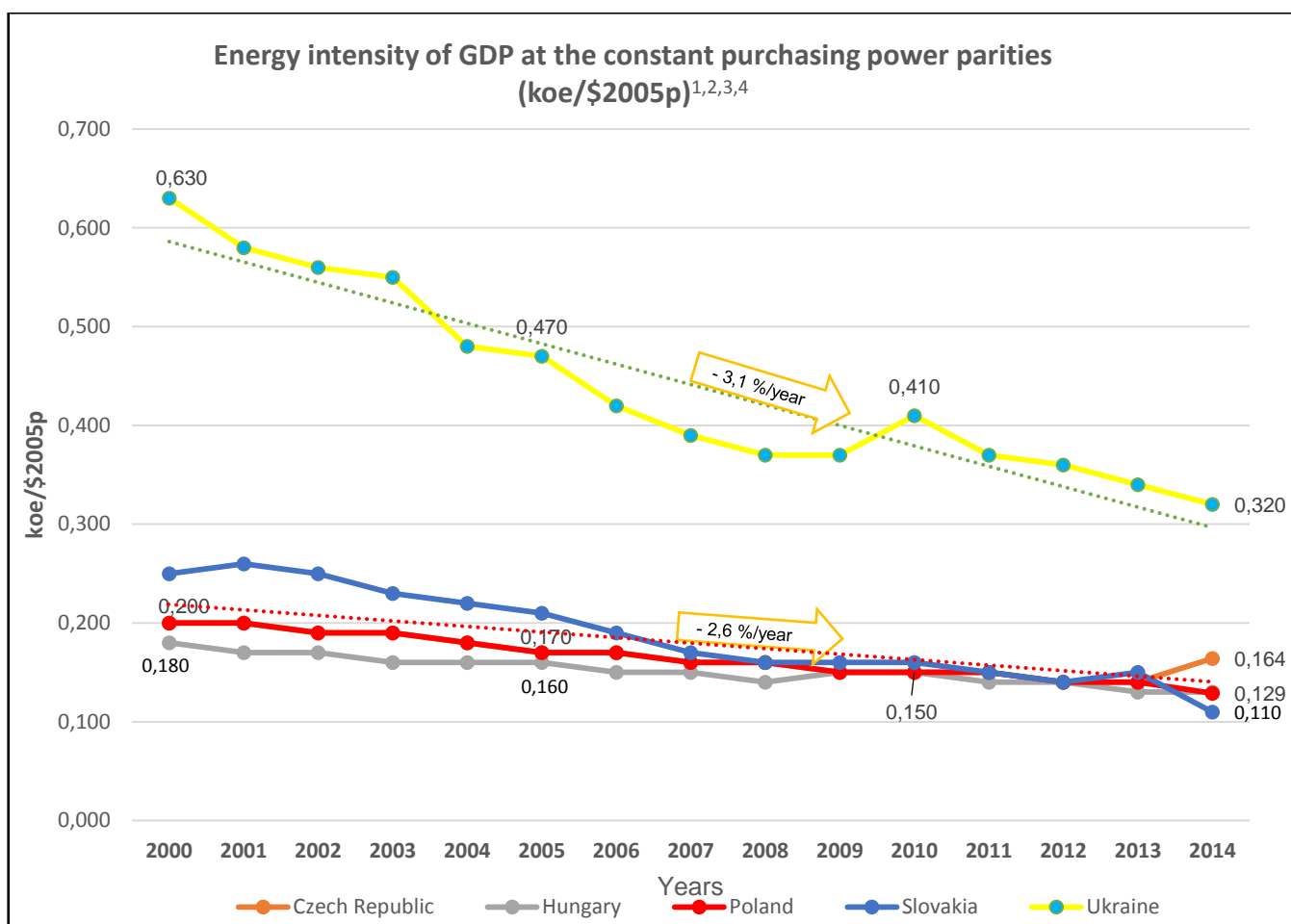
Continuation of Table 3.

Country / Years	2008	2009	2010	2011	2012	2013	2014
Czech Republic	0,160	0,150	0,150	0,150	0,140	0,140	0,164
Hungary	0,140	0,150	0,150	0,140	0,140	0,130	0,130
Poland	0,160	0,150	0,150	0,150	0,140	0,140	0,129
Slovakia	0,160	0,160	0,160	0,150	0,140	0,150	0,110
Ukraine	0,370	0,370	0,410	0,370	0,360	0,340	0,320

Data sources to Table 3:

- ¹ International Energy Agency - for the years 2000 – 2013.
- ² Enerdata – for 2014 year for Czech Republic, Poland and Ukraine.
- ³ Authors' calculations – for 2014 for Hungary and Slovakia.

The data of the Table 3 and the graphs on the Figure 9 demonstrate that Ukraine has in 2-3 times higher the level of GDP energy intensity than V4 counties during the period from 2000 to 2014. Generally, Ukraine and V4 are moving in the same global trend on the declining of GDP energy intensity but within the different ranges. Ukraine's range is located more higher than V4's range on the Figure 9. In the same time, Ukraine demonstrates more essential average annual rate of the GDP energy intensity declining which equal - 3,1% than V4 countries have in average – -2,6%.



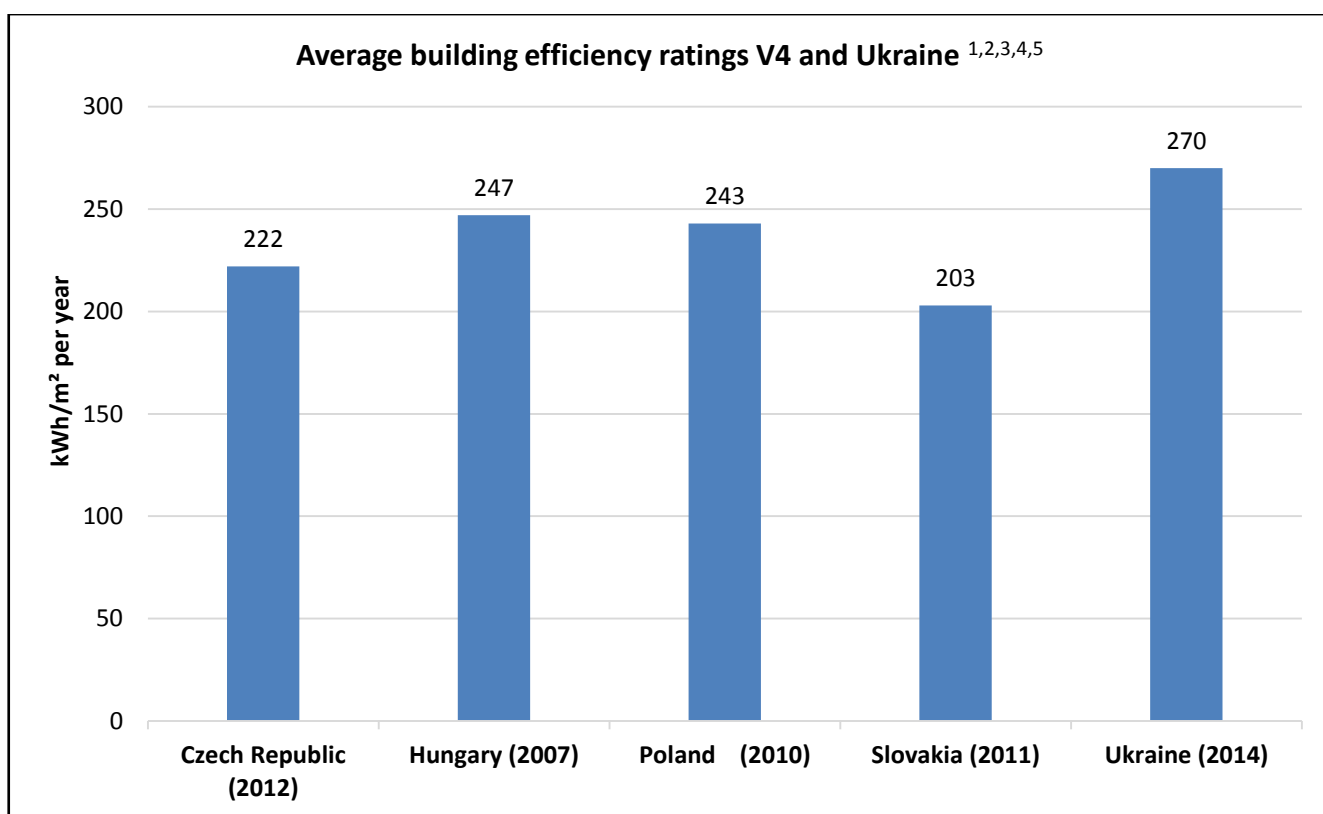
Data sources to Figure 9:

1. International Energy Agency - for the years 2000 – 2013.
2. Enerdata – for 2014 year for Czech Republic, Poland and Ukraine.
3. Authors' calculations – for 2014 for Hungary and Slovakia.
4. Average annual rates of GDP intensity reduction – Razumkov Centre's calculations.

Figure 9. GDP energy intensity at the constant purchasing power parities of V4 and Ukraine.

If these average rates for Ukraine and V4 will be keeping for a long period, Ukraine will achieve V4's GDP energy intensity only over 22 years. If there are possibilities to compress this time for Ukraine? Certainly, yes. Firstly, Ukraine should undertake the efforts in physical shortages the energy rates consumptions in all sectors of national economy. Moreover, Ukraine has much more high potential for such shortages and energy resources saving than V4 countries have. Secondly, in order to improve the GDP energy intensity indicator, Ukraine should pay attention to other component on this indicator formation – the GDP value. In order to increase GDP Ukraine should create competitive and friendly to investments market medium, which provide the production of the goods and services with high added value.

About 1/3 of final energy consumption in Ukraine is used by non-industrial sectors and by the households⁷. Therefore, the indicators of building efficiency ratings (BER) are very important to estimation of energy efficiency in dimension mainly in the context of ordinary energy customers. Figure 10 shows the indicators of average building efficiency ratings (BER) for V4 and Ukraine. The input data for comparative research is differ in time in relation from the country to the country. Because these type of research requires collection and procession a comprehensive massive of data concerning energy and buildings statistics as well as accounting uninhabited square, therefore these researches are not conducted each year.



Data sources to Figure 10:

- ¹ Czech Republic: Ministry of Local Development of Czech Republic, author's calculations.
- ² Hungary: National Building Energy Performance Strategy. - Budapest, 2015. https://ec.europa.eu/energy/sites/ener/files/documents/2014_article4_hungary_en%20translation.pdf.
- ³ Poland: Financial Building energy Performance Improvement in Poland. - BPBI report, 2016. <http://bpie.eu/publication/financing-building-energy-performance-improvement-in-poland-status-report/>.
- ⁴ Slovakia: Ministry of Economy of the Slovak Republic, Statistical Office of the Slovak Republic, author's calculations.
- ⁵ Ukraine: National Security and Defence Journal, No 1, 2015. Razumkov Centre edition. http://www.uceps.org/ukr/files/category_journal/1_8_2015_Energy_1121_A4.pdf.

Figure 10. Average building efficiency ratings V4 and Ukraine.

⁷ State Statistics Service of Ukraine, Energy Balance of Ukraine for 2014.

However, even latest data for Ukraine (2014 year) is essentially worse than oldest confirmed data for Hungary (2007 year): 270 vs 247 kWh/m² per year, to say nothing of other V4 countries which, likely Hungary, certainly have also achieved best indicators thanks to the implementation of energy efficiency reforms and special buildings renovation programs during last years. Absolutely, Ukraine has significant reserves and challenges to improve energy efficiency in public sector, because the BER shortage for each 10 kWh/m² per year (-4%) in the scale of Ukraine is equal about 84630 GWh of energy or 7,3 mtoe or 8,8 bcm of natural gas per year.

Directive 2012/27 /EU determines the general EU's energy efficiency policy "On energy efficiency". The Directive sets the task to increase energy efficiency in the Union to achieve the objective of saving 20 % of the Union's primary energy consumption by 2020 compared to projections that means the projections made in 2007 showed a primary energy consumption in 2020 of 1 842 mtoe. A 20 % reduction results in 1 474 mtoe in 2020, i.e. a reduction of 368 mtoe is additional energy savings as compared to projection⁸.

Other Directives 2010/31/EU "On the energy performance of buildings"⁹ and 2010/30/EU "On the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products"¹⁰ supplement each other and the both comply with previous EU's Directive. Their main task of directives related to energy performance of building and labeling of energy consumption is implementation of the measures are needed to increase more energy efficient of the buildings, thereby reducing both energy consumption and carbon dioxide emissions. For this purpose EU member states elaborate, implement and regulatory report their national plans for increasing the number of nearly zero-energy buildings and regularly to EU Commission. In the context of the institutional reform of Ukrainian energy sector, the improvement of buildings energy efficiency can be achieved due to creation and acting

⁸ Directive 2012/27/EU "On energy efficiency".

⁹ Directive 2010/31/EU "On the energy performance of buildings".

¹⁰ Directive 2010/30/EU "On the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products".

of Energy Efficiency Fund on the principles of the relevant EU's directives and national plans taking into account the practical and institutional experience of V4 countries.

Energy security and competitiveness

Other two dimensions of comparative research: energy security and competitiveness of energy sector dedicate to the more general issue of national security. This problem is actual for Ukraine in recent 2 years but is actual in EU and V4. European Union recognizes that too often energy security issues are addressed only at a national level without taking fully into account the interdependence of EU member states. The key to improved energy security lies first in a more collective approach through a functioning internal market and greater cooperation at regional and European levels, in particular for coordinating network developments and opening up markets, and second, in a more coherent external action. This includes ensuring through the enlargement instruments that these guiding principles are followed by candidate countries and potential candidates¹¹. These guiding principles are concentrated in conceptual document – European Energy Security Strategy - communication from the Commission to the European Parliament and the Council. Summarizing 2013 key data on EU energy security, the EU imports 53% of the energy it consumes. Energy import dependency relates to crude oil (almost 90%), to natural gas (66%), and to solid fuels (42%) as well as nuclear fuel (40%). For V4 energy security issues are valid in particular because the countries are less integrated and connected to other European regions and are most pressing energy security of supply issue is the strong dependence from a single external supplier – RF. The same conditions and challenges correlate to Ukraine. Therefore, Ukraine and V4 as well as Baltic region are more vulnerable than others EU countries are.

Energy security and energy competitiveness of the countries in comparative research for V4 and Ukraine are measuring by the possibilities of diversification of energy supply sources, internal potential of country's self-sufficiency with energy resources and possibilities to reduce internal energy dependence. The figures 11 – 15 explain the levels

¹¹ Communication from the Commission to the European Parliament and the Council. European Energy Security Strategy, 2014.

of internal energy dependence in primary energy sources supply for V4 and Ukraine and the changes of the dependence rates for 2014 compared with 2010. The rates are given for the total energy dependence for the economies and for main groups of the primary energy supply:

- Coal and other solid fuel;
- Crude oil and petroleum products;
- Natural gas;
- Combustible renewable and waste.

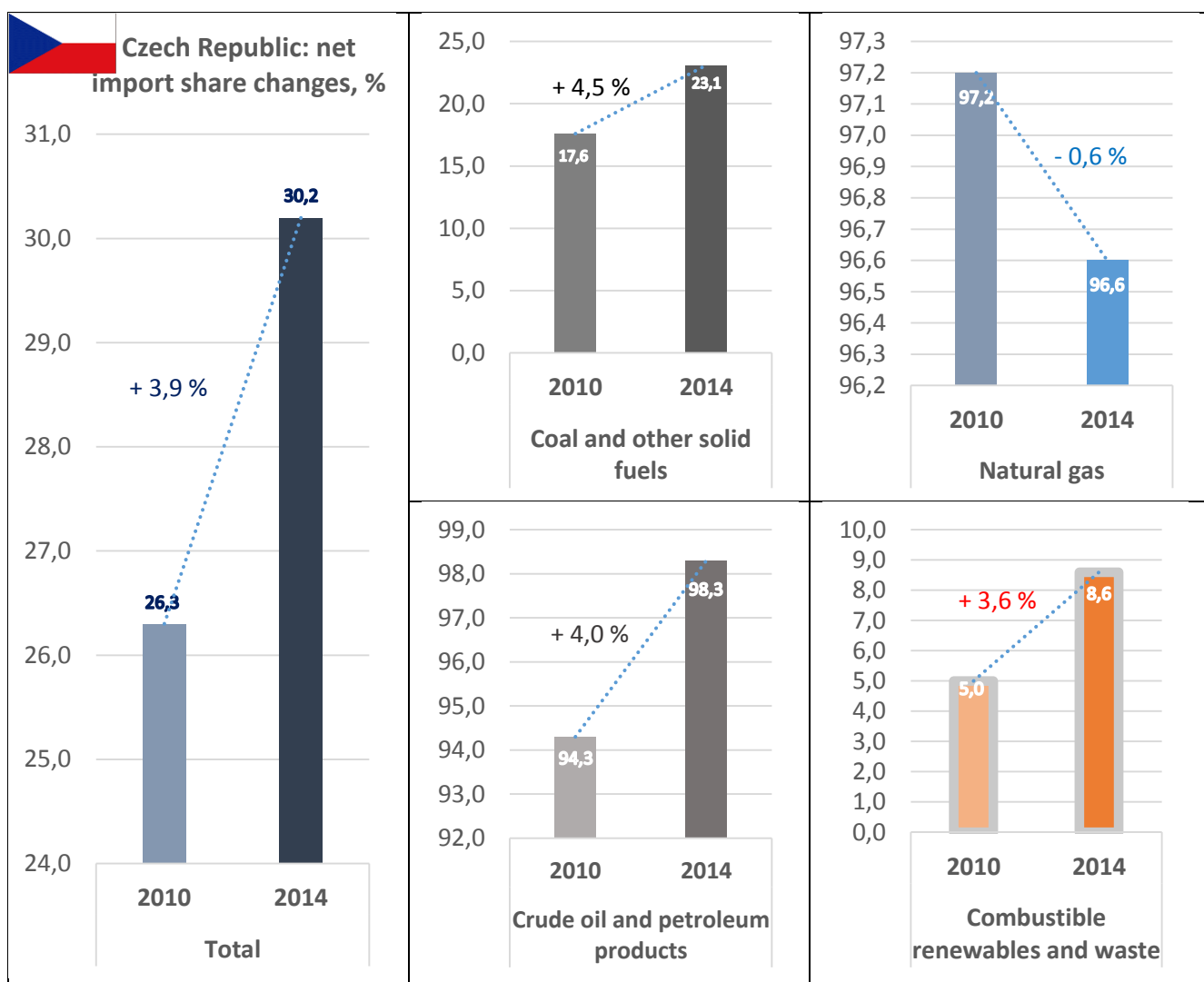


Figure 11. The import dependence in primary energy sources supply in 2010 and 2014 for Czech Republic, percentage.

The comparative research indicates the most of external energy depended economies are Slovakia and Slovakia with the total rates of import respectively 61,9% and 59,0% for 2014. Over more, Hungary as well as Czech Republic have increased their total energy dependency in 2010 in relating to 2010. Poland and Czech Republic have less energy import dependence in V4: 28,8% and 30,2% respectively for 2014. The most essential reduction of the total energy import rate – - 8,6% was achieved in Ukraine for the period 2010 – 2014. This phenomenon in Ukraine is explained by two main factors: general drop of energy resources consumption in 2014; RF factor (usage of energy bludgeon in political and military interests and direct governmental restrictions to supply energy products to Ukraine).

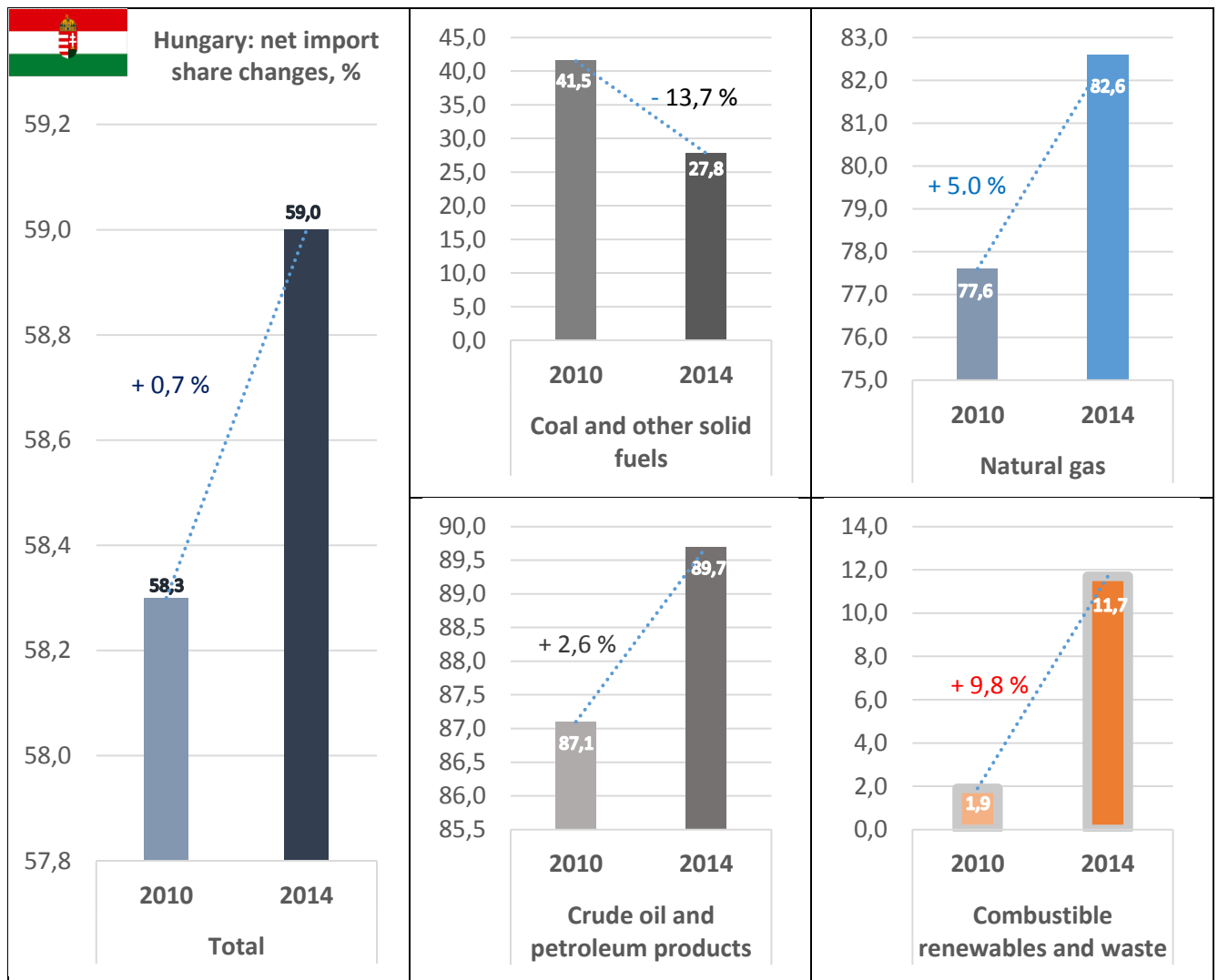


Figure 12. The import dependence in primary energy sources supply in 2010 and 2014 for Hungary, percentage.

The comparative analysis indicates the common high import dependence V4 and Ukraine in supply of crude oil and petroleum products in 2014 for Czech Republic – 98,3%, Hungary – 89,7%, Poland – 96,5%, Slovakia – 99,6%, and Ukraine – 73,6%. Only Ukraine and Poland have achieved the slight reduction their oil dependency in 2014 compared 2010: - 1,1% for Ukraine and - 3,4%.

Natural gas dependence is also a large challenge for V4 countries but in the less extent for Ukraine. In 2014 the share of imported natural gas in Ukraine has essentially decreased on 14,6% to the level of 51,1% in relation to 2010. In the same time, the import of natural gas shares were stable and high for V4 countries in 2014 and occupy the range from 72,1% in Poland to 97,9% in Slovakia.

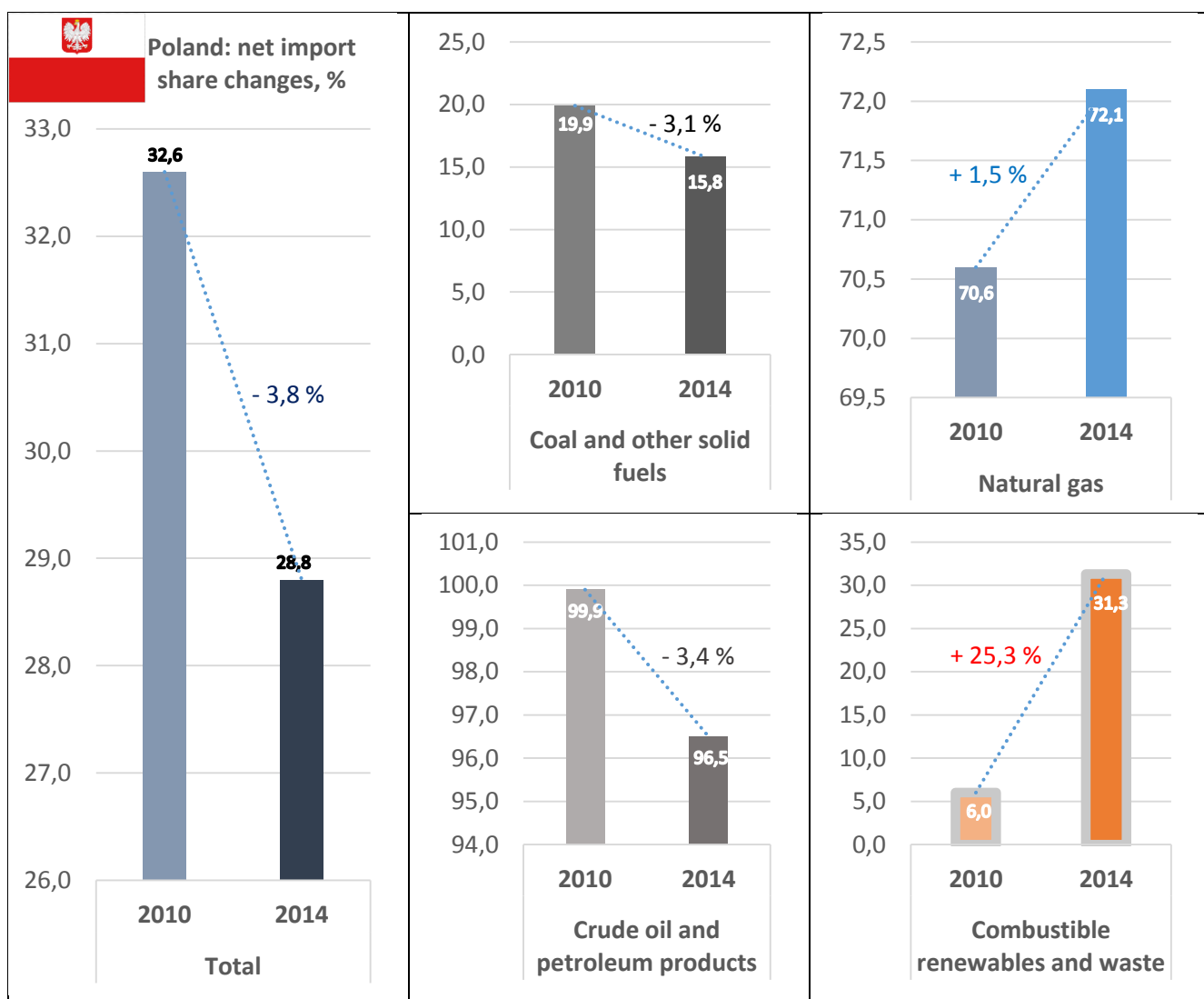


Figure 13. The import dependence in primary energy sources supply in 2010 and 2014 for Poland, %.

V4 and Ukraine demonstrate less dependence in import of coal and other solid fuels. Coal import dependence in 2014 is highest for Slovakia – 83,1% and lowest in other countries under research: in Hungary – 27,8%, Czech Republic – 23,1%, Poland – 15,8% and Ukraine – 14,6%.

The group the combustible renewables and waste is the type of local origin energy resources that are utilized mainly in regions their formation. In the same time, the import rates of dependence for combustible renewables and waste were grown essentially for all countries under research in 2014 in relation to 2010. The most depended country in this category of primary energy resources is Poland – 31,3% for 2014.

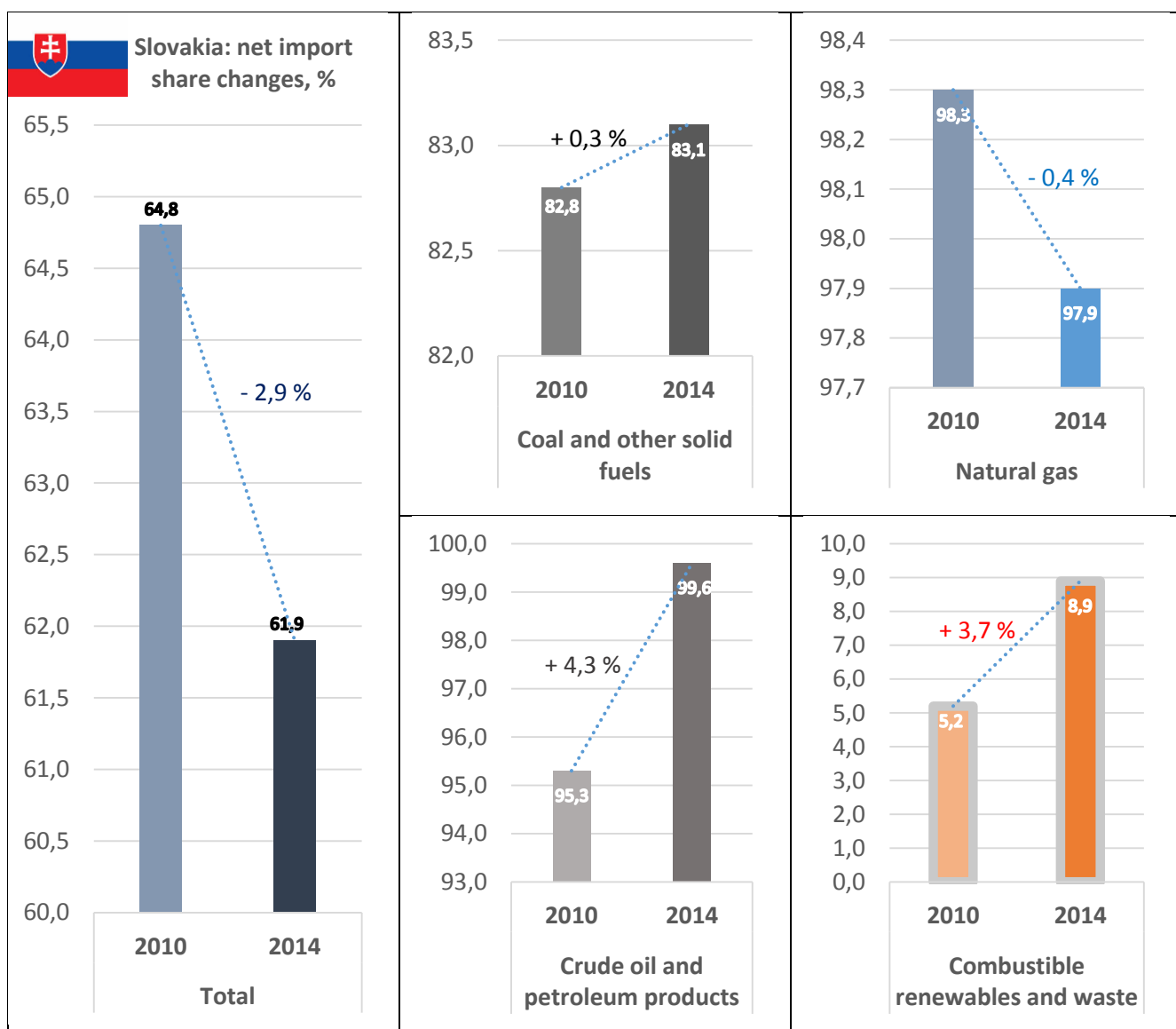


Figure 14. The import dependence in primary energy sources supply in 2010 and 2014 for Slovakia, %.

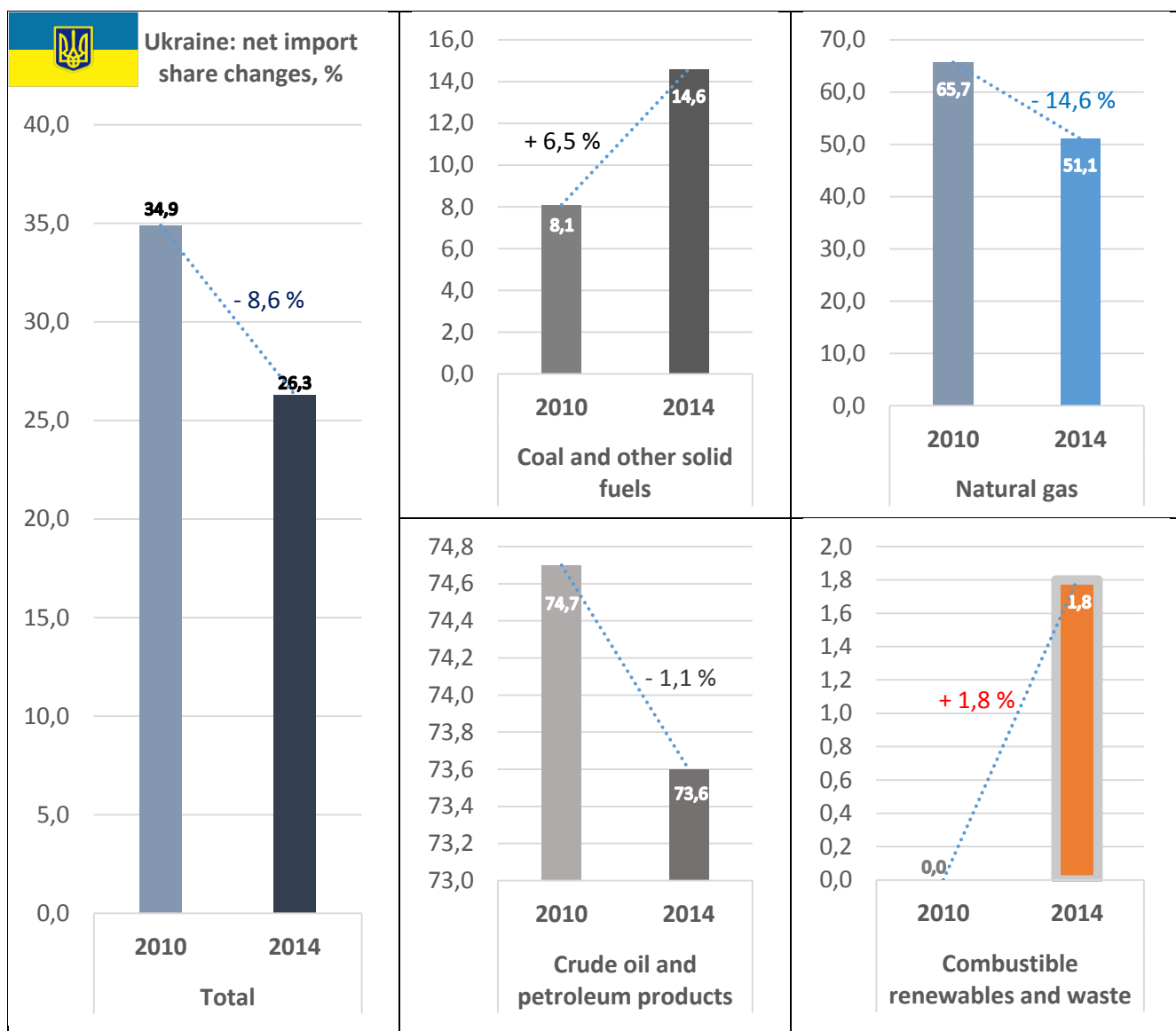
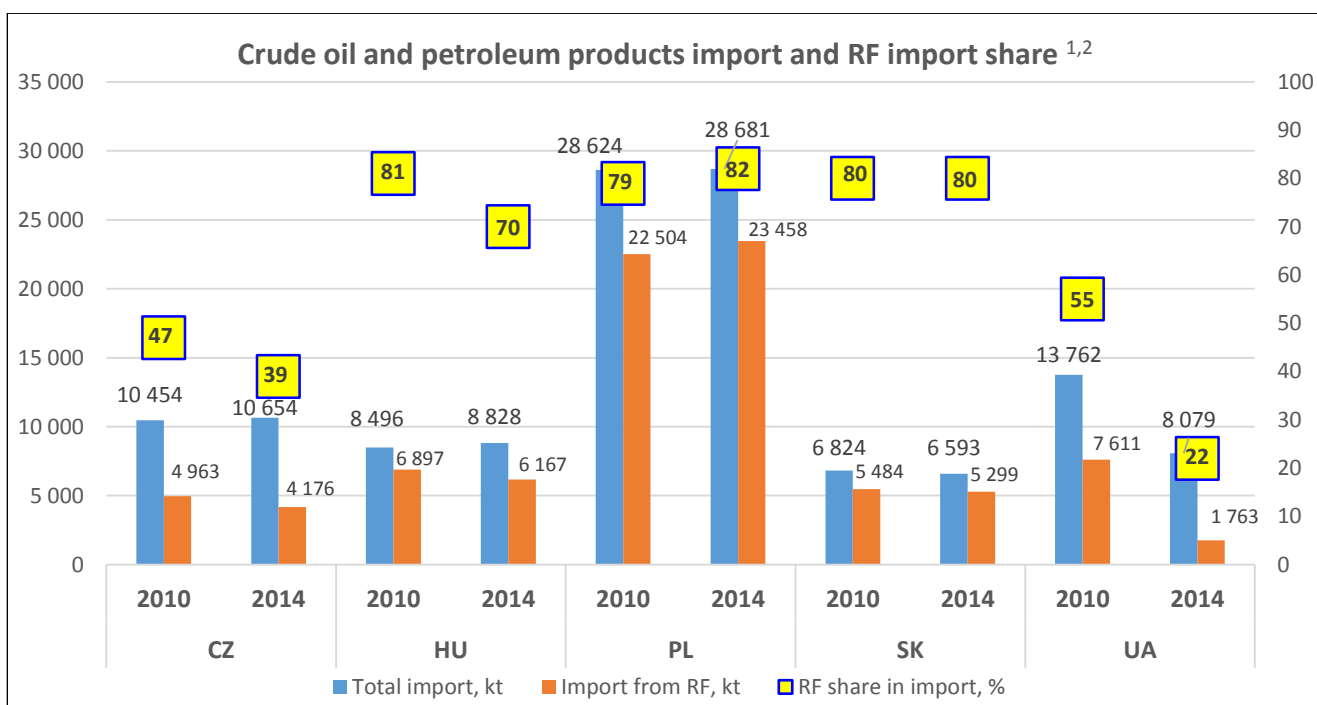


Figure 15. The import dependence in primary energy sources supply in 2010 and 2014 for Ukraine, %.

The graphs of the figures 11 – 16 demonstrate that most competitive in the sense of self-sufficient primary energy supply country is Ukraine. Even the huge losses of territories, citizens, industrial and energy facilities, which were occurred due to RF intervention, energy sector of Ukraine confirms its survivability and readiness to rehabilitation and reforms.

Other dimension of comparative research of the energy security and competitiveness is lying on the analysis of energy supply in natural units and determination of the dependence rates from the determined sources (countries) of supply. Further, the figures 16 – 19 represent the changes of energy resources supplying for V4 and Ukraine and their dependence from RF for 2014 in comparison with 2010.

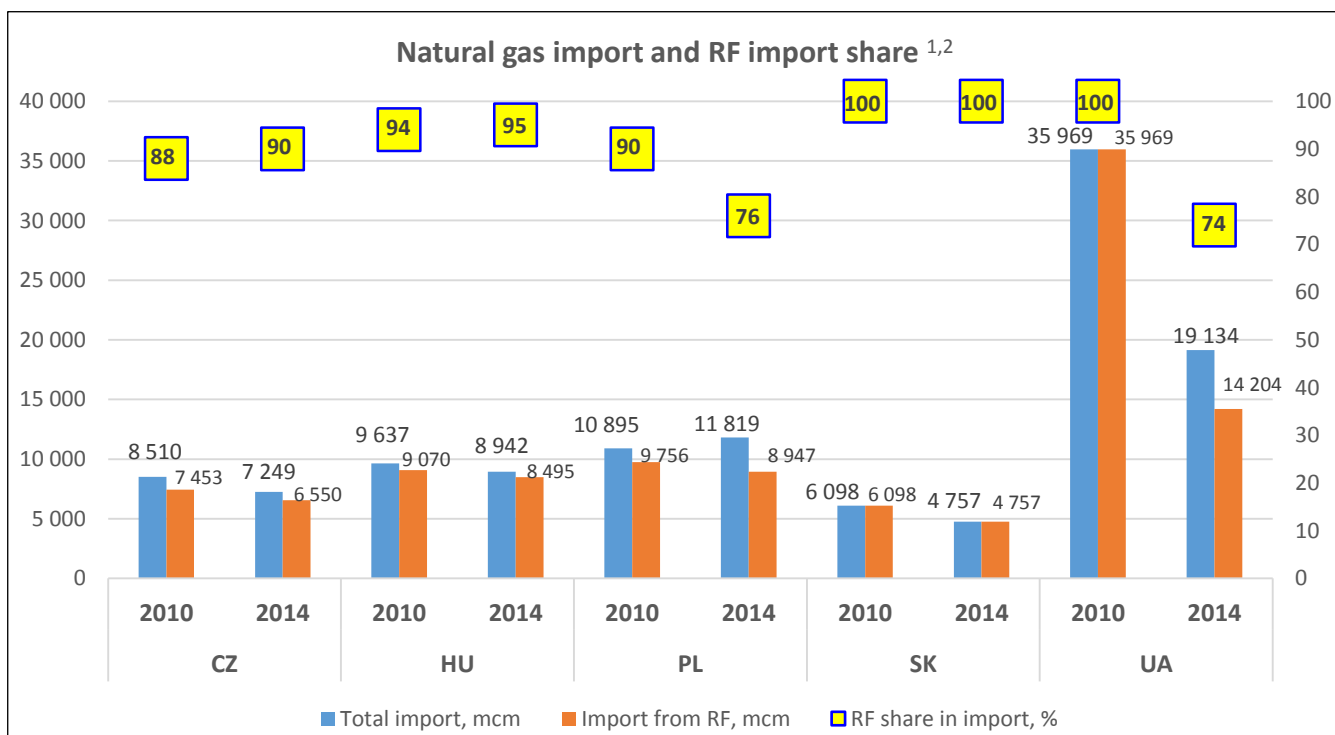


Data sources to Figure 16:

¹ Eurostat.

² Razumkov Centre's calculations.

Figure 16. V4 and Ukraine import dependence in crude oil and petroleum products considering RF factor: 2014 in comparison with 2010.

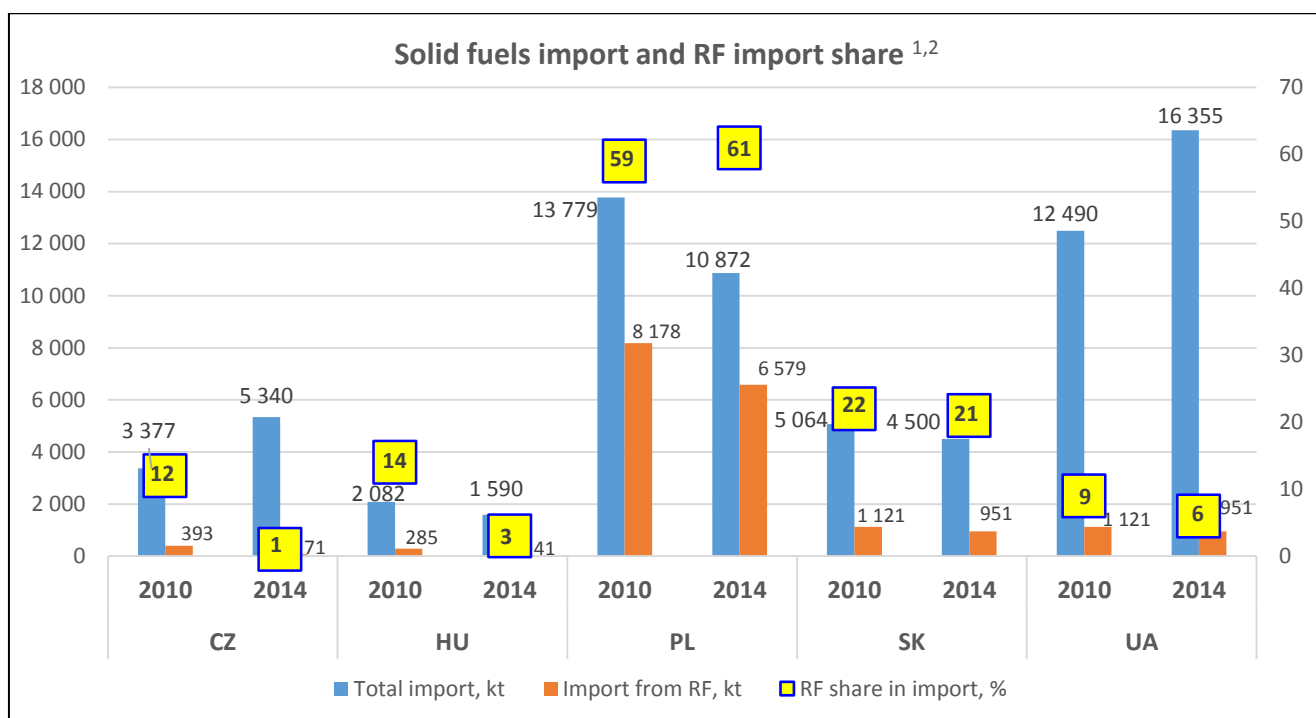


Data sources to Figure 17:

¹ Eurostat.

² Razumkov Centre's calculations.

Figure 17. V4 and Ukraine import dependence in natural gas considering RF factor: 2014 in comparison with 2010.

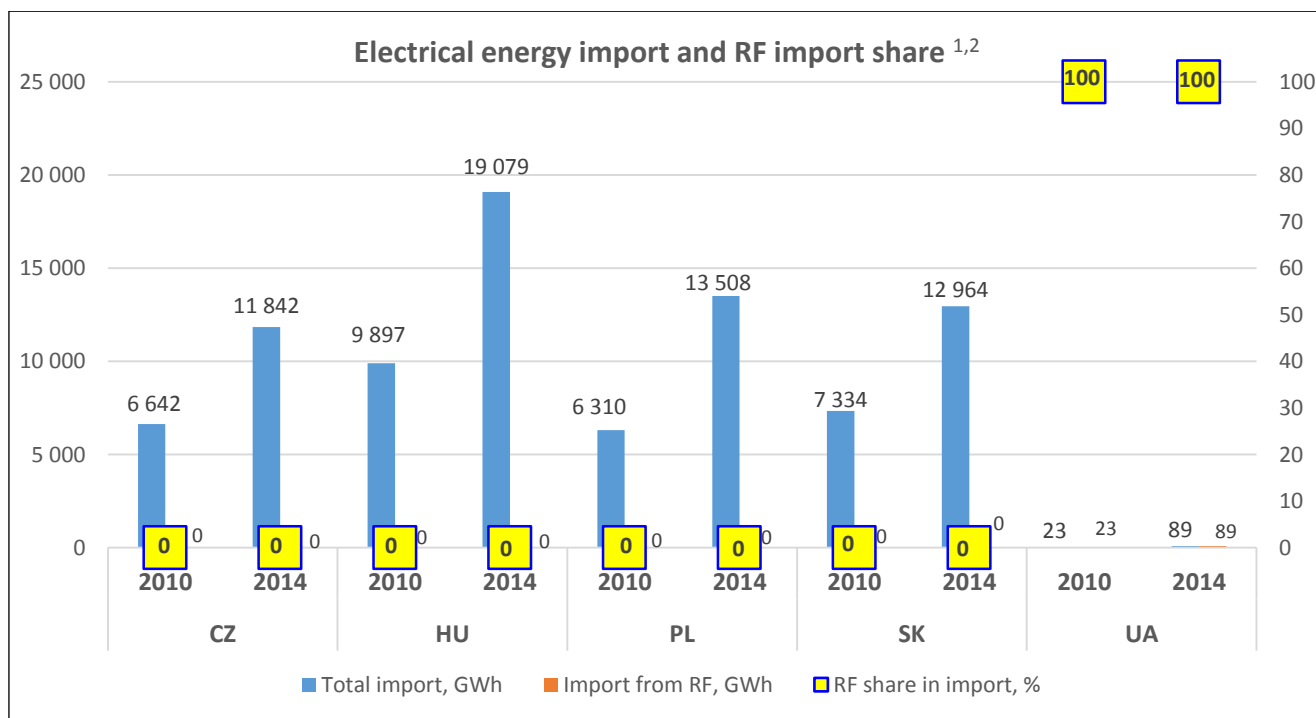


Data sources to Figure 18:

¹ Eurostat.

² Razumkov Centre's calculations.

Figure 18. V4 and Ukraine import dependence in solid fuels considering RF factor: 2014 in comparison with 2010.



Data sources to Figure 19:

¹ Eurostat.

² Razumkov Centre's calculations.

Figure 19. V4 and Ukraine import dependence in electrical energy considering RF factor: 2014 in comparison with 2010.

The volumes of energy resources supply demonstrate the diminish of the import in physical units for crude oil and oil products in 2014 in comparison with 2010 only in Ukraine. V4 countries have increased their import. Nevertheless, the RF shares in the import for the period have decreased or remained on the same in all countries with exception of Poland. The most essential shrinking of the RF share was happened in Ukraine: from 55% in 2010 to 22% in 2014.

The natural gas import supply was increased for the period only in Poland but was decreased in other countries. The RF share in natural gas supply was the stable in most of the countries under research, with exception of Ukraine where dramatic decreasing was occurred: from 100% in 2010 to 74% in 2014 and to 37% in 2015.

Special comments should be given in relation to import of electrical energy. No one V4 country imports electrical energy from RF, but Ukraine has imported in 2010 minor electricity volumes in the terms of the technical agreement about so-called "inter countries power flows" and 89 GWh in second half of 2014 under the purchasing contract. In the same time, Czech Republic, Hungary and Slovakia have 100% dependence from RF with nuclear fuel supply. In this sense, Ukraine attempts to escape from this nuclear dependence thanks to cooperation with Westinghouse Electric in recent years. It is estimated that nuclear fuel supply to Ukraine from Westinghouse Electric will grow up to 50% that will allow diversify this essential components of power electricity generation.

The Ukrainian case and its interpretation in dimension of "Political Stability and Absence of Violence/Terrorism" of Worldwide Governance Indicators (WGI) under the World Bank's research initiatives (graph d, Annex 1) demonstrates catastrophic drop of this dimension rate to the level of only 6% in 2014 due to RF aggression to Ukraine. This is an instructive exercise and enormous challenges for Ukraine, its energy sector, and incentive for consolidation of solidarity efforts to protect the international laws and justice. In the next chapter, the proposals for institutional reforming of Ukraine's energy sector will be formulated as the part of the consolidated answer on the related challenges.

ELABORATION OF PROPOSALS FOR INSTITUTIONAL REFORMING OF UKRAINE'S ENERGY SECTOR

National energy regulator: V4 experience and proposals for Ukraine

Outlook in Ukraine

The Supreme Court of Ukraine has sent at 30th of May, 2016 the submission to the Constitutional Court on the legitimacy of presidential decrees on 27th of August and on 10th of September, 2014, regulating the activity of the National Commission, carrying out state regulation in the areas of energy and utilities (NKREKP), and the legitimacy of its decisions on the establishment of housing and utility tariffs.

According to the submission above, the Supreme Court has also decided to apply to the Constitutional Court of Ukraine with a view on the constitutionality of the current legislation regarding the NKREKP authority, as well as the relative presidential decrees dated at August 27, 2014 № 694/2014 “On the National Commission, carrying out state regulation in the areas of energy and utility services” and at September 10, 2014 # 715/2014 “On approval of the National Commission, carrying out state regulation in the sphere of energy and utility services”.

In particular, the Supreme Court of Ukraine doubts the acts do comply with the provisions of the Constitution of Ukraine. Supreme Court of Ukraine states that according to the Constitution, the President has no authority to create public collegial bodies that carry out state regulation in the areas of energy and utilities and appoint its members. Thus, during almost last 2 years the different political forces in Ukraine has proposed several drafts of The Law “On the NKREKP” in order to create more solid legislative basis on National Regulator activity. Currently, at least of two options of the drafts of the Law are being under Parliament’s consideration.

The first option, Verkhovna Rada of Ukraine has considered as the basic draft Law “On the NKREKP” and once again forwarded this Law for further improvements, on so-called “repeated second reading”. This option of the draft document provides for the election

of NKREKP members on a competitive basis, ensuring relative independence of the regulator in its decision-making.

The second and alternative option of the draft of the Law “On the NKREKP” stipulates the NKREKP’s members would be nominated by the Parliament’s fractions and appointed by the resolutions of the Verkhovna Rada. This draft provides NKREKP subordination to the Government of Ukraine.

Recent political clashes related to the National Regulator in Ukraine call on European and, especially, most closed V4’s experience. This issue is provided by the each V4 country within the following framework:

- Legal background of formation and activity;
- Spheres for regulation;
- Regulation approaches;
- Authorities and responsibilities;
- Review of organizational structure and staff (central, local/branches);
- Regulation of appointment, approval, rotation of the Members and Chairperson of the Regulator;
- Financing of the Regulator activity (sources of financing, annual budget).

Czech Republic

Czech National Regulator: Czech Energy Regulatory Office (Energetický regulační úřad).

1. Legal background of formation and activity:

- The Czech Energy Regulatory Office was formed on the basis of The Energy Act, formally the Law 458/2000 Coll. on Business Conditions and Public Administration in the Energy Sectors and on Amendments to Other Laws;
- The Act was passed by Parliament on November 28, 2000;
- Background on the approval of the law: The bill was drafted by the Czech government, led by then-prime minister Miloš Zeman and formally submitted to the Parliament by the Minister of Industry and Trade, Miroslav Grégr. The bill

passed the House of Deputies on September 21, 2000 with 144 MPs supporting it and 21 against. The bill was supported by the governing Social Democrats (Czech Social Democratic Party), by the Civic Democrats (Civic Democratic Party), and the Christian Democrats (Christian Democratic Union), while the Communists (Communist Party of Bohemia and Moravia) opposed it and the liberal Freedom Union Party abstained. On October 30, 2000 the Czech Senate rejected the bill. However, according to the Czech Constitution, the House of Deputies can overrule the Senate. So, on November 28, 2000 the House of Deputies once again voted in favor of the bill with 136 supporting it and 26 against, along the same party lines as previously. On December 13, 2000 President Václav Havel signed the bill into law;

- The Energy Regulatory Office was formally established on January 1, 2001 and is headquartered in Jihlava, the seat of the Vysočina region. Its main areas of activity include price controls, support for the use of renewable energy sources and combined heat and power generation, consumer protection, protection of interests of license holders, support for competition in the energy market (by cooperation with the Office for the Protection of Competition [ÚOHS]), and supervision over markets in the energy industries;
- The activities and competencies of the Energy Regulatory Office (hereinafter ERO) have changed significantly over time. This activity can be divided into three regulatory periods:
 - First regulatory period (2001-2004): In 2001, the ERO was responsible for overseeing the liberalization of the electricity and gas markets, but also ensuring a proper balance between electricity and gas prices. The electricity market opened formally in 2002, when regional prices for electricity and natural gas were established. In the following two years, the ERO's activities and competencies were adjusted to align with EU rules;
 - Second regulatory period (2005-2009): In 2005, the natural gas market formally opened; at the same time, small businesses could choose their supplier of

electricity for the first time. In 2006, all customers, including households, had the right to choose their supplier of electricity; at the same time, the ERO finally stopped setting final electricity prices, and only regulated the prices of components that contribute to the final electricity price. In 2007, the same change happened in the natural gas market, when all customers, including businesses and households, could choose their own distributor of natural gas. In 2009, the Energy Act was finally amended in terms of transposing EU directives, promotion of more free market principles in the energy sector, and more details on the regulation and resolution of disputes between suppliers and distributors of energy;

- Third regulatory period (2010-2014): This period is marked by the expansion of ERO oversight into the emerging renewables market; in 2010, the ERO began issuing licenses for electricity production from renewable sources, particularly solar plants, which became popular in the Czech Republic due to ambitious subsidies by the Czech government. In 2011, the ERO gained the authority to inspect energy suppliers and distributors, and also began to focus more on consumer protection and market integration with other EU countries, particularly in the V4. Due to the market bubble in electricity production from solar energy, in 2012 and subsequent years the ERO aimed to stop support for the construction of further solar plants by not issuing more licenses.

2. Regulative Spheres:

- Electricity (generation, distribution, and trading);
- Natural gas (transmission, distribution, storage and trading);
- Heat generation and distribution;
- Other: market competition; price regulation (particularly in the 2000s); consumer protection; licensing and inspection; oversight of the Grid of the Czech Republic.

3. Approaches of Regulation:

- Licensing to the subjects of activities:

- Electricity:
 - Installed production output up to 200 kW;
 - Installed production output over 200 kW;
 - Distributing electricity;
 - Transmitting electricity;
 - Trading or business with electricity;
 - Recognizing the authorization to do business with electricity in the Czech Republic.
- Heating industry:
 - Producing thermal energy;
 - Distributing thermal energy.
- Gas industry:
 - Producing natural gas;
 - Distributing gas;
 - Transporting gas;
 - Trading or business with gas;
 - Storing gas;
 - Recognizing the authorization to do business with gas in the Czech Republic.
- Tariffs estimation, approval and controlling (brief overview of tariff policies): The ERO sets tariffs (price decisions) for electricity consumption by the specific electricity distributor (there are currently 5 companies in operation [ČEZ Distribuce, a.s., E.ON Distribuce, a.s., PRE distribuce, a.s., LDS Sever, spol. s r.o., and SV servisní, s.r.o.], of which the first three are dominant players), and for whether the consumer is considered to be low consumption, medium consumption or high consumption. The consumer chooses the tariff; he or she can also choose a single-rate tariff or a dual-rate tariff, with lower prices in times of low demand (night time). Electricity tariffs are set by the size of the circuit breaker in the building of final consumption. Electricity tariffs are separated into a capacity

charge (size of circuit breaker) and the charge for the quantity of distributed electricity (CZK/MWh). Similar tariffs structures apply for natural gas and heat¹².

4. Authorities and responsibilities of National Regulator.

The authority and responsibility of the ERO in the areas of electricity, gas, and heat (including renewables) include:

- price controls;
- support for the use of renewable and secondary energy sources and combined heat and power generation;
- protection of customers' and consumers' interests;
- protection of license holders' interests;
- inquiries into conditions for competition;
- cooperation with the Office for the Protection of Competition (ÚOHS);
- support for competition in the energy industries;
- supervision over markets in the energy industries.

5. Review of Organizational structure and staff:

- Main organizational sections of the ERO:
 - First Vice-Chairman Division;
 - Internal Audit Unit;
 - Security Director;
 - Department of the Chairwoman's Bureau;
 - Regulation Section;
 - Legislation and Administration Section;
 - Supported Energy Sources Department;
 - Operations Section;
 - Inspection Section;
 - Section for European Affairs and Strategy.

¹² Current tariff prices in Czech Republic at August 2016:

<https://www.ero.cz/documents/10540/1122285/Price+decision+8+2015+EN.pdf/1ab81d00-02c3-40db-8134-c6899047ffc9>

- Details on most important sections:
 - The Regulation Section prepares the ERO's price decisions for the electricity, gas and heating industries. The section decides disputes when license holders themselves, or license holders and their customers, fail to enter into an agreement, approves the operating rules for the electricity transmission system and electricity distribution systems, and the gas TSO's grid code and the gas DSOs' grid codes. The section also drafts regulations that implement provisions of the Energy Act and the law on support for the use of renewable energy sources, lays down the rules for electricity and gas market organization, and analyses the operation of the markets, and lays down the required quality of supplies and services in the electricity and gas industries;
 - The Supported Energy Sources Department addresses issues of supported energy sources under Act No 165/2012 on supported energy sources and amending certain laws, as amended. It drafts price decisions in which it sets out the amount of financial operating aid to electricity from supported energy sources, which is generated using renewable energy sources and secondary energy sources or in the process of high-efficiency combined heat and power generation, and also the amount of financial operating aid to heat under Act No 165/2012. The Supported Energy Sources Department also drafts implementing regulations related to the law on supported energy sources;
 - The Inspection Section oversees compliance with the Energy Act in the electricity, gas and heating industries, with the obligations in the electricity and gas industries laid down in the law on consumer protection, and with the Act on Prices to the extent defined in the law on the competences of the authorities of the Czech Republic in respect of prices. The performance of oversight follows Act No 255/2012 on oversight (oversight rules), unless the Energy Act stipulates otherwise. The Energy Regulatory Office carries out checks, inspections and reviews on its own motion or upon suggestions received from the Ministry of Industry and Trade. Before starting checks, inspections and reviews on its own

motion, the Energy Regulatory Office also evaluates the justifiability of the communications received from the persons who have suggested checks, inspections and reviews;

- The Section for European Affairs and Strategy creates a more effective structure for functioning of relations with other foreign regulators associated in the ACER and CEER and the EU institutions in the framework of issues related to the energy market. At the same time, the Section interlinks international issues with the REMIT Department, which provides national oversight over ensuring integrity and transparency of wholesale energy markets in the scope of the Regulation No. 1227/2011 of the European Parliament and of the Council.

In the budget approved for 2014, the number of ERO employees was set at 224.

6. Regulation of appointment, approval, rotation of the Members and Chairperson of Regulator.

The chairperson of the ERO is appointed by, and can be removed by, the Government of the Czech Republic. The current chairwoman of the ERO is eng. Alena Vitásková, who has served in that capacity since 2011 (that is, by a previous government). There is no set term limit defined by law. The chairwoman appoints and fires her own deputies, who oversee individual sections of the ERO. In other words, the ERO has a single director (chairperson), rather than controlled by a directing board.

7. Financing of the Regulator activity:

- Source: of financing state budget (special chapter of the annual state budget);
- Annual budget of ERO in 2014: 7,5 million EUR.

Hungary

Hungarian National Regulator: Hungarian Energy and Public Utility Regulatory Authority (Magyar Energetikai és Közmű-szabályozási Hivatal).

1. Legal background of formation and activity:

- The legal predecessor of the Authority is the Hungarian Energy Office (HEO) as established under Act XLI of 1994 on Natural Gas Supply. In 2013 the Office went through a major legal and organizational reshuffle, was renamed as Hungarian Energy and Public Utility Regulatory Authority (HEPURA) and was established in its current form as an independent regulatory body under Act XXII of 2013 as of 4 April 2013;
- In 1994 the establishment of the Office served as an institutional guarantee for foreign investors for future profitability after the then forthcoming privatization of energy sectors, primarily in electricity and natural gas distribution. The rationale of the reshuffle in 2013 was the decreasing leverage of foreign investors and the government's wish to take a more active regulatory and ownership role in the sector. During the reform the Authority's responsibilities were considerably widened, but some of its main competencies shifted to the Ministry of National Development;
- HEPURA has its seat in Budapest. The Authority is responsible for the regulation of the energy and utilities industry, for the licensing, supervision, tariff setting (for TSOs and network-related components) and price preparation (for universal service) for electricity, natural gas, district heating, and water utility, as well as for some price supervision activities in the public waste management services sectors. In line with these tasks it also oversees the renewable energy sectors (if their activity falls within the above mentioned fields), provides consumer protection and statistical data processing in these sectors;
- The activities and competencies of the Authority have changed significantly over time. This activity can be divided into three periods:
 - "Investment protection" (1995-2001): In these early years, the HEO focused on tariff formulation. Sectoral prices were set administratively and the Office was responsible to set tariffs in a profitable range, especially as for foreign investments regarded. This system, coupled with the relatively low energy

prices, robust growth primarily in the residential sectors channeled major investments into the respective networks;

- “Market opening” (2001-2010): The market opening started in 2003 and 2004 in the electricity and gas markets respectively. HEO was in charge of the liberalization process, to align it to the EU rules. In 2007 and 2008 the new Acts on full market opening was accepted in the two sectors respectively;
- “Statist regulation” (2010-current): Fidesz publicly criticized the existing status quo in the utility sectors and the Orbán-cabinet reshuffled the existing regulatory framework. It strengthened the system of universal service, delegating its price setting functions to the Ministry of National Development (on the basis of the tariff proposals of the Regulator). Furthermore, HEO and HEPURA played an active role in the price moratorium since 2010 and in the utility price cuts (above 25%) in 2013-14. Regulation has also become a part of the publicly advocated “renationalization” of the utility sector, which intensified after 2014.

2. Regulative Spheres:

- Electricity (generation, distribution, and trading);
- Natural gas (transmission, distribution, commercial and strategic storage, trading);
- District heating (generation and distribution);
- Water utilities (distribution);
- Pubic waste management (oversees tariffs);
- Other: price preparation (universal service) and tariff setting; consumer protection; licensing and inspection; coordination of transposition of EU regulatory measures.

3. Approaches of Regulation:

- Licensing to the subjects of activities:
 - Electricity:
 - Installed production output over 500 kW;

- Electricity TSO;
- Electricity transmission;
- Electricity distribution;
- Electricity trade (including universal service);
- Generation from renewable or high-efficiency combined sources (including the conditions of mandatory off-take);
- Power exchange;
- Street lighting.
- Heating industry:
 - Producing thermal energy over 5 MW;
 - Distributing thermal energy.
- Gas industry:
 - Gas TSO;
 - Gas transportation;
 - Gas distribution
 - Gas trade (including universal service);
 - Gas storage;
 - Gas exchange;
 - Off-take price preparation for domestic production.
- Water utility:
 - Single license for the activity.
- Public waste management:
 - Tariff supervision.
- Tariff estimation, approval and controlling: Tariffs for system operators are set by the decrees of the HEPURA. The prices in the universal service are set by the Ministry of National Development. HEPURA is responsible for the preparation of these decisions, making price estimation and proposals for the Minister. In the case of heat, similar procedures are to be applied with a much sizeable differentiation. For public waste management the HEPURA has the right to

monitor their activities and pricing and even withdraw licenses in case of excessive misuse of market power. Domestic gas production matters directly do not belong to HEPURA's auspices, but it prepares the mandatory off-take prices for the Minister for approval.

4. Authorities and responsibilities of National Regulator.

The authority and responsibility of the HEPURA in the areas of electricity, gas, heat and water utilities include:

- Price preparation for universal service and tariff setting;
- protection of customers' and consumers' interests;
- protection of license holders' interests;
- transposition of the relevant EU regulations;
- market and competition issues;
- collecting statistical data on the respective sectors.

5. Review of Organizational structure and staff.

HEPURA is headed by its President, responsible for the Authority, its activities and decisions in one person. His cabinet takes decisions related to communications, press and public relations and oversees the internal auditing, IT and security departments. Four deputy Presidents are in charge of energy sector; public utilities; international cooperation and general affairs. Gas, electricity and heat belong to the first; water and public waste belong to the second Deputy. Besides legal, HR and financial issues, the consumer protection and statistical departments are under the Deputy responsible for general affairs. In the case of the first two deputies, there is a clear and strict sectoral separation of the activities. The total maximal staff of HEPURA was 321 people in 2015.

6. Regulation of appointment, approval, rotation of the Members and Chairperson of Regulator.

The president of the HEPURA is appointed (for seven years) and can be removed by the Prime Minister. The current President is Lajos Dorkota who has served in that capacity

since 2013. The President can be reappointed once. The President appoints and fires his own deputies and he bears full responsibility for the activities of the HEPURA.

7. Financing of the Regulator activity:

- Source of financing: primarily the state budget (under the chapter “National Assembly”), but supervisory fees and related penalties also transferred to its budget;
- Annual budget of ERO in 2015: 7,100 million HUF (22,72 million EUR).

Poland

National Energy Regulator in Poland is The Energy Regulatory Office - Urząd Regulacji Energetyki.

1. Legal background of formation and activity - Energy Law (10.04.1997). The regulative spheres of Energy Law: energy policy; energy consumption/delivery condition; utilities; institutions, among them Energy Regulatory Office.
2. Regulative Spheres:
 - Electricity (generation, distribution, and trading);
 - Natural gas (production, transmission, distribution, storage and trading);
 - Heat generation and distribution;
 - Liquid fuels;
 - Other engineering grids.
3. Approaches of Regulation:
 - Licensing;
 - Approving tariffs and prices;
 - Designating transmission system operators and monitoring the fulfillment of the operators' tasks;
 - Monitoring bio-components and liquid fuels market.
4. Authorities and responsibilities of National Regulator.
 - Regulatory activities:

- a. Energy Law Act enables the President to control the activities of energy enterprises during the process of license granting or changing as well as through taking appropriate action after notification from other government body or user (e.g. in a form of complaint) of any violation of law or a suspicion of noncompliance with the law or conditions of the issued license;
 - b. The result of revealing the incorrectness is an intervention with the use of available legal means, including financial penalties;
 - c. The regulation methods should support the development of infrastructure. One of the means to realize this goal is prolonging the period of the tariffs' validity, because the stable regulatory frame in the long run helps operators to develop long-term strategies. At the same time the operators should be required to improve the operational effectiveness.
- Promotion of competition and strengthening the consumer's position:
 - a. ERO's President does not have a wide range of competences directly connected with the promotion of competition. Among main activities of the regulator leading towards eliminating the barriers for competition on the energy market are:
 - i. approving the instruction for operation and maintenance of the grid: resolutions determining the conditions of balancing the system and managing the system limitations, as well as the conditions of use and conducting traffic, exploitation and planning the development of the grid;
 - ii. approving the programs for the compliance of the distribution system operators – program for the compliance is a document that may significantly aid the competition on the energy market as well as aid the creation of the competitive gas market by ensuring non-discriminating treatment of the system users;
 - iii. monitoring the mechanisms for balancing the system – through analysis of the information and periodical transmission system operator's

- reports; the President also evaluates the functioning of the principles for balancing and congestion management in the National Power System based on monitoring the situation on the market and analyzing the causes of possible disruptions;
- iv. monitoring the conditions for connecting the enterprises to the grid and how they are fulfilled as well as monitoring modernization works on the grid. This is done by verifying and analyzing the information coming from energy enterprises and users; especially through monitoring the fulfillment of the enterprises' obligation to inform the President of ERO about every case of refusal to connect to the grid; during resolving disputes concerning refusal to enter into agreement for connection to the grid and considering the complaints of consumers against the energy enterprises; monitoring is also conducted at ERO during the licensing process (including license changes);
 - v. monitoring the conditions of gas storage, liquefying natural gas;
 - vi. control over the realization of the obligation of public electricity sale (exchange obligation);
 - vii. committing to the implementation of the entry-exit tariff system, including consultations with the gas TSO as regards rates in the entry-exit system and the rules of their calculation.
- b. All actions and decisions concerning liberalization of the rules and principles of the market's functioning have to be taken keeping in mind the resulting advantages for end users. Energy user has to be the final beneficiary of the liberalization process;
 - c. Among many activities for the promotion of competition, it is worth to distinguish the ERO President's educational and informational campaigns organized on a large scale, in order to strengthen the demand side of the market;

- d. The number of suppliers' switching cases measures the development of the competitive energy market. The ERO President systematically monitors the degree of the use of the possibility to choose the energy provider by the authorized consumers. The results of the monitoring show that in Poland mostly the industrial and institutional consumers benefit from TPA rule. However more and more consumers know about their right to change the provider and learn to use that right. ERO's guidebook website promoting TPA has thousands of guests daily (www.maszwybor.ure.gov.pl);
 - e. ERO undertakes a number of initiatives and actions leading to improvement of the gas and energy market's functioning. An example of such an initiative is an elaboration of documents „Good Practice for Providers and Distribution System Operators” of gas and energy.
- Tariffication:
 - a. Every year the President of ERO conducts around 1200 administrative proceedings concerning approving energy, gas and heat tariffs;
 - b. One of the key issues is developing a methodology of benchmarking analysis and financial projection for tariffication needs of the largest distribution system operators as well as establishing for those enterprises the amount of justified return on the capital. Incentive regulation model with elements of comparative analysis has been used for a few years now in energy operators' activities, whereas in case of gas the appropriate model was implemented in 2011;
 - c. At the same time ERO controls tariffs inter alia in terms of compliance of the presented tariffs with the law, the obligation to use approved tariffs and to apply tariffs – especially in accordance with their conditions;
 - d. The President of ERO approves the tariffs for transmission and distribution of energy. In electricity trading tariffs' approval applies only to households;
 - e. Tariffication of the infrastructural enterprises is an indirect method of monitoring the security of supply. During the tariffication process decisions on the extent of financing the assets indispensable for the fuel supply are being

made. The amount of investment in the network assets, the amounts dedicated to renovation and modernizing the assets determine its condition. Approved tariffs assure good financial condition of enterprises but also the possibility to finance planned investments, modernizations and renovations.

- Security of energy supply:
 - a. One of the basic tools used by the regulator to maintain the security of energy and gas supply is the obligation imposed on the energy enterprises to agree with the President of ERO their development plans in terms of satisfying the current and future energy and gas demand. On the basis of the agreed the plans, the infrastructural enterprises carry out investment and renovation tasks and ERO monitors the status of the realization of the ventures necessary for maintaining the appropriate level of reliability and quality of network services;
 - b. Moreover, the tasks of the President of ERO contributing to supervising and monitoring the energy security include:
 - i. Agreeing the plans of implementing the limitations in energy supply and consumption developed by the system operators in case of emergency and approving such plans for gas consumption by operators. Creating such plans should assure energy security in case of a threat to national energy supply, unforeseen increase in consumption, disruption in gas supply, breakdown of the network or threat to the security of network functioning;
 - ii. Fuel reserve control: enterprises producing energy or heat are obliged to maintain the reserves in the amounts ensuring the continuity of electricity or heat supply. The obligatory amount of reserves the gas enterprises have to maintain is verified or established by the regulator's decision;
 - iii. Monitoring the conditions of gas storage;
 - iv. Monitoring of the system limitations management helps the President of ERO to identify barriers for use of the grid;

- v. Monitoring the diversification of the natural gas foreign supply.
- International cooperation:
 - a. Energy Regulatory Office operations are influenced significantly by the external conditions which role and meaning in the recent years increased along with the convergence of the regulatory activities and progressing integration of energy markets;
 - b. While taking regulatory decisions on the national market, the regulator can not disregard good practice elaborated within associations such as CEER (The Council of European Energy Regulators) or ERA (Energy Regulators Regional Association). Moreover, progressing integration of energy markets within EU means that many regulatory solutions elaborated by the European Commission, European Council and European Parliament are either directly applicable in the Member States or need to be implemented into the national legislation. The President of ERO takes part in the development and implementation process both on European (first within ERGEG – European Regulator's Group for Electricity and Gas, the European Commission's consulting body and now at ACER – Agency for Cooperation of Energy Regulators that replaced ERGEG) and on national level. As a result the national regulator becomes more and more involved in the international cooperation, especially within the EU;
 - c. Every year Energy Regulatory Office prepares and presents, to the European Commission, a National Report on the functioning of the Polish energy market and the activities of the President of ERO aiming at creating a competitive energy market. Furthermore, ERO regularly informs the Commission about the situation on the Polish energy market, contributes to research and analyses conducted by the EC, takes part in the sessions of Committees and working groups;
 - d. Among the institutions of international rank that the Polish regulator cooperates with a special place is taken by the regulators' associations: CEER

- (The Council of European Energy Regulators), ACER (Agency for Cooperation of Energy Regulators) and ERRA (Energy Regulators Regional Association);
- e. From February 2011, the President of ERO holds the function of the Vice President of the Board of the CEER. ERO's experts contribute to the works of the Council and take part in consultations on the documents elaborated by CEER, aiming at creating the tools for the future functioning of the European electricity and gas market;
 - f. In 2010, Energy Regulatory Office began cooperation with European energy regulators within ACER, officially established by the EU Regulation in 2011. The President of ERO represents Poland in the Agency Board of Regulators. ERO representatives take an active part in the works of many ACER working groups as well as Regional Initiatives in the field of electricity (ERI): North Europe, Central Eastern Europe and gas (GRI): South and South East;
 - g. Poland is also among the founding countries of the ERRA created in 2000 by the representatives of 15 countries of Central and Eastern Europe. From 2009, the President of ERO is a member of the ERRA Presidium.
- Education and information:
 - a. Shaping the consumer awareness of the end users became an important goal in the ERO's strategy, which aims at creating an open and competitive energy market;
 - b. Still, many consumers do not know their rights and obligations. Therefore, informing them of the possibilities that appeared together with progressing process of market liberalization is crucial. ERO created an Information Centre for Energy Consumers „How to change the supplier”, also the Contact Point provides guidance for end users. The main responsibility of the Contact Point is to inform the consumers about their rights and obligations towards energy enterprises;
 - c. ERO leads informational and educational campaigns using new technologies and tools such as internet, TV, radio, billboards and press. A guidebook

website – www.maszwybor.ure.gov.pl – prepared by ERO in the social campaign promoting the right to change the energy supplier is one of the examples.

5. Overview of organizational structure and staff:

- A. There are 9 branches offices:
 - North-West branch seated in Szczecin;
 - North branch seated in Gdańsk;
 - Western branch seated in Poznań;
 - Eastern branch seated in Lublin;
 - Middle-Western branch seated in Łódź;
 - South-West branch seated in Wrocław;
 - Southern branch seated in Katowice;
 - South-East branch seated in Kraków.
- B. There are 6 departments, 2 managerial offices and 3 divisions:
 - Department of Strategy and Public Communication;
 - Department of Electricity and Heat Markets;
 - Department of Gaseous and Liquid Fuels Markets;
 - Department of Support Systems;
 - Department of Markets Development and Consumer Issues;
 - Department of Legal Issues and Dispute Settlement;
 - Office - Coordination Centre for Smart Grids Development;
 - Office of the Director General;
 - International Cooperation Unit;
 - Position for the Protection of Classified Information;
 - Internal Auditor.

Staff of ERO is including of 300 people by the professions:

- Economists – 22%;
- Lawyers – 20%;

- Management specialists – 10%;
- Power engineers and electricians – 8%;
- Business administrators – 8%;
- Environmentalists – 7%;
- Mechanical engineers – 6%;
- Other professionals – 19%.

6. Regulation of appointment, approval, rotation of the Chairperson of Regulator.

The President of Energy Regulatory Office is a member of central government body. The President is appointed by the Prime Minister from the candidates chosen in an open competition. The President's authority is supported by the Energy Regulatory Office that comprises of the head office and 9 regional offices (In operation from 1998). The President's has 5-year cadency, which can be prolong one time.

7. Financing of the Regulator activity (2014):

- Expenses – 38 million zloty (9.08 million EUR);
- Income – 100 million zloty (23.89 million EUR) - gained from energy companies in license fees and remitted wholly to the national budget.

Slovakia

National regulator in Slovakia: Regulatory Office for Network Industries (Úrad pre reguláciu sieťových odvetví).

1. Legal background of formation and activity - the Act No. 250/2012 Coll. On regulation in network industries.

2. Regulative Sphere:

- Electricity (generation, transmission, distribution and supply of electricity and the related services; performance of the short-term electricity market administrator's activities);

- Gas (production, transport, distribution, storage and supply of gas and the related services);
- Heat (production, distribution and supply of heat);
- Potable water (production, distribution and supply of potable water by public water supply system, abstraction of surface water and energy water from water flows, utilization of the hydro-potential of the water flows);
- Waste water (diversion and purification of sewage through public sewerage system).

3. Approaches of Regulation:

- Licensing for regulated activities performance:
 - In heat sector:
 - heat generation;
 - generation and distribution of heat or heat supply for a consumer or an end-consumer.
 - in energy sector (production, transmission, distribution and supply of electricity):
 - generation and supply of electricity by a generation facility with the total installed capacity of up to 1 MW;
 - generation and supply of electricity generated from renewable sources of energy by a generation facility with the total installed capacity of up to 1 MW, provided the electricity is generated and supplied in small hydro plants, wind power plants, solar power plants, geothermal power plants, biogas plants, biomass plants);
 - production, transport, distribution and supply of gas:
 - production and supply of gas from biomass;
 - production and supply of gas from biogas;
 - sale of compressed natural gas to be used as fuel for motor vehicles.
 - operation of pipelines for the transport of fuels or oil:

- transport of extracted oil from the place of extraction to the place of processing.
- operation of equipment for filling of pressure vessels:
 - sale of liquefied hydrocarbon gas in pressure vessels of up to 100 liters;
 - sale of liquefied hydrocarbon gas to be used as fuel for motor vehicles;
 - transport of liquefied hydrocarbon gas in pressure vessels;
 - issuing of pre- agreements;
 - operational Orders approvals;
 - issuing the confirmations on electricity origin, etc.
- Price regulation (Price regulation is the key activity of the Office. Its aims, priorities, scope and methods of performance are reflected in the Office`s executive documents in the form of decrees and administrative acts/decisions. These instruments comprise a regulatory framework and establish conditions conducive to the formation of a transparent and non-discriminatory market environment in which the regulated entities have sufficient space to cover their costs and generate reasonable profit. Moreover, the Office adopts measures guaranteeing the consumers secure and reliable energy supply at a fair price. The basic principle of price regulation approved or determined by the Office for the regulatory period 2012-2016 is based on the price cap method. The price regulation procedure is initiated upon the submission of a price proposal for electricity, gas, heat, potable water, wastewater, and related regulated activities to the Office by a regulated entity, or the Office initiates the procedure upon its own initiative. As a result of the price regulation procedure, the Office approves or determines the price, which is stated in a price decision issued by the Office, for the regulated entity. The regulated entity is allowed to appeal against the Office`s decision. An appeal against a decision made in a price regulation procedure, if any, must be lodged, within 40 days from the notification date).

4. Authorities and responsibilities of National Regulator.

The Regulatory Office for Network Industries is a public authority for the sector of regulation in network industries with a nation-wide jurisdiction. The Office operates as

an impartial and independent competent authority. Neither public authorities, municipal authorities, other public bodies nor other persons may influence the office in the performance of activities within its remit.

Regulatory policy is a strategy, which provides for the implementation of regulation during a determined regulatory period. Its core attributes include determination of the length of the next regulatory period, assessment of potential needs for additional regulation for the next regulatory period, including justification of the proposed scope of price regulation and the implementation method of price regulation, scope of price regulation and the implementation method of price regulation in the next regulatory period. Regulatory policy is binding throughout the regulatory period for all market participants in network industries.

Bodies of the Office are the Chairman of the Office and the Council for Regulation. The seat of the Office is in Bratislava.

The Office is led by the Chairman, appointed and recalled by the President of the Slovak Republic upon proposal of the Government of the Slovak Republic. The Chairman of the Office is also chairs the Council for Regulation. The term of office of the Chairman of the Office is six years. The same person may be appointed as the Chairman of the Office for no more than two consecutive terms. The Chairman of the Office governs the Office and acts on behalf of the Office externally in all matters, appoints and recalls the Vice-Chairman of the Office, decides in regulation procedures as the first-level authority and decides on the imposition of penalties in appeal proceedings.

The Council for Regulation is in charge of strategic management and regulation policy with regard to network industries. The Council adopts regulation policy, approves the rules of procedure of the Council, establishment of branches of the Office outside of its seat, annual financial statements of the Office, and decides in appeal proceedings, except for decisions on the imposition of a penalty.

Members of the Council for Regulation, except for the Council Chairman, are appointed and recalled by the President of the Slovak Republic upon proposal of the National

Council of the Slovak Republic and the government. The nominations are distributed as follows: three Council members are nominated by the National Council of the Slovak Republic and three Council members are nominated by the government. The term of office of a Council member is six years whereby the Council is renewed by replacing one third of members every two years.

5. Overview of organizational structure and staff (central, local/branches):

The seat and headquarters of the Office is in the capital city Bratislava. Local branches are in Trenčín (western part of Slovakia), Martin (middle part of Slovakia) and Košice (eastern part of Slovakia).

The Office has statutory bodies and organizational units. Bodies of the office are the Chairman of the Office and the Council for Regulation. Organizational units of the Office include the Vice-Chairman, office of the Chairman, Human Resources and Administration Department, Legal Department, Competition and Market Regulation Department, Control Department, Monitoring and Analysis Department, Electricity Regulation Department, Gas Regulation Department, Heat Regulation Department, Water Regulation Department, Internal Audit Unit.

Number of employees (2014): 106.

6. Regulation of appointment, approval, rotation of the Members and Chairperson of Regulator.

The Office is led by the Chairman, appointed and recalled by the President of the Slovak Republic upon proposal of the Government of the Slovak Republic. The Chairman of the Office is also chairs the Council for Regulation. The term of office of the Chairman of the Office is six years. The same person may be appointed as the Chairman of the Office for no more than two consecutive terms.

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Republic and three Council members are nominated by the government. The term of office of a Council member is six years whereby the Council is renewed by replacing one third of members every two years.

7. Financing of the Regulator activity:

- Sources of financing: state budget
- Annual budget of Regulator in 2014: 2,94 million EUR.

Proposals for Ukraine in reforming national energy regulator

1. Ukraine should a maximum de-politicize the question of forming of the key management and activities of the national energy regulator in order to ensure its regulatory functions best manner. The experience of Poland and the Czech Republic show that high functionality of the energy regulators of these countries can be done even in the absence of a special law on their energy regulators, unlike Hungary or Slovakia, where these laws are persist. As for arranging such special law in Ukraine, its relevance is primarily motivated by the need to fill certain legal gaps, since there is no legal regulations of the existence of this state authority in the list of on the state agencies in the text of the Constitution of Ukraine.
2. The experience of most countries of Visegrad Group States that their national energy regulators (energy regulatory offices) take regulatory decisions for the industry on the principle of "one-man management or individual responsibility". This principle provides greater efficiency in decision-making because it does do not require the specific routine organizational procedures that always accompany to the meetings, e.g.: formulation in advance and approval of the agenda, advance notice of the participants of the meeting, the need to ensure a quorum for decisions approval, protocol support, etc. Moreover, the principle of "one-man management" does not create preconditions for "blurring" of responsibility for collegiate decisions and, subject to controls by the national energy regulator entity unbiased and appropriately qualified, almost nothing is driving the potential corruption field. In such

circumstances, the requirements for qualifications, impartiality, high moral qualities of the Regulator's chairperson and his/her deputy are extremely increased. Within the examined countries, only in Slovakia its national energy regulator partly makes its decisions on collegiate basis and only in disputing procedure when the decision of Regulator are disputed by the Council for Regulation as the pre-trial procedure before, and as alternative option to the appealation to the court of arbitration. Council for Regulation is formed on a parity basis with candidates from the Parliament and the Government of this country, who are approved by the President of Slovakia. Thus, it is obvious that Ukraine is followed by more Slovak model of the formation of the senior executives of the national energy regulator. However, given the large scale of the energy sectors in the Czech Republic and especially Poland, the energy capacity of it is coming to Ukraine, Ukraine would consider and courage on the transition from the collegiate principle of making regulatory decisions to decision-making on the basis of one-man management. This transition would, in turn, to reduce the level of politicization in the question of the formation of the top management structure of the regulator because it is easier to choose the very best 1 person than simply best 5-7 persons with the same number of potential applicants.

3. In the V4 countries their energy regulators are "embedded" in the executive branch of the state power, and in most of the countries in which they are subordinated to the Governments, the leader of the Regulator is appointed on his/her post by the Prime Minister on the results of laborious selection of potential candidates. In Slovakia, energy regulator office operates as an impartial and independent competent authority. Neither public authorities, municipal authorities, other public bodies nor other persons may influence the office in the performance of activities within its remit. Ukrainian state governance, at least, should clearly recognize the affiliation of its energy Regulator to the executive branch, since no judicial or legislative branches, according to the regulator's functional and responsibilities. At the same time, there is Slovak experience when Regulators occupies more independent from the Government of the country position as an executive state

authority. Any way, the draft of the Law on NKREKP should be putted into regularity of the Constitution of Ukraine.

4. The regulative areas of the regulators in the V4 countries generally include the products and services primarily related to the energy resources and/or transportation services which use the engineering grids. However, the competence of the energy regulator of Hungary applies the scope of the regulation of solid residential waste management. The competence of the Ukrainian regulator also refers to this sector under which created the corresponding department in organizational chart of NKREKP. But the Ukrainian Regulator has no real levers of influence on this process because the activity of the disposal and processing of solid residential waste is not subject to licensing according to the Ukrainian legislation. At the same time, the problem of waste disposal in Ukraine is extremely actual today (4% of the territory of Ukraine is under the damps and syndrome of Hrybovyts'ke Damp's accident with human loses, major part of this business is being in black zone, etc.). Therefore, in order to create preconditions for stimulation of waste recycling and in order to move of a substantial share of the waste management business to legal basis, the state governance of Ukraine should immediately decide: either provide this mechanism of stimulation and control, thanks to the introduction of licensing of utilization of solid residential waste; or pass this matter and related issues to resolve them at the local level by clearing the corresponding responsibilities from NKREKP.
5. In the V4 countries is observed the transition from pricing according to the principle "costs plus" to the principles of incentive pricing: "RAB (Regulatory Asset Base)" or to "Price Cap Regulation". The latter is usually used for the determination of tariffs for natural monopolies. We consider that is appropriate to draw the attention of the NKREKP on this latest methodological approach to pricing and create the necessary conditions for its application in the medium term.

Energy efficiency funds/programs: V4 experience and proposals for Ukraine

Outlook in Ukraine

The Cabinet of Ministers of Ukraine by its Ordinance No 1228-p of 25 November 2015 approved The National Action Plan On Energy Efficiency for the Period until 2020 which outlined main steps to achieve highest standards of countries energy efficiency in all sectors accordingly to the European Union standards and regulations. In development of the Action Plan, the Ministry of Regional Development, Construction, Housing and Communal Services of Ukraine presented in February 2016 the Concept of Energy Efficiency Fund. This Concept was criticized by the experts due to the Concept does not secure, among other, exact result from energy efficiency projects, which can be measured and confirmed by independent auditing and clear sources and mechanisms of financing¹³. Due to the criticism to Conception of Energy Efficiency Fund, the Cabinet of Ministers approved only the Concept of the Introduction of Mechanisms of Stable Financing of Energy Efficiency Measures (as the first step creation of the Energy Efficiency Fund) by its Ordinance No. 489-p of 13 July 2016.

Fundamentally, the idea of creating an Energy Efficiency Fund and indicated efforts of the Government in this direction are comforting to the Ukrainian society and foreign partners of Ukraine. Therefore, the experience of V4's countries to use this type of fund and/or special programs to stimulate energy efficiency measures in these countries is extremely important. Relevant V4 experience by the member country is presenting within such framework:

- Legal background of formation and activity;
- Founder/co-founders of the Energy Efficiency Funds/Programs;
- Aims and scope of activity;
- Review of activity, including the results, controlling/auditing mechanisms;
- Financing issues.

¹³ <http://necu.org.ua/wp-content/uploads/2016/05/Rezultaty-opytuvannia-po-fondu-2.pdf>.

Czech Republic

The Energy Efficiency Program in the Czech Republic: Green Saving Program

1. Legal background of formation and activity:

- The Green Savings Program is not based in a specific national law. This is a program of the Czech Ministry of the Environment, which is administered by the State Environmental Fund of the Czech Republic and focuses on energy savings and renewable energy sources in family houses and other residential units.
- The program has been implemented in three phases, each with its own government approval and criteria. The first Green Saving Program ran from 2009-2012, and was largely seen as a great success in terms of financially supporting (subsidizing) investments in the energy efficiency of residential buildings; without such financial support, building owners may not have had the financial incentive to reduce energy efficiency. The second Green Savings Program was implemented in 2013. The current, third Green Saving Program is operating from 2014-2020. Below, I describe this current program.

2. Founder/co-founders of the Fund/Programs: The Programs are founded by the Ministry of Environment of the Czech Republic, and are administered by State Environmental Fund of the Czech Republic.

3. Aims and scope of activity: housing renovation

- The Program's objective is to improve the environment by reducing greenhouse gas emissions through the improved energy efficiency of buildings, the support of residential development with very low energy performance and the efficient use of energy sources. The program is divided into the following basic support areas: 1) reducing energy performance in existing family houses; 2) the construction of family houses with very low energy performance; 3) Efficient use of energy resources. That is, the program aims to improve the environment by reducing emissions of pollutants and greenhouse gases (mainly CO₂), as well as saving energy in final consumption and stimulating the economy of the Czech Republic with other social benefits, such as increasing the quality of life and improve the appearance towns and villages.

- The program supports measures leading to the energy efficient buildings, mainly in the form of thermal insulation of external facades and replacement panels for windows and doors of buildings (especially highly insulated windows). It is also supports the construction of new buildings with very low energy consumption (so-called “passive buildings”), replacing non-organic sources of heat for efficient, environmentally-friendly sources (such as biomass boilers and heat pumps or boilers) and installation of technologies using renewable energy sources and heat recovery from exhaust air (solar thermal and photovoltaic systems and forced ventilation unit with heat recovery).
- The principle of granting subsidy amount is very simple. The more energy efficient the buildings are after the implementation of the measures, the greater the degree of financial support. The subsidized program is divided into two parts: one for family homes and the other for apartment buildings.
- Areas of support for family houses: 1) Reducing the energy performance of existing houses via subsidies for thermal insulation of the building envelope - the replacement of windows and doors, insulation of exterior walls, roofs, ceilings, floors. 2) Construction of houses with very low energy consumption. 3) Efficient use of energy resources. These include grants to replace the original main sources of solid fossil fuels that not meet the parameters of the third emission class as an effective environmentally-friendly source of energy. This part of the program also provides grants for: replacing systems for electric heating with a heat pump; the replacement for natural gas heating system with gas heat pump or per unit of combined production of electricity and heat using natural gas as fuel; the installation of solar thermal and photovoltaic systems; ventilation systems with heat recovery from exhaust air.
- Areas of support for apartment buildings are generally the same as for residential homes. One difference is that the program does not support funds for the construction of “passive” apartment buildings.
- Who can apply for support: Eligible applicants and beneficiaries are the owners and builders of houses and owners of apartment buildings. These include:
 - individual residents and entrepreneurs (natural and legal persons);

- owners associations;
- housing associations;
- cities and municipalities (including municipal districts);
- business entities;
- other legal entities.

4. Review: the results, controlling/auditing mechanisms.

- Applications for subsidies are accepted only electronically and based on time-limited calls. Applications may be submitted prior to the implementation of the supported measures. The for the current program, the first call was in January 2014 with about 70 million EUR available. By Czech standards, this is one of the largest grant or subsidy programs in the country that is available to ordinary people.
- As a subsidy program, the key feature (and difficulty for ordinary people) is that applicants must first implement remodeling efforts, and afterwards apply for partial reimbursement of the incurred costs. To ensure energy efficiency and quality assurance, remodeling (or new constructions in the case of passive buildings) must be carried out by Qualified Suppliers (who gain their certificates from the Ministry of Environment) and Qualified Products and Technologies. The List of Qualified Suppliers and the List of Products and Technologies are to set and guarantee the minimum quality standards for both the services provided and the products and technologies used in the Program. Both lists are open for all suppliers and products meeting the pre-defined Program conditions. Registration in the lists is free of charge. Only the measures performed in a qualified manner by the companies from the List of Qualified Suppliers using the high-quality materials and technologies from the List of Products and Technologies are subsidized.
- The amount of aid is influenced by the extent and quality of the implemented measures: the more measures leading to energy savings applicant performs, the higher receive support.
- The total amount of grant per application is limited to max. 50% of eligible expenses properly documented and is paid only after the proper completion of the

implementation of measures supported. The maximum grant per applicant is under this call for houses set at 5 million CZK. For houses located in Moravia, and Usti region, the grants are increased to substantial amounts to about 10%.

- Financial support for reducing the energy performance of existing houses: In this area of support the subsidy is provided according to the extent of actually implemented measures – i.e. according to the surfaces of insulated structures on the envelope of the building, depending on the area of intervention achieved A.0 to A.3. The first subregion serve as input to the "softer" requirements, which allows implementation of e.g. replacement panels for building openings, together with the thermal insulation of the ceiling below an unheated soil. The maximum amount of support for individual types of structures according to sub-areas:

The type of construction	A.0 of A.1 (CZK/m ²)	A.2 (CZK/m ²)	A.3 (CZK/m ²)
External walls and floors of the exterior	500	600	800
Roofs	500	600	800
Openings	2 100	2 750	3 800
Floors on the ground	700	900	1 200
Ceilings and other structures	330	400	550

- Financial support for construction of houses with very low energy consumption: support is provided in the form of one-off fixed subsidy per house. The amount is determined according to the achieved level of energy performance of the building and the required technical parameters (i.e. according to the achieved sub-region B.1 or B.2). In addition, subsidies for construction of houses in Moravia and the Usti region is increased by 10%. Financial support for expert documentation is set at a maximum 35,000 CZK.

Subregion support	Description	The amount of support per house [CZK]
Subregion B.1	House with very low energy consumption	300 000
Subregion B.2	House with very low energy consumption with an emphasis on the use of renewable energy sources	450 000

- Financial support for the efficient use of energy resources: grants for the exchange of non-organic sources of heat (for example, burning coal, coke, coal briquettes) for efficient environmentally friendly sources (e.g. biomass boiler, heat pump or boiler) and connection to district heating supply with greater than 50% share of renewables. Support is given a fixed amount depending on the type acquired a new source / system and the sub-region.

Subarea C.1 and C.2 - Replacement of heat sources

Subregion support		Source type	The amount of support [CZK]	
			C.1 (along with insulation)	C.2 (no insulation)
C.1.1	C.2.1	Biomass boiler with manual fuel supply	50 000	40 000
C.1.2	C.2.2	Biomass boiler with automatic fuel	100 000	80 000
C.1.3	C.2.3	Stoves biomass with boiler with manual fuel supply and closed fireplaces with exchanger	50 000	40 000
C.1.4	C.2.4	Wood stove or insert biomass with boiler with automatic fuel	50 000	40 000
C.1.5	C.2.5	Heat pump water - water	100 000	80 000
C.1.6	C.2.6	Heat pump earth - water	100 000	80 000
C.1.7	C.2.7	Heat pump air - water	75 000	60 000
C.1.8	C.2.8	Gas condensing boiler	18 000	15 000
C.1.9	C.2.9	Connection to district heating networks with more than 50% share of RES	40 000	30 000

- Support for installation of solar (PV) systems. A subsidy for these measures may be granted to the homeowner for one family house only once for the duration of the program, even in the case of a house with more residential units; the exception is the combination of a solar thermal system (sub-support C.3.1 / C.3.2) with a photovoltaic system (sub-support C.3.5 / C.3.6) with accumulation of electricity exclusively to the batteries.

Subregion support	Type of system	The amount of support [CZK]
C.3.1	The solar thermal system for hot water	35 000
C.3.2	The solar thermal system for hot water heating	50 000
C.3.3	The solar PV system for hot water heaters, direct fired	35 000
C.3.4	The solar PV system without the accumulation of electrical energy to heat using surplus and total usable gain ≥ 1700 kWh/year	55 000
C.3.5	Solar PV system with the accumulation of electrical energy and the total usable gain ≥ 1700 kWh/year	70 000
C.3.6	Solar PV system with the accumulation of electrical energy and the total usable gain ≥ 3000 kWh/year	100 000

- Support for forced ventilation systems with heat recovery: Support in this sub-region can be gained simultaneously with the filing of an application for support in the area A or independently; separate application is only possible if the forced ventilation system with heat recovery will reduce the specific heating demand at least 20%.

Subregion support	Type of system	The amount of support [CZK]
C.4.1	Central forced ventilation system with heat recovery	100 000
C.4.2	The decentralized system of forced ventilation with heat recovery	75 000

5. Financing:

- Czech Republic gained financing on this program by selling so-called EUAs (European Union Allowances) pursuant to Act no. 383/2012 Coll., on conditions for trading in

greenhouse gas emissions, as amended in the EU ETS from 2013 - 2020. Funding program runs through the state budget.

- The amount of funding varies by year, depending on conditions of the state budget. If there are any unused funds for a given year, they are transferred for use in the subsequent year. In a typical year funding is more than 1 billion CZK (37 million EUR). For example, in 2014 6110 applications were funded for a total of 51,8 million EUR.

Hungary

Energy efficiency programs in the Hungary.

1. Legal background of formation and activity:

- Hungary has many different energy efficiency programs pursued by the government, corporations and the population. The backbone of all energy efficiency activities is the EU funding through various channels, comprising 450 billion HUF (around 1,45 billion EUR) between 2014 and 2020. This is a significant rise from 236.6 billion HUF between 2007-13. Roughly 65% of this funding is non-refundable. Around 40% of the funding comes through the Environment and Energy Operational Programme, another 45% is provided by the Economic Development and Innovation Operational Programme. This funding is also meant to substitute the EU-wide Energy Service Providers' Efficiency Obligations, that sets a 1,5% annual saving requirement from their total sales for energy companies.

Other, smaller sources include:

- Green Economy Financing System (ZFR): According to Law CCXVII/2012 on GHG emissions, half of the income from selling EUAs (European Union Allowances) shall be used for climate change purposes. There is no information about the size and facilitation of these funds, but reportedly the "Otthon Melege Program" ("Warm of the Home"), used for residential efficiency improvement, was financed on this basis. Estimates run up to an annual flows of 10 billion HUF (32 million EUR);

- EIB provided small scale funding through its Green Initiative. Unlike many other CEE countries, EBRD does not pursue similar activities in Hungary.
- Understandably the EU support has to be facilitated through a complex chain of EU-conform planning, applying and implementation procedures. The targets have been laid in the National Energy Efficiency Action Plan until 2020 (accepted in August 2015). This document aims to harmonize the national targeting with the common goals and set national subtargets and tasks. As a result around 31% of the funding goes for efficiency improvement of public buildings, 49% for the residential sectors (buildings, appliances), 16,5% for the SMEs, the rest for district heating. There are some other funding and targets set for transportation, major industrial plans with much smaller budgets.
- Despite an existing 2020 target for the share of renewables in the energy-mix, Hungary abolished its renewables financial supporting scheme in 2010 and has not launched a new model yet. This also applies for combined energy production in most of the cases. Investments prior to 2010 are financed according to the then existing legal arrangements. Accordingly renewable capacities are established whether on a private risk basis or with the support of government/EU funds. Due to EU classification mechanisms a large extent of the funds provided for efficiency measures mean renewable projects. The two are often inseparable.

2. Founder/co-founders of the Fund/Programs:

The national Operative Programs are set directly by the cabinet of Ministers and prepared by the Prime Minister's Office. Three Programmes (GINOP, TOP, VEKOP), including the Economic Development and Innovation Operational Programme are controlled and monitored by the Ministry of National Economy, while the Environment and Energy Operational Programme primarily belongs to the Ministry of National Development. Nevertheless, due to the complexity of these Programmes, responsibilities are often interlapping and harmonized between the two Ministries and

other organizations. The funds coming from the GHG-emissions trade are reportedly also divided between the two Ministries.

3. Aims and scope of activity:

- Renovation of public buildings;
- Renovation of residential buildings;
- Improvement of energy efficiency of SMEs, enterprises;
- Modernization of residential appliances;
- Modernization of energy production and distribution.

The objectives are formulated along the different spheres and financing mechanisms. As far as housing renovation regarded, they are meant for physical improvement of the housing stock, decrease utility costs and consumption and also to decrease GHG emissions. Preference is given to public building renovation because of unclear reasons. In the case of SMEs and enterprises, the main consideration is improving their competition through limiting their energy costs. This is in line with the priorities of the Hungarian government, the bulk of the provided funds go for this objective.

There is no single application mechanism for the housing programs, their content may change case by case. Usually it supports measures leading to the energy efficient buildings, mainly thermal insulation of external facades, replacement windows and doors and modernization of heating systems and appliances. In some cases, also biomass boilers and heat pumps, solar thermal and photovoltaic systems and forced ventilation unit with heat recovery are supported.

In the past, public buildings and apartment (former Soviet block) houses had a preference, recently family houses also may apply increasingly. In Hungary, the bulk of heat use falls on this latter category. Application procedure is easy, in the case of public buildings the municipalities shall tender in most of the cases (or the state organization owning/responsible for the building). In the case of residential houses the owners, in case of block houses the association of owners.

4. Review: activity, the results obtained, controlling/auditing mechanisms.

Applications are announced sporadically without any coordination. The system is relatively fragmented and disproportional, residential funds usually exhaust on the first day of on-line registration, while in the case of SMEs, enterprises often cannot contract the money. There is no reporting/controlling mechanisms in the residential housing applications except the financial part. Auditing is not mandatory. In the case of bigger industrial projects, some sort of reporting to the EC is likely, but no public information is available. Energy consumption has been falling in almost all segments of the energy-mix, but the result are largely independent from efficiency programmes. In the case of renewables, Hungary slipped behind regional partners significantly.

The government has been severely criticized by the environmental organizations because of its inactivity in the field of climate change. Despite its spectacular promises in the National Energy Strategy and the subsequent documents, hardly anything was visible between 2010 and 2014. Apart from the lack of funding and attention, the permanent reorganization of the responsible institutions, the fast rotation of the staff and people deteriorates the quality of the policy significantly. Some improvement can be noticed since 2014 in terms of increased funds and growing attention from the government and related corporations.

5. Financing of the activity:

As indicated at point 1, the overwhelming bulk of the funds comes from the EU. The terms efficiency and renewables are taken very broadly also by the EC classification. The system of distribution is heavily centralized and not very transparent.

Poland

Context - Role of energy efficiency in national environment

1. energy efficiency is one of the 7 priorities defined in national environmental strategy adopted in 2014
2. There are 4 issues related to energy efficiency in this document:

- a. Development of cogeneration and heating system;
- b. Transmission and distribution system;
- c. efficiency of final consumption;
- d. efficiency of house construction.

Energy Efficiency Fund

1. The system of financing environmental protection in Poland is based on environmental funds:
 - a. National Fund for Environmental Protection and Water Management (NFEPWM):
 - 1) key element of the environmental funds' system;
 - 2) established in 1989 – executing tasks of strategic importance at the national level;
 - 3) state legal person;
 - 4) mission - “We provide effective and efficient support for environmental activities”;
 - 5) approximately 550 employees, including more than 200 engineers;
 - 6) In the years 1989-2012 the NFEPWM co-financed environmental projects with approximately PLN 33 billion (EUR 8 billion) of its own funds;
 - 7) decision of the Minister of the Environment and the Minister of Regional Development to manage projects co-financed under: the Green Investment Scheme (GIS), LIFE+ Financial Instrument, the Norwegian Financial Mechanism and the Financial Mechanism of the European Economic Area, the ISPA pre-accession fund as well as the Cohesion Fund 2000-2006, the Sectoral Operational Programme „Improvement of the Competitiveness of Enterprises“ (2004-2006), PHARE: Environmental Partnership Fund, Danish EPA Partnership

Funds, SIDA Funds (Sweden) as well as bilateral aid funds in the years 1990-2008.

b. Voivodeship Funds for Environmental Protection and Water Management (VFEPWM):

- 1) acquired legal personality in 1993;
- 2) supporting tasks of regional scope in each of the 16 voivodeships in Poland;
- 3) Within 20 years of its operations, in the period between 1993-2012, the financial outlays of all VFEPWM for environmental protection tasks exceeded PLN 29 billion (EUR 7 billion);
- 4) Voivodeship Funds for Environmental Protection played a significant role in the absorption of financial assistance funds in the first years of Polish membership in the European Union (SAPARD, IRDOP, PHARE) and in the budgetary period 2007-2013 (IEOP, Regional Operational Programmes) provide strong institutional and financial support for local government units, businesses, environmental organizations and many other beneficiaries.

2. Legal background of formation and activity (Documents setting out the directions of support by NFEPWM):

- i. Environmental Protection Law;
- ii. Joint strategy of the National Fund and voivodeship funds for environmental protection and water management for 2013-2016 with the perspective until 2020;
- iii. NFEPWM's operating strategy for 2013-2016 with the perspective until 2020;
- iv. NFEPWM's priority programmes.

3. Aims and scope of activity:

- a. in the “Common action strategy for the National Fund and Voivodeship Funds for Environmental Protection and Water Management for the years 2013-2016 with an outlook to the year 2020” there have been formulated objectives for the four primary directions for financing environmental protection in Poland:
 - i. Water resources’ protection and sustainable management:
 - 1) Water and sewage management in agglomerations;
 - 2) Construction, alteration and reconstruction of hydrotechnical structures.
 - ii. Rational waste management and the protection of earth’s surface protection of the atmosphere, including counteracting climatic changes, as well as conservation of nature and biodiversity:
 - 1) Rational waste management;
 - 2) Protection of earth’s surface;
 - 3) Geology and mining;
 - iii. Atmosphere protection:
 - 1) Air quality improvement;
 - 2) Energy efficiency improvement;
 - 3) Supporting distributed, renewable energy sources;
 - 4) GIS – Green Investment Scheme.
 - iv. Protection of biological diversity and functions of the ecosystems -
 - 1) Protection and restoration of biological diversity.
 - v. Interdisciplinary programmes:
 - 1) Support of the Minister of the Environment in implementing environmental protection policy;
 - 2) Tasks listed by the legislature;
 - 3) Supporting environment monitoring programme;

- 4) Prevention of environmental threats and liquidation of their effects
- 5) Environmental education;
- 6) Co-financing of the LIFE programme;
- 7) SYSTEM – Support for environmental protection and water management activities carried out by the VFEPWM;
- 8) Strengthening local communities' activities for sustainable development.

b. Priority programme includes:

- i. goal of the programme and achievement indicators;
- ii. legal basis for providing funding;
- iii. budget and implementing period;
- iv. types of beneficiaries and projects;
- v. procedure and criteria for selecting projects;
- vi. detailed regulations.

c. Beneficiaries of the NFOŚGW:

- i. Local government entities;
- ii. Enterprises;
- iii. Institutions and offices;
- iv. Universities;
- v. Health care organizational units;
- vi. Non-governmental organizations;
- vii. Public administration;
- viii. Private individuals.

d. areas of funding:

- i. Water protection and management;

- ii. Climate and atmosphere protection;
 - iii. Protection of earth surface;
 - iv. Waste management, including recycling;
 - v. Nature and landscape protection;
 - vi. Forestry;
 - vii. State Environment Monitoring;
 - viii. Environmental threats prevention;
 - ix. Mining and geology;
 - x. Environmental education;
 - xi. Professional analyses and scientific research;
 - xii. Energy efficiency;
 - xiii. Renewable energy sources.
- e. Forms of funding:
- i. Subsidies;
 - ii. Interest-bearing loans;
 - iii. Credits granted by banks from NFEPWM's;
 - iv. Funds;
 - v. Subsidies for disassembly of end-of-life;
 - vi. Vehicles;
 - vii. Subsidies for interest rates of credits;
 - viii. Cancellations;
 - ix. Equity investments;
 - x. Subsidies for interest rates or bonds;
 - xi. redemption price;

- xii. Partial payments of loans' principals.
- f. Method of operation:
- i. Beneficiaries lodge applications for co-financing;
 - ii. Assessment of the application in accordance with the criteria (completeness, technical and environmental, financial);
 - iii. Decision by the Management or Supervisory Board of the NFEPWM;
 - iv. Conclusion of the contract with the Beneficiary;
 - v. Project implementation;
 - vi. Project completion.
4. Financing of the activity NFEPWM:
- a. annual payments in the amount of approx. EUR 1-1,5 bln;
 - b. approx. 50% from EU funds/ 50% from national funds);
 - c. Financial leverage:
 - i. Substitution fees and fines laid down by the Energy Law Act;
 - ii. Recycling fees for end-of-life vehicles;
 - iii. Financial income;
 - iv. Fees and fines for using the environment;
 - v. State budget subsidies;
 - vi. Selling assigned amount units of greenhouse gases;
 - vii. Royalties and concession fees.
5. Review of results from Energy Efficiency Fund/Programs:
- a. Positive effect of energy efficiency in industry and multifamily construction;
 - b. Lack of strategy of supporting energy efficiency for household:
 - i. Construction - 30% of energy consumption;

- ii. Half of polish household live in houses - usually poor people in villages;
- iii. Most of houses build in 1960s, 1970s - weak thermal modernization;
- iv. 70% of houses in Poland use not efficient coal heating - It cause not only higher use of energy but higher particulate matter emission and smog;
- v. Technical problems with programs;
- vi. Lack of financial support - the only program dedicated to household (part of NFOŚiGW) - "RYS" - 30 mln EUR for 5 year (0,16 EUR per person!);
- vii. Lack of regulation related to quality of coal;
- viii. Huge potential for improvement in this sector.

Thermo-modernization and Renovation Fund

1. Legal background of formation and activity: Act dated 18 December 1998 on supporting thermo-modernization projects (Journal of Laws no. 162, item 1121, as amended);
2. Founder/co-founders of the Fund/Programs - State Development Bank (Bank Gospodarstwa Krajowego):
 - a. has been servicing Thermo-modernization Fund since 1998;
 - b. Established in 1924;
 - c. 100% state-owned;
 - d. Operates country-wide;
 - e. Till services in over 4000 partner outlets;
 - f. Operates pursuant to BGK act (cannot go into bankruptcy);
 - g. Zero risk weight for BGK guarantees as part of government programs;
 - h. Fitch rating same as for the State Treasury "A-" in foreign currency and "A" in domestic currency.
3. Aims and scope of activity:

- a. The main objective of the Fund is to provide financial assistance in the form of **premiums for investors** i.e. housing associations and cooperatives, households etc which carry out thermo-modernization and refurbishment projects aimed at energy consumption reduction;
- b. The Fund supports an accomplishment of thermo-modernization and refurbishment undertakings;
- c. Its' framework covers, among others:
 - i. thermal refurbishment of all types of residential buildings;
 - ii. buildings used by municipal entities for purposes of public services (schools, hospitals etc.);
 - iii. local district heating network and local sources of heating;
 - iv. installation of renewable energy sources or high efficiency energy equipment.
- d. The aid is granted through:
 - i. Thermo-modernization premium:
 - Thermo-modernization premium constitutes a repayment of part of a loan drawn by an investor for the execution of a thermo-modernization undertaking;
 - It may be granted to investors that use a commercial loan. Investors who execute thermo-modernization undertakings with their own funds only are not allowed to receive such a premium;
 - Thermo-modernization premium is equal to 20% of a commercial bank loan used for the execution of thermo-modernization undertaking, however it cannot exceed:
 - 16 % of the total cost of undertakings;

- double amount of expected annual energy costs savings (determined in the energy audit).
- the minimum calculated energy savings after thermal refurbishment should exceed 25% per year;
- the premium is given to the bank, which finances the refurbishment in a given building, at a rate of up to 20% (25% until 2009) of the loan;
- the fundamental document necessary for obtaining the state support is the energy audit:
 - Technical assumptions for the refurbishment;
 - Estimates the cost of measures and their effectiveness;
 - Calculates the monthly rate of repayment of the loan;
 - Required own sources;
 - Amount of the loan Amount of the loan.
- the energy audits are subject to verification of their compliance with Law by the Bank Gospodarstwa Krajowego:
- The premium is available to:
 - home owners associations;
 - housing co-operatives;
 - commercial companies;
 - individuals;
 - municipalities;
 - local authorities.
- which carry out thermal undertakings for:
 - residential buildings;

- non-commercial buildings;
- public buildings public buildings;
- local heating networks;
- local sources of heating.

ii. Refurbishment premium:

- Refurbishment premium constitutes a repayment of part of a loan drawn by an investor for the execution of a refurbishment undertaking.
- It may be granted to investors that use a commercial loan. Investors who execute refurbishment undertaking with their own funds only are not allowed to receive such a premium;
- Refurbishment premium is equal to 20% of a commercial bank loan used, however, it may not exceed 15% of total costs of a refurbishment undertaking;
- Premium may be granted to individuals, home owners associations where individuals constitute a majority, housing co-operatives and social houses associations.

4. Review: the results obtained, controlling/auditing mechanism

a. Energy efficiency goal criteria

Thermo-modernization project	Type of saving	Savings to be achieved
Modernization of heating system in building only	Reduction of annual energy demand	Min. 10 %
Comprehensive modernization	Reduction of annual energy demand	Min. 25% Or min. 15 % when the heating system was modernized after 1985
Modernization of local heat source and district heating networks	Reduction of annual energy losses	Min. 25 %

Thermo-modernization project	Type of saving	Savings to be achieved
Connection to district heating network due to liquidation of local sources of heating	Reduction of annual energy losses	Min. 20 %
Conversion of conventional energy sources into renewable (unconventional) ones	Replacement of conventional energy sources	Conversion savings

Source: Based on Polish Banking Association

5. Financing of the activity:

a. Budget subsidies to the Thermo-modernization Fund in million PLN and EUR:

Year of the Thermo-modernization Programme	Value, million PLN	Value, million EUR
1999	5	1.2
2000	12	3.0
2001	3	0.8
2002	37	9.6
2003	5	1.1
2004	42	9.3
2005	115	28,6
2006	125	32.1
2007	298	78.8
2008	270	76.8
2009	109	25.8
2010	0	0.0
2011	260	63.1
2012	120	28.7
2013	133	31.7
Total 1999 - 2013	1533	390.6

In addition, sources of funding in %:

- Budget subsidies – 94.5 %;
- Fund own sources – 4.1 %;
- Other sources – 1.4 %.

6. Review of the main results from Energy Efficiency Fund/Programs

a. Number of applications for premiums for the period 1999 to 2013:

Year of the Thermo-modernization Programme	Number of applications for premium
1999	144
2000	303
2001	191
2002	325
2003	890
2004	1413
2005	1871
2006	3214
2007	3314
2008	2859
2009	3463
2010	3813
2011	3804
2012	4251
2013	1501
Total 1999 - 2013	31356

The aggregated structure of applications for premiums by types of applicants for the period 1999 – 2013:

- Home owners association – 54 %;
- Housing cooperatives – 35 %;
- Municipalities – 5 %;
- Individuals - 4 %;
- Other investors – 2 %.

And the aggregated structure of applications for premiums by types of modernized objects in period 1999 – 2013:

- Apartment block - 93 %;

- Public utility buildings – 4 %;
- Detached houses – 2 %;
- Local heating facilities – 1 %.

b. Thermo-modernization program – conclusions:

- i. Efficient tool for thermo-modernization and energy consumption savings;
- ii. Well accepted by investors, some banks and government – each side has benefits from it;
- iii. Some potential investors are not interested in the program participation mainly because of complex procedures, obligation to prepare additional documentation, lack of assurance that premium shall be granted;
- iv. Investors apply to banks for loans and apply for premiums; credit risk is taken by banks;
- v. Some banks are not interested in the program, partly because of complex procedures and doubts on loan repayment;
- vi. Government changes priorities of budgetary spending;
- vii. Wide promotion in the beginning of the Fund changed into little active marketing done by BGK and some by lending banks;
- viii. Transfer of applications in a paper form as well as verification and approval has not been changed so far despite plans for electronic means;
- ix. Additional verification of energy audits still exists;
- x. There are significant fluctuations in the demand because of investment schedules, lack of funds, suspension of applications acceptance by BGK, etc.;
- xi. Strong demand because of investors thermo-modernization plans;
- xii. Demand exceeds supply significantly because funding is not sufficient;
- xiii. Improved safety, insulation and aesthetics of buildings are extra benefits;
- xiv. Steady and appropriate financing is a big concern.

Slovakia

Energy Efficiency Fund/Programs.

1. Legal background of formation and activity:

- Name of the Law, or Decree of the Government, or other act; approval data, No of the act:
 - Main policy documents:
 - Energy Efficiency Policy of the Slovak Republic (Konceptcia energetickej efektívnosti Slovenskej republiky);
 - Energy Efficiency Action Plan 2008–2010 (Akčný plán energetickej efektívnosti na roky 2008 – 2010);
 - Energy Efficiency Action Plan 2011–2013 (Akčný plán energetickej efektívnosti na roky 2011 – 2013);
 - Energy Efficiency Action Plan 2014–2016 with an Outlook up to 2020 (Akčný plán energetickej efektívnosti na roky 2014 – 2016 s výhľadom do roku 2020).
 - Main acts:
 - Act No 321/2014 on the Energy Efficiency Act (Zákon č. 321/2014 Z. z. o energetickej efektívnosti);
 - Act No 555/2005 on the energy performance of buildings (Zákon č. 555/2005 Z. z. o energetickej hospodárnosti budov);
 - Act No 314/2012 on the periodic inspection of space heating systems and air conditioning systems (Zákon č. 314/2012 Z. z. o pravidelnej kontrole vykurovacích systémov a klimatizačných systémov);
 - Act No 50/1976 on spatial planning and building rules [the Building Act] (Zákon č. 50/1976 Z. z. o územnom plánovaní a stavebnom poriadku [stavebný zákon]);
 - Act No 309/2009 on the promotion of renewables and high-efficiency co-generation (Zákon č. 309/2009 Z. z. o podpore obnoviteľných zdrojov energie a vysoko účinnej kombinovanej výroby).

2. The founder/co-founders of the Fund/Programs:

- a. Government of the Slovak Republic;
- b. Funds of European Union;
- c. Commercial banks;
- d. Municipalities;
- e. Industrial plants;
- f. Consumers' associations;
- g. Other parties to the agreement.

3. Aims and scope of activity.

The aims:

In line with Directive 2006/32/EC on energy services, the Energy Efficiency Policy established energy savings targets up to 2016. The 2016 targets were calculated as energy savings amounting to 9 % of the average value of final energy consumption in the period from 2001 to 2005. These targets were revised in the Second Action Plan by deducting the share of consumption reported for those companies contributing to greenhouse gas emission allowance trading in accordance with Directive 2003/87/EC (ETS companies). See table:

Energy savings targets set in Slovakia's strategy documents in accordance with Directive 2006/32/EC.

Indicator	Energy savings based on the recalculated average final energy consumption in 2001–2005	
	[%]	[TJ]
Annual target	1	3 122
Three-year target up to 2010*	3	9 366
Medium-term target up to 2013*	6	18 722
Long-term target up to 2016*	9	28 098

Indicator	Energy savings based on the recalculated average final energy consumption in 2001–2005	
	[%]	[TJ]
Long-term target up to 2020*	11	34 342

*Note: the objectives are set for the end of the year, i.e. including the year to which the target applies.

National targets, expressed as final energy consumption and primary energy consumption, were set in accordance with the requirements of Directive 2012/27/EU.

See table:

Slovakia's national indicative energy efficiency targets pursuant to Directive 2012/27/EU

Energy efficiency target expressed as the 2020 target final and primary energy consumption		
Energy efficiency target – to achieve the following level of final energy consumption in 2020	105 TWh	378 PJ
Energy efficiency target – to achieve the following level of primary energy consumption in 2020	191 TWh	686 PJ

Scope of activity:

- Energy efficiency measures:
 - in the buildings sector:
 - Improvements in the thermal performance of buildings;
 - New construction to a low-energy standard;
 - New construction to an ultra-low-energy standard;
 - New construction of nearly zero-energy single-family and multi-family buildings;
 - Provision of energy services in buildings via gas, electricity and heat suppliers;
 - Application of legislative measures (i.e. insulation of hot water distribution systems in residential buildings with heat supply);

- Amendment to the implementing regulations on periodic inspections of space heating systems and air conditioning systems;
- 'Major Building Renovation' information campaign.
- in the industrial sector:
 - Innovation and technology transfers at industrial enterprises;
 - Increased energy efficiency in industrial production;
 - Application of legislative measures;
 - Innovation and technology transfers at industrial enterprises;
 - Increased energy efficiency in industrial production;
 - Implementation of energy efficiency measures derived from energy audits;
 - Voluntary energy savings agreement.
- in the public sector:
 - Improvements in the thermal performance of public buildings;
 - Upgrading of public street lighting;
 - Application of the principle of energy efficiency in public procurement;
 - Support for the construction of nearly zero-energy buildings in the public sector;
 - Publication of supporting documents covering the lead role played by the public sector;
 - Provision of energy services for the public sector via gas, electricity and heat suppliers;
 - Production, approval and implementation of plans for sustainable energy and reductions in greenhouse gas emissions;
 - Introduction of energy management systems, including energy audits and environmental management;
 - Support for the development of energy services regionally and locally
 - Energy audits in public buildings;
 - Analysis of energy-saving potential in public buildings.

- in the transport sector:
 - Bus and passenger rail transport policy; restriction on vehicle age;
 - Bus and passenger rail transport policy – financing of public interest services – regional rail;
 - Upgrading of rolling stock – public rail transport;
 - Building and upgrading the transport infrastructure;
 - Building a basic network of public interports;
 - Support for the development and use of public passenger transport;
 - Reduction of specific energy consumption in individual transport;
 - Improvements in support for non-motorized modes of transport (cycling);
 - Traffic control optimization and smart transport systems (road transport);
 - Programme which support for the use of CNG in Slovak transport;
 - Renewal and modernization of the fleet – Rail transport;
 - Renewal and modernization of the fleet – Bus/coach transport;
 - Building and upgrading the transport infrastructure;
 - Support for the development and use of public passenger transport, including support for the creation of integrated transport systems;
 - Support for the development of non-motorized transport, especially cycling;
- in the appliances sector:
 - White goods replacement;
 - Energy-saving lighting;
 - Replacement of electric and electronic household equipment;
 - Replacement of office equipment;
 - Application of legislative measures;
 - Information campaigns aimed at energy-saving appliances;

- Introduction of transparent monitoring of the replacement of white goods and other appliances and equipment on the market.
- Energy transformation, transmission and distribution measures:
 - Construction, reconstruction and modernization of heat distribution systems;
 - Construction, reconstruction and modernization of electricity and heat production plants via high-performance combined production with a maximum thermal input of 20 MW;
 - Reconstruction and modernization of electricity and heat production plants, electricity, heat, gas distribution systems;
 - Reconstruction and modernization of electricity and heat production plants, heat distribution systems in the Bratislava Region;
 - Heat map of Slovakia;
 - Comprehensive assessment of national heating and cooling potential.
- Horizontal energy efficiency measures:
 - 'Energy Auditor' training course;
 - Educating children on energy efficiency;
 - Energy efficiency information campaign;
 - Draft legislative measures;
 - Monitoring and information system;
 - Harmonization of reporting systems in respect of the sources used to monitor air emissions;
 - Energy service development support;
 - Energy consulting;
 - Support for research and development in energy savings;
 - Analyses of the potential energy savings in sectors of the national economy;
 - Analysis of energy efficiency support mechanisms in Slovakia;
 - Assistance for towns and municipalities in the preparation of Sustainable Energy Action Plans.

4. Review: the terms, steps, results obtained, controlling/auditing mechanism:

- Start of the activity: 2008;
- Main steps and criteria of the results obtaining, controlling/auditing mechanism:
 - 2007 – government approved Energy Efficiency Policy of the Slovak Republic as main document to prepare the first action plan;
 - 2007 – government approved Energy Efficiency Action Plan 2008–2010;
 - 2011 – government approved Energy Efficiency Action Plan 2011–2013;
 - 2014 – government approved Energy Efficiency Action Plan 2014–2016 with an Outlook up to 2020;
 - 2014 – parliament approved Act No 321/2014 on the Energy Efficiency Act;
 - 2015 – government started compiling annual reports on the progress achieved towards national energy efficiency targets; Annual Report on the Progress Achieved towards National Energy Efficiency Targets for 2014 was the first that the government took into account.

Slovakia has a clearly defined long-term target up to 2020: Energy savings based on the recalculated average final energy consumption in 2001–2005 should be in 2020 at the level of 11 %. Energy efficiency target is to achieve final energy consumption in 2020 at the level of 378 PJ. Slovakia adopted a policy on how to meet this long-term target.

Methodology: In order to achieve the final target measures have been identified in specific sectors (buildings, industry, public sector, transport, appliances, energy transformation, transmission and distribution and total). Therefore, each sector has its own sub-targets. Measures are structured (specific programmes, projects, legislative regulation, information campaigns and the like) and the responsibilities of individual competent ministries are defined. Annual targets are set as total amounts as well as broken down for individual areas. The implementation of precisely defined measures is evaluated on an ongoing basis and any deflection relative to sub-targets triggers corrective action.

Regular annual evaluations are a key positive aspect of the policy. Slovakia as an EU Member State must regularly inform the European Commission on the achievement of annual targets and on the progress made towards reaching the final target in 2020. General public is calling for more energy conservation. This pressure has materialized in extensive schemes of thermal insulation of buildings, in the construction of new low-energy buildings, proliferation of use of renewables, preference given to appliance with low energy consumption.

Energy efficiency programme is not an initiative of Slovakia but of the European Union. Therefore, the acceptance process is not seamless. The energy awareness level is rather low in Slovakia and more local activities promoting energy conservation are needed.

Programmes implemented based on the Commission's initiative tend to instruct and dictate by nature, impose more red tape and be less effective. Had the energy efficiency programme been based on own initiative the negative accompanying effects would have been minimal. Examples of dictated commitments:

- According to Directive 2012/27/EU, each Member State shall ensure that, as from 1 January 2014, 3 % of the total floor area of heated and/or cooled buildings owned and occupied by its central government is renovated each year to meet at least the minimum energy performance requirements for buildings;
- In accordance with Article 7(1) of Directive 2012/27/EU, each Member State must establish an energy efficiency obligation scheme ensuring that energy suppliers achieve the cumulative end-use energy savings target by 31 December 2020. The cumulative target represents the accumulation of annual energy savings established at 1.5 % of the average annual energy sales to final customers of all energy suppliers.

Energy efficiency programme is being implemented in the absence of an information campaign in Slovakia. The aspiration to reduce energy by more than one tenth within one and a half decade while GDP is continually growing is desperate without citizens

able to identify with this target. Conversely, with them on board the end results could outperform the targets set by government.

When evaluating sub-targets little attention is paid to what may have been influenced by private companies or households based on their own initiative. For example, the fact that companies and households themselves are keen to save energy is almost neglected. One of the reasons why consumers must save is the high price of electricity relative to its price in other EU Member States. Companies try to compensate this competitive disadvantage by consuming less energy.

Programme financing is highly financially dependent on EU funds. This conditionality is not addressed in evaluation reports but the financing methods behind concrete programmes disclose the high level of dependency. Year 2015 serves as a good example. It was an exceptional year as regards achieved energy savings because in that year massive transfers of money from the remaining balances of EU funds in the programming period 2007–2013 were made into individual projects. It is highly probable that unlike 2015 year 2016 will be lagging behind in meeting the target because of low uptake of EU funds available for the programming period 2014–2020.

A holistic approach to improve energy efficiency fails in locations with limited use of EU funds (due to higher economic prosperity of the location) thus confirming the dependency of adoption of integrated projects based on own initiative. One example mentioned in the 2015 Assessment Report: At present, there is no comprehensive support system in place for energy efficiency measures offering constant financing arrangements that covers those segments not embraced by the Structural Funds (in the new 2014-2020 financial framework, this mainly concerns the Bratislava Self-governing Region) and that responds flexibly to market needs.)

An annual report on the progress achieved towards national energy efficiency targets is drawn up annually by the Ministry of Economy of the Slovak Republic for the preceding calendar year on the basis of Section 4(1)(d) of Act No 321/2014 on energy efficiency, and in accordance with Article 24(1) and with Annex XIV, Part 1, of Directive 2012/27/EU on energy efficiency (the 'Directive'). This report contains a basic update on progress in

the fulfilment of set energy savings targets and on compliance with other provisions of Directive 2012/27/EU. The aim of the Annual Report is to provide an annual evaluation of compliance with energy savings targets set by Slovakia by reference to Directive 2012/27/EU, and of the fulfilment of obligations thereunder. This chiefly encompasses:

- an evaluation of progress in the pursuit of the national indicative energy efficiency target for 2020 (the 'national target') in the form of the absolute value of primary energy consumption and final energy consumption in accordance with Section 5(1)(c) of Act No 321/2014;
- an evaluation of progress in the pursuit of the final consumer energy savings target in accordance with Section 5(1)(b) of Act No 321/2014;
- an evaluation of progress in the pursuit of the building energy savings target in accordance with Section 10(3)(a) of Act No 321/2014;
- the provision of basic statistics on energy consumption in Slovakia and selected statistical indicators for previous available years;
- updates on legislative and non-legislative measures implemented in the previous year which contribute towards the national target in accordance with Section 5(1)(c) of Act No 321/2014;
- 2016 – government took note of the Annual Report on the Progress Achieved towards National Energy Efficiency Targets for 2015.

5. Financing:

- Sources and structure of financing (state budget, special funding, loans, etc., mixed financing):
 - State budget;
 - Funds of European Union;
 - Commercial banks;
 - Municipalities;
 - Voluntary contributions by parties to the agreement;
 - Special offers from retailers and manufacturers;
 - Consumer associations, retailers;

- Consultancy services of energy companies;
- Other private resources.
- Fund/program budget: total amount, average annual amount during the program, mln. EUR

Investments by years, EUR thousand			Total	Average annual amount
2008 – 2010	2011 – 2013	2014 – 2020*		
3 890 550	6 886 333	19 589 886	30 366 769	2 335 905

*Planned

- Typical case of financing and execution

Housing sector case

In the area of the refurbishment of housing stock we have identified as a potential pilot project a residential building with the following parameters:

Locality: Bratislava

Age/Year of flat inspection: 25/1985

Building construction: panel

Number of apartments: 48

Overall floor surface: 3298,96 m²

Floor surface of the common utilities: 253 m²

Annual heat consumption: 1423 GJ

Annual contributions to the of the maintenance fund: 2163 euro

Building management: Association of apartment Owners

Certain partial measures have been already realized in the house:

- Exchange of windows in the apartments (provided for by the individual owners).
- Regulation of the heating and warm water distribution.

- Reconstruction of the roof.

Content of the project

At the present, the owners do have interest in the realization of further measures, which would contribute to the improvement of the technical condition of the building, as well as to a decrease of energy consumption. For this reason they have prepared a project which includes the realization of the following measures:

- Insulation of the periphery walls and balconies,
- Removal of systemic defects of balconies,
- Exchange of windows in the common utilities,
- Exchange of glass stuffing on each floor.

The overall costs for the realization of the project in the mentioned scope are within the project documentation estimated in the amount of 177 696 euro, e.g. 3 702 euro/apartment. The assumed length of the realization period is 16 weeks.

The most important economic effect of the proposed project would be the savings in energy consumption. The decrease is projected at about 448 GJ/year, which represents a 31,5% savings constant. In financial terms, this saving represents an asset of 8 194 euro/year for the building as a whole (at the prices of 2010).

The comparison of the costs and of the financial amount saved shows that the pure backflow period of the investment is 21,7 years.

Project process – Case Study

For the realization of the proposed project, it is of course necessary to secure the financing. According to the legislation in force, a signature of a loan agreement for a multi-apartment house requires the agreement of a two third majority of the owners. Such an agreement is mainly preceded by a market inquiry by the authorized representative of the association of apartment owners or the manager of the building house. The apartment owners in the relevant house then mainly

approve the submission of the application for a concrete loan product with clearly defined conditions (amount, repayability, bank rate, form of guarantee).

After the signature of the loan agreement, the selection of the supplier of the construction work follows and a contract is signed for the construction works, with clearly defined conditions. As regards financing, mainly the conditions of the cover of invoices are important. Under this type of loans (specific investment loan), the invoices are usually distributed directly by the bank, based on the submitted documents.

Based on methods usual within the submission of loans of this type, it is possible to expect following formal requirements of the bank to the applicant:

- Administration of a common account in the financing bank,
- Sustainability of the owners structure,
- Sustainability of the contributions to the maintenance fund (as these contributions are required by law, financial discipline of flat owners is considered in first place),
- Description of the project;
- Approval of a two third majority of owners with the investment activity, the loan application and the guarantee to be provided (at the present usually an insurance pledge and the establishment of a standby right for the assets of the maintenance fund).

In the case of the pilot project, it could be expected that the signature of the loan agreement would be realized within five weeks from the date of approaching the selected bank.

Based on economic characteristics of the investment activity proposed in the pilot project the Association of Apartment Owners seem to be ready to utilize the sources obtained through the energy saving consumption, as well as up to a certain level to increase the contributions in the maintenance fund in such a way that these

sources together cover the payment for the loan. The owners currently prefer a loan with period of maturity longer than 15 years so that the repayment does not significantly affect their living standard.

For the purpose of repaying the loan, the resources saved on the consumed energy are offered in a form of contributions into the maintenance fund from the individual owners. The higher contributions into the fund would be compensated for the individual owners through decreased payments for the delivered energy.

For the pilot project financed through a loan product with the parameters mentioned in the previous part, we could consider the following increase of costs:

- Maturity 10 years: 2346 euro/apartment for 10 years e.g. average 235 euro/year/apartment
- Maturity 15 years: 1809 euro/apartment for 15 years e.g. average 121 euro/year/apartment
- Maturity 20 years: 1280 euro/apartment for 18 years* e.g. average 71 euro/year/apartment * as of the 19th year the resources from energy savings are sufficient for the repayment
- Maturity 25 years: 908 euro/apartment for 17 years* e.g. average 53 euro/year/apartment * as of the 18 year of the resources from energy savings are sufficient for the repayment

Through testing of the acceptance of the proposed product for the owners of the house as proprietors of a potential pilot project, it was discovered that their preferences and economic situation are best suited by the variant with 15 years maturity period.

Source: JESSICA Evaluation Study – Implementing JESSICA Instruments in Slovakia

Proposals for Ukraine in development of energy efficiency fund and programs

1. In order to run completely the energy efficiency fund or programs, Ukraine should develop and adopt basic laws on energy efficiency in accordance with EU directives: Directive 2013/27/EU On energy efficiency; the Directive 2010/31/EU On the energy performance of buildings; the Directive 2010/30/EU On the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products.
2. In formation of institutional support initiatives for energy efficiency, Ukraine's Government should identify priority programs, such as the creation of the Energy Efficiency Fund. However, it should also form the economic and legislation framework for the development of other energy efficiency programs that will allow using existing in Ukraine and in the world human, material and financial resources in order to attract a greater number of investors/sponsors. Thus, inter-ministerial coordination on different energy efficiency programs with the participation of involved parties, i.e. appropriate governmental bodies and intermediate institutions, organizations specialized in energy efficiency, etc. is very important.
3. Energy efficiency programs should provide an ecological subtext. On the one hand, the introduction of more energy efficient technologies always contributes to reduce emissions of greenhouse gases, along with saving energy, provides a synergistic effect from activity such programs. On the other hand, given the present climate of negative trends, problem oriented environmental funds which have a financial opportunities will be more willing to go for cooperation with Ukrainian institutions if it reflected a strong environmental component as one of the objectives of such programs.
4. The Czech experience in implementation of energy efficiency program is generally reported as a great success by the Czech media, because most of the funding goes to individual families, owner-occupied residential apartment buildings, and municipal-owned apartment buildings. Though residents with more financial resources (the wealthy) are more likely to get funding, since they have the resources to carry out remodeling, the program is not seen as being only for the wealthy, but a rather

effective program benefiting many residential neighborhoods throughout the country. Because the construction companies carrying out remodellings have to be certified and receipts or invoices must be used, the program is also seen as reducing the black market in construction. In addition, the program has arguably led to major reductions in greenhouse gas emissions. For these reasons, a similar program would also be of great benefit to Ukraine, which is also a country that could make major strides in improving the energy efficiency of buildings.

5. The negative side of the EU energy efficiency programs is its sizable cost. Tens of millions of EUR are spent annually to subsidize roughly 50% of the cost of the remodeling individual dwellings. The absolute cost of a program in Ukraine would cost much more, given the greater population size. At the same time, reducing the size of the subsidy per dwelling (decreasing the subsidy in percentage of the cost) would reduce the incentive to remodel. It is not known whether Ukraine has the financial resources to dedicate to such a massive investment program in energy efficiency.
6. While low utility costs and maintaining competitiveness through the government subsidies is very strong at the decision making levels, and the residential sector efficiency policies are combined with artificially low utility prices, questioning the rationale distribution of the funds, hardly anything has been done to incentivize the population or the companies to invest into these goals. The government wants to keep the distribution of the funds in its hands. This is mainly demonstrated in its wishes to spend as much funds in the public housing sector as they can. The cabinet confronted even the EC in this regard, as it wanted to channel most of the funds from non-refundable residential projects to public buildings. Given the weaknesses of the application and auditing systems, centralization would provide some benefits. At the same time it also a highly non-transparent solution, increases the risks of corrupt practices. Thus, Ukraine should provide domestically and internationally recognized mechanism for controlling and auditing of energy efficiency programmes fulfillment and smart media and reporting systems for the intentions, status and the results related to the programmes.

7. Ukraine should pursue an energy efficiency policy based on its own initiative. It should adopt programmes that motivate both Ukrainian citizens and companies to be more energy conscious. To that end, it needs to launch a sweeping information campaign so that citizens understand that given the current energy intensive state of affairs energy conservation is the only way forward. In its efforts to reach the set targets, Ukraine will receive foreign assistance. Nevertheless, it needs to be prepared, to have the capacity for receiving support. It should adopt a long-term, binding policy with a set final target, concrete programmes, and systems of interim reviews. Otherwise, the efficient use of domestic and foreign funding provided for the said purpose could be at risk.

CONCLUSION

1. Ukraine has the relatively weak rank of the overall governance quality for all indicators of the governance under World Bank's and The World Economic Forum's indicators terminology that confirms the presence of long-term and systemic deficiencies of the institutional development in Ukraine in general and institutional structure of the Ukraine's energy sector in particular.
2. Weak institutional structure of the energy sector leads to the constant emergence of a number of systemic problems in the industry, which are not being solved quite for a long period, and from time to time become especially acute forms and require an immediate solution.
3. In the framework of the Project, the survey among energy sector's top managers of the companies and heads of the state authorities related has been conducted for the identification of the most actual problems of the industry and their priority assessment as of February 2016.
4. Based on the analysis of the obtained data and interpretation of the survey's results were summarized the main problems in the energy sector with their rating to the following thematic categories:
 - A. Legislative and Regulatory;
 - B. Financial and Economic;
 - C. Energy Efficiency and Technical Upgrading;
 - D. Social and Security.
5. According to the analysis were found hypothetic causal links between the most relevant problems (consequences) that were classified in four thematic categories, and certain systemic deficiencies (causes) of the institutional structure of the energy sector of Ukraine. The main deficiencies as of February 2016 are following:
 - Imperfect legislation regarding to the National Regulator (NKREKP);

- Weak institutional base of the state regulation and imperfect economic and legal mechanisms to ensure the more higher level of energy efficiency and competition in the energy markets;
 - Underdevelopment of the governmental institutions for stimulation of domestic and foreign investments and improvement of the investment protection mechanism.
6. In order to achieve the synergistic effect in removing the above basic deficiencies, as well as in dealing with complex other institutional defects of the energy sector in Ukraine, should focus on the implementation of the following measures:
- Improvement of legislation regarding to the National Regulator, approval, adoption and implementation of the Law on NKREKP;
 - Development, approval, adoption and implementation of the Energy Efficiency laws;
 - Creation and support of activity of the Energy Efficiency Fund and Programmes.
7. In spite of several differences in estimations of priority of energy sector problems by the groups of respondents, key players of Ukraine's energy sector have sufficiently consolidated opinion of the necessity of institutional reforming of energy sector. Moreover, Ukrainian society also has a critical capacity required for the qualitative reform of the country and its energy sector. At the same time, comes the awareness, that the necessary steps of the energy sector reforming should be more strongly and rapidly implemented by the state institutions and, above all, by the Verkhovna Rada of Ukraine for legislative reforms and by the Government of Ukraine for their systematic and consistent implementation.
8. The results of comparative research of the V4 and Ukraine's energy sectors in dimensions of their capacity, energy efficiency, energy security and competitiveness demonstrate organic development of energy sectors all countries within the global trends and tendencies of increasing the share of renewables in energy balances.
9. In the same time, mainly V4 energy sectors and partly Ukrainian are still deeply depends from the import of energy resources and essential share of imports belongs to one

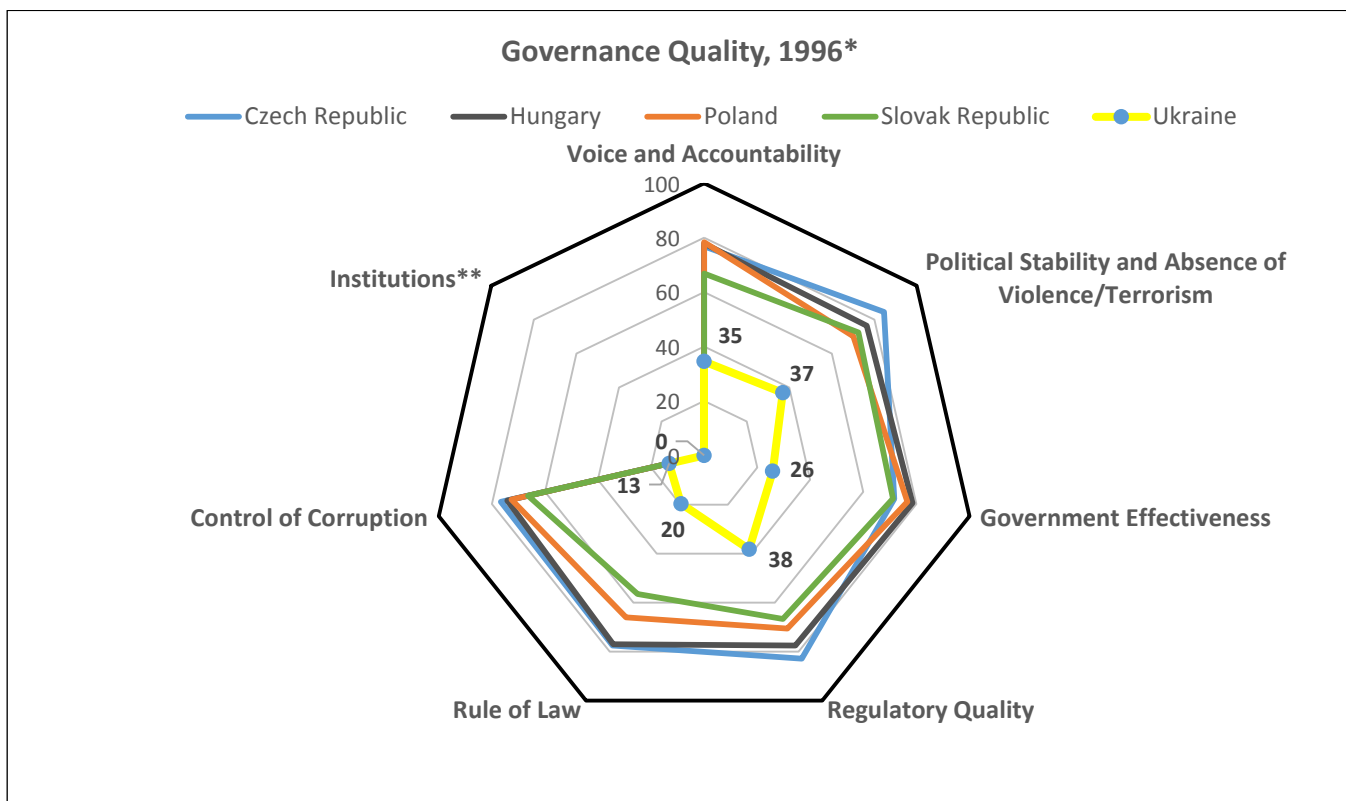
- country – RF. V4 countries provide their energy security within the European Energy Strategy (2014). Ukraine has not updated and approved by the government or parliament its own energy strategy and acts mainly on the manner of exact practical answers on exact threats and challenges during last recent years.
10. In spite of the huge losses of territories, citizens, industrial and energy facilities, which were occurred due to RF intervention, energy sector of Ukraine confirms its survivability and readiness to rehabilitation and reforms.
 11. The resilience and sustainability of the energy sector of Ukraine in the face of external threats would not be provided in sufficient degree without the help of the countries of the Visegrad Group, especially neighboring countries: Poland, Slovakia and Hungary. These countries over the past two years have provided organizational and technical ability to reverse the natural gas to Ukraine, which almost offset the disruption and the purchase of gas from the Russian Federation. Ukrainians will always remember with gratitude the hand of brotherly help of V4 countries in ensuring alternative deliveries of natural gas at this difficult time for Ukraine.
 12. In order to enhance its energy security, Ukraine needs to more persistently implement the competitive markets of energy resources in accordance with the 3rd Energy Package and directives of the European Union. In particular: the Directive 2009/73/EC of 13 July 2009 concerning common rules for the internal market in natural gas, which confirms the criteria of isolated natural gas market, when supply from one external source to the national gas market is at a level higher than 75% of the total amounts of inland consumption; Regulation (EU) No 994/2010 of the European Parliament and of the Council of 20 October 2010 concerning measures to safeguard security of gas supply that defines three main crisis levels of gas supply disruption (early warning level, alert level and emergency level); the Directive 2009/119/EC of 14 September 2009 which imposing an obligation to maintain minimum stocks of crude oil and/or petroleum products at a level of at least the 90 days of import or 61 days of the national consumption, whichever of the two quantities is greater; Regulation 714/2009 of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity.

13. The results of the key holders survey and comparative research confirm the main direction of institutional reform of Ukrainian energy sector. The main efforts in reforms should be consolidated in achievement of high standards of energy efficiency and the appropriate standards of energy security. Therefore, the Ukraine's institutions responsible for energy sector development should be enhanced by sufficient legislation, including the law on National Regulator.
14. Ukraine should a maximum de-politicize the question of forming of the key management and activities of the national energy regulator in order to ensure its regulatory functions best manner. The experience of Poland and the Czech Republic show that the high functionality of the energy regulators of these countries can be done even in the absence of a special and separate law on their energy regulators, unlike Hungary or Slovakia, where these laws are persist. As for arranging such special law in Ukraine, its relevance is primarily motivated by the need to fill certain legal gaps, since there is no legal regulations of the existence of this, collegially managed, state authority in the list of on the state agencies in the text of the Constitution of Ukraine.
15. In the European countries their energy regulators are "embedded" in the executive branch of the state power, and in most of the countries in which they are subordinated to the governments, the leader of the Regulator is appointed on his/her post by the Prime Minister on the results of laborious selection of potential candidates. Ukrainian state governance, at least, should clearly recognize the affiliation of its energy Regulator to the executive branch, since no judicial or legislative branches, according to the regulator's functional and responsibilities. At the same time, there is Slovak experience when Regulators occupies more independent from the Government of the country position as an executive state authority. Any way, the draft of the Law on NKREKP should be putted into regularity of the Constitution of Ukraine.
16. In the EU members countries is observed the transition from pricing according to the principle "costs plus" to the principles of incentive pricing: "RAB (Regulatory Asset Base)" or to "Price Cap Regulation". The latter is usually used for the determination of tariffs for natural monopolies. We consider that is appropriate to draw the attention of

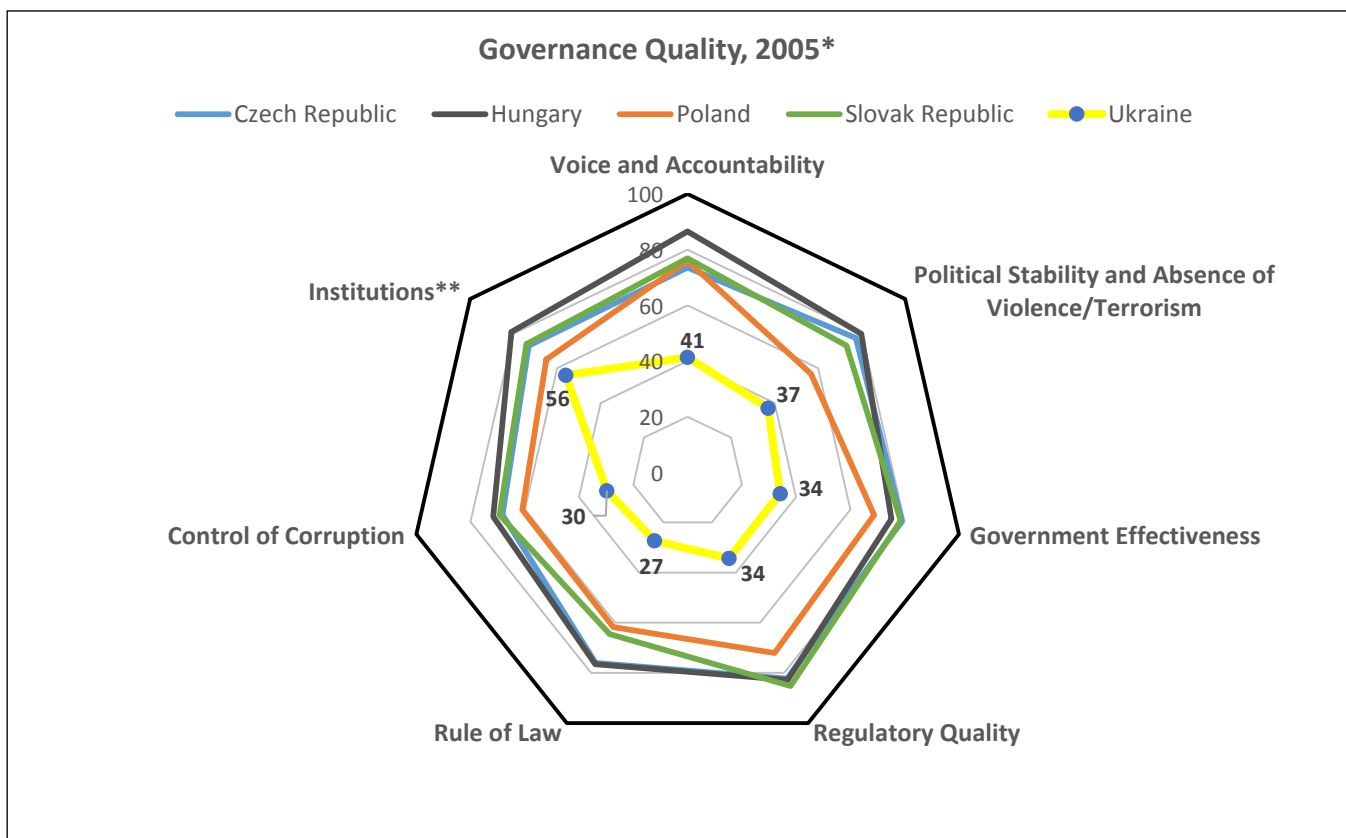
- the NKREKP on this latest methodological approach to pricing and create the necessary conditions for its complete application in the medium term.
17. Establishment and further activity of the Energy Efficiency Fund is an essential new institutional decision which allows consolidate the human, financial and material resources and implement successful experience of V4 countries in order to reach the better energy efficiency in Ukraine in the best manner.
 18. In order to run completely the energy efficiency fund or programs, Ukraine should develop and adopt basic laws on energy efficiency in accordance with EU directives (Directive 2013/27/EU On energy efficiency; the Directive 2010/31/EU On the energy performance of buildings; the Directive 2010/30/EU On the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products).
 19. In formation of institutional support initiatives for energy efficiency, Ukraine's Government should identify priority programs, such as the creation of the Energy Efficiency Fund. However, it should also form the economic and legislation framework for the development of other energy efficiency programs that will allow using existing in Ukraine and in the world human, material and financial resources in order to attract a greater number of investors/sponsors. Thus, inter-ministerial coordination on different energy efficiency programs with the participation of involved parties, i.e. appropriate governmental bodies and intermediate institutions, organizations specialized in energy efficiency, etc. is very important.
 20. Ukraine should pursue an energy efficiency policy based on its own initiative. It should adopt programmes that motivate both Ukrainian citizens and companies to be more energy conscious. To that end, it needs to launch a sweeping information campaign so that citizens understand that given the current energy intensive state of affairs energy conservation is the only way forward. In its efforts to reach the set targets, Ukraine will receive foreign assistance. Nevertheless, it needs to be prepared, to have the capacity for receiving support. It should adopt a long-term, binding policy with a set final target, concrete programmes, systems of interim reviews, reporting and external audit.

ANNEXES

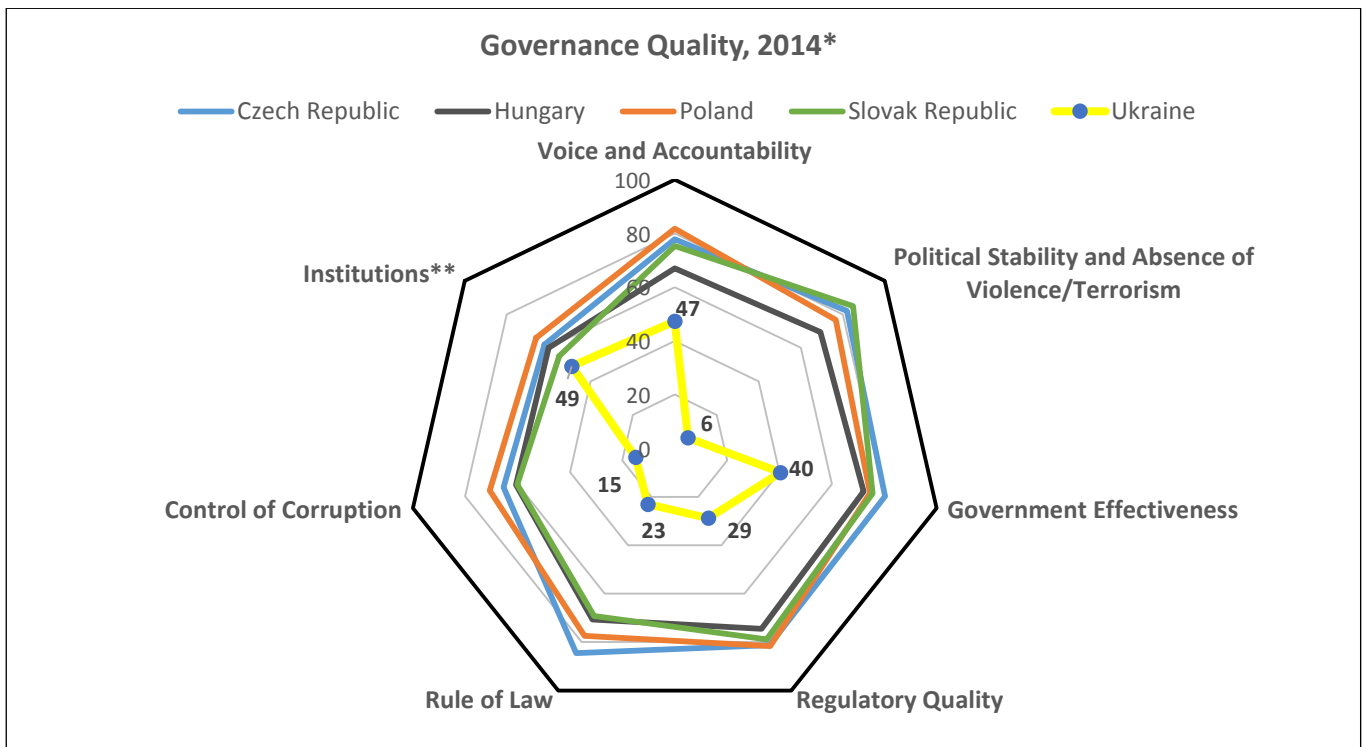
Annex 1. Diagrams of governance quality: Ukraine and V4 countries



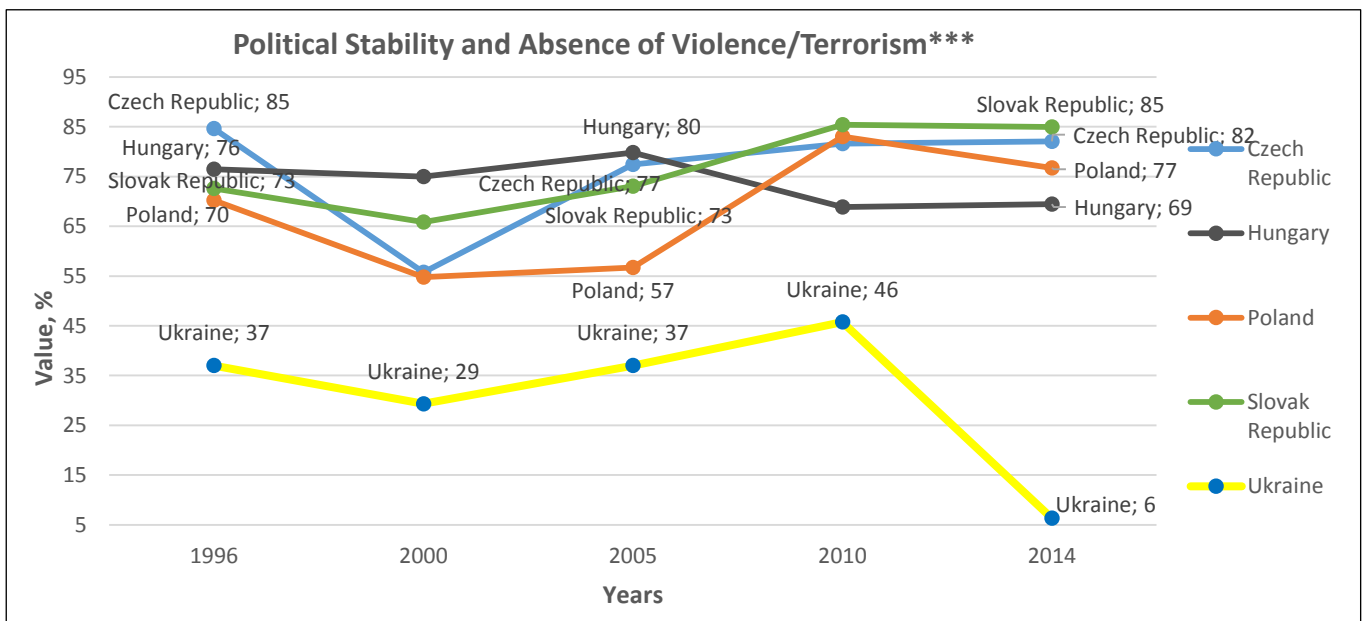
a. Governance indicators, 1996.



b. Governance indicators, 2005.



c. Governance indicators, 2014.



d. Dimension "Political Stability and Absence of Violence/Terrorism".

* The graphs are based upon The Worldwide Governance Indicators (WGI) project under World Bank's research initiatives.

** The new dimension "Institutions" was added by the author in order to estimate general institutional capabilities of the countries as the part of governance quality. Institutions dimension was estimated based on the re-calculated by the author data of The Global Competitiveness Reports for 2005 and 2014 under research initiatives of The World Economic Forum (WEF). For 1996, the input data for the dimension "Institutions" for V4 and Ukraine from WEF is not available.

*** Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.

Annex 2. Concluding statement of the survey “The energy sector of Ukraine: problems identification and ranking”

Range No 1 of the problems: macro-level (the country as a whole)

No	The Statement of the Problems	Scale of Assessment of the Priority				
		Highest Priority	High Priority	Medium Priority	Low Priority	Not a Priority
1.1	Improvement of the general legal framework of regulatory policy	50,0	37,5	0,0	0,0	12,5
	<i>Private companies</i>	60,0	20,0	0,0	0,0	20,0
	<i>State owned enterprises</i>	20,0	60,0	0,0	0,0	20,0
	<i>State authorities</i>	66,7	33,3	0,0	0,0	0,0
1.2	Wider delegation of regulatory functions of the State to the self-governing industry regulatory institutions/associations	6,3	25,0	50,0	18,8	0,0
	<i>Private companies</i>	0,0	60,0	20,0	20,0	0,0
	<i>State owned enterprises</i>	20,0	0,0	80,0	0,0	0,0
	<i>State authorities</i>	0,0	16,7	50,0	33,3	0,0
1.3	Wider delegation of regulatory functions from the Central Government to the regions	0,0	31,3	50,0	18,8	0,0
	<i>Private companies</i>	0,0	60,0	0,0	40,0	0,0
	<i>State owned enterprises</i>	0,0	0,0	100,0	0,0	0,0
	<i>State authorities</i>	0,0	33,3	50,0	16,7	0,0
1.4	Improvement of overall tariff policy	31,3	50,0	6,3	0,0	12,5
	<i>Private companies</i>	40,0	20,0	20,0	0,0	20,0
	<i>State owned enterprises</i>	20,0	60,0	0,0	0,0	20,0
	<i>State authorities</i>	33,3	66,7	0,0	0,0	0,0
1.5	Overcoming disparities in the prices of goods and services (in particular the share of salaries) and its approaching to the structure of prices for similar goods and services in the EU	25,0	25,0	37,5	6,3	6,3
	<i>Private companies</i>	20,0	0,0	40,0	20,0	20,0
	<i>State owned enterprises</i>	20,0	40,0	40,0	0,0	0,0
	<i>State authorities</i>	33,3	33,3	33,3	0,0	0,0
1.6	Improvement of fiscal policy and budget process, including decentralization in accumulation funds	25,0	62,5	0,0	6,3	6,3
	<i>Private companies</i>	20,0	60,0	0,0	20,0	0,0
	<i>State owned enterprises</i>	20,0	60,0	0,0	0,0	20,0
	<i>State authorities</i>	33,3	66,7	0,0	0,0	0,0
1.7	Fighting corruption at the highest levels of the state governance	68,8	6,3	12,5	0,0	12,5
	<i>Private companies</i>	60,0	0,0	20,0	0,0	20,0
	<i>State owned enterprises</i>	60,0	0,0	20,0	0,0	20,0
	<i>State authorities</i>	83,3	16,7	0,0	0,0	0,0
1.8	Ensuring the effective operation of the National Anti-corruption Bureau, Antimonopoly Committee	37,5	18,8	12,5	18,8	12,5
	<i>Private companies</i>	20,0	0,0	20,0	40,0	20,0
	<i>State owned enterprises</i>	60,0	0,0	20,0	0,0	20,0
	<i>State authorities</i>	33,3	50,0	0,0	16,7	0,0
1.9	The need to re-view the results of the privatization of State property, which took place in the period of 1991-2013	25,0	12,5	25,0	18,8	18,8
	<i>Private companies</i>	20,0	20,0	0,0	0,0	60,0
	<i>State owned enterprises</i>	20,0	20,0	40,0	20,0	0,0
	<i>State authorities</i>	33,3	0,0	33,3	33,3	0,0
1.10	Approximation of national legislation to the legislation of the EU countries	18,8	56,3	12,5	6,3	6,3
	<i>Private companies</i>	0,0	40,0	40,0	0,0	20,0
	<i>State owned enterprises</i>	20,0	60,0	0,0	20,0	0,0
	<i>State authorities</i>	33,3	66,7	0,0	0,0	0,0
1.11	Transition to the standards and regulations of the EU	12,5	62,5	12,5	6,3	6,3
	<i>Private companies</i>	0,0	40,0	20,0	20,0	20,0
	<i>State owned enterprises</i>	20,0	80,0	0,0	0,0	0,0
	<i>State authorities</i>	16,7	66,7	16,7	0,0	0,0
1.12	Achievement EU standards and guidelines of Ukraine for indicators of energy security of the state	25,0	50,0	12,5	6,3	6,3
	<i>Private companies</i>	20,0	20,0	20,0	20,0	20,0
	<i>State owned enterprises</i>	20,0	80,0	0,0	0,0	0,0
	<i>State authorities</i>	33,3	50,0	16,7	0,0	0,0
1.13	The reduction of the overall energy intensity of GDP of Ukraine	50,0	25,0	12,5	0,0	12,5
	<i>Private companies</i>	40,0	20,0	20,0	0,0	20,0
	<i>State owned enterprises</i>	60,0	20,0	0,0	0,0	20,0
	<i>State authorities</i>	50,0	33,3	16,7	0,0	0,0
1.14	Improvement the energy efficiency of the buildings (Building Energy Ratings)	56,3	25,0	6,3	0,0	12,5
	<i>Private companies</i>	40,0	20,0	20,0	0,0	20,0
	<i>State owned enterprises</i>	80,0	0,0	0,0	0,0	20,0
	<i>State authorities</i>	50,0	50,0	0,0	0,0	0,0

No	The Statement of the Problems	Scale of Assessment of the Priority				
		Highest Priority	High Priority	Medium Priority	Low Priority	Not a Priority
1.15	Improvement of mechanisms to support the vulnerable categories of the population	18,8	62,5	0,0	12,5	6,3
	<i>Private companies</i>	20,0	40,0	0,0	20,0	20,0
	<i>State owned enterprises</i>	0,0	100,0	0,0	0,0	0,0
	<i>State authorities</i>	33,3	50,0	0,0	16,7	0,0

Range No 2 of the problems: mid-level (energy sector)

No	The Statement of the Problems	Scale of Assessment of the Priority				
		Highest Priority	High Priority	Medium Priority	Low Priority	Not a Priority
2.1	Improvement of the legislative base of the regulation of the energy sector	31,3	56,3	6,3	0,0	6,3
	<i>Private companies</i>	20,0	60,0	20,0	0,0	0,0
	<i>State owned enterprises</i>	20,0	60,0	0,0	0,0	20,0
	<i>State authorities</i>	50,0	50,0	0,0	0,0	0,0
2.2	Improvement of the legal principles and activities of the National Commission, which performs state regulation in the energy and utilities (NKREKP)	25,0	56,3	6,3	0,0	12,5
	<i>Private companies</i>	0,0	60,0	20,0	0,0	20,0
	<i>State owned enterprises</i>	20,0	60,0	0,0	0,0	20,0
	<i>State authorities</i>	50,0	50,0	0,0	0,0	0,0
2.3	Improvement of pricing system in the energy sector	31,3	50,0	6,3	0,0	12,5
	<i>Private companies</i>	20,0	60,0	0,0	0,0	20,0
	<i>State owned enterprises</i>	20,0	60,0	0,0	0,0	20,0
	<i>State authorities</i>	50,0	33,3	16,7	0,0	0,0
2.4	Improvement of sectoral tax system	31,3	43,8	0,0	18,8	6,3
	<i>Private companies</i>	0,0	60,0	0,0	40,0	0,0
	<i>State owned enterprises</i>	40,0	20,0	0,0	20,0	20,0
	<i>State authorities</i>	50,0	50,0	0,0	0,0	0,0
2.5	Implementation of the standards initiative, the transparency of the extractive industries (EITI)	25,0	25,0	43,8	6,3	0,0
	<i>Private companies</i>	0,0	20,0	60,0	20,0	0,0
	<i>State owned enterprises</i>	0,0	40,0	60,0	0,0	0,0
	<i>State authorities</i>	66,7	16,7	16,7	0,0	0,0
2.6	Fighting corruption at the level of the leadership of public sector bodies and key State enterprises sector	43,8	18,8	31,3	0,0	6,3
	<i>Private companies</i>	20,0	20,0	60,0	0,0	0,0
	<i>State owned enterprises</i>	40,0	20,0	20,0	0,0	20,0
	<i>State authorities</i>	66,7	16,7	16,7	0,0	0,0
2.7	Implementation of industry standards and EU regulations, in particular Network Eurocodes	12,5	50,0	31,3	0,0	6,3
	<i>Private companies</i>	0,0	20,0	60,0	0,0	20,0
	<i>State owned enterprises</i>	20,0	60,0	20,0	0,0	0,0
	<i>State authorities</i>	16,7	66,7	16,7	0,0	0,0
2.8	Construction/renovation of the domestic network infrastructure with the purpose of broader physical integration of transport energy networks of Ukraine and the EU	37,5	31,3	25,0	0,0	6,3
	<i>Private companies</i>	0,0	20,0	60,0	0,0	20,0
	<i>State owned enterprises</i>	60,0	40,0	0,0	0,0	0,0
	<i>State authorities</i>	50,0	33,3	16,7	0,0	0,0
2.9	Improvement of the corporate governance in the energy sector and in large enterprises, including the introduction of the Institute of independent directors (members of the supervisory boards)	12,5	25,0	56,3	6,3	0,0
	<i>Private companies</i>	20,0	40,0	20,0	20,0	0,0
	<i>State owned enterprises</i>	0,0	0,0	100,0	0,0	0,0
	<i>State authorities</i>	16,7	33,3	50,0	0,0	0,0
2.10	Improvement of the procurement policy for goods and services	25,0	56,3	12,5	6,3	0,0
	<i>Private companies</i>	0,0	60,0	40,0	0,0	0,0
	<i>State owned enterprises</i>	60,0	20,0	0,0	20,0	0,0
	<i>State authorities</i>	16,7	83,3	0,0	0,0	0,0
2.11	Attraction of investments	50,0	31,3	6,3	0,0	12,5
	<i>Private companies</i>	60,0	20,0	0,0	0,0	20,0
	<i>State owned enterprises</i>	40,0	40,0	0,0	0,0	20,0
	<i>State authorities</i>	50,0	33,3	16,7	0,0	0,0
2.12	The creation of the municipal (regional) companies-operators of energy networks on the basis of the privatization of state-owned networks and networks built by the private investors	6,3	18,8	50,0	6,3	18,8
	<i>Private companies</i>	20,0	20,0	40,0	0,0	20,0
	<i>State owned enterprises</i>	0,0	20,0	40,0	0,0	40,0
	<i>State authorities</i>	0,0	16,7	66,7	16,7	0,0
2.13	Privatization of the large state-owned enterprises of the energy sector	12,5	6,3	37,5	31,3	12,5
	<i>Private companies</i>	20,0	0,0	40,0	20,0	20,0
	<i>State owned enterprises</i>	20,0	20,0	40,0	0,0	20,0
	<i>State authorities</i>	0,0	0,0	33,3	66,7	0,0

Range No 3 of the problems: micro-level (enterprise/state authority of the energy sector)

No	The Statement of the Problems	Scale of Assessment of the Priority				
		Highest Priority	High Priority	Medium Priority	Low Priority	Not a Priority
3.1	Y Improvement of the enterprise's accounting policy and reporting	6,3	62,5	18,8	6,3	6,3
	<i>Private companies</i>	0,0	40,0	40,0	20,0	0,0
	<i>State owned enterprises</i>	0,0	60,0	20,0	0,0	20,0
	<i>State authorities</i>	16,7	83,3	0,0	0,0	0,0
3.2	Implementation of stimulating methods of pricing for the products and services	12,5	56,3	18,8	0,0	12,5
	<i>Private companies</i>	40,0	20,0	20,0	0,0	20,0
	<i>State owned enterprises</i>	0,0	80,0	0,0	0,0	20,0
	<i>State authorities</i>	0,0	66,7	33,3	0,0	0,0
3.3	Implementation mechanism of accelerated depreciation of fixed assets	6,3	43,8	43,8	6,3	0,0
	<i>Private companies</i>	20,0	60,0	20,0	0,0	0,0
	<i>State owned enterprises</i>	0,0	60,0	40,0	0,0	0,0
	<i>State authorities</i>	0,0	16,7	66,7	16,7	0,0
3.4	Implementation of the standards initiative, the transparency of the extractive industries (EITI)	6,3	37,5	37,5	18,8	0,0
	<i>Private companies</i>	0,0	40,0	40,0	20,0	0,0
	<i>State owned enterprises</i>	0,0	20,0	60,0	20,0	0,0
	<i>State authorities</i>	16,7	50,0	16,7	16,7	0,0
3.5	Improvement of corporate governance, including the introduction of the Institute of independent directors (members of supervisory boards) into public joint stock companies	0,0	37,5	37,5	25,0	0,0
	<i>Private companies</i>	0,0	60,0	20,0	20,0	0,0
	<i>State owned enterprises</i>	0,0	20,0	40,0	40,0	0,0
	<i>State authorities</i>	0,0	33,3	50,0	16,7	0,0
3.6	Improvement of the procurement policy for goods and services	25,0	31,3	31,3	6,3	6,3
	<i>Private companies</i>	0,0	20,0	60,0	20,0	0,0
	<i>State owned enterprises</i>	40,0	20,0	20,0	0,0	20,0
	<i>State authorities</i>	33,3	50,0	16,7	0,0	0,0
3.7	The introduction of quality standards for the products and services and EU regulations	6,3	62,5	18,8	6,3	6,3
	<i>Private companies</i>	0,0	20,0	40,0	20,0	20,0
	<i>State owned enterprises</i>	0,0	80,0	20,0	0,0	0,0
	<i>State authorities</i>	16,7	83,3	0,0	0,0	0,0
3.8	Fighting corruption at the top management level of enterprises and at the level of its subsidiary bodies/branches	37,5	18,8	25,0	0,0	18,8
	<i>Private companies</i>	0,0	20,0	40,0	0,0	40,0
	<i>State owned enterprises</i>	40,0	20,0	20,0	0,0	20,0
	<i>State authorities</i>	66,7	16,7	16,7	0,0	0,0
3.9	Protection from illegal alienation of assets, unfair acquisitions (raiding attacks)	31,3	25,0	31,3	0,0	12,5
	<i>Private companies</i>	20,0	20,0	40,0	0,0	20,0
	<i>State owned enterprises</i>	20,0	20,0	40,0	0,0	20,0
	<i>State authorities</i>	50,0	33,3	16,7	0,0	0,0

Annexes 3. Milestones of V4 energy sectors development: institutional and infrastructure aspects

Annex 3.1. Czech Republic

DIVISION OF ENERGY COMPANIES

The transition from a command to a market economy in Czech energy production and distribution first involved processes of 1) the division and 2) privatization of state enterprises in the energy sector in the 1990s, followed by price liberalization and policies oriented towards improving competitiveness and market access. It should be noted that “division” refers to the breakup of state enterprises in the energy sector into smaller units, but still under state ownership; as a result, it should be distinguished from the de-monopolization of energy companies, which is achieved only after conditions of private ownership, price liberalization, and characteristics of competitive behavior are achieved. In this section, we deal only with the division of energy companies.

1990: The division of ČEZ

After the Velvet Revolution, the Czech energy sector, like the rest of the economy, was highly centralized, inefficient, and among the most polluting in the world. In 1990, one of the first reforms of the energy complex was the division of energy production and distribution by ČEZ (the Czech Energy Utility company). At this time, eight regional distribution companies (REAS) were separated from ČEZ, while the latter continued to own large power plants, heating plants, and transmission systems (both 400 kV and 220 kV). The heating supply companies were gradually separated from ČEZ in the course of the 1990s, and typically privatized from state control into the ownership of local governments, with the state and/or ČEZ maintaining some stakes.

January 1994 – ČPP

After the Velvet Revolution, the state Czech Gas Company (ČPP) had a monopoly on the import, distribution and transport of natural gas in the Czech Republic. In January 1994, ČPP's activities relating to gas distribution were divided into eight regionally based distribution companies, ownership of which remained in state and municipal hands. The remaining entity was renamed ČPP Transgas and maintains underground gas tanks and the transit pipeline network. In December 2001, the main assets of this company, known as Transgas, were privatized by the government to RWE for 4,1 billion EUR.

PRIVATISATION OF ENERGY COMPANIES

The privatization of state-owned energy companies is among the most controversial issues in Czech politics. While the privatization of companies in the natural gas sector was generally seen as successful (though not without controversy), the privatization of companies in the electric power sector, particularly coal, was poorly managed and quite untransparent, the consequences of which are still felt today.

1999 - Privatization of Mostecká uhelná

Mostecká uhelná (MUS) was the largest brown coal producer in the North Bohemia region that was established in 1992 from previous state enterprises in the coal sector. In 1994, in the second round of voucher privatization, about 49% of the shares were privatized to the public, 5% were given to the city of Most, with the state keeping the remaining stake. However, the publicly traded shares were gradually controlled by various financial groups, and ultimately Appian Group, whose ownership was not publicly known. In 1999, the Social Democratic government sold its 46% stake in MUS to the Swiss-based Investenergy (which was controlled by the US-based Appian Group) for about 24 million EUR, a very low price, and without a competitive auction. However, in 2005 the Appian Group apparently stripped assets of MUS for the personal use of four MUS managers, who subsequently used those funds to purchase MUS from Appian Group. Not long after, the Swiss police announced that it was investigating the possibility of money laundering, and in 2011 allegations emerged that money (about 5.5 million Euros) from the privatization was also laundered to Social Democratic politicians. From the Swiss investigation, it has become clear that the initial privatization of MUS by the state in 1999 – well below its market value and to unknown owners of Appian Group – and the second transfer of shares from Appian to the MUS managers, were connected as a scheme for the MUS managers to practically steal MUS from the Czech state. The company is now known as the Czech Coal Group.

2000: The introduction of the State Energy Policy

While minority shares in many Czech energy companies, including ČEZ, were sold as part of the process of voucher privatization in the 1990s, most of these companies were still majority owned by the state. This began to change in 2000, when the Czech government approved the State Energy Policy, which dealt with the privatization of state ownership in the most important energy companies, such as ČEZ (electricity production), Transgas (gas storage and distribution), Unipetrol (oil refineries and petrochemical production), and MERO (oil storage and distribution). While the government initially intended to transform these companies into joint stock companies with state ownership, in 2001 the Social Democratic government voted in favor of privatization.

2001: Privatization of Transgas

The privatization of Transgas was relatively uncontroversial. At that time, the Czech state had full ownership of Transgas, as well as a controlling interest in the majority of the regional gas distribution companies. Transgas was bid on by six investors, including E.ON, SNAM/Ruhrgas/Gaz de France, Gaz-Invest (Gasprom), and RWE Gas/Wintershall, among others. This sent a positive signal to the Czech government in terms of the recognition of the market value of these assets; the presence of major European gas distribution companies also ensured a competitive bidding process. In the end, RWE won the bid with a price of 133 billion CZK (about 4.9 billion EUR), which was more than the price anticipated by the government at that time.

2001-present: The failed attempt to privatize ČEZ

ČEZ is undoubtedly the most prized asset in the Czech energy sector. In 2001, the Czech government aimed to privatize ČEZ, but with many conditions attached, such as that electricity production from nuclear sources be maintained after privatization. Many of the leading energy producers – such as Electricite de France, RWE, E.ON, British International Power, Enel, AES and others – submitted bids for ČEZ, but due to the complicated requirements of the bids, nearly all the bids but one (from Electricite de France, which submitted a low price) were disqualified, and thus the privatization was cancelled.

In late 2001 the government announced a second auction, but with the same conditions except for a minimum bid price, which also ended unsuccessfully. When compared to the privatization of Transgas, the failure of the privatization of ČEZ can be seen as due to the desire of the Czech government to maintain and even expand Czech nuclear energy capacity, especially at the Temelín nuclear power plant, as well as the desire to maintain high levels of coal production, and thus employment in coal producing regions. In other words, the Czech government wanted to impose requirements that would limit the ownership rights and capabilities of the buying firm, thus reducing the value of ČEZ in the eyes of potential buyers.

After the failed privatization of ČEZ, the government of Miloš Zeman (now President of the Czech Republic) changed course and aimed to establish ČEZ as a so-called 'national champion' – i.e. a monopolist on the domestic market but with a resource base large enough to compete on the pan-European market. In the subsequent decade, that vision has been somewhat fulfilled. However, the Czech Anti-monopoly Office prevented ČEZ from consolidating its position (by trying to re-acquire the regional distribution companies), as well as forced it to sell its minority stake in ČEPS. Thus ČEZ has maintained its structure more or less intact from 2001 to the present, which is characterized by a huge interdependence between ČEZ and the Ministry of Energy, in which many politicians are appointed to the ČEZ Board of Directors, and in which ČEZ has an outsized influence on Czech public policies. The dependence of the

state budget on annual dividends from ČEZ (due to its 69% stake in the company) has also served to maintain the status quo. The relationship between ČEZ and the state has remained one of the most controversial issues in the Czech Republic, where the concept of “state capture” – in which a firm significantly controls or dictates state policy due to its size, financial resources, and influence – is frequently used by NGOs to describe the status quo.

2003 – Privatization of Unipetrol

A key condition of the privatization of Unipetrol was that the subsequent owner was not to sell or separate off any of the parent company for a decade after privatization. In the auction, there were two bidders: Agrofert (owned by Andrej Babis, now Minister of Finance) and an Austrian and Hungarian coalition led by OMV and MOL. Even though the Agrofert bid was less than the OMV-MOL bid, Agrofert was chosen as the winner – an issue that remains controversial today. Because Agrofert was ultimately unable to meet the privatization conditions, the auction was annulled and a second auction was held. In the second auction, Agrofert, in alliance with the Polish PKN Orlen, again won the bid, and paid 14.7 billion CZK (543 million EUR) for full ownership.

2004 – Privatization of OKD

OKD, or Ostravsko-karvinské doly, was the main producer of bituminous coal in the Czech Republic. Similar to the MUS case, its privatization is a typical example of ‘tunnelling’ or corruption as a result of poor state oversight of the economy in the 1990s. The government’s share in OKD declined substantially, to 46%, after its managers succeeded to quietly agree to have OKD buy a private firm (later known as Karbon Invest) owned by the managers for 144 million Euros; that private firm then in turn bought a huge stake in OKD for only 88 million Euros, thus tunneling the difference. In 2004, the government sold its OKD stake to Karbon Invest for 151 million Euros, even though another firm, Penta Investment, offered a higher price. The low price of the sale was confirmed when Zdeněk Bakala, a leading Czech billionaire, purchased the OKD stake from Karbon Invest for nearly half a billion Euros.

2004 - Privatization of Sokolovská uhelná

The Czech government privatized its 50% stake in another important brown coal producer, in Sokolovská uhelná in Northern Bohemia in 2004. Because of conditions favoring Czech over foreign bidders (foreign bidders were eliminated from the auction, for unknown reasons, even though they offered the most money), there were only remaining two bidders for the company: OKD and the managers of Sokolovská uhelná. At that time, the new owners of OKD were being investigated for corruption, which contributed to the decision of the Social Democratic government to privatize the 50% stake to the managers of Sokolovská uhelná, who paid only 96

million Euros, which was even less than the cash on hand by the company, not to mention the value of the other assets.

2005 - Privatization of Severočeské doly

The privatization of Severočeské doly, a producer of brown coal in Northern Bohemia and officially formed in 1994 from two different mines, was different than with the other coal producers. ČEZ had a minority stake in the company (about 40%), which provided ČEZ with the majority of the coal it needed for electricity production. After a failed tender, when the government cancelled due to low bid prices by three other firms, the government decided to sell its 37% stake in Severočeské doly to ČEZ (still state-owned) for about 330 million Euros, meaning that it is basically in state hands.

STATE DEREGULATION AND OPENNING OF ENERGY MARKETS

1992 – Energy Policy of the Czech Republic

The beginning of the process of price deregulation began with the 1992 Energy Policy of the Czech Republic, the first of its kind. The main goal of the policy was to adopt legislative measures in the energy sector (electricity, gas, and heat) for restructuring the still state-owned energy companies (into larger units that would be privatized later) and for ensuring that energy policy addressed air pollution (especially desulfurization in the burning of brown coal) and was compatible with market principles. For example, direct payments or subsidies by the state to the energy companies were gradually replaced by investments and loans of the companies themselves, ensuring they behave in an economical manner.

1990s – Electricity price regulation

Electricity prices were fully regulated in the 1990s, with prices issued by the Ministry of Finance. The continued need for regulation was due to the monopolistic nature of the electricity market, i.e. the dominance of ČEZ. Nonetheless, consumer electricity prices increased by an average of 20% a year in the 1990s. It should be noted that these price increases generally matched the increases in the average Czech wage. While rates for moderate consumption generally tripled from 1992 to 2000, so did the average Czech wage.

Before 2005, electricity prices used a basic tariff structured based on three rates: a BS rate for small consumption up to 500 kWh a year, a moderate B consumption rate from 500 to 4000 kWh a year, and a cheaper N rate for consumption of up to 8 hours, which consumers could combine with either the B or BS rate to have inexpensive electricity at night. The prices for these rates were the same for all households. However, beginning in 2001, prices also began to reflect the size of the circuit breaker used in the home.

2000 – The Energy Act

The process of price deregulation began with the Energy Act, formally the Law 458/2000 Coll. on Business Conditions and Public Administration in the Energy Sectors and on Amendments to Other Laws, passed by Parliament on November 28, 2000. The law established the Energy Regulatory Office and called for gradual price deregulation to be called out by that office, beginning in 2002, when regional prices for electricity and natural gas were established. From 2001, price regulations were decided by the Energy Regulatory Office.

2005 – Deregulation of the electricity market

In 2005, the electricity market formally opened, with small businesses being able to choose their supplier of electricity for the first time. In 2006, all customers, including households, had the right to choose their supplier of electricity; at the same time, the ERO finally stopped setting final electricity prices, which would be subject to market competition; instead, from 2006 only the prices of components and services (which contribute to the final electricity price) are regulated.

ERO continues to set tariffs on the components of electricity prices. These components include:

- A capacity charge tariff for the circuit breaker selected by the consumer (rates for 14 different circuit breakers are determined)
- Single-tariff rates for low, medium and high consumption
- Two-tariff rates in which a low consumption period can be selected
- Different rates for each of the 5 different distributors of electricity

The combination of these tariffs means that, despite price regulation of these components, consumers have a wide choice of electricity distribution options to meet their household needs. Similar tariff structures are also issued for heat pumps, public lighting, etc.

2007 – Deregulation of the natural gas market

The deregulation of natural gas prices was made possible by the previous privatization of Transgas and the emergence of competition among distributors at the regional level. In 2007, all customers, including businesses and households, could choose their own distributor of natural gas. Since this time, ERO uses complex algorithms for calculating regulated prices for the distribution of natural gas among the three gas distributors in the Czech Republic. ERO differentiates between the price for the transport of natural gas to major distribution centers, the price of distribution of natural gas to the consumer, and the price of services provided by the state-owned market operator. Any additional services by natural gas distributors are not price regulated. For consumers, the most important price regulation concerns the

distribution price, which has two parts, a fixed price (based on installed capacity) and a variable price, based on the amount of natural gas consumed.

TRANSITION TO INDEPENDENT REGULATOR

1993 – Regulation in the Area of Oil Security

In 1993, the parliament passed a new law that established the Administration of State Material Reserves, which supports the preparations for emergency measures for the time of a state of oil emergency arising as a result of stopped or suspended crude oil and petroleum products supplies into the Czech Republic and performs subject-matter international cooperation. It also develops the national oil security concept, develops relevant regulative and other measures on emergency provision of the Czech Republic with crude oil and petroleum products, and monitors imports and exports of crude oil and petroleum products into/from the Czech Republic, oil processing in Czech refineries, and domestic consumption of selected petroleum products and follows developments in the global oil market.

1993 – Regulation in the Area of Nuclear Security

After the establishment of an independent Czech Republic, the State Office for Nuclear Safety was also established, which is a state body headed by a chairman appointed by the Czech government. The State Office for Nuclear Safety is a regulatory body responsible for governmental administration and supervision in the fields of uses of nuclear energy and radiation and of radiation protection. It ensures state supervision of nuclear safety of nuclear facilities, nuclear items, physical protection of nuclear facilities, radiation protection, and emergency preparedness of nuclear facilities and workplaces handling ionizing radiation sources.

1997 – Establishment of the Radioactive Waste Repository Authority (RAWRA)

RAWRA was established by the Ministry of Industry and Trade on the basis of the Atomic Act (Act 18/1997, on peaceful uses of nuclear energy and ionizing radiation). RAWRA has been a fully state-controlled organization since 2000. Its main tasks are ensuring the preparation, construction, commissioning, operation and closure of radioactive waste repositories and the monitoring of the impact of such repositories on the surrounding environment. Its most visible activity is its attempt to find a location in the Czech Republic that can serve as a permanent depository for the storage of used nuclear fuel from the Duhovany and Temelin nuclear power plants and other sources. Since 2000, RAWRA has been responsible for the management of the three radioactive waste repositories in the Czech Republic: the Richard repository near Litoměřice which is used for the disposal of institutional waste, the Dukovany

repository for waste generated by Czech nuclear power plants and the Bratrství repository for the disposal of waste containing only naturally occurring radionuclides.

1998 – Independence of ČEPS

ČEPS, which operates and maintains the Czech electricity transmission system, was separated from ČEZ only in 1998 by decision of the ČEZ board of directors. In 2002, ČEPS oversaw the introduction of the market in the export and import of electricity, and in 2005, initiated responsibilities relating to auctioning capacity for cross-boarder electricity transmission. In 2009, it established market coupling with Slovakia, which was expanded to Hungary three years later. ČEPS has made plans to make significant investments into the modernization of the electricity grid over the next two decades.

2001 – Establishment of the Energy Regulatory Office

Based on the 2000 Energy Act, the ERO carries out independent regulation (taking over responsibilities previously carried out by the government) in the areas of tariff setting (electricity, heat, and natural gas), support for the use of renewable energy sources and combined heat and power generation, consumer protection, protection of interests of license holders, support for competition in the energy market (by cooperation with the Office for the Protection of Competition [ÚOHS]), and supervision over markets in the energy industries.

2001 – Establishment of the State Energy Inspection

The State Energy Inspection is part of the Ministry of Industry and Trade and carries out control and inspection activities in the energy sector, based on complaints from the Ministry, from its own activities, and from third parties. It can impose sanctions in case energy companies are found to be in infringement of laws.

2011 – Dual Monitoring of Energy Sector

After a 2011 amendment of the Energy Act, the ERU also has the authority to carry out some of the same inspection activities as the State Energy Inspection – but as an independent state body, not as part of the Ministry. This has increased the authority of the ERU over the State Energy Inspection. Now, the ERU has a wide authority in the area of ensuring fair competition in the energy market, and to ensure competition, it can enter the offices of energy companies, inspect business records, and act as a protector of consumer interests. These authorities go beyond those of the State Energy Inspection, and was largely a result of EU demands for greater competition and consumer protection in the energy sector.

CHANGE OF PRODUCTION CAPACITY AND INFRASTRUCTURE

2000 – The Commissioning of the Temelín Nuclear Power Plant

Temelín began construction in 1987, and faced many cost overruns. In 2000, the plant was finally completed at a cost of 3,7 billion Euros; the commissioning of its first nuclear reactor was met by major protests by Czech, Austrian and German activists (due to its proximity to those countries), including the blocking of all border crossings between the Czech Republic and Austria. In 2002, the second reactor was commissioned. Each reactor has a gross capacity of 1056 MWe and thermal output of 3120 MW and are planned to be in service for at least 40 years.

2004 – Proposed expansion of nuclear energy

The Czech Energy Policy of 2004 envisaged building two or more large reactors to replace the Dukovany power plant after 2020. Those plans were further developed in 2006, with the government proposal to build a third nuclear reactor at the Temelín nuclear power plant by 2020, with a fourth reactor to be built later. These would be in the location of the two unfinished blocks at Temelín station. In August 2009, ČEZ sought bids for two pressurized water reactors (PWRs) for these units, which pitted Russian and US-Japanese consortiums against each other. Due to the highly political nature of the bids, the government chose to indefinitely postpone the decision.

2005 – Upgrades at the Dukovany Nuclear Power Plant

The Dukovany Nuclear Power plant has four power units with pressurized water reactors that were commissioned from 1985 to 1987. In 2005, Unit 3 was upgraded to 456 MWe gross capacity, and the same upgrade was made to Unit 1 and Unit 4 in 2007. Unit 3 was further upgraded in 2009 to 500MWe.

2007 – Beginning of Growth in Wind Power Production

After the passage of the the feed-in tariff system, Czech wind power production expanded greatly beginning in 2007. Production expanded from 49,4 GWh in 2006 to 125 GWh in 2007, and stands at 572 GWh (in 2015), with an installed capacity of 283 MW (also as of 2015). Many of these wind power installations are located in rural areas and are subject to environmental impact assessments, as well as frequent local referendums. Local residents have tended to support wind power projects if it meant increased revenue to the community.

2009 - Doosan Škoda Power

In the area of energy technology, in 2009 Škoda Power, a Czech producer of steam turbines since 1904, became part of Doosan Heavy Industries & Construction, a leading provider of integrated solutions for energy production, from boilers and turbines to turnkey power-plant projects. Doosan Škoda Power's turbines used in

energy production (from 10MW up to 1200MW) has reached over 65GW total output worldwide, and a new R&D centre was established in the Czech Republic in 2013.

2011 – Major expansion in Solar Power Production

Also due to the feed-in tariff system, the electricity generation from solar installations increased from 88 GWh in 2009 to 2182 GWh in 2011, due to a massive expansion of the installed base the previous year. This was caused by an excessively generous tariff structure that led to the construction of solar installations on greenfields and productive agricultural land. This led to a decline in popular support for renewables, which made it possible for subsequent governments to cut tariffs for new installations. As a result, current energy production has remained similar to the 2011 level due to the lack of new solar installations.

PROMOTION OF RENEWABLE ENERGY

2005 – Law 180/2005 Coll. on the support of electricity production from renewable sources

This law is the most decisive bill supporting renewables in the Czech Republic. The law guaranteed the level of the feed-in tariff, which is valid at the time of installation, over a period of 20 years for solar, wind and biomass plants, and 30 years for hydropower generators and 15 years for sewage gas-fired plants. These tariffs ensured price transparency and stability for energy producers and a guaranteed minimum return on investment that can be calculated upfront.

However, the size of the tariffs were extreme. For example, in 2010 the guaranteed tariffs for renewables was about 526 Euros per MWh for installations commissioned that year. Not only is the amount very high, the law also called for a 2% annual increase in the guaranteed amount.

The rapid growth of wind and power power installations in the Czech Republic were directly due to the way those tariffs were set according to this law. The above law stipulates feed-in tariffs and feed-in premiums as the two key support measures for promoting electricity from renewables. Due to market conditions in the 2005–2010 period, supported by a decline in the prices for solar panels, the expansion of solar capacity during this time was among the largest in the world.

2009 – Bringing Renewables under Control

By this time the public image of renewable energy investments was that investors were making huge profits at the expense of Czech taxpayers. As a result, the Czech parliament imposed a windfall profit tax of 26% on the tariffs from 2009 until 2013.

2011 – ČEPS steps in

For several months in 2011, ČEPS, the Czech transmission system operator, declared a temporary connection moratorium for variable renewable electricity plants. They ended the moratorium at the end of 2011. Although renewable electricity producers are generally entitled to priority connection to the grid, the ČEPS argued that the grid capacity was not sufficient for additional renewable electricity installations.

2014 – the End of the Tariff System

In 2013, the Czech Parliament adopted a proposal stating that as of 2014 public support for new renewable electricity generators would no longer be provided feed-in tariffs or premiums for the construction of new capacities. The exception to this are wind, geothermal, biomass and hydropower plants if building permits were issued by the end of 2015, ensuring that planned investments at that time could be completed.

LESSONS LEARNED

Many lessons can be learned from the successes and failures of reforms in the Czech energy sector.

First, in terms of support for renewables, it is essential that tariffs be regulated in a way that provides a financial incentive for the construction of new capacity, but that such incentives cannot be extreme, leading the possibility of unethical behavior. For this to happen, tariff decisions need to be made independently, with a minimal role for the government, due to political and lobbying pressures placed on it. Pricing mechanisms need to also take a long-term view to avoid boom and bust cycles, as well as include independent experts with deep knowledge of the costs of renewable facility production (the decline in production in solar panels contributed to the excessive boom in solar capacity) and emerging technologies in the sector.

Second, environmental goals need to be integrated into energy policy in a comprehensive manner. This was achieved in the 1992 Energy Policy and in the 2005 Law on support of renewables, though in a poorly thought out way. Environmental concerns are often ignored in the issue of state support for coal production, or where to locate a long-term nuclear fuel repository. Environmental impact assessments are too often seen as an obstacle for energy infrastructure rather than a mechanism to bring that infrastructure in balance with environmental risks.

Third, privatization of energy companies worked when the bidding process was fair, transparent and competitive. It didn't work when the government chose detailed criteria for bids, which ultimately were used to exclude major energy companies from the bid process, which helped serve the interests of anti-competitive Czech businessmen with close ties to the government, and which were accompanied by low

bid prices. There is a direct connection between fighting corruption and ensuring competitive privatization procedures.

Fourth, the Czech Republic needs to find a way to privatize ČEZ in a way that does not endanger national security, with the goal of enhancing competition and reducing perceived corruption in the energy market. One possibility would be to break up ČEZ into smaller units that would be able to compete with each other, each of which being small enough to not be a major threat to national security. In other words, the Czech Republic needs to do more to promote a competitive marketplace by getting the government out of the market.

Fifth, the Czech experience indicates that it is important for the government to take a long-term view toward coal production, especially in terms of supporting coal regions as coal production declines, such as by retraining programs for coal workers that may lose their jobs. Coal deposits in the Czech Republic will gradually decline over the next 30 years, and alternative sources of energy (or sources of energy efficiency) need to be found.

Annex 3.2. Hungary

1991 - 1992: Regulation

Transformation of mines, power plants and all sectoral state-owned companies from Socialist trusts into joint stock companies. Parallel, the first asset assessments were made. The process of mergers among the mining companies was launched in order to utilize synergies.

1993: Regulation

The Parliament approves the concept titled “The Hungarian Energy Policy”. It sets the main priorities for energy policy: increasing supply security and strengthening the diversification efforts regarding the fuel/import mix; improving the legal and economic background, setting the fundamentals for a market-conform and competitive sector, enforcing the principle of the lowest costs thorough the value chain; enhanced consideration of environmental, energy efficiency factors; increasing publicity and transparency of the decision making process.

1994 - 1995: Regulation, ownership

The codification of key sectoral acts, opening up the way for privatization. These include the first acts of this kind on mining, natural gas, electricity and finally on privatization (No. XXXIX/1995). The underlying rationale of this intensified codification was to promote Western investments into the sector and increase state revenues. The acts set the necessary benchmarks and definitions separating national, public and private spheres and responsibilities, establish the Hungarian Energy Office and limit the scope of potential state property in the sector (accordingly the majority

stake in the MVM has to be kept in state hands: this includes the Paks nuclear plant, the wholesaler and high-voltage transmission assets).

1995: Infrastructure

The first gas pipeline interconnection with the West (Austria). The HAG pipeline with its 4,5 bcm capacity is the third cross-border interconnection besides Ukraine and Serbia. The rationale was to diversify Hungary's gas imports. The Hungarian side concludes minor gas import contracts with Ruhrgas and GdF and purchases the "blue fuel" at a considerable price premium from the Western direction.

1995 - 1996: Ownership

Privatization of the electricity and gas sectors. The regional electricity and gas distribution companies (except the majority stake in the gas distributor of the capital city) and a number of power plants were sold for 185 billion HUF (around 3% of the GDP). The state-owned electricity company, MVM concludes long-term supply contracts with the privatized power plants. The buyers are Western companies (E.ON, GdF, RWE, EdF). The Paks nuclear plant, the electricity transmission network remains at the wholesaler, the state-owned MVM. The oil sector, including the domestic gas production and the whole gas value chain remains at MOL, privatized step-by-step primarily to domestic groups and actors.

1997: Regulation

The Hungarian Energy Office launches its tariff reform. It includes an 8% legally guaranteed, asset-based profit margin for sectoral investments (a measure practically implemented since 1995). By 1999 it abolishes the existing system of social tariffs in case of electricity prices.

2001: Regulation

The adoption of the new electricity act and the first steps in the market opening. Until then two regulated monopolies (in the electricity field MVM, in the case of natural gas MOL) controlled the wholesaler positions. The new codification liberalizes electricity imports and as a first step, it creates the free market for large consumers. It sets a renewables target for electricity generation for the first time (3,6%). The market liberalization starts in 2003 and by 2008 any consumer, including households may opt for free market purchases. Similar reforms were implemented in the gas sector with a couple of years delay.

2002: Regulation

The unbundling process starts in the electricity sector. The establishment of the electricity TSO (MAVIR) as a separated from the wholesaler (MVM) legal entity. MAVIR "returned" to MVM in 2008.

2004: Ownership

The closure of the last major coal mines in Hungary. Except the Visonta lignite plant only a smaller unit continues production in Western Hungary.

2006: Ownership

E.ON buys the gas wholesaler and gas storage company from MOL. The main asset of the company is the LTSC with Gazprom, covering the bulk of Hungarian imports and valid at least until 2015. In case of gas storage the capacity (above 5 bcm) goes well beyond the country's needs.

2006 - 2012: Infrastructure

The years of the "pipeline rivalry" between Nabucco-South Stream. In Hungary it evolves into a major political clash between the Socialist-liberal government and the then opposition conservative (until 2010) Fidesz. The Nabucco consortium lost against the TAP pipeline in 2012, while the South Stream has been suspended due to Western opposition in 2014.

2007 - 2008: Regulation

Renegotiation of the long-term (20-25 years) electricity supply contracts. The system hindered any meaningful market liberalization due to its broad and long-term nature. The government's mediation and interaction was needed to solve the issue.

2007 - 2011: Ownership

Takeover attempts over MOL. In 2007 Austrian ÖMV launched a hostile takeover attempt for MOL. It accumulated around 20% of MOL's shares from free-float and made a bid for the majority. The MOL management and the Hungarian government fenced off the Hungarian company by various legal and business instruments. In 2009 the ÖMV purchased its package to Russian Surgutneftegaz. The conflict was settled by a buy-back arrangement between the Orbán-cabinet and the Surgutneftegaz management in 2011.

2009: Regulation, Infrastructure

Hungary establishes its "strategic gas storage". Similarly to "strategic oil storage", the 1,2 bcm capacity shall be sufficient to provide a daily 20 mcm for 45 days. The reserve can be utilized in certain emergency situations. Costs are put into tariffs, ownership rights are similar to those in case of oil (until 2013, when state-owned MVM buys the company).

2010 - 2012: Regulation

Hungary finishes its unbundling process. In the case of natural gas the LTSC (E.ON) and the TSO (Fgsz, MOL) was unbundled on the ownership level. The unbundling certification process focused on separation of domestic production of MOL and the TSO/pipeline network. In the case of electricity network the ITO unbundling scheme was certified by the EC in 2012.

2010 - 2015: Infrastructure

Following the 2009 Russian-Ukrainian gas crisis Hungary, as many other regional countries, intensified its gas interconnectivity programme. Since then three new interconnections have been built. In 2010 the Hungarian-Romanian pipeline with 1,4 bcma was put into operation. In 2011 the gas interconnection between Hungary and Croatia was established. The 6,5 bcma pipeline will enhance imports from any future Croatian LNG facility. Until then it functions mainly from the Hungarian direction. In 2014 the Hungarian and Slovak networks were linked by a 5 bcma capacity pipeline.

Since 2010: Regulation, ownership

Major reassessment of tariff policies and renationalization. The incumbent Orbán-government introduces a price moratorium on natural gas and consciously decreases the profitability in the energy sector. These steps are accompanied by public statements on renationalization from senior government officials. In 2013 state-owned MVM purchases the gas wholesaler and storage companies from E.ON. By 2016 the bulk of Western companies sell their distribution assets to the cabinet due to heavy losses in their balances.

2012: Regulation, infrastructure

The Czech-Slovak-Hungarian electricity market coupling comes into operation. Both price levels and price volatility decrease, cross-border trade boosts substantially in the consecutive years in Hungary.

2012: Regulation

The new “National Energy Strategy until 2030” was approved by the government. It prioritizes decreasing external dependence and announces a green-coal-nuclear development path for the sector. It also emphasizes the need to increase the role of the state in the industry.

2013: Regulation

Major reshuffle of the Hungarian Energy Office. Several responsibilities were transferred to the Minister of National Development. Lawmakers change its status and name and broaden its scope of authority.

2013 - 2014: Regulation

The government announces and pursues its public utility price cut campaign. All utility costs reduced by at least 25% (primarily gas and electricity). The move becomes increasingly popular and boosts the support of Fidesz in the 2014 elections.

2014: Infrastructure

The Orbán-cabinet signs the Paks extension contract with Rosatom. The project envisages the construction of two new nuclear blocs (2*1200 MW) by 2025 and 2026

around 12,5 bln EUR value. The Russian government also provides a 10 bln EUR credit-line.

Annex 3.3. Poland

STATE PRICE DEREGULATION

-1998 The Minister of Finance/ The Ministry of Industry and Trade set energy prices

Until 1998 the regulation of electric energy prices followed two mechanisms: The Minister of Finance set consumer prices, guided by a realization of social purposes and an anti-inflation policy. The Ministry of Industry and Trade established the prices for the energy wholesale trade. PSE S.A. (Polish Power Grids Company) bought the energy from the power stations at the prices defined by the Ministry.

Because of the subordination of the pricing policy to social policy there was constant financial deficit in the energy sector. As a result, enterprises of better financial standing had to bear the burden of the weak financial position of the entire sector. Instead of being rewarded, they were punished. This did not contribute to an increase in economic effectiveness. In this way, the suppression of rises in price for social reasons led to ineffective regulations in the energy sector.

1998 - Tariff system introduced

Since 1998, according to the Energy Law Act, energy suppliers are required to submit their tariffs on electricity to the President of the Energy Regulatory Office for his approval. Tariffs should cover the justified operational costs of energy undertakings, ensure a return on capital employed, and include a transmission and distribution service component. Furthermore, they can include expenses incurred by the energy companies for the integration of renewable sources into energy production and the promotion of energy efficiency among consumers. Tariffs should be so calculated as to protect consumers from unjustified price levels.

The Chairman of ERO approves the tariffs submitted or rejects a tariff if it is inconsistent with the principles and provisions. In view of tariff regulations, Polish solutions provide for an ex-ante regulation that – in comparison with the ex-post type of regulation – allow for providing more effective control.

2001 - Relief from the duty to approve a tariff issued on electricity generation and electricity trading companies

The URE President is authorized to free an energy enterprise from the obligation to submit tariffs for approval, if he states that the energy enterprise operates in competitive conditions. In June 2001 President of ERO relief from the duty to approve a tariff issued on electricity generation and electricity trading companies.

2008 - Electricity prices for industry are no longer regulated

The obligation concerns only tariffs for households, since as of 1 January 2008 electricity prices for industry are no longer regulated.

Apart from the fact that electricity prices were regulated in some segments of the electricity market in Poland, most of the components of unit electricity price in Poland has been shaped by the State (regardless of the existence of price regulation). In order to determine the degree to which the electricity price was determined by the policy of the State, it is worth making the decomposition of the cost of electricity consumed in Poland. Its level was influenced by the following elements:

- price of purchased Energy,
- cost of property rights from renewable sources (green certificates),
- cost of property rights from cogeneration units (red certificates),
- cost of property rights from gas cogeneration units (yellow certificates)
- the cost of the property rights from generation of methane (purple certificates),
- balancing and transaction costs and margin
- Excise duty on electricity

UNBUNDLING OF ENERGY COMPANIES

1989 - “The Community of Power Industry and Lignite Coal” was the only one vertically integrated undertaking

Before the liberalization began, the energy sector was not divided into the three segments of generation, transmission and distribution. There was only one vertically integrated power institution named “Wspólnota Energetyki i Węgla Brunatnego” (The Community of Power Industry and Lignite Coal) controlling the entire electricity chain from generation to supply. As a result, competition was absent and national markets segmented.

The Community supervised five territorially distinguished districts and covered power stations and combined heat-and-power plants. These districts were operated as state enterprises, whereas the power stations and combined heat-and-power plants worked on the principles of internal economic accounting. The Community conducted activities according to five-year and annual plans, which contained tasks connected with energy and thermal production, extracting and processing the lignite coal, the

expansion of the power stations, the combined heat-and-power plants and the power grid. The plans were approved by the Ministry of Industry.

1990 - Dissolving the energy districts and Community of Power Industry and Lignite Coal, Polish Power Grids Company was established

Reforms in the Polish energy sector began with organizational changes instituted in 1990. The main goal of the energy sector transformation were the introduction of competition and the improvement of efficiencies of electricity companies. These purposes were to be achieved by the division of the energy sector. In 1989 the power industry districts were liquidated. The electricity and coal-mining industries were officially separated. Generation, transmission and distribution of electricity became separate segments as well and all power and CHP stations gained fully autonomy. In 1990 Polskie Sieci Energetyczne S.A. (Polish Power Grids Company) was established as a joint-stock company wholly held by the Treasury in 1990 responsible as monopoly for transmit system. Since that time PSE has been monopsony buyer of almost all electricity produced and a monopoly seller to all distribution companies. As a result of dissolving The Community of Power Industry and Lignite Coal there were:

- 1) Generation: 19 power stations and 60 heat-and-power plant were established as separated companies.
- 2) Distribution: 33 Zakłady Energetyczne - national distribution companies,
- 3) Transmission: one transmission company - Polskie Sieci Energetyczne S.A.

1993 - PSE in 1993 took control over high voltage grid

In order to realize a given function, PSE in 1993 took control over high voltage grid (750, 400 i 220 kV) and dispatch system from national distribution companies.

1997 - Energy Law Act adopted

The regulatory framework for the Polish energy sector was defined in the Energy Law Act, adopted on 10 April 1997 (Prawo energetyczne 1997). The Energy Law changed the structure of the energy market. To achieve objective accounting, organizational and legal unbundling, new undertakings dealing exclusively in electricity trade entered the market.

2004 - TSO established in electricity and gas sector

The State Treasury separated the existing transmission assets previously owned by vertically integrated undertakings (such separation being effected in the course of either transfer of assets or division of companies controlled by the State Treasury) and established two sole-shareholder companies controlled by the State Treasury: PSE SA, which is appointed as a transmission system operator for electricity and OGP

Gaz-System SA, which is appointed as transmission system operator for natural gas. OGP Gaz-System SA is also appointed as independent transmission system operator with respect to the 'Yamal' pipeline owned by the vertically integrated company named 'EuRoPol GAZ SA' – a joint venture company of the Polish company PGNiG and Russian company GAZPROM.

PSE– Operator was established in 2004 by its parent company PSE SA (currently part of Polska Grupa Energetyczna – PGE) as transmission transit operator in electricity sector. Until 2007. PSE Operator was a part of the PSE Group (now: Polska Grupa Energetyczna). In gas sector there was unbundling of transmission networks from PGNiG structures and PGNiG – Przesył Sp. z o.o. (April, 2004) was established, then converted to Gas Transmission Operator Gaz-System S.A. (June, 2005). Gaz-System has been legally unbundled since 1 July 2005.

The foregoing transmission system operators are responsible for development of the respective transmission networks within the territory of Poland as well as expansion of trans border interconnectors. OGP Gaz-System also established its wholly-owned subsidiary named 'Polskie LNG Sp. z o.o.' responsible for development of the LNG regasification facility in Świnoujście.

2005 - Amendment to the Energy Law (unbundling required)

In 2004 Poland joined the EU and had to comply with its regulations. In January 2005 the Polish government passed an amendment to the Energy Law implementing the EU's Directives into the national legislation and paving the way for a competitive market. It included the transposition of the regulations of the "Electrical" Directive 2003/54/WE concerning common rules for the internal market in electricity.

The Energy Law stated that the transmission system operator, the distribution system operator and the interconnected system operator which is part of a structure of vertically integrated undertaking should remain independent with respect to their legal and organizational form and decision-making capabilities from other activities not related to transmission or distribution of electricity. The transmission system operator and distribution system operator are appointed by administrative decision made by the URE President on the proposal of the owner of the transmission or distribution network.

2007 - Separation of TSO

In 2007 PSE Operator was separated from the PSE S.A. group (In 2013 PSE-Operator renamed back to PSE SA.). The company acts currently as energy enterprise dealing with the transmission of electricity, responsible for grid operation in electricity transmission system, the ongoing long term operational security of that system, the use, the maintenance and repair and the necessary expansion of transmission grid, including its connections to other electricity systems.

2007 - Separation of DSOs

The situation in the distribution segment of the Polish energy sector is more complicated than in transmission. After consolidation, out of 33 distribution companies operating in 1990, in 2004 only 14 remained on the market. Distribution companies are dominant in their respective geographic regions. New traders occasionally enter the market but they are generally linked to one of the main generators. According to Polish officials, DSOs have been functionally and legally unbundled. In reality, most DSOs are part of distribution supply companies (which have no production/generation capacity, though most of them are linked to major electricity generating companies).

Electricity and gas distribution systems are generally operated by separate companies belonging to vertically integrated undertakings, the most significant of them being local incumbents (ENEA in northwest Poland, ENERGA in northern Poland, TAURON in southern Poland, PGE in central and eastern Poland). Depending on the specific situation, distribution system operators (DSOs) are appointed with respect to either certain geographic areas (especially operators belonging to incumbent vertically integrated undertakings) or specific installations (e.g., operators of local distribution grid developed within industrial zones, office complexes, etc.). Nevertheless, Polish law does not provide for exclusive rights of DSOs to provide distribution services in a particular geographic area, such right to provide distribution services being limited to installations operated by given DSOs.

2013 - Amendment to the Energy law act (EU third energy package)

The energy law in Poland has been subject to a series of changes, which, in 2013, resulted in the introduction of a package of amendments to the Energy Law Act, under the name of “the Little Energy Three-Pack”. The legislature introduced the amendments under the pressure of the threat of penalties pursuant to the allegations put forward in the complaint lodged by the European Commission. The legislative changes mainly pertained to the allegations submitted by the European Union (third energy package).

PRIVATIZATION OF ENERGY COMPANIES

Until the end of the 1980s the organization of Polish power industry was based on public property, central planning and vertical and horizontal integration. The level of internal integration was so high that nobody tried to introduce legal or economic unbundling. The power sector was identified with the infrastructure of the economy.

1990 - 1997 - Commercialization

The process of reconstructing the energy sector started at the turn of the **1980s and 1990s**. A commercialization was the first stage. The state reduced its control of the energy sector in order to concentrate on activities directed at raising effectiveness and profitability. This policy was accompanied by a corporatization relying on establishing economically and legally separated enterprises, still owned by the state. Nearly all state companies transformed into joint-stock company (wholly held by the Treasury) after 1990.

1996 – 2000: PGNiG's organizational restructuring

Gas monopoly PGNiG was transformed into a company wholly owned by the Treasury, and technical facilities were unbundled and partially privatized. In the years 1999-2000, PGNiG carried out an internal restructuring process, the so-called small restructuring that distinguished three types of activities: exploration and production, transport and storage, distribution.

1997 – 2005: Privatization in electricity generation

Privatization plans for the electricity market started as early as 1997. The first privatized combined heat and power plants was **CHP Kraków** in 1997 (EDF). The next transaction was:

- Power plant Pątnów-Adamów-Konin in 1999 (Elektrim)
- Distribution company - Górnośląski Zakład Elektroenergetyczny in 2000 (Vattenfall),
- Power plant Połaniec in 2000 (Electrabel),
- CHP Wybrzeże in 2000 (EDF)
- CHP Warsaw in 2000 (Vattenfall)
- Power plant Rybnik in 2001 (EDF)
- Stoen in 2002 (RWE).
- Power plant Skawina in 2002 (PSEG, later CEZ)
- CHP Poznań in 2004 (Dalkia)

Many other privatization of power plant was planned but didn't realized. Previously there was a plan in 1999 to privatize a distribution companies but the government withdraw it.

2006 - Consolidation process - four new energy giants were established

"Program for the Polish energy sector" was adopted in **2006** by the Council of Ministers. On its basis, electricity distribution companies with network assets were

grouped together with generators. As a result, **four new energy giants were established**. At present, the largest companies in the energy sector include:

Grupa Kapitałowa (GK) PGE – the company manages among others over 40 power stations and heat and power plants, 8 operators of distribution grids, 7 retailers and 3 lignite mines; in 2011 it produced 56,5 TWh of electricity (approx. 40% of the domestic production) and had installed capacity of 13,1 GW;

GK Tauron – installed capacity of the group's coal-fired plant is 5300 MW; the group has 35 hydro plants (132 MW) and two wind farms (61 MW); in 2011 it produced 21,4 TWh of electricity, i.e. 14% of domestic production, and also 16% of thermal energy in Poland;

GK Enea – operator of the coal-fired plant in Koźienice (2,9 GW) and distributor of energy in western Poland; the total installed capacity of the group is 3,1 GW; in 2011 the group produced 12,3 TWh and sold 15,5 TWh of energy to 2,4 million buyers;

GK Energa – operator of 47 hydro plants and of the coal-fired plant in Ostrołęka; in 2011 the group produced 4,7 TWh of energy, distributed 19,6 TWh to 2,9 million buyers and sold 19,3 TWh of energy

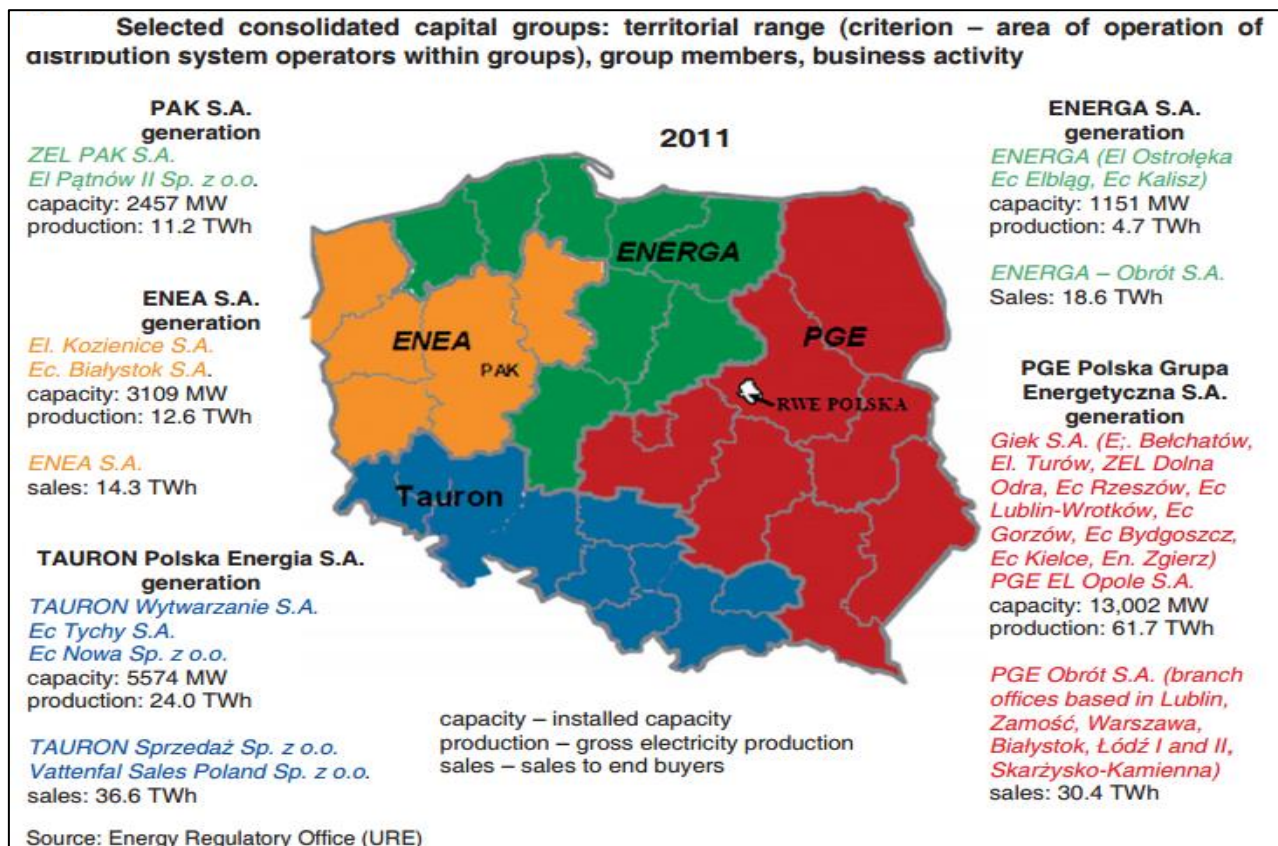
ZE PAK – second biggest producer of energy from lignite; has installed capacity of 2900 MW; in 2010 the group produced 12% of Poland's energy and sold 7,9 TWh of electricity;

EDF – operator of among others the power plant in Rybnik; energy distributor; the group has installed capacity of 3500 MW and produces 10% of Poland's electricity and 15% of network heat; the group was formed thanks to a French investor which entered the Polish market in 1997. **2009** - Polish Office of Competition and Consumer Protection didn't allow sell Energa to PGE.

2011 - Vattenfall sold Elektrociepłownie Warszawskie (PGNiG) and Górnośląski Zakład Energetyczny (Tauron) - Since then RWE is the only foreign owner of energy company

According to the Central Statistical Office (GUS), in 2010 in Poland there were 451 entities with at least 10% foreign shareholding active in the sector of generation and supply of electricity, gas, water vapour and hot water. According to the National Bank of Poland (NBP), total income from investments of this type of entities in Poland in 2011 was USD 678,8 million. French, German and Swedish companies are the most frequent investors in the energy sector in Poland. The biggest foreign investors in the energy generation and distribution sector in Poland are: the French groups – EDF (production of 10% of electricity and 15% of district heating in Poland), GDF SUEZ (controls the fourth biggest Polish power plant in Połaniec) and Dalkia (has among others installed capacity to supply 4290 MW of heat and 820 MW of electricity). Other active entities include: the Czech group ČEZ, which since 2006 is among others the

operator of two coal-fired power plants, the Finnish company Fortum – active both in conventional and renewable energy, the German company E.ON, and the Spanish company Iberdrola specializing in wind Energy.



Foreign investors have still very limited role in the Polish energy sector which still is dominated by its former monopolists - four conglomerates controlling the entire electricity distribution chain from generation to supply. After discussion on the best energy model for Poland in 1990s it is obviously that followers of UK approach that encompasses ownership unbundling, less market concentration, less public ownership and more private capital in the industry - lost. The continental model was introduced: more concentration and vertical integration and more State or public ownership in the energy field (for instance, the French model).

The situation of the gas sector is similar. Polskie Górnictwo Naftowe i Gazownictwo S.A. (PGNiG SA), established in 1976 as a fully vertically integrated State owned monopoly responsible for the entire gas distribution chain, continues to be the largest, as well as the only Polish, company operating in oil and gas exploration, production, processing, storage, and trade.

2014 - PGNiG Obrót Detaliczny Sp. z o.o was established

In 2014 a new company PGNiG Obrót Detaliczny Sp. z o.o. was separated from PGNiG S.A. capital group. The company serves the end-users who consume natural gas less than 0,025 bcma (6,5 million consumers). The restructuring of PGNiG S.A. resulted in a growth of gas volumes which are subject to gas exchange obligation, as a new

undertaking buys nearly all gas via POLPX. In effect In 2014 one could note the speeding up of the gas market liberalization process. The number of entities holding a license for gas trading (OPG) and for foreign trade in natural gas (OGZ) was growing systematically. At the beginning of November 2014 there were 139 entities holding a OPG license and 47 entities with a license for foreign trade in natural gas. Since the beginning of 2014 the President of ERO granted 22 OPG licenses and 14 OGZ licenses. The growing interest in obtaining these types of licenses as well as growing number of tariffs approved by the regulator in this area give evidence of positive effects of natural gas market liberalization in Poland.

TRANSITION TO INDEPENDENT REGULATOR

Until the mid 1990s, regulation was a foreign concept for Polish organizational and legal theory and practice. Polish policy-makers saw regulation as an unwanted development, considering independent regulators to be a threat to their authority. What was needed was indeed a fundamental overhaul of the governance structure of the sector and separating the different roles that the government was until then playing in the energy industry: policy maker, owner, regulator. The most important part of the whole concept was to establish a separate, independent energy regulatory agency.

1997 - ERO established

In 1997, in order to implement and supervise the liberalization process of the energy market, the regulatory authority represented by the President of the Energy Regulatory Office was established. The regulatory authority was created with the aim of supporting uniformity of solutions in the field of energy regulation, adoption of the relevant EU standards and thus facilitating appropriate structural and system transformations in energy undertakings.

The competences of URE changed considerably with Poland's accession to the EU. Presently, it holds the position of a central authority of public administration. The Prime Minister can dismiss the URE President in one of the listed cases: continued inability to perform his/her duties due to severe illness; grave violation of duty or criminal conviction. He has full authority in organizational and personal matters with respect to URE's local branches and separate (outside the budget) system of employees remuneration.

At first sight, it might seem that the law provides the regulator with sufficient independence from the government. However, the dismissal grounds are rather vague. With this change, the government acquired almost unlimited power to shape the structure of the regulatory system. In practice, the autonomy of the regulator is therefore rather limited while political influence is significant. As a result, the regulator is often under political pressure to act in favour of the incumbents (owned

by the Treasury) or in favour of political considerations, rather than in favour of the market, for example, by approving inappropriate supply tariffs for gas or electricity (prices charged to end users).

OPENING ENERGY MARKETS

1995 - In October 1995 Poland was successfully connected to the UCPT system

1997 - Adoption of the Energy Law act

The construction of a liberal energy market began in **1997**, with the adoption of the Energy Law. The Energy Law provides conditions for the gradual implementation of a market mechanism. The Energy Law as well as regulations issued on its basis include instruments of promoting competitiveness and of protection against monopoly abuse. One is the principle of the equal treatment of entrepreneurs active in the energy market. All entrepreneurs act according to the same rules and conditions of pursuing business activities. Any kind of privilege relating to the status or condition of working was outlawed.

2000 - The Polish Power Exchange started

Trading in electricity and natural gas at the Polish Power Exchange is regulated by the 2000 Act on Commodity Exchange as well as internal by-laws developed by the operator of the commodity exchange and subject to prior approval of the Polish Financial Supervisory Commission. The remaining OTC electricity and gas sale agreements are regulated by the 1997 Energy Law and secondary legislation issued thereupon as well as grid codes which are binding on market participants upon their approval by the President of the Energy Regulatory Office.

The new Company was registered and began its operation on December 7th, 1999. The Polish Power Exchange (Giełda Energii S.A., later renamed to Towarowa Giełda Energii S.A. - (POLPX)) was established to cope with the arising challenges and to become a necessary element of the liberalizing Polish energy market. Within six months from launch of the Company, the electrical power spot market was in place and running. Prices from this market became a benchmark for bilateral contracts.

2001 - The daily/hourly balancing market started to operate

In September 2001 another segment of the electricity market – the daily/hourly balancing market started to operate. On this market the transmission system operator, in hourly cycles, obtains a balance of production and demand, taking into account contracts and transactions concluded earlier by market participants in other segments and submitted balancing offers with 24 hours advance notice. The establishment of the daily/hourly balancing market, and simultaneously a gradual

limiting of the sales of energy within long-term contracts, had a positive impact on the development of different forms of energy trading

2005 - Exchange was appointed to establish and manage a register of certificates of origin for the electrical power generated from renewable sources

In 2005 the Exchange was appointed to establish and manage a register of certificates of origin for the electrical power generated from renewable sources. In 2007, the license was extended to power produced in co-generation. Those registers are the hearts of support systems for power generators in those sources. In parallel to the Registers, a Property Rights Market was also established, providing producers of renewable and co-generation energy and entities obliged to acquire certificates of origin with a platform for trading rights to such certificates.

2006 - POLPX has launched a spot market for CO₂ emission certificates

In 2006, POLPX has launched a spot market for CO₂ emission certificates in collaboration with the National Administrator of the Emission Allowance Certificates Trading System. Participants of this market can trade EUA units (European Union Allowance).

2007 - TPA principle was introduced in energy market in Poland

In July 2007, the TPA principle was introduced in energy market in Poland. According to predictions, liberalization of electricity market results in a systematic increase in the number of customers who used the TPA and changed their suppliers. From that time every household is theoretically free to choose from which producer or supplier it wishes to purchase its Energy.

After many years of relatively small interest of switching electricity supplier, since 2009 we are seeing a considerable increase in the amount of customers, who used the TPA and changed energy suppliers. This trend can be observed both for recipients of tariff group G (household) as well as tariff groups A, B, C (which are not households).

2007 - A new law on the recovery of stranded costs due to the cancellation of LTCs

Opening energy market was blocked by long term contracts (LTC) signed 1994-98 between power station and PSE. It were used as a collateral in external financing of necessary investments. In 2011 60% of energy sold was related to LTC.

Poland has repeatedly tried to eliminate LTCs between electricity generators and PSE (acting as a single buyer). A new law on the recovery of stranded costs due to the cancellation of LTCs entered into force in August 2007. A maximum of € 3,3 billion in compensation is offered to State owned and private electricity generators as an incentive for a voluntary cancellation of LTCs. If power producers do not take advantage of this voluntary scheme, they leave themselves open to sanctions by the

Commission, which believes that LTCs distort competition. Compensation payments started in the second quarter of 2008 – all 13 State owned generators as well as several privately owned generators, such as Elcho (owned by CEZ), Zielona Góra and Kraków (owned by EDF), Połaniec (owned by Electrabel) and Nowa Sarzyna (owned by Ashmore Energy, formerly Enron), are expected to cancel their LTCs.

The cancellation of LTCs is legally and practically logical and justifiable. They have a negative influence on competition and market liquidity creating entry barriers and distorting the prices of final energy products. The mechanism is straightforward – compensation is being paid in quarterly, pre-payments spread over a period of several years. The payments are handled by a special body, the Manager of Accounts (Zarządca Rozliczeń), owned by the TSO PSE-Operator. The costs of the compensation were borne by end users. A transitional fee will be added to their electricity bills replacing the current equalization fee. Compensation will be calculated based on the difference between revenues raised from the sale of the amount of electricity produced at market prices and estimated stranded costs.

Although the cancellation of LTCs does not raise major legal issues, it has some negative economic consequences. Long-term contracts provide a financial guarantee for electricity generators seeking to invest in infrastructure to finance the modernization of aging plants and the construction of new capacity. Additionally, LTCs serve as a guarantee for private investors seeking to invest in the energy sector. Assuming that there is a need for new nuclear generation capacity, or capacity based on renewable resources, the return on investment in the energy sector is very long. Finding potential investors is therefore difficult, especially since the necessary input would have to be substantial. Receiving a guarantee in the form of a LTC for the supply of electricity would help secure investment and sustain its rating. Because around 60% of Polish infrastructure needs immediate upgrading, that extra security is important. Unfortunately, legal and business considerations are not always in sync – a lot depends here on the will of the banks to grant credits without the guarantee of a LTC.

2008 - POLPX has launched an Electrical Power Derivatives Market

In 2008, POLPX has launched an Electrical Power Derivatives Market. Futures covering supply of electrical energy allow setting the electrical power prices over a longer time horizon, which allows sellers and large energy consumers to forecast prices and optimize their costs of selling/buying electrical power. In 2009, TGE has launched the Financial Derivatives Market, quoting future contracts for the IRDN24 index.

2010 - Amendments to energy law act - obligation to selling energy on energy exchange

In principle, electricity and natural gas may be traded either via commodity exchange or in the OTC contracts. However, Amendments in 2010 to the Energy Law provide that:

- a) every electricity producer is obliged to sell at least 15 per cent of its annual production via the commodity exchange and/or other organized trading platforms operated by the company operating the regulated stock exchange;
- b) furthermore, the electricity producers entitled to compensation for the stranded costs are obliged to sell their outstanding production (i.e., not subject to the abovementioned 15 per cent commodity exchange obligation) via the commodity exchange and/or other organized trading platforms operated by the company operating the regulated stock exchange and/or in public auction;
- c) the above-mentioned obligations related to public sale of electricity do not apply to certain types of electricity (inter alia, electricity delivered via direct lines, electricity generated in installations with total installed capacity not exceeding 50MW and/or renewable energy sources and/or certain CHP installations, as well as electricity used for the producer's own purposes or for statutory tasks allocated to system operators);
- d) the entrepreneur trading in natural gas is obliged to sell via the commodity exchange and/or other organised trading platforms operated by the company operating the regulated stock exchange at least 55 per cent (in 2014 – 40 per cent) of natural gas introduced into Polish gas transmission system, it being specified that the foregoing obligation does not apply to certain quantities of natural gas (inter alia, compulsory stocks, natural gas exported from Poland and/or used for own purposes of the gas trader and/or used for statutory tasks allocated to system operators).

2012 - Gas spot market was launched

In December 2012 POLPX has admitted forward contracts to trading on the Commodity Forward Instruments Market with physical delivery. The contracts are settled by way of a physical delivery of Group E high-methane natural gas and are hereinafter referred to as "gas forward contracts". The launch of the Commodity Forward Instruments Market with physical delivery (gas) is only the beginning for the gas exchange in Poland. On 31 December 2012 the gas spot market was launched.

At present, TGE is controlled by Giełda Papierów Wartościowych w Warszawie SA (the Warsaw Stock Exchange) and it operates the commodity exchange named 'Polish Power Exchange' allowing for:

(1) trading in electricity within the Polish national electricity system as well as in trans-border exchanges (market coupling) with the Swedish electricity system (the latter effected via the SWE-POL link developed on the seabed of the Baltic Sea);

(2) trading in emission allowances as well as certificates issued under the incentive schemes addressed to RES and CHP installations as well as energy-efficiency investments;

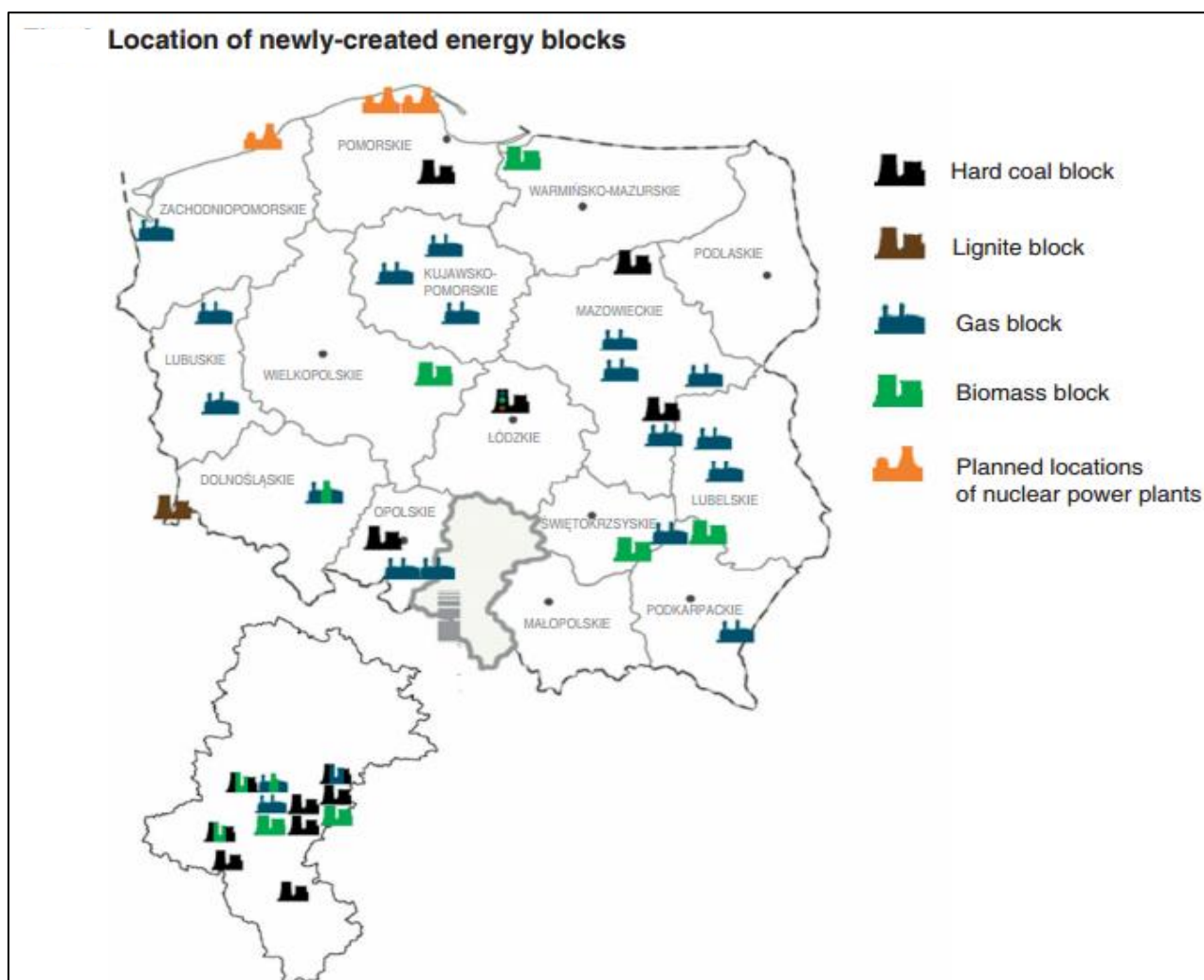
(3) trading in natural gas;

(4) entering into derivatives contracts based on commodities traded at Polish Power Exchange. TGE also renders a system designed for public auctions of power. Transactions executed at the Polish Power Exchange are cleared and settled by Izba Rozliczeniowa Giełd Towarowych SA (the Warsaw Commodity Clearing House). According to the respective grid codes, the transactions concluded within the Polish Power Exchange have priority when it comes to their physical performance via transmission system.

Apart from the Polish Power Exchange, there is one more organized system for trading in electricity in Poland named 'Platforma Obrotu Energią Elektryczną' (the Electricity Trading Platform) which is currently directly operated by the Warsaw Stock Exchange. The foregoing platform should be gradually unified with the Polish Power Exchange.

ENERGY INFRASTRUCTURE DEVELOPMENT

In the near future the Polish energy sector will require substantial investments. Development opportunities for the sector result from dynamic growth of Polish economy, which despite the crisis grows fast. Also, it is a natural consequence of aging of the existing power plants and industrial installations. Modernisation is also motivated by EU requirements, especially as regards lowering dust, nitrogen oxide and carbon dioxide emissions. The fact that emission requirements will have to be met might result in a necessary retirement of many power blocks (fired on coal and thus producing high emissions) when stringent emission standards become effective. The sector will require significant investments, as confirmed among others by the average age of existing power plants. Almost 40% of power blocks are over 40 years old and 15% of them are over 50 years old and qualify for immediate retirement. Over 70% of blocks are more than 30 years old. Only within the next few years necessary investments will include the replacement of units of few thousand megawatts of capacity. Total funds necessary for modernizing the Polish energy sector (investments in power blocks and transmission grid) are estimated at PLN 150–200 billion in the next 15 years. Power plant owners cannot afford to finance such extensive investments from own equity, so it will be necessary to find financing from external sources. Nevertheless, modernization is already in progress.



The biggest investments in power generation in Poland

Power plant / heat and power plant	Investor	Power	Fuel	Stand of performance
Power plant Turów	PGE	430 - 450 MW	Lignite	2016-2019
Power plant Opole	PGE	2 x 900 MW	Hard coal	2014- 2017/18
Power plant Jaworzno	Tauron	910 MW	Hard coal	2014-2019
Heat and power plant Tychy	Tauron	50 MW	Hard coal	is planned
Power plant Kozienice	Enea	900 - 1000 MW	Hard coal	2012-2017
Power plant Ostrołęka	Energa	1 000 MW	Hard coal	is planned
Power plant Rybnik	EDF	900 MW	Hard coal (with biomass combustion)	Is planned

Power plant / heat and power plant	Investor	Power	Fuel	Stand of performance
Power plant Północ	Jacek Strzelecki - 50,01 %, Radwan Investments GmbH - 10 %, Kulczyk Holding - 39,99 %	2x1000 MW	Hard coal	Is planned
Heat and power plant Włocławek	PKN Orlen	463 MWe	Gas	2013 - 2016
Power plant Grudziądz	Energa	420 - 600 MWe	Gas	Is planned
Heat and power plant Żerań	PGNiG Termika	450 MW _e i 300 MW _t	Gas	Is planned
Heat and power plant Stalowa Wola	Tauron i PGNiG	450 MW _e i 240 MW _t	Gas	2014-2018
Power plant Puławy	ZA Puławy i PGE Górnictwo i Energetyka	400 MW _e	Gas	Is planned
Heat and power plant Płock	PKN Orlen	596 MWe	Gas	2015-2018
Power plant Łagisza	PGNiG i Tauron	413 MW	Gas	Is planned
Nuclear power station	PGE	2 x 3000 MW	Nuclear	Is planned

Crucial investments in gas sector:

1993 - Agreement Poland and Russian Federation on construction of a transit gas pipeline system for transportation of Russian natural gas through the territory of the Republic of Poland and on deliveries of Russian gas to the Republic of Poland.

1999 - construction of a transit gas pipeline system finished

2011 - an interconnector with the Czech Republic was implemented in the Cieszyn area and an interconnector with Germany in Lasów was developed. These

investments, and the ability to supply gas under the so-called virtual reverse gas flow on the Polish section of the Yamal pipeline since November 2011, translate into greater Poland's energy security. By implementing these solutions in 2011, greater technical possibilities appear to import gas to the country from new directions, which are alternatives to the eastern source, by 3,3 bcm, which totals approx. 30% of realized natural gas imports to the Polish market.

2016 - The completion of this project of LNG terminal in Świnoujście

2018/2019 - New interconnectors finished

There are plan to build interconnector with Czech Republic, Slovakia (project of "North-south corridor"), Lithuania, Ukraine and Norway (via Denmark).

PROMOTION OF RENEWABLE ENERGY

2010 - National Action Plan With Regard to RES, adopted by the Government

In accordance with the objectives of the European Union as defined in the Directive of the European Parliament and Council Directive 2009/28/EC of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, by 2020 Poland should reach a 15% share of electricity generated from RES in the gross electricity consumption. This target has been confirmed in the National Action Plan with regard to RES, which is meant to encourage investment in RES.

2011 - Act on Energy Efficiency

The main incentive scheme relating to energy efficiency and conservation is based on tradable white certificates, which are granted to investors that completed investments related to energy efficiency, such investments selected within tenders organized by the President of the Energy Regulatory Office. According to the 2011 Act on Energy Efficiency, certain market players (including electricity suppliers and major end-users) are obliged to acquire and redeem white certificates corresponding to a certain percentage of electricity sold to end-users or pay a substituting fee (such fee working in practice as maximum level of support available to beneficiaries). The foregoing scheme is effectively designed for the period 2012–2015 (while some of obligations should be performed by 31 March 2016). Apart from the foregoing incentive scheme, there are preferential financing schemes offered by governmental funds and banks (e.g., the National Fund for Environmental Protection and Water Management) addressed to energy-efficiency investments.

2012 - Regulation of the Minister of Economy regarded to the system of certificates of origin

The system of certificates of origin (so-called green certificates) is specifically defined in the Regulation of the Minister of Economy of 18 October 2012 on the detailed scope of obligations to obtain and present for redemption certificates of origin, the substitute fee, purchase of electricity and heat from renewable energy sources and the obligation to confirm the data on the amount of electricity generated from a renewable energy source.

In the EU Member States were used various tools (measures) supporting renewable energy and energy efficiency policies (production of electricity from cogeneration - CHP). A popular support system commonly used in the EU were certificates and negotiable certificates of origin. They were used, among others, by Poland. It consists in the fact that the electricity generated from renewable sources or cogeneration units is certified, and electricity companies are obliged to purchase and redemption of certificates of origin for this electricity. Thus, generation companies receive revenue from the sale of these negotiable certificates of origin for electricity. Due to the fact that there are such support systems, the cost of their implementation were shifted onto final consumers in their electricity bills. For this reason, despite the fact that the State in some countries does not directly fix the electricity prices (does not regulate them), the State indirectly shaped the level of electricity bills paid by final customers.

The State aiming to achieve the objectives from the climate package 3x20% and a willingness to increase the share of renewables in total energy consumption and the energy produced in cogeneration, it have introduced a number of obligations on energy companies, which increased the electricity price paid by households. These duties (except the need for paying excise duty and VAT) are:

- a duty to obtain and submit for cancellation by the President of the ERO certificates of origin for electricity produced from renewable energy sources (green certificates) or to pay a replacement fee. This obligation was determined as a percentage share of such energy in total executed annual electricity sales;
- a duty to obtain and submit for cancellation by the President of the ERO certificates of origin for electricity produced in cogeneration units (so-called yellow, red and purple certificates) or to pay a replacement fee. In this area were introduced obligations for energy produced in coal-" red cogeneration (CHP1), gas (CHP2) and from mine gas or biogas (CHP3).

RES operators currently benefit from a number of incentives, including :

- (1) an incentive scheme based on an obligation imposed on certain market players (mainly electricity suppliers and major end-users) to acquire and redeem green

certificates corresponding to a pre-defined percentage of electricity sold to end-customers or pay a substituting fee (such fee working in practice as maximum level of support available to beneficiaries);

(2) exemption from excise tax;

(3) reduction of interconnection fees payable by certain RES energy producers; as well as

(4) preferential financing, etc. In general, the current incentive system does not differentiate in the level of support depending on the RES technology applied (biomass, wind, photovoltaic, etc.) or generation capacity of a given RES installation. It does not provide RES operators with stable support as the level of support depends on the global amount of RES energy supplied to the market in a given period (thus if the overall production of RES energy is higher than the general aim set forth in the law, the level of support is lower). Therefore, it is envisaged that the current incentive scheme based on tradable green certificates will be soon replaced by auctions (type of feed-in tariffs where the price is determined in the auction) which are to limit overall budget allocated for the support system.

2015 - New Law on Renewable Energy Sources ("RES Law") was introduced

In March 2015 a new Law on Renewable Energy Sources ("RES Law") was introduced into the Polish legal system. From that moment it constitutes the basic regulation on renewable energy sources and comprehensively sets out the legal framework for doing business in this sector. However, it is worthwhile noting that the entry into force of the RES Law is spread in time and its full applicability will only be possible from 1 January 2016. In particular, the provisions of Chapter 4 of the containing regulations concerning the auction system, the feed-in tariffs, as well as certificates of origin, all enter into force starting from 2016.

According to the last available EUROSTAT data for Poland the share of renewable sources in total energy consumption has been constantly increasing over the last years reaching 11,3% in 2013. However, according to the Central Statistical Office and the Ministry of Economy it amount to 11,9%. It is worth mentioning that Poland is ranked 5th in the EU in terms of production of primary energy from solid biomass. Poland is also leading among new EU member states in terms of total installed wind power capacity.

Renewable energy installations (electricity)

Type of installation	Quantity	Power (MW)
Biogas power-stations	267	198
Biomass power-stations	36	1033
Photovoltaic power-stations	225	51
Wind power-stations	1003	4254
Hydro-electric power-stations	754	982
Co-fired technology	44	n/a

Source: Energy Regulatory Office (as of December 2015)

LESSONS LEARNED

It is doubtful whether the consolidation of the energy sector under State auspices is the correct choice. In Poland, consolidation through administrative methods is a political, rather than a market-oriented, solution. It goes against the Commission's ambitions to liberalize the continent's energy markets, to offer consumers more choice and to lower gas and electricity bills. Whenever politicians intervene in the mechanism of the free market, they jeopardize its overall long-term economic outcome. That has certainly been the case in Poland. The Polish Government might not have enough human and financial resources to equally equip all four of its new energy giants in order to create potentially competitive players on the EU market. A general scarcity of capital and resources in different branches of the national economy might also negatively affect the energy sectors. In addition, domestic consolidation by administrative means might bring about either of two possible outcomes. It may have a positive impact on the conglomerates, or at least on some of their parts, by strengthening poorly performing companies within the group. In other words, their well performing elements might act as leverage for their weak elements. However, the opposite might be true instead whereby the poorly performing companies might slow down the development of the strong ones, thus lowering the value and competitiveness of the group overall. This would, in turn, lower the overall competitiveness of the group in the context of the internal market.

Consolidation might indeed lead to greater cost savings or lower energy prices for consumers but only under the assumption that the group would become more efficient thanks to internal restructuring and better transparency. In this regard, privatization is the best route: consolidation makes sense only when accompanied by

a sell of parts of the energy companies. At least partial privatization would generate the capital and achieve the internal corporate resilience necessary to compete on EU markets.

One has to wonder therefore whether it would be possible to somehow apply a conjunction of the two different models - liberal and state-controlled? The answer is, to some extent, yes. Consolidation through administrative means, as conducted in Poland, goes against the Commission's spirit of liberalization. However, it could succeed in the long run if followed by privatization (through the stock exchange or through private ownership by a strategic investor and, if necessary, partial government ownership) which would lead to internal restructuring of the energy conglomerates. Paradoxically, privatization needs strong support from the government. Unfortunately, the government's seemingly strong liberal approach towards the reform of the energy sector is threatened by the negative attitude towards privatization in general, and unbundling in particular, of the trade unions and the two energy giants PGNiG and PGE. The workforce and the companies themselves are indeed very influential stakeholders in this debate, allegedly able to successfully lobby the government and to affect the formation of economic policy.

Annex 3.4. Slovakia

STATE PRICE DEREGULATION

1990 – 1991: The first phase of energy price deregulation in Czecho-Slovakia

After the political turnaround in 1990 the government let loose the artificial prices that until then had been fixed. In 1991 the price of electricity for businesses and households relative to 1989 leaped by 80% and 70%, respectively. Concurrently the prices of natural gas grew by 130%, coal by 240%, and heat by 320%. The drastic hike roughly accommodated the actual production costs and paved the way of healthy economic development of the energy sector.

February, April 1998: Adoption of key energy legislation

The Slovak Parliament adopted two legal acts concerning the energy sector. They were closely linked to the conditions imposed by the EU on Slovakia in its pre-accession period. The Energy Act that defined business requirements applicable to all branches of the energy sector. The Act on the Peaceful Use of Nuclear Energy that regulated any activities in this branch of the energy sector. These two legal acts laid the fundamentals enabling the transposition of EU regulations later on and spurred future liberalization, competition and transparency in the energy sector.

1999 – 2002: The second phase of energy price deregulation

Following the first phase of price deregulation in 1990 and 1991, energy prices in the independent Slovak Republic due to its highly cautious government remained more or less unchanged causing serious economic problems of energy companies. In 1999 through 2002 the next government embarked on a series of price adjustments better reflecting actual costs which in practical terms almost doubled the gas and electricity prices. At the same time the government prepared ill-managed state companies for their privatization and the price adjustments were to enhance companies' attractiveness for the bidders.

DIVISION OF ENERGY COMPANIES

1990 – 1994: Separation of energy companies

In 1990 the government divided the Slovak Energy Enterprise, a monopoly producer and distributor of electricity in Slovakia into two main branches, i.e. one dedicated to power generation (Slovenské elektrárne) and the other primarily to distribution (three territorial distribution companies). Furthermore, it made them ready for privatization. Transmission and distribution of natural gas remained with the monopoly incumbent Slovenský plynárenský priemysel which divested natural gas storage and local exploration & production of hydrocarbons by virtue of establishing a new Nafta company. By such division of former state enterprises conditions were set for eliminating cross-subsidized energy prices and introducing competition in the energy sector.

January 2002: Establishment of Slovenská elektrizačná prenosová sústava

Slovenská elektrizačná prenosová sústava became an independent entity after being separated from Slovenske elektrárne. This operator of the high-voltage electricity transmission system has remained state owned to date. Such separation exercise was in line with EU energy policy and was a prerequisite for future liberalization of Slovak trade in electricity.

July 2006: Legal unbundling of Slovenský plynárenský priemysel

Two entities were separated from Slovenský plynárenský priemysel (SPP), the then monopoly gas supply and transmission operator in Slovakia, namely SPP-distribúcia in charge of domestic gas distribution and SPP-preprava (renamed Eustream in 2008) transporting gas within the territory of Slovakia. That done, the conditions opening the market to new gas suppliers were in place.

July 2007: Legal unbundling of electricity distribution companies

Each one of the three regional electricity distribution companies was divided into two entities – one distributing energy while the other was selling it. No longer were the

distribution companies selling electricity to the end customers, they were merely providing their capacities to entities, whoever they may be, that sold electricity to the end customer.

PRIVATISATION OF ENERGY COMPANIES

1992 – 1996: First phase of privatization in the energy sector

So-called voucher privatization took place in 1991 and 1992. Minority shareholders acquired one fifth of the shares in the monopoly incumbent fuel producer Slovnaft. In 1996 the government incorporated the dominant fuel distributor Benzinol into Slovnaft and without any tender process it sold a majority stake in Slovnaft to a local, politically well-connected private company SlovinTEGRA. Later on this private company profited from its sale to a genuine investor, the Hungarian company MOL. In the course of voucher privatization almost one half of Nafta shares were acquired by ordinary citizens. In 1996 the government sold the remaining shares at a fraction of their price to a well-connected private company Druhá strategická, which after having depleted the company handed it back to the state. After the processes of reorganization and privatization of SPP were completed the Nafta shares fell into the hands of private companies, namely SPP Infrastructure and Czech Gas Holding Investment. With their new private owners both Slovnaft and Nafta became stabilized and profitable companies. In 1996 the government sold under daunting terms 97% of shares of the largest Slovak coal company Hornonitrianske bane to a private company, namely Hornonitrianske bane zamestnanecká. Massive state subsidies poured into it have been the only life-jacket keeping it afloat and these subsidies were one of the components included in the end price of electricity. All other lignite mines in Slovakia are no longer in operation as the government seems to have no interest in supporting them.

May 2001: Privatization of Transpetrol

A call for tenders was published in May 2001 and a year later 49% shares of Transpetrol, a monopoly operator of oil transit in Slovakia, were acquired by the Russian company Yukos. After Yukos was declared bankrupt, the government bought back the stake privatized in 2009. Transpetrol, that inter alia transports Russian oil using the Druzhba pipeline to the single Slovak refinery Slovnaft, is currently fully owned by the state. Privatization was supposed to streamline the management of Transpetrol and to diversify foreign sources of raw materials. None of those aims have been achieved yet.

March 2002: Privatization of Slovenský plynárenský priemysel

In March 2002 the government approved the sale of a 49% stake and management control in SPP to Gazprom, Gaz de France (later renamed GDF Suez) and Ruhrgas (later renamed E.ON Ruhrgas). In a few years' time the economic performance of the company significantly improved and gained transparency. The initial privatizers were replaced by the Czech company EPH in 2013 and 2014. Despite its minority ownership stake it controls the transmission and distribution of natural gas. The sale of gas to end customers was based on mutual agreement completely handed over to the government. The government made no secrets about the fact that the nationalization of the gas selling business was motivated by gaining control over gas prices for households although at that point the Regulatory Office for Network Industries was already the competent authority in charge of price regulation.

May 2002: Privatization of electricity distribution companies

Government decided on the privatization of three distribution companies – 49% of shares and management control in Západoslovenská energetika, Stredoslovenská energetika and in Východoslovenská energetika were acquired by E.ON Energie, Elektricite de France International and RWE Plus, respectively. In a few years' time the economic performance of the companies significantly improved and gained transparency. In 2013 the foreign investor in Stredoslovenská energetika sold its stake to EPH.

December 2004: Privatization of Slovenské elektrárne

Government approved the sale of a 66% stake in Slovenské elektrárne to the Italian company ENEL. It also decided that the dividends accrued in Slovenské elektrárne would in the future finance the completion of the Mochovce nuclear power plant. In a few years' time the economic performance of the company significantly improved and gained transparency. In 2015 ENEL agreed to sell its stake to EPH.

CHANGE OF PRODUCTION CAPACITIES, INFRASTRUCTURE DEVELOPMENT**October 1992: Launch of Gabčíkovo hydropower plant**

In October 1992 a power plant started its operation within the framework of a barrage project on the Danube. To date it accounts for one tenth of the total electrical power generated in Slovakia. In 2014 the state enterprise Vodohospodárska výstavba unilaterally withdrew from the rental of the Gabčíkovo hydropower plant to Slovenské elektrárne and has been operating it on its own ever since.

July 1998: Launch of Mochovce nuclear power plant

Slovenské elektrárne put in operation the first block of the Mochovce nuclear power plant in July 1998 and the second block in December 1999. It accounts for one fourth

of the total electrical power generation in Slovakia. The ever stricter security regulations and financing problems have caused delays in the completion of additional two block of the Mochovce power plant and the date of their launch remains unknown.

December 2003: Planned oil pipelines in Slovakia and Austria

The Austrian OMV and Slovak Transpetrol signed a joint-venture agreement on the construction and operation of a new crude oil pipeline between Bratislava and OMV's Schwechat refinery in Austria. The oil pipeline could cover part of OMV's oil demand from Russia and in the case of reverse flow the Slovak refinery Slovnaft could have access to non-Russian crude oil. The project has been undermined by protests against the planned pipeline routing in the vicinity of Bratislava.

December 2006: Curtailed power generation in Jaslovské Bohunice nuclear plant

The first block of the nuclear power plant in Jaslovské Bohunice was shut down in December 2006 and the second block in December 2008. The reason behind these steps was the commitment of the Slovak Republic arising from the 2004 EU accession treaty to shut down and decommission part of the nuclear power plant due to security concerns. As a consequence of these steps the total power generation in Slovakia dropped by about 20%.

January 2009: Dealing with the gas crisis

The Ukrainian-Russian controversies affected the flow of gas in the transit pipeline to Central Europe to the extent that it stopped. SPP had to find an emergency solution which was to reverse the gas flow and arrange with its western partners the gas supply necessary to bridge the sudden deficit. The merits of foreign shareholders in the company as well as solidarity of EU Member States was indispensable in this crisis resolution.

May 2012: Gas interconnection Slovakia - Hungary

The construction agreement was signed in May 2012 and in three years' time the involved Slovak and Hungarian gas companies commenced the operation of the cross border interconnected gas pipeline. This project has increased the energy security of both countries and demonstrates EU solidarity and the pragmatic approach of neighboring countries.

November 2013: Planned gas interconnection Slovakia - Poland

Slovak and Polish governments signed an agreement on building a gas pipeline connecting neighboring states. This project planned to be completed by 2020 will connect the Adriatic and Baltic Seas with a pipeline that will boost the energy security of all countries along the pipeline route.

April 2014: Transmission of natural gas from Slovakia to Ukraine

Half a year after signing a memorandum in April 2014 the Slovak transmission system operator Eustream and its Ukrainian counterpart Ukrtransgaz launched operation of a reconstructed gas cross border pipeline supplying Ukraine with gas from the West. This project is a showcase of cooperation based on goodwill of neighboring countries and EU with Ukraine.

February 2015: Launch of the modernized Adria oil pipeline

The renovated Adria oil pipeline connecting the Croatian coast with the Slovak branch of the Russian transit pipeline was put in operation in February 2015. Sloznaft gained an alternative for importing oil from a non-Russian market and that enhances the energy security of the entire country.

November 2015: Planned Easting gas pipeline as priority of the European Union

In November 2015 the European Union approved the request of Eustream and added the project Easting gas pipeline routed from Slovakia, through Hungary and Romania down to the Bulgarian-Turkish borders to the updated list of key projects. This transmission route will provide new alternative gas supplies to the countries involved.

OPENING ENERGY MARKETS**January 2000: Adoption of new energy policy**

The energy policy adopted by the government envisaged liberalization of the electricity and gas markets and the creation of an independent regulatory body vested with competences currently held by the government. Specific measures were defined to further transparency, efficiency and competitiveness in the energy sector.

December 2001: Opening electricity and gas markets

Government decided to open these markets for the time being only to large electricity and gas customers. This was the first genuine step towards market liberalization as it allowed customers to purchase energy from foreign suppliers.

October 2004: Approval of key liberalizing energy legislation

Parliament adopted three key legal acts – a new energy act, amendment of the act on regulation of network industries and an act on thermal energy. This was the legislative action needed for implementing EU directives concerning common rules for the internal market in electricity and gas optimizing its functioning. Full liberalization of the energy market became the ultimate goal.

January 2005, July 2007: Free choice of electricity suppliers

Business customers in Slovakia could choose any registered electricity supplier as of 2005, households as of mid-2007. In reality businesses have applied the free choice of electricity suppliers since 2005 and households since 2008.

July 2007: Free choice of gas suppliers

Customers could choose any registered gas supplier as of mid-2007. In reality businesses have applied the free choice of gas suppliers since 2009 and households since 2011.

TRANSITION TO INDEPENDENT REGULATION**June 2001: New approach to energy market regulation**

Parliament adopted the Act on regulation of network industries. This Act was based on the energy policy of Slovakia and EU's first energy package dated 1996-1998. Its main objective was to eliminate the monopoly position of energy companies in the Member States and to simplify access to energy infrastructure. The Act on regulation of network industries ceded the regulatory competence of the government to an independent body.

August 2001: Creation of the Regulatory Office for Network Industries

The Regulatory Office for Network Industries (RONI) in Slovakia was established in August 2001. Its top representatives were elected by the Slovak Parliament. The legislation required for transferring regulation to the independent office was drafted by the end of 2002.

January 2003: Regulation of energy prices by an independent authority

RONI assumed full responsibility for price regulation in the energy sector. It prioritized efforts to eliminate cross-subsidies and launched the process of legal unbundling (separation of transmission networks from other business activities). Furthermore, price ceilings of energy sources were increased year by year until 2007 which to a certain extent correlated with the increases in global prices of energy commodities. At this point RONI was applying the second energy package approved by EU in 2003 which accentuated functional separation of energy generation from its transmission and the liberalization of markets by offering the free choice of suppliers.

July 2012: Significant strengthening of the regulator's position

Parliament adopted a new energy act and a new act on regulation of network industries. This legislative effort was driven by the transposition of EU's third energy package into the legal system of the Slovak Republic. Its main aim was to facilitate liberalization of the electricity and gas markets, upgrade consumer rights and bolster

the powers of regulatory authorities. With a view to influencing the market in Slovakia the creation of a regulatory council was crucial. One half of the council's members are appointed by the government and the other half by the parliament, but more importantly it adopts, independently of the government, regulatory policy which would typically be the key instrument for exercising the position of power. The status of RONI has been one of strong autonomy ever since although being limited by the post of the Chairman who is appointed by the government. This flaw took its toll in a number of decisions of RONI when it gave way to the government's pressure or cooperated with it to the detriment of the energy market.

PROMOTION OF RENEWABLE ENERGY

April 2006: Use of biofuels

In 2006 the Slovak government transposed the respective EU directive and adopted the regulation on the minimum fuel volume produced from renewables in petrol and diesel. The ambition of EU is to reach a 10% share of renewables in fuels by 2020. In Slovakia the minimum volume of biofuels in fuel sales was set directly in the applicable legislation. Since 2006, this minimum share has been incrementally growing and should reach 8.5% by 2020. In 2014 it stood at 5.7%.

June 2009: Adoption of the act on the promotion of renewables

Parliament adopted the act on the promotion of renewables and high-efficiency co-generation dictating the method and rules of supporting power generation based on renewables. This act propelled massive support of construction of new facilities, mainly photovoltaic power plants that culminated in a politically motivated boom in 2010-2011. According to the selected strategy valid to date the production of electricity from renewables is subsidized whereby the subsidy is embedded in higher electricity prices for all customers. RONI is the competent regulatory authority. The support scheme for renewables emanates from the EU strategy referred to as the 20–20–20 strategy which in Slovakia has been applied in a deformed way.

October 2010: Adoption of plan for energy based on renewables

Government adopted the National action plan for energy based on renewables. It was inspired by the EU goals defined in 2007 referred to as the 20–20–20 strategy (by 2020 to have in EU 20% of the energy, on the basis of consumption, coming from renewables, a 20% increase in energy efficiency and a 20% reduction in CO₂ emissions compared to 1990 levels). Slovakia has pledged to increase the percentage of renewables in final energy consumption to 14% by 2020. This commitment gave rise to a number of specific measures, predominantly concerning the support of power generation based on renewables, the addition of biofuels into fuels and enhanced efficiency. In 2014 the share of renewables in final energy consumption in Slovakia reached 11.6%.

October 2014: Adoption of a new act on energy efficiency

Parliament carried a new act on energy efficiency that furthered the Energy efficiency policy adopted by the government in 2007. Its aim was to improve the efficiency of energy use throughout the energy chain particularly in the area of final consumption with a high potential of energy savings such as buildings and industry.

LESSONS LEARNED

Pursue a solid policy

State authorities should follow a long-term, broadly respected and binding energy policy. Otherwise, they will not withstand deformations accompanying election cycles such as those experienced in Slovakia. Troublesome hikes of energy prices after periods of artificially keeping them at unreasonably low levels are a telling negative example.

Avoid copying models without scrutiny

As regards its energy legislation, Slovakia usually mechanically copied regulations coming from EU headquarters. However, examples from other countries prove that despite their binding nature there is quite broad maneuvering space for own initiatives that accommodate local needs of the given state and its citizens.

Pay governmental experts

The specificity of Slovakia is that governmental bodies (ministries) lack competent energy experts and as a consequence of that governmental politicians (ministers) make decisions without relevant reference documents and under the bold influence if not pressure of skilled lobbyists. Governmental experts are worth the money; their fees are incomparable with the damage caused by incompetent or corrupt politicians.

Consider the impacts of steep price liberalization

Only in the recent years, the EU idea of supporting the economically most vulnerable consumers of energy has been recognized in Slovakia as well grounded. But, it should have been taken into consideration in Slovakia earlier, particularly at the point of drastic price liberalization exercises in the early 1990s and a decade later. Transformation costs could have been allocated in a fairer way and would not have invoked more unnecessary, politically motivated deformations (as those in the last 1990s).

Keep politics out of privatization

Privatization of state assets in a democratic state always bears a political dimension because it entails a decision of top state authorities led by general election winners. Unless politics is eliminated as much as possible from the decision-making process of

privatization the process becomes inefficient and ethical principles are breached (Slovnaft, Nafta).

Recognize the importance of raising awareness

Even today many Slovak citizens share the opinion promoted by populist politicians that privatization stripped the state of valuable assets. The economic performance of energy companies significantly improved after their privatization which proves the opinion false. This fact deserves consistent and targeted reiteration otherwise, the re-nationalization resulting in new inefficiency may prevail (Slovenský plynárenský priemysel, Transpetrol).

Install respectable individuals in regulatory institutions

It is impossible to come up with a model guaranteeing absolute impartiality of regulatory bodies. At the end of the day their top officials have to be nominated by politicians either sitting in the parliament, government or state president's office. A solution at hand is to pick strong, respectable leaders able to become partners of the government. Regretfully that has not been the case in Slovakia.

Promote renewables as an opportunity instead of a threat

People in Slovakia believe that the renewables-related subsidy is the reason behind the high end prices of electricity. Admittedly, because of the unreasonable policy of the government and regulator in the period 2010-2014 renewables did push up electricity prices therefore a more appropriate model should be based on other forms of renewables promotion such as direct subsidization of customers willing to use more expensive energy produced from renewables.

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