INSTITUTIONAL REFORM OF UKRAINE'S ENERGY SECTOR: CHALLENGES AND TREATMENT

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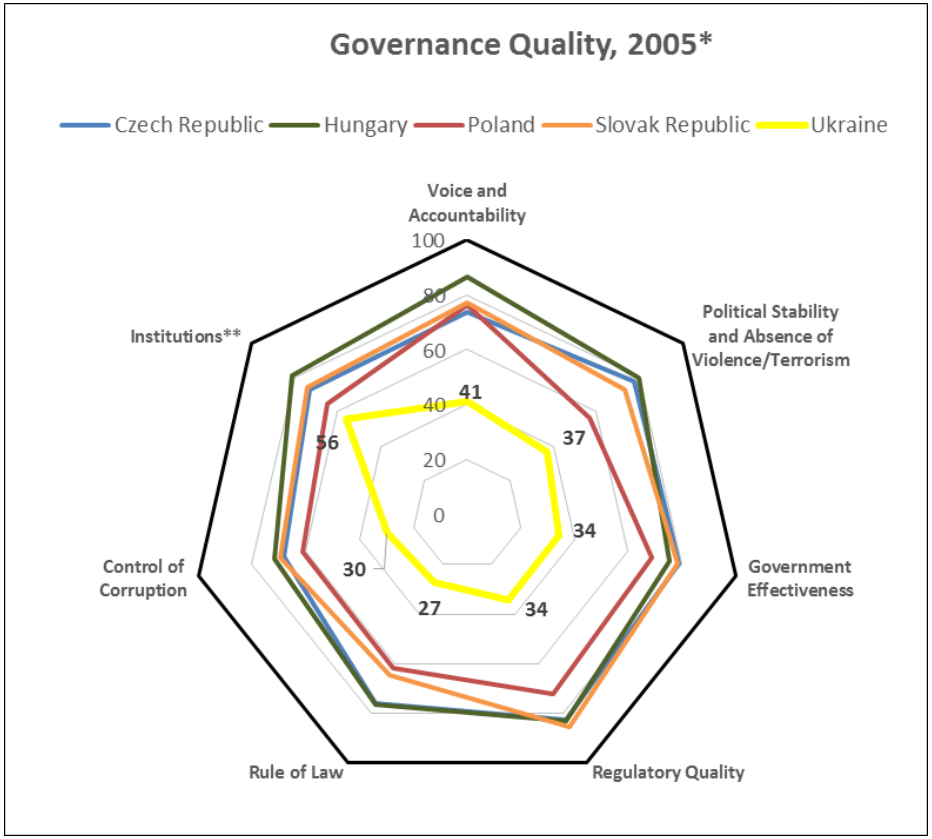
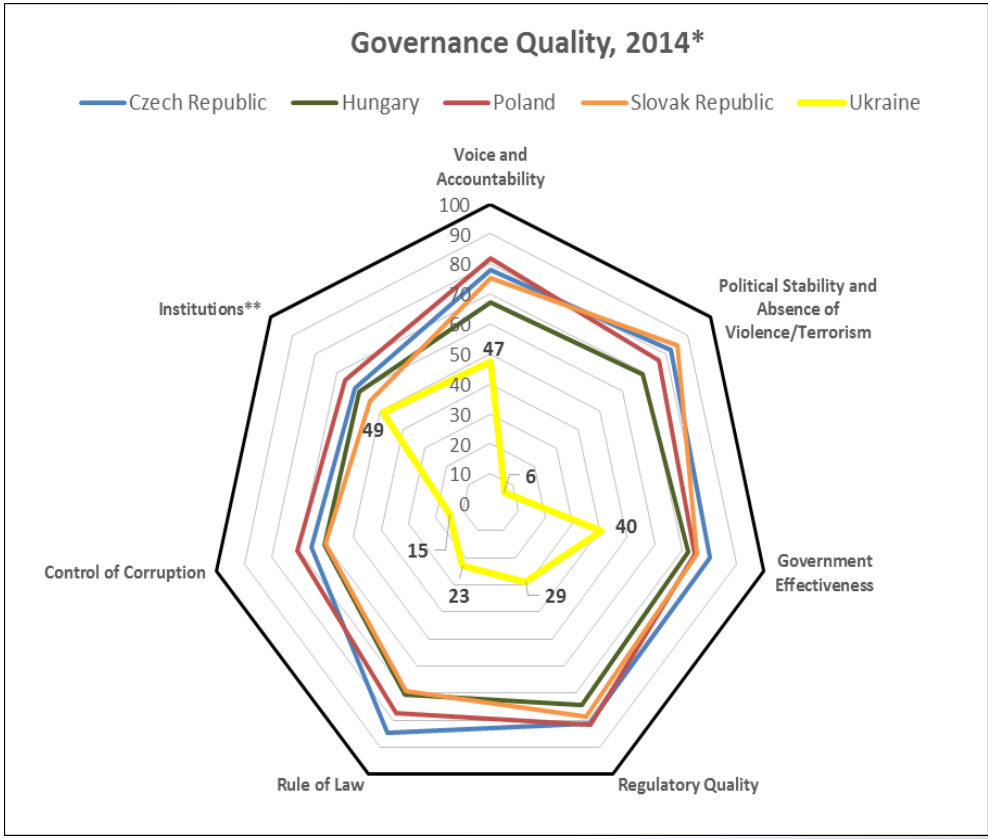
PART 1

1. Main Dimensions of Governance Quality of Ukraine and V4 Countries
2. Institutional Reform as the Driver of Ukraine's Energy Sector Development – the Survey Results

1. Main Dimensions of Governance Quality of Ukraine and V4 Countries (1)

Governance Quality Ranks: Ukraine vs V4 countries





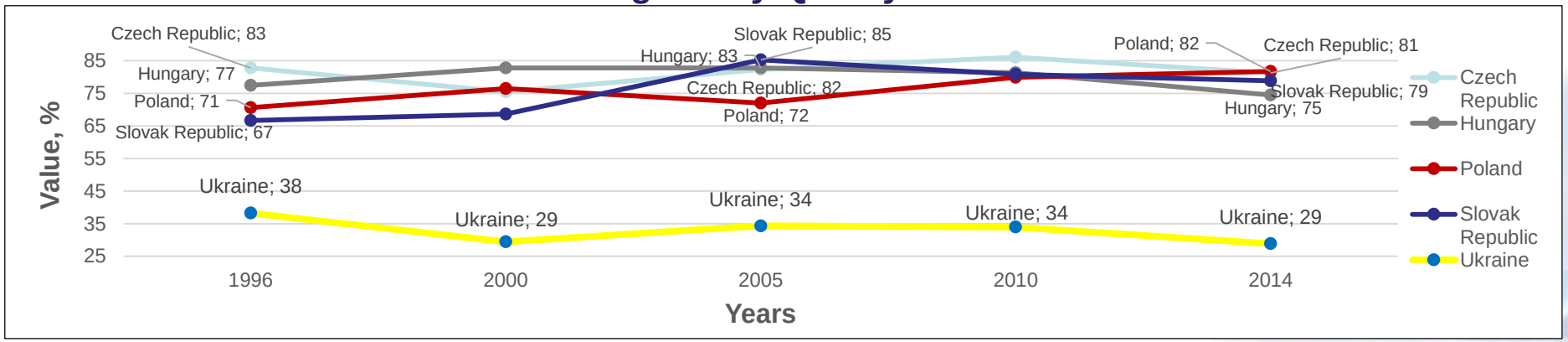
* The graph is based upon The Worldwide Governance Indicators (WGI) project under World Bank's research initiatives.

** 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).

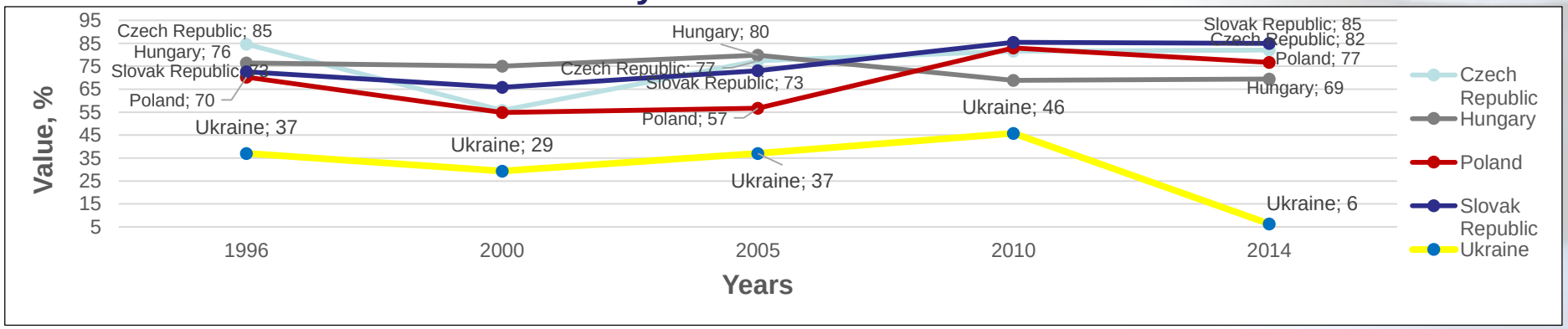
Ukraine's ranks of governance quality for all indicators of the governance quality are much lower than the relevant indicators of the V4 countries

1. Main Dimensions of Governance Quality of Ukraine and V4 Countries (2)

1.1. Regulatory Quality *



1.2. Political Stability and Absence of Violence/Terrorism **



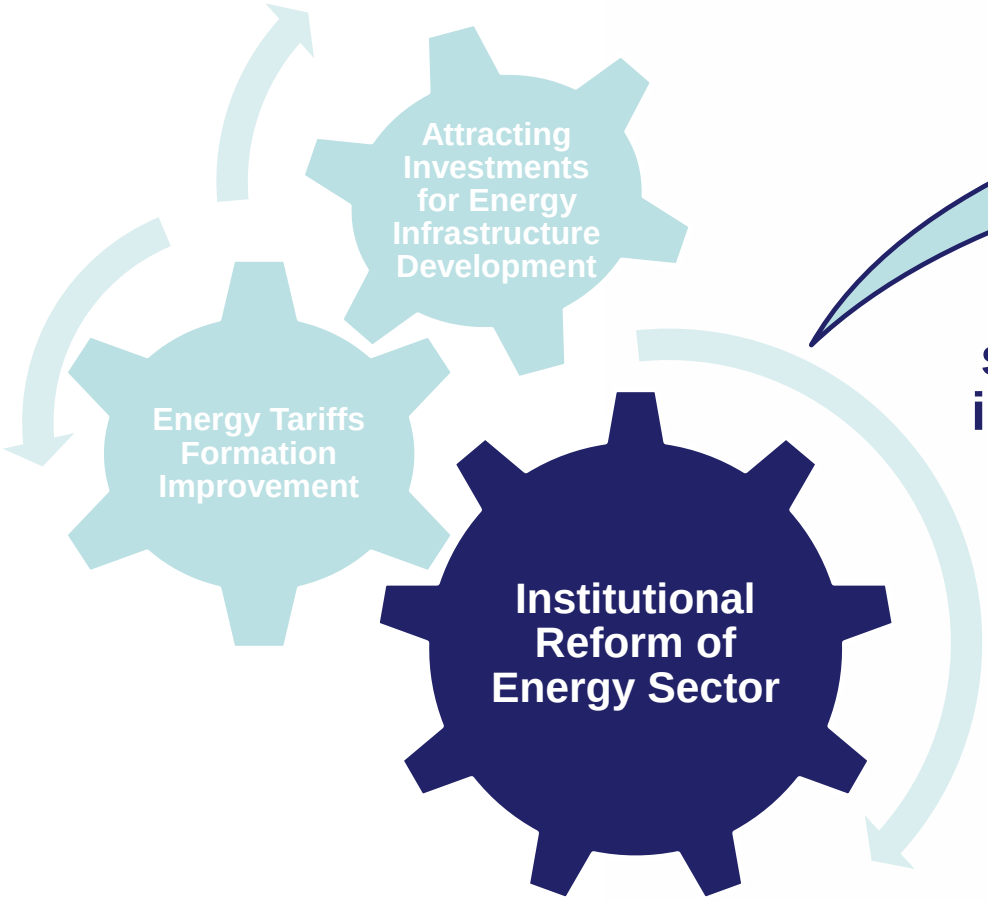
* The Dimension reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.

** The Dimension measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.

- **Ukraine's Regulatory Quality in about 2.5 time lower than in V4 countries**
- **Dramatic changes in estimation of Political Stability and Absence of Violence/Terrorism for Ukraine in 2014 due to Crimea annexation and military conflict in Donbass**

2. Institutional Reform as the Driver of Ukraine's Energy Sector Development – the Survey Results (1)

Institutional Reform as the Driver



Provision of energy services of high quality in sufficient volume and with reasonable prices

2. Institutional Reform as the Driver of Ukraine's Energy Sector Development – the Survey Results (2)

Thematic Categories of the Actual Energy Sector Problems with Highest Priorities

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 and pricing systems policy in the energy sector – 81,3%
- Attraction of investments – 81,3%

C. Energy Efficiency and Technical Upgrading

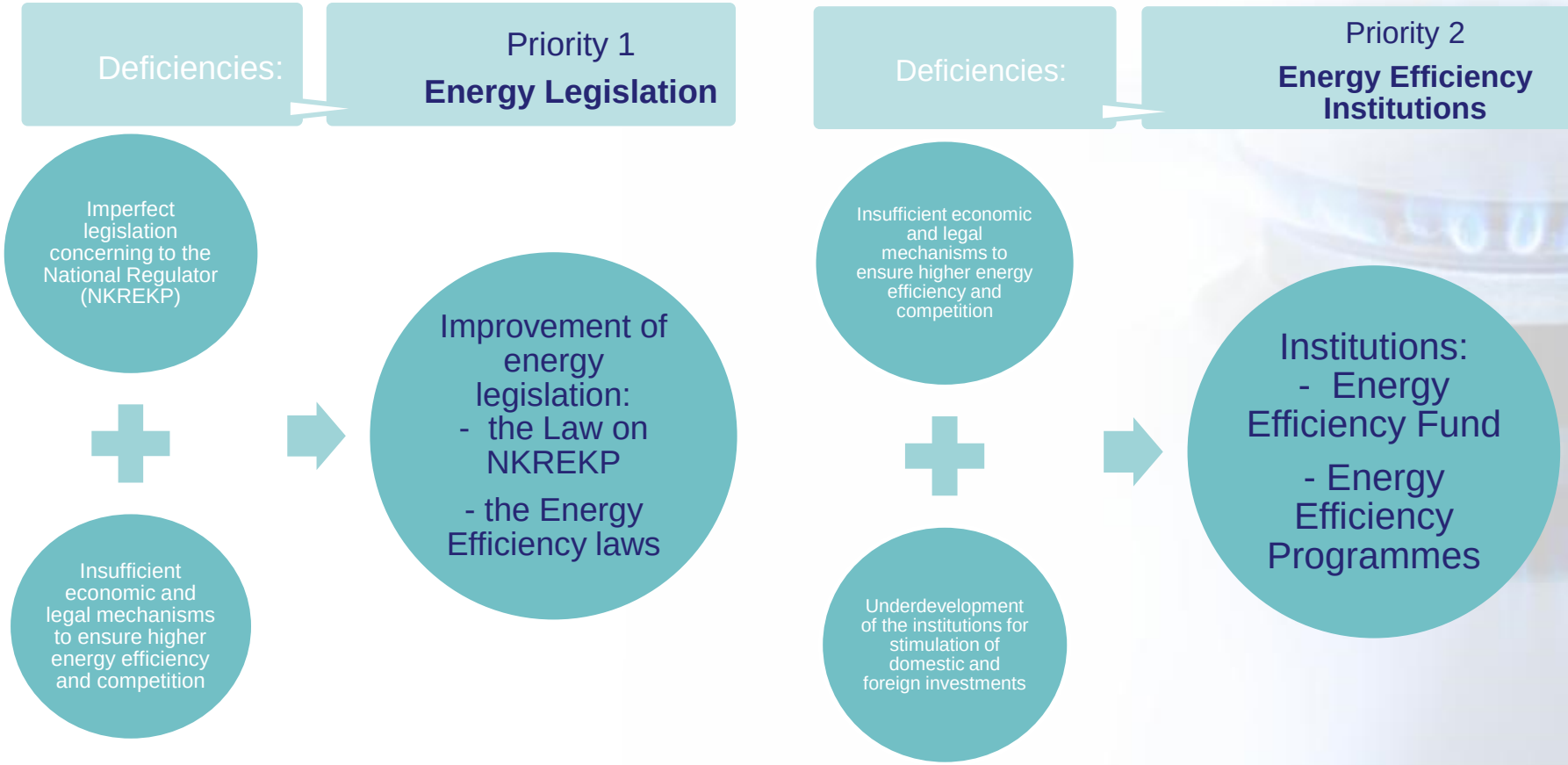
- Improvement the energy efficiency of the buildings (Building Energy Ratings) – 81,3%
- The reduction of the overall energy intensity of GDP of Ukraine – 75,0%
- Construction and renovation of the domestic network infrastructure – 68,8%

D. Social and Security

- Improvement of mechanisms to support the vulnerable categories of the customers – 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%.

2. Institutional Reform as the Driver of Ukraine's Energy Sector Development – the Survey Results (3)

Establishment of the Priorities in Institutional Reforming of Ukraine's Energy Sector



PART 2

3. Ukraine's Energy Sector at a Glance
4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors
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3. Ukraine's Energy Sector at a Glance (1)

The Structure and Capacity of Ukraine's Energy Sector (2015)

ENERGY SECTOR OF UKRAINE

FUEL

NATURAL GAS

Reserves[1]: 1014 bcm

Production (2015)[2]: 19,9 bcm

OIL

Reserves (incl. NGL)[3]: 250 mt

Production (2015)[2]: 2,5 mt

COAL

Reserves[4]: 33873 mt

Total production (2015)[2]: 39,7 mt

BIOMASS TO FUEL

Available resources (2008)[5]: 33,02 mt o.e.

NATURAL GAS TRANSPORTATION AND STORAGE

Transit capacity[7]: 140 bcm/year

Total length of main gas pipelines[7]: 38550 km

Natural gas compressor stations[7]: 72

Underground natural gas storage facilities[7]: 12 with 31 bcm of storage working capacity

Total length of natural gas distribution networks[8]: 367000 km

Natural gas transit (2015)[2]: 67,1 bcm

CRUDE OIL TRANSPORTATION AND STORAGE

Output capacity[9]: 56,3 mt/year

Total length of main oil pipelines[9]: 4767 km

Oil pumping stations[9]: 51

Reservoir parks[9]: 11 with total storage capacity of 1083 thousand cm

Sea oil terminal "Pivdenny"[9] with total capacity of 14,5 mt/ year

Crude oil transit (2015)[10]: 15,2 mt

REFINERY

Design capacity (crude oil) of 6 biggest refineries[11]: 51,1 mt/year

In operation (2015)[12]: only 1 from 6 biggest

Crude oil processed (2015)[13]: 2,4 mt

ELECTRIC POWER INDUSTRY

NUCLEAR

Installed capacity of 15 power units (reactors)[6]: 13835 MW-e

Electricity production (2015)[2]: 87,6 mMWh

THERMAL

Installed capacity including cogeneration plants[6]: 34299 MW-e

Electricity production (2015)[2]: 61,3 mMWh

HYDRO

Installed capacity[6]: 5854 MW-e

Electricity production (2015)[2]: 6,8 mMWh

OTHER RES

Installed capacity of RES power stations[6]: 1126 MW-e

Including:

- Solar[6] – 582 MW-e

- Wind[6] – 509 MW-e

- Biomass fired[6] – 35 MW-e

Electricity production (2015)[2]: 1,5 mMWh

POWER ELECTRICITY NETWORK

Length of main power transmission lines[14]: 29190 km

136 basic substations with total transformation capacity[14] of 78632 MVA.

Length of electrical distribution grid[14]: about 1 million km

about 200 thousand 6-150 kV local transformer substations[14].

Electricity transportation (2015)[14] 154,3 mMWh

Export of electricity (2015)[2]: 3,6 mMWh

Sites references:

1 Victor Logatskiy and others. - Natural Gas Recovery in Ukraine: Tax Incentives Initiatives for Discussion. Razumkov Centre edition, 2015. – Kyiv, 44 pp.

2 Kateryna Markevych and others. - Energy Sector of Ukraine: Summary for 2015. Razumkov Centre edition, 2016. – Kyiv, 72 pp.

3 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.

4 Black Gold of Ukraine: Infographics. Ukrinform Information Agency. http://www.ukrinform.ua/rubric-other_news/1536886-vidobutok_vugillya_v_ukraiini_nini_vedetsya_v_160_shahtah_infografika_1857135.

5 Georgiy Geletukha and others. – Energetic Potential of Biomass in Ukraine. http://elibrary.nubip.edu.ua/8102/1/10ggg.pdf.

6 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

7 Data of PJSC Ukrtransgas.http://utg.ua/en/utg/gas-transportation-system/characteristic.html

8 Data of NJSC Naftogaz of Ukraine.

9 Data of PJSC Ukrtransnafta. http://www.ukrtransnafta.com/en/about_company/shema/.

10 Interfax-Ukraine Information Agency. http://ua.interfax.com.ua/news/general/323378.html.

11 Refinery Industry of Ukraine: Condition, Problems and Development Ways. National Security and Defence Journal, No 3. Razumkov Centre edition, 2006. - Kyiv, 48pp.

12 Only PJSC Ukrtatnafta - the one of 6 biggest refineries processed crude oil in Ukraine in 2015.

13 Razumkov Centre's estimation.

14 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.

3. Ukraine's Energy Sector at a Glance (2)

SWOT Analysis of Ukraine's Energy Sector (middle 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 easy accessible 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 infrastructure assets and deep degradation of domestic refinery industry
- Insufficient legislation, over-regulation and weak governmental institutions which do not provide market competition
- Temporary loses of several energy infrastructure objects and access to several hydrocarbons deposits

Threats

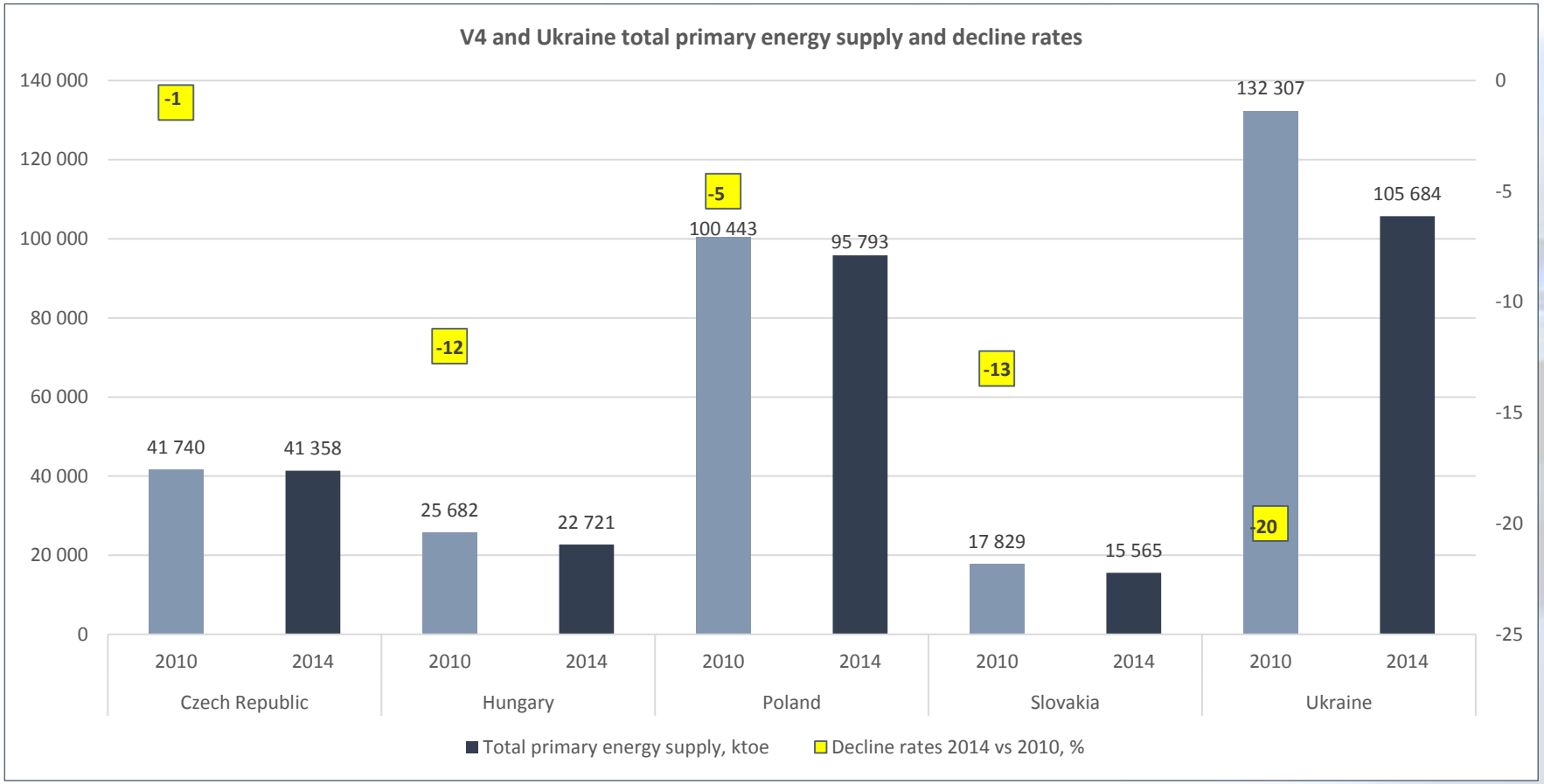
- Sporadic war activities in several east districts of the country
- Un-predictive RF military policy in relation to Ukraine
- Losses of the rates of energy sector development caused by temporary loss of control by Ukrainian governmental over the Crimea and several districts of Donbass
- Accidents on 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

Opportunities

- Growth of production convenient and inconvenient hydrocarbons on new discovered and old reservoirs
- Confirmation of country's "energy bridge" position between main suppliers and European markets
- Privatization of the big and medium size energetic enterprises
- 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
- Growth of export potential, especially electricity
- Business based on RES, utilization of biomass and recycling
- Access to Ukraine's energy market as the one of largest in Europe

4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors (1)

Primary Energy Supply V4 and Ukraine (2014 vs 2010)



- **All countries reduced their primary energy supply in 2014 in relation to 2010**
- **Least reduction – -1% in Czech Republic, most reduction – -20% in Ukraine**

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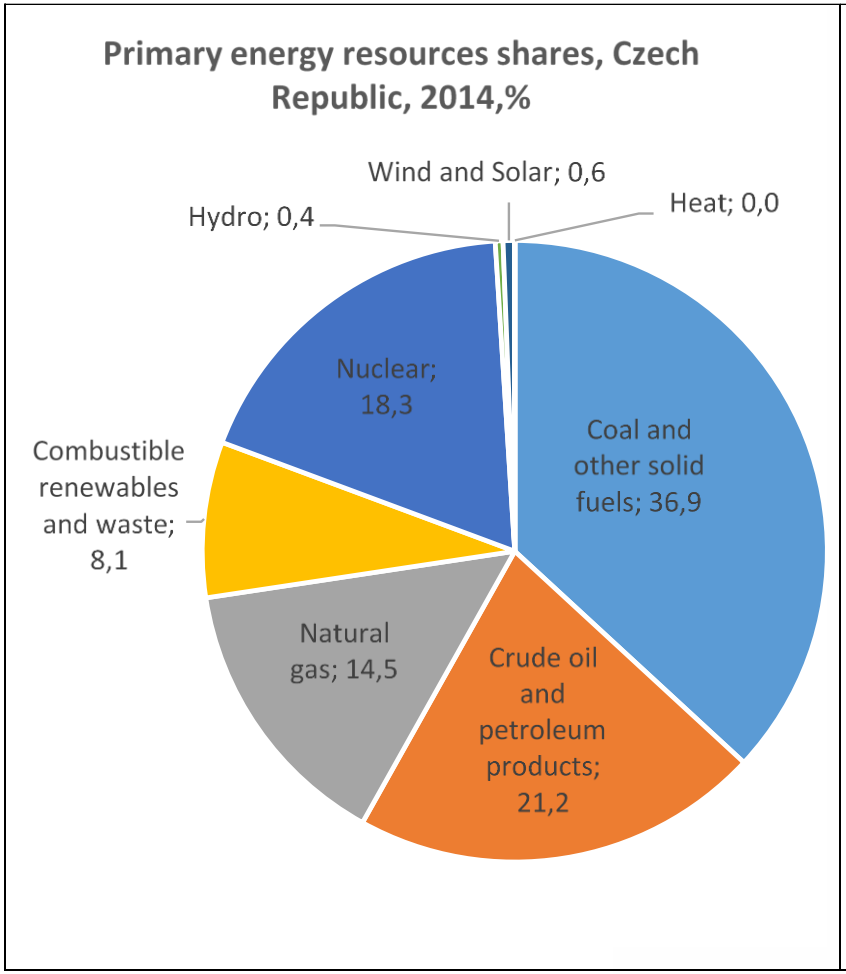
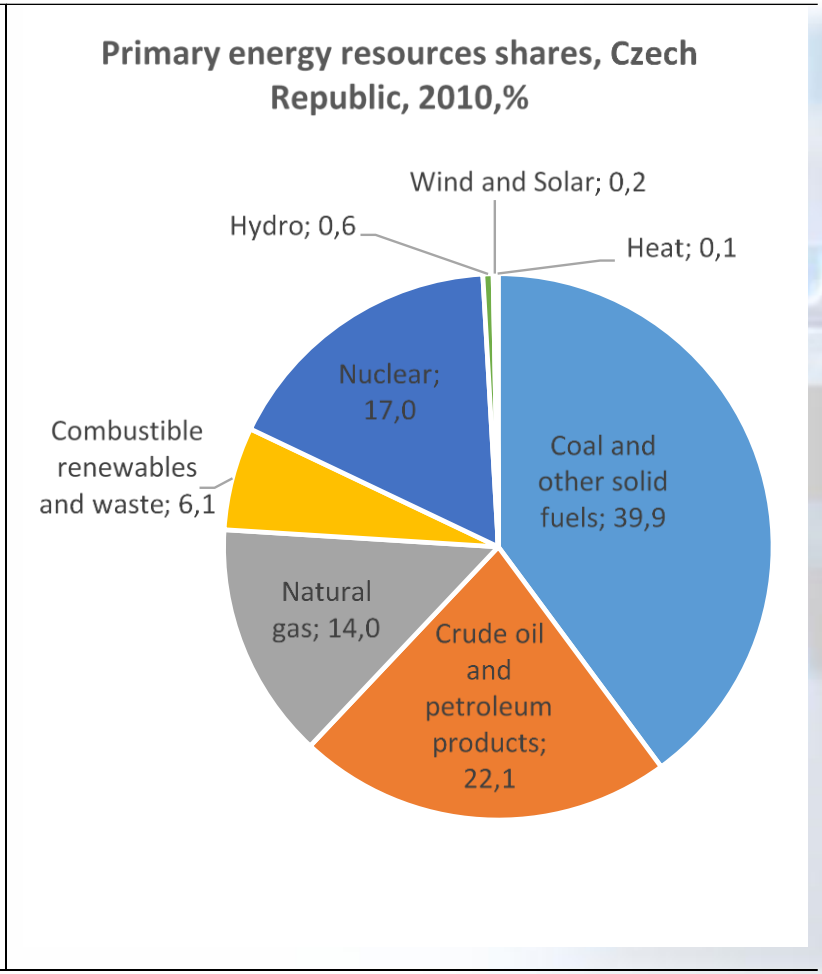
4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors (2)

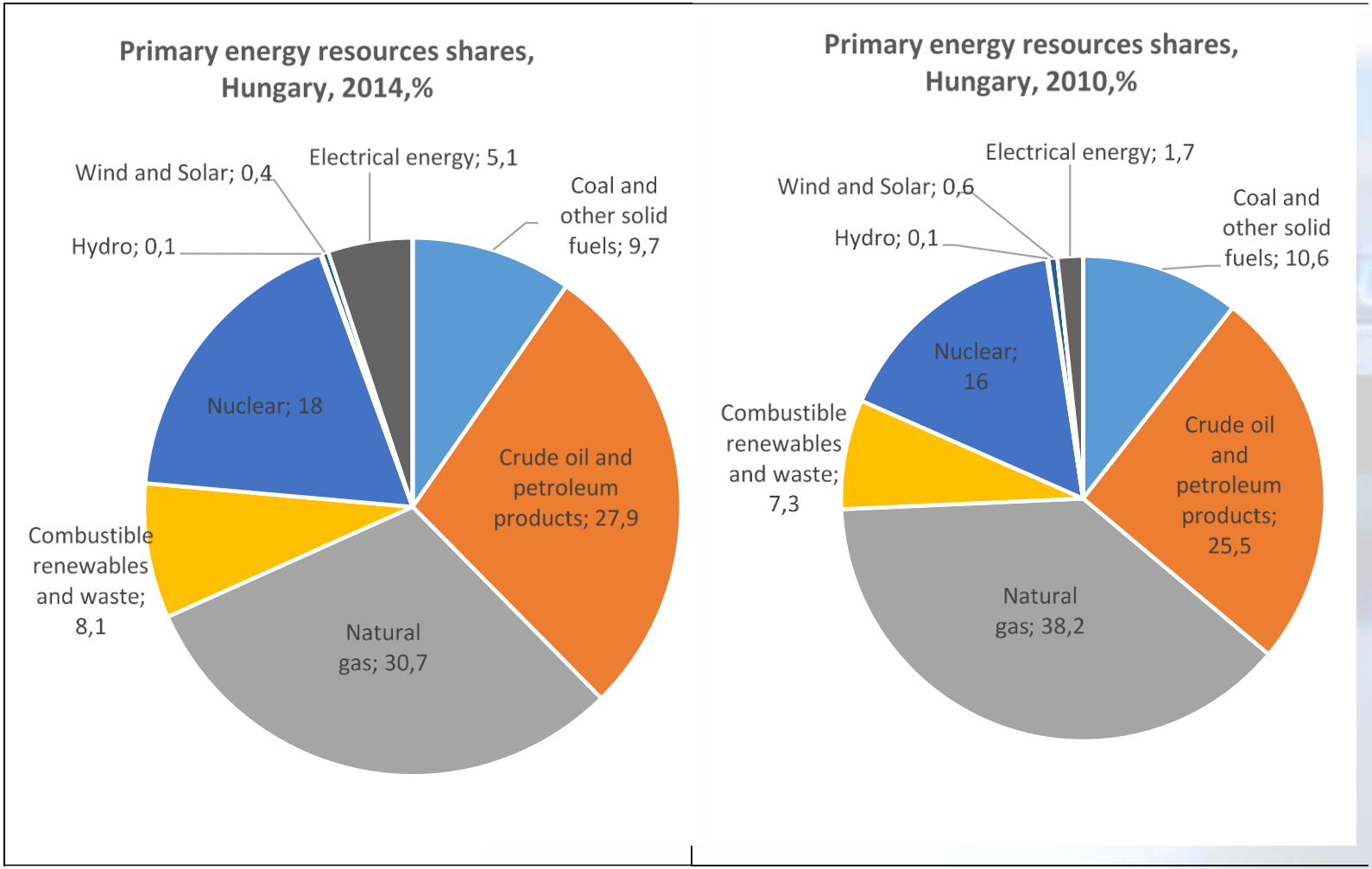
Energy Structure of Czech Republic (2014 vs 2010)





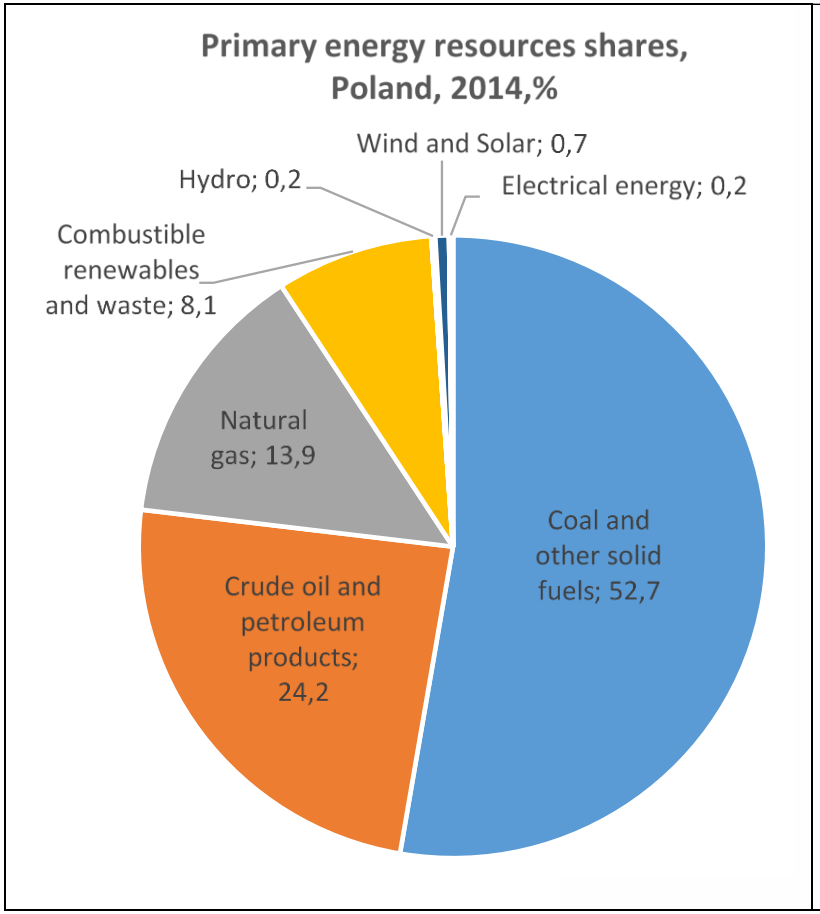
4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors (3)

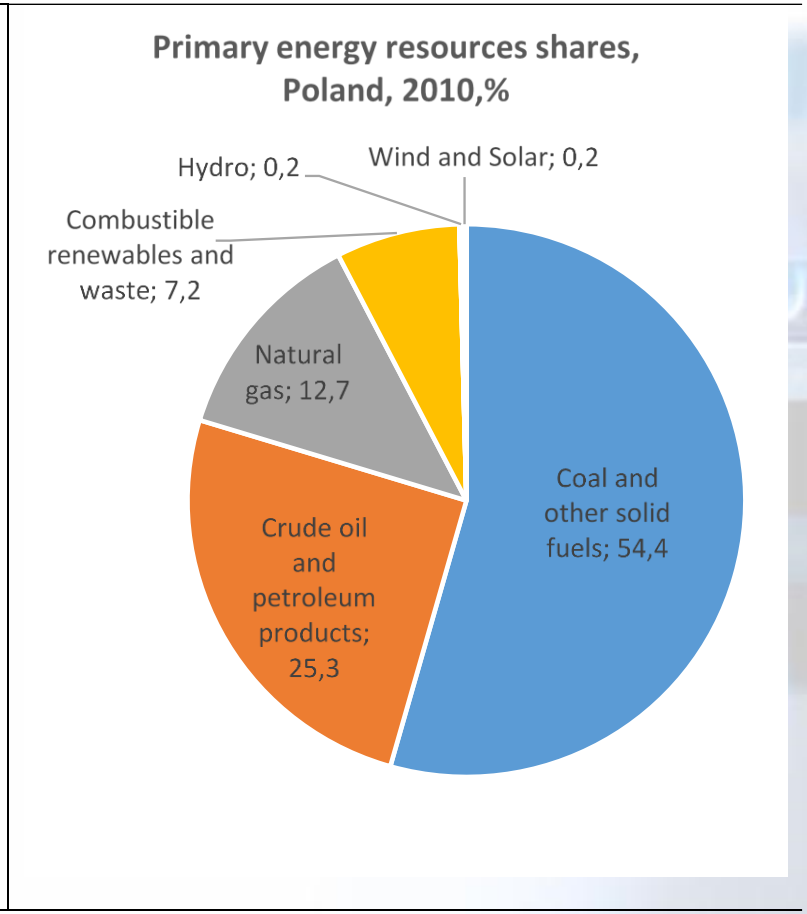
Energy Structure of Hungary (2014 vs 2010)



4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors (4)

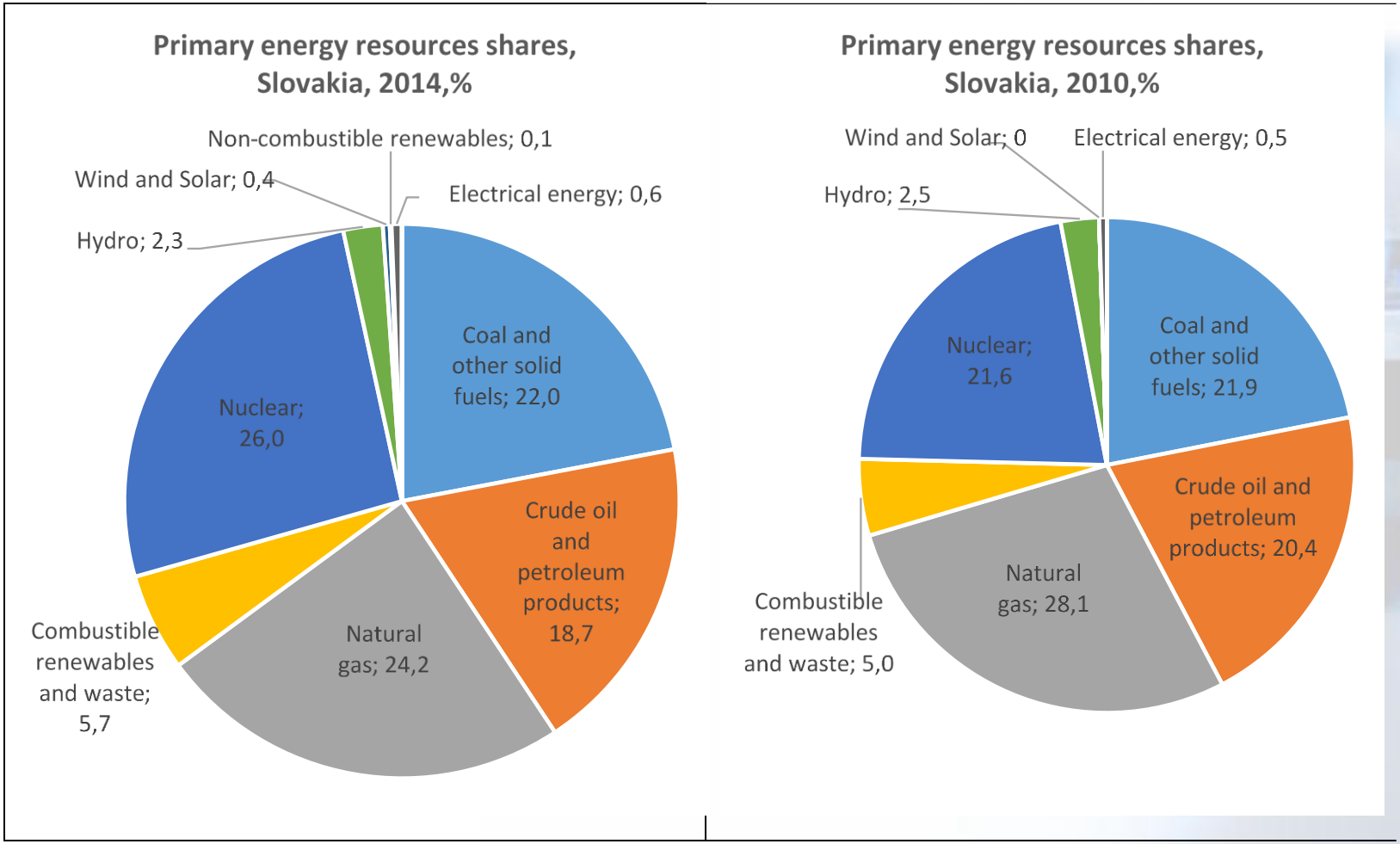
Energy Structure of Poland (2014 vs 2010)





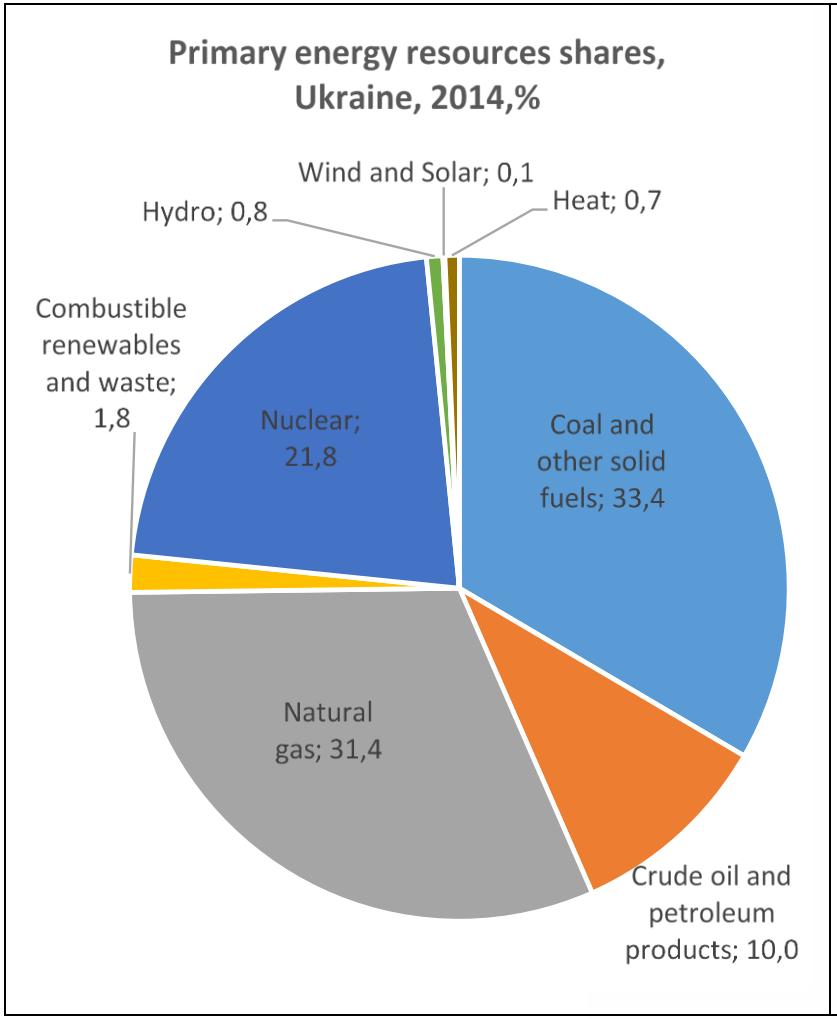
4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors (5)

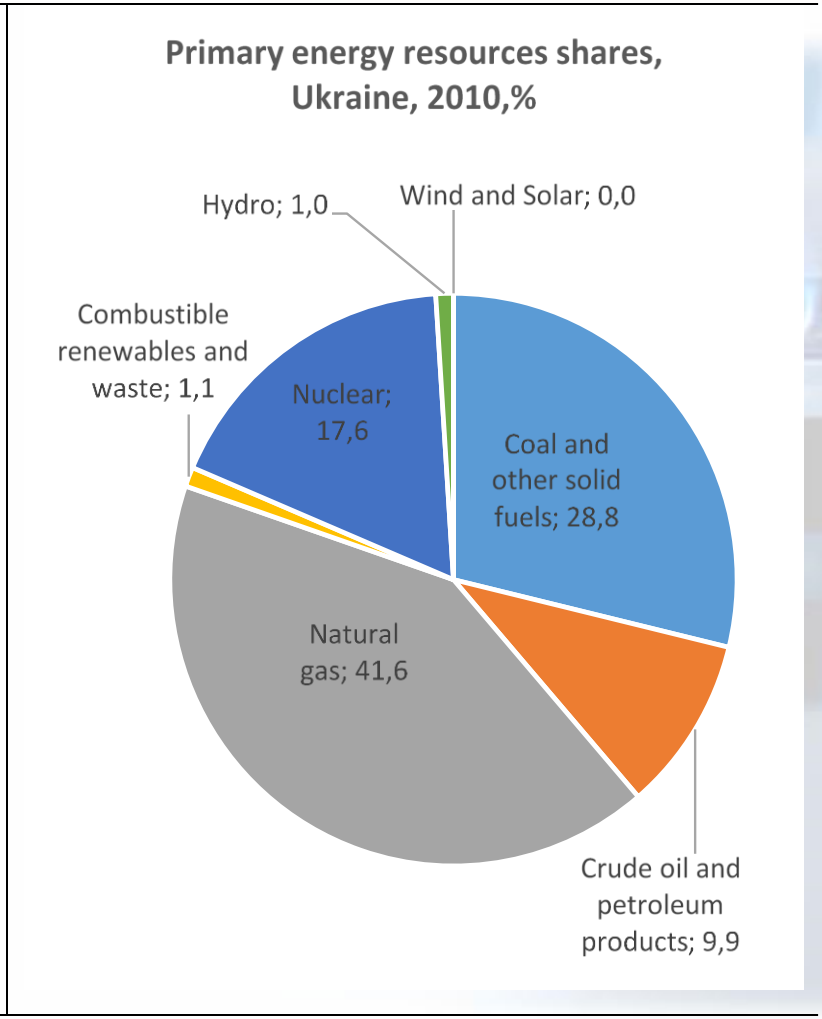
Energy Structure of Slovakia (2014 vs 2010)



4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors (6)

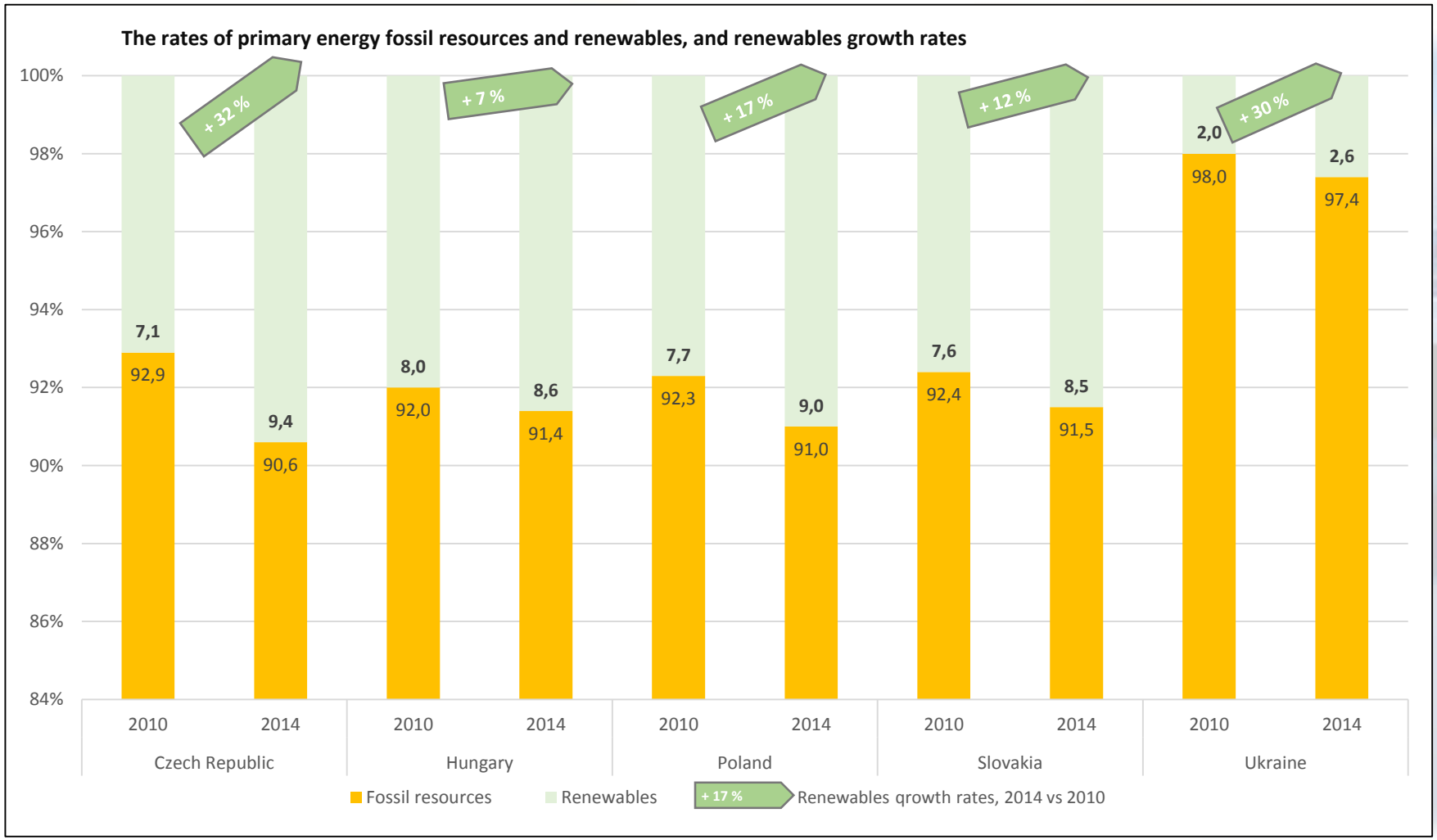
Energy Structure of Ukraine (2014 vs 2010)





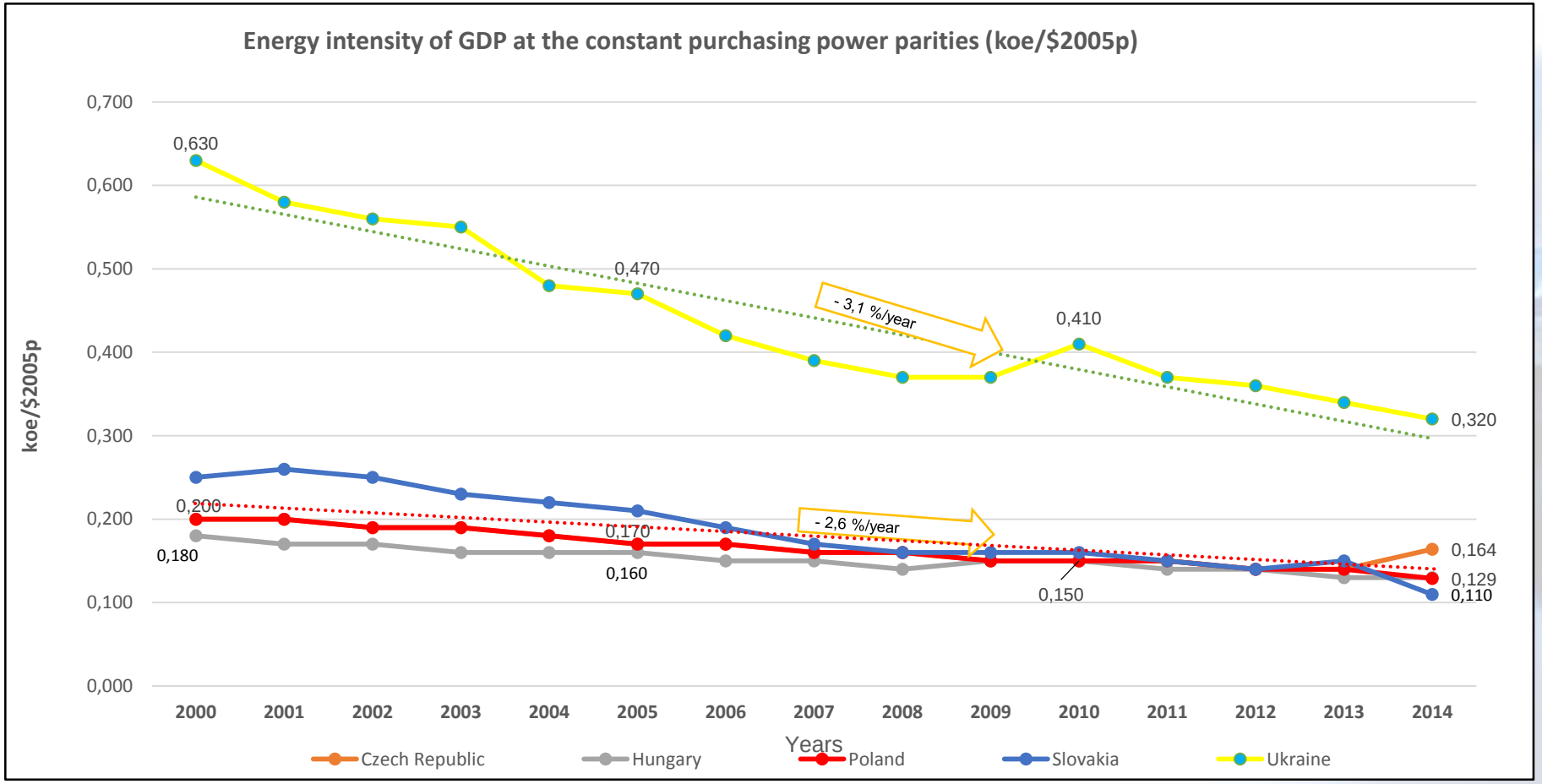
4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors (7)

V4 and Ukraine: RES and Fossil Shares (2014 vs 2010)



4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors (8)

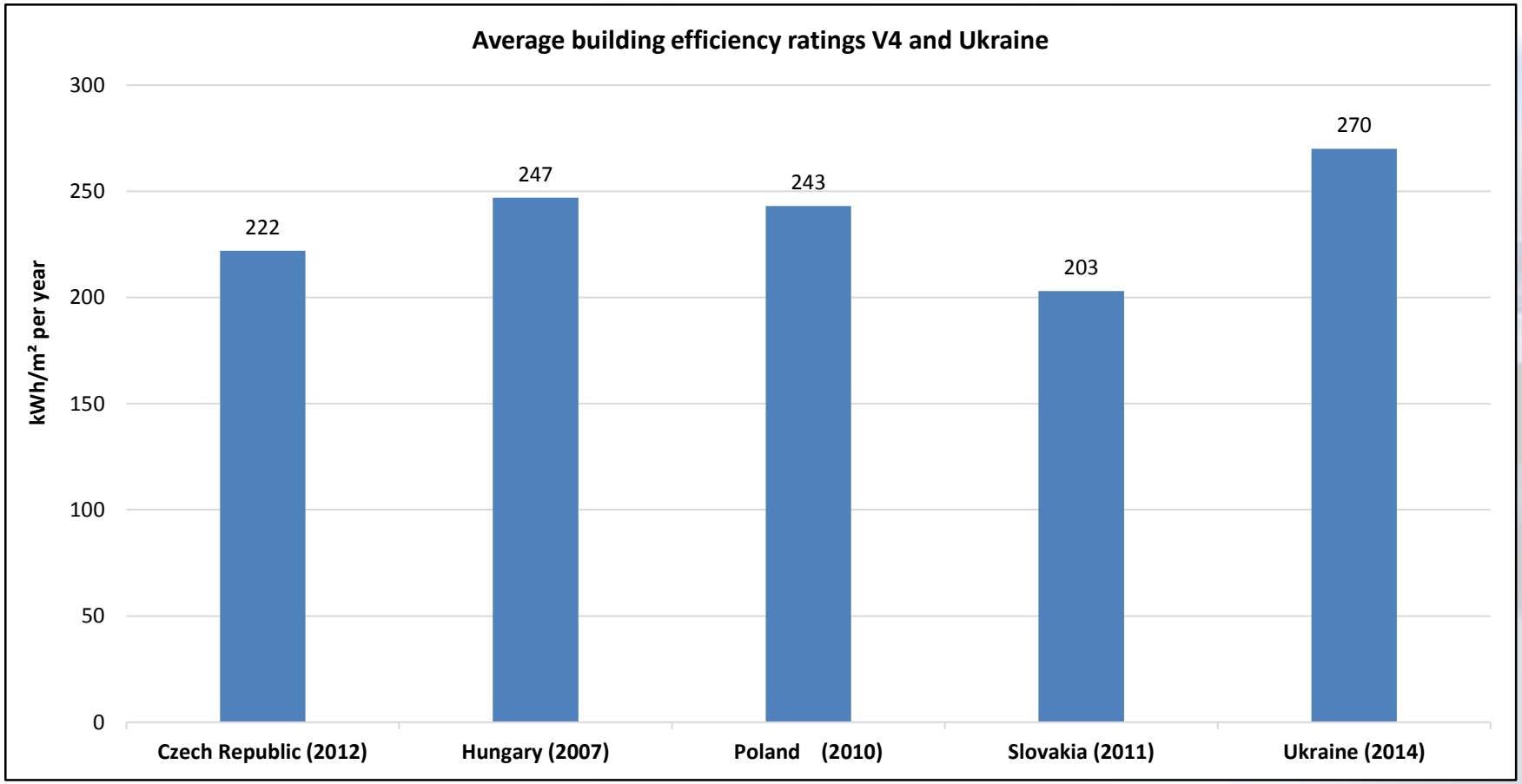
Energy Efficiency Dimension: V4 and Ukraine GDP Energy Intensities



- **If the 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**

4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors (9)

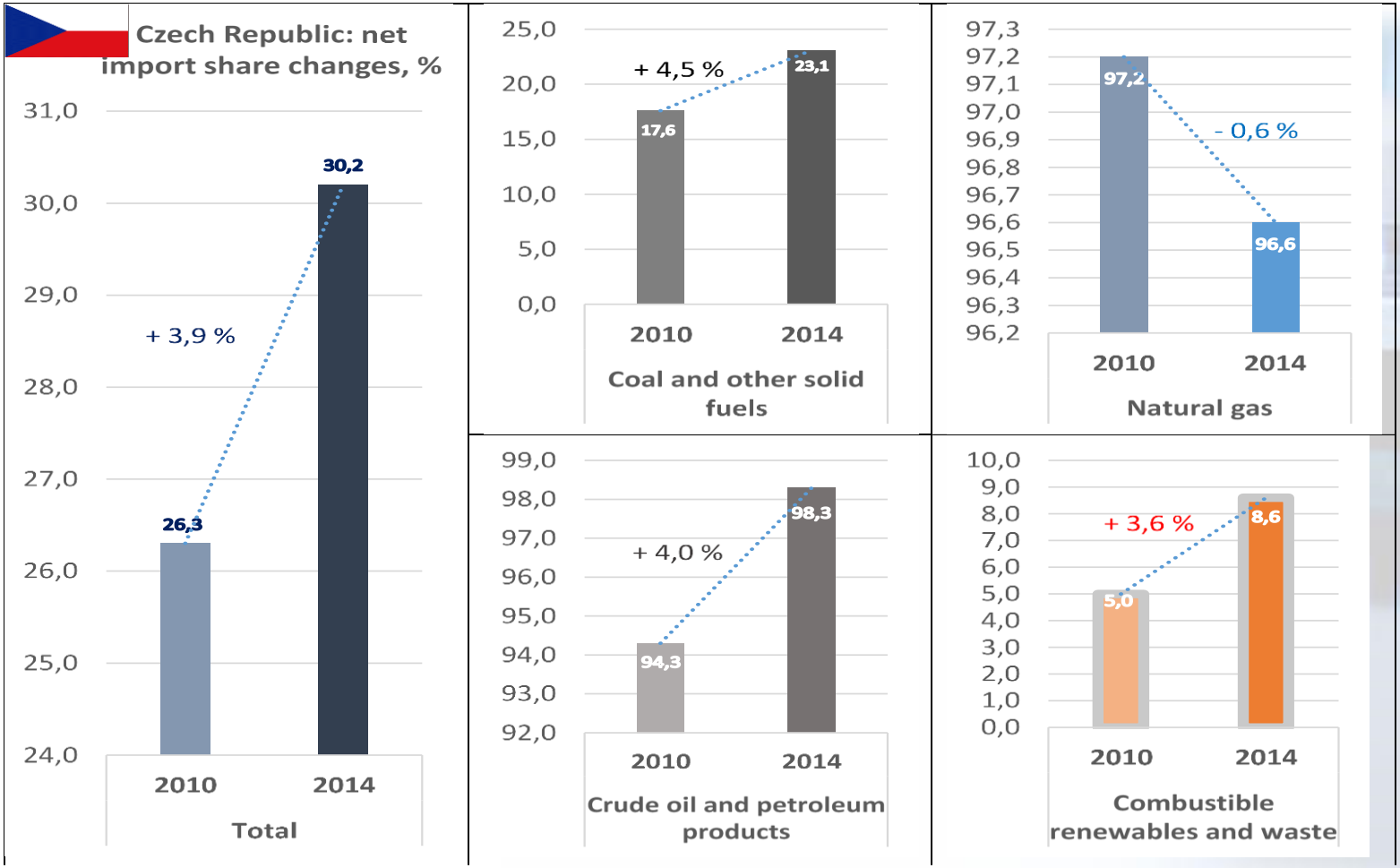
Energy Efficiency Dimension: BER Indexes of V4 and Ukraine



- **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 annually**

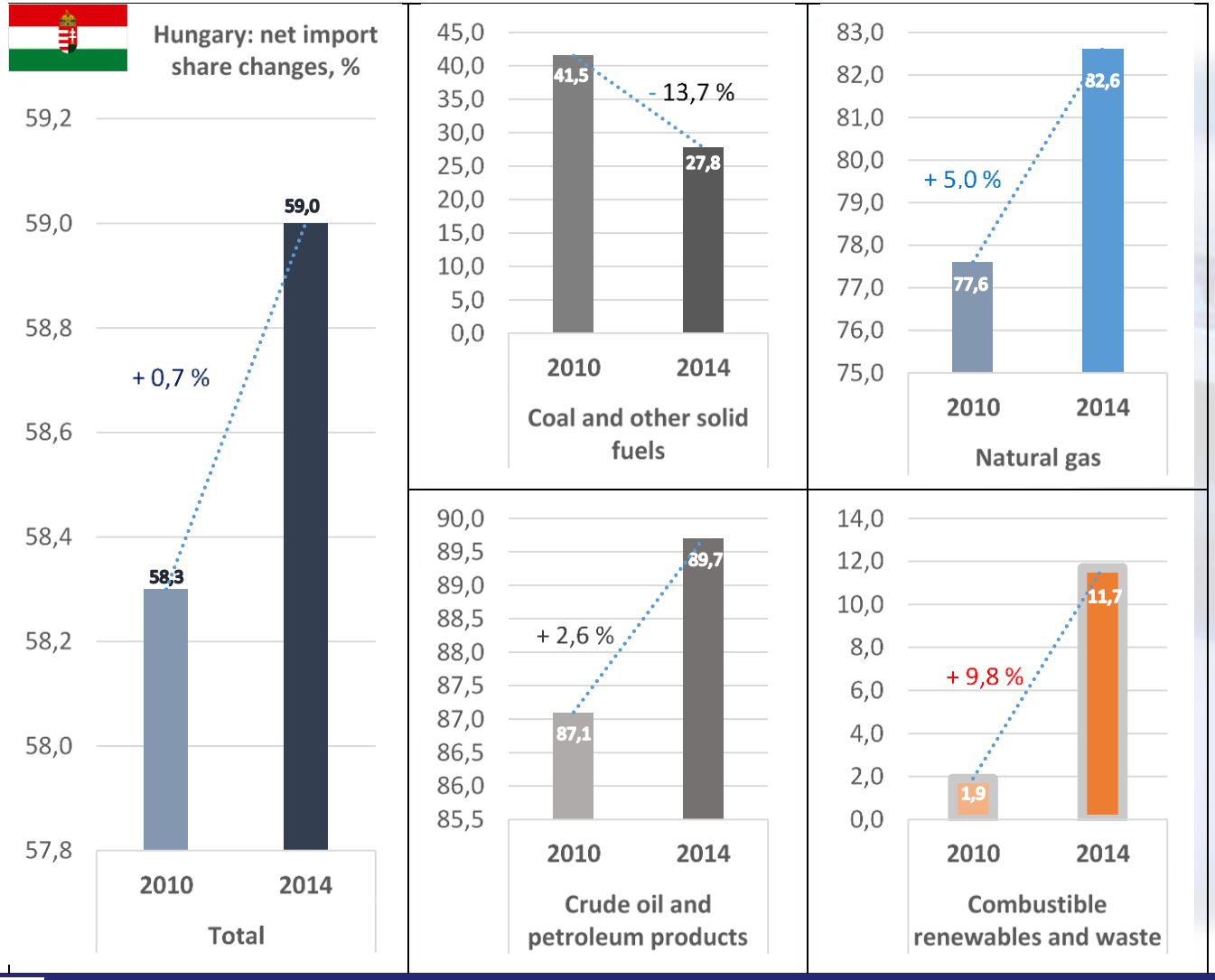
4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors

Energy Security Dimension: Import Shares in Czech Energy Balance



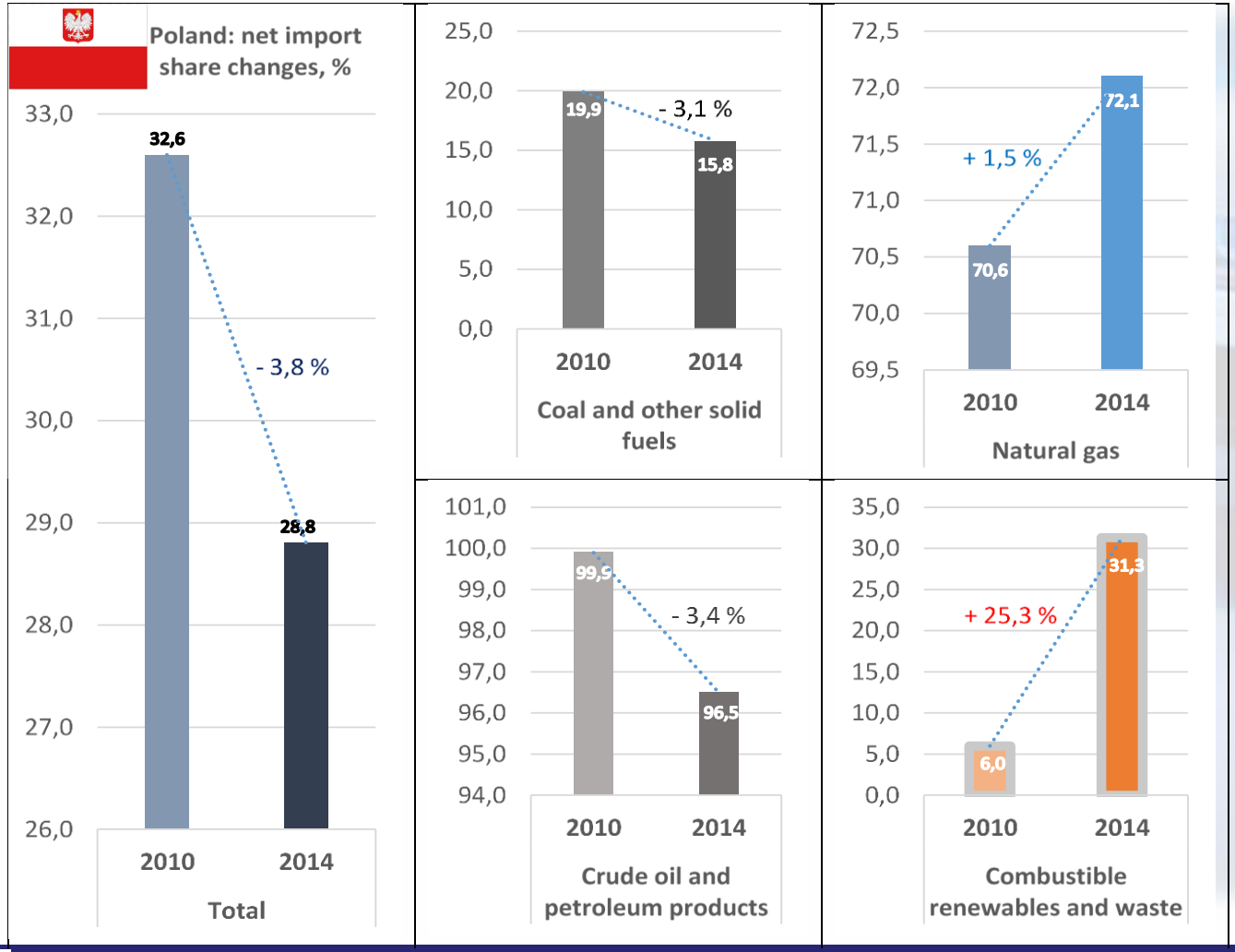
4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors

Energy Security Dimension: Import Shares in Hungarian Energy Balance



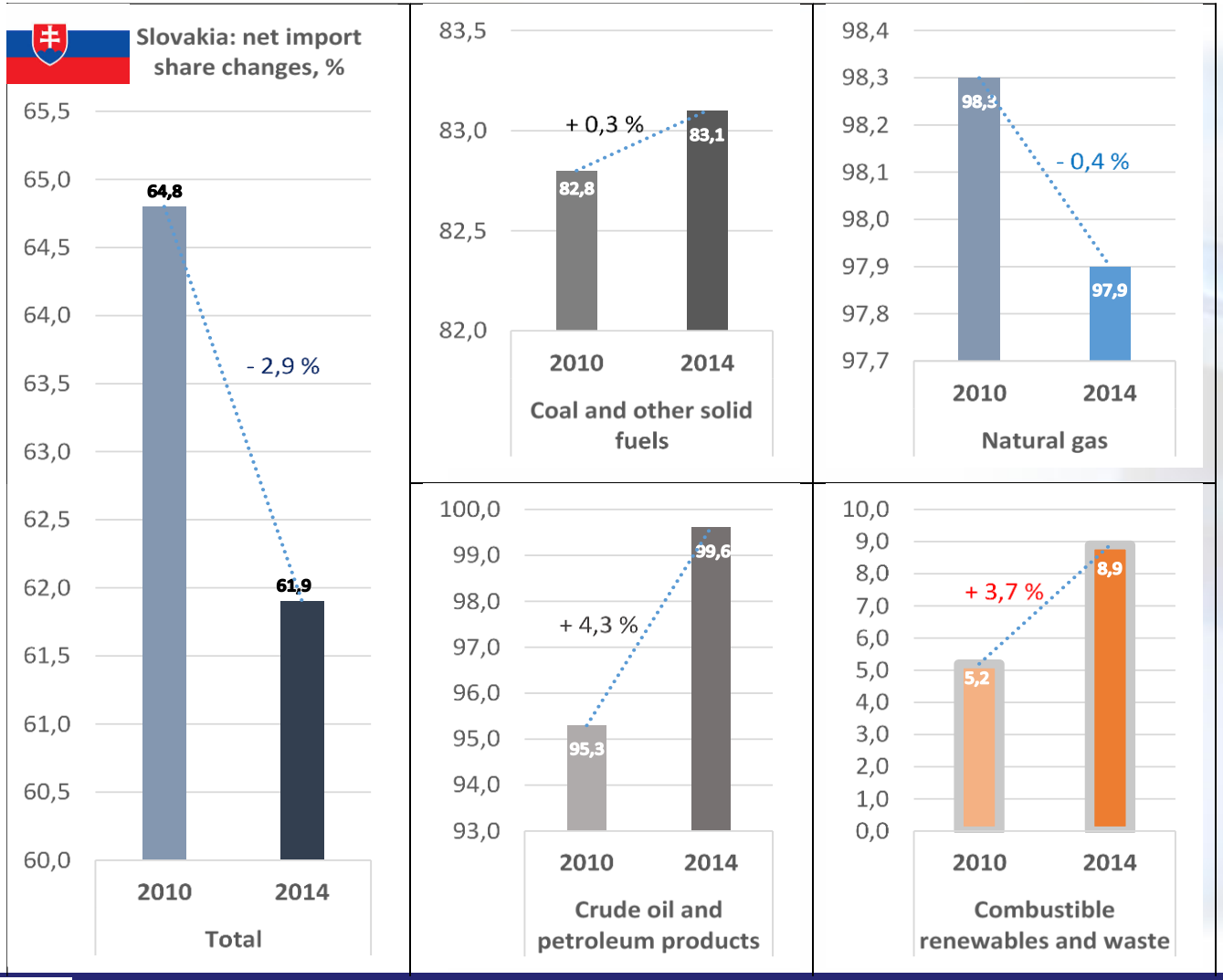
4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors

Energy Security Dimension: Import Shares in Polish Energy Balance



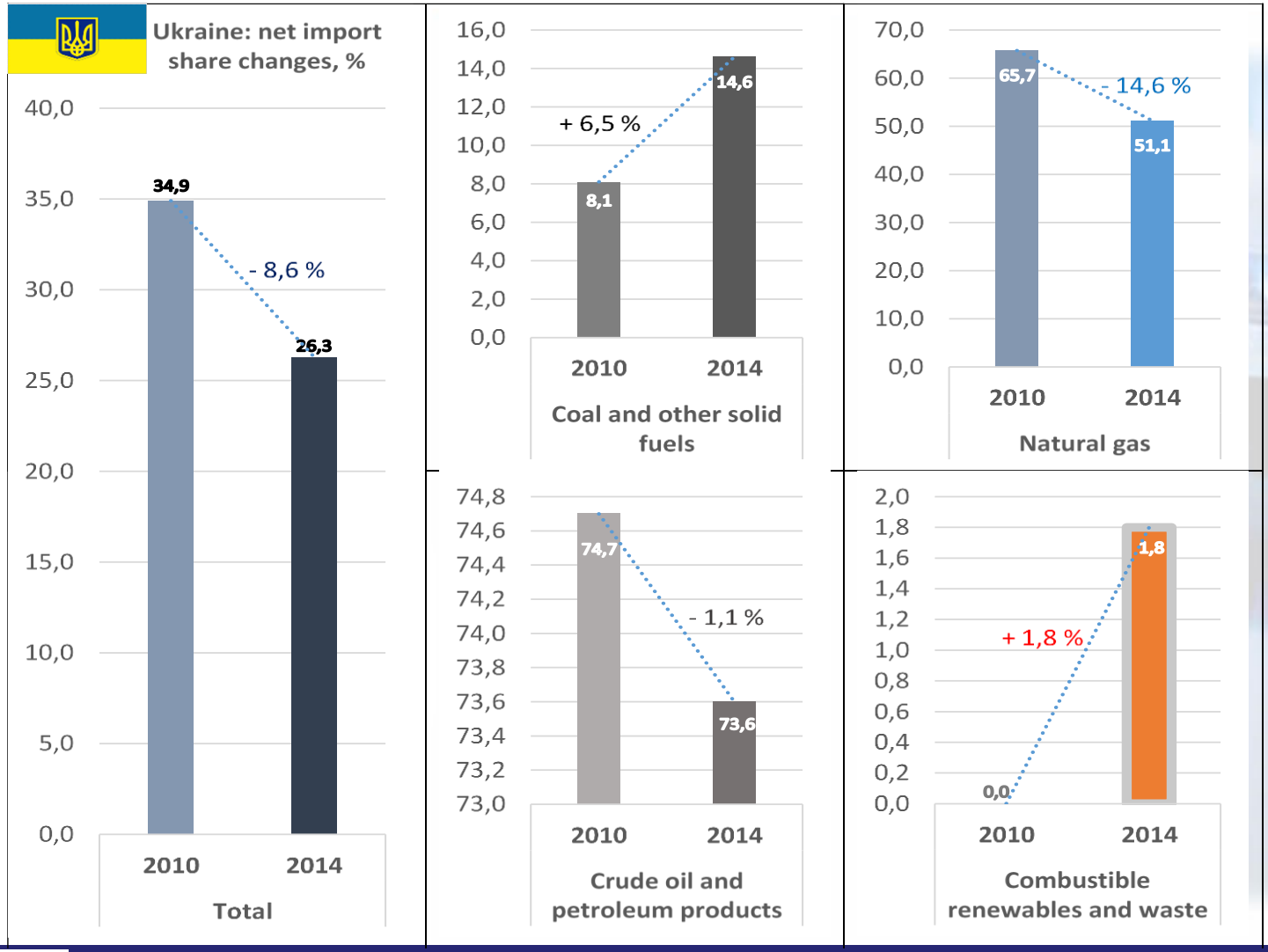
4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors

Energy Security Dimension: Import Shares in Slovakian Energy Balance



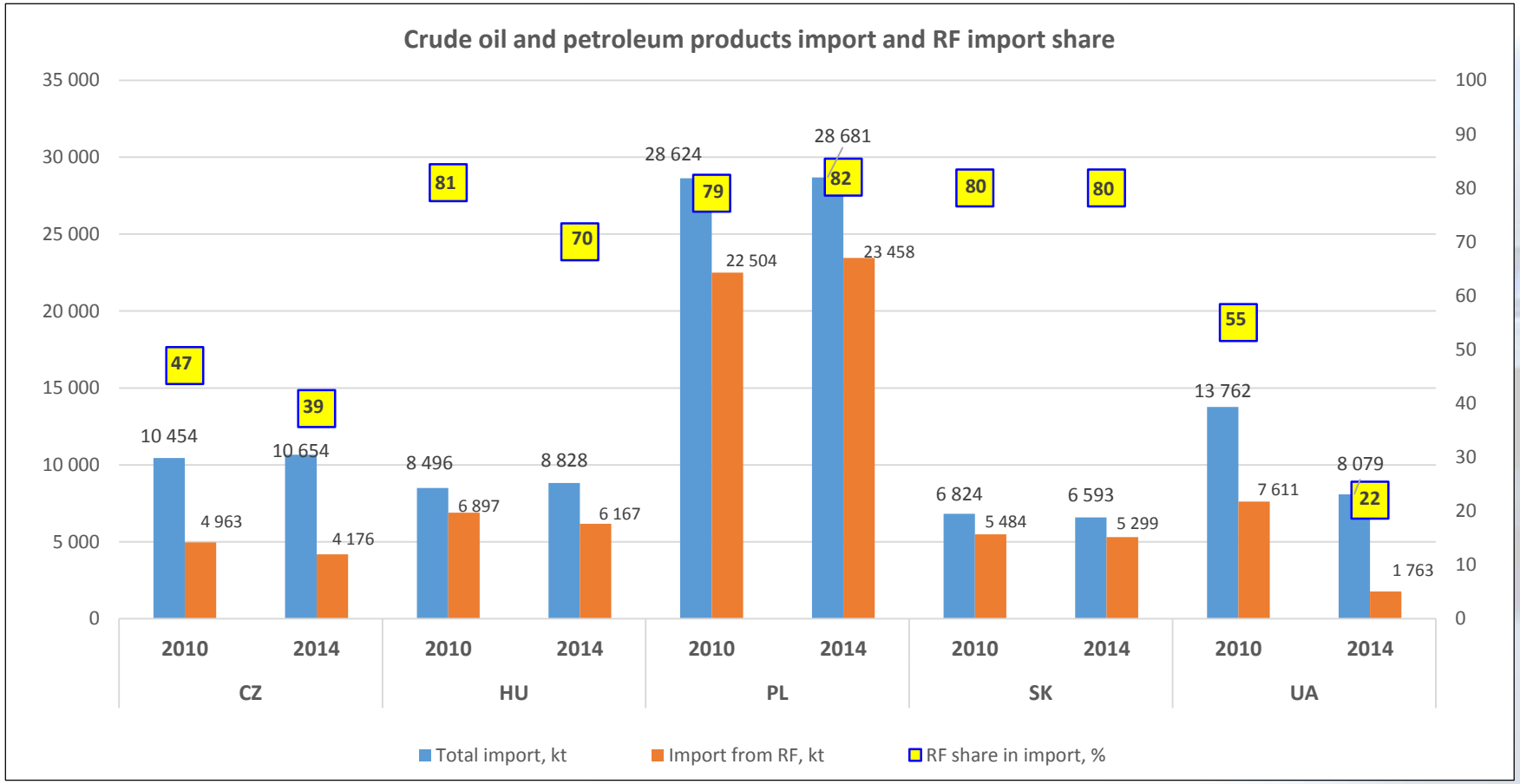
4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors

Energy Security Dimension: Import Shares in Ukrainian Energy Balance



4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors

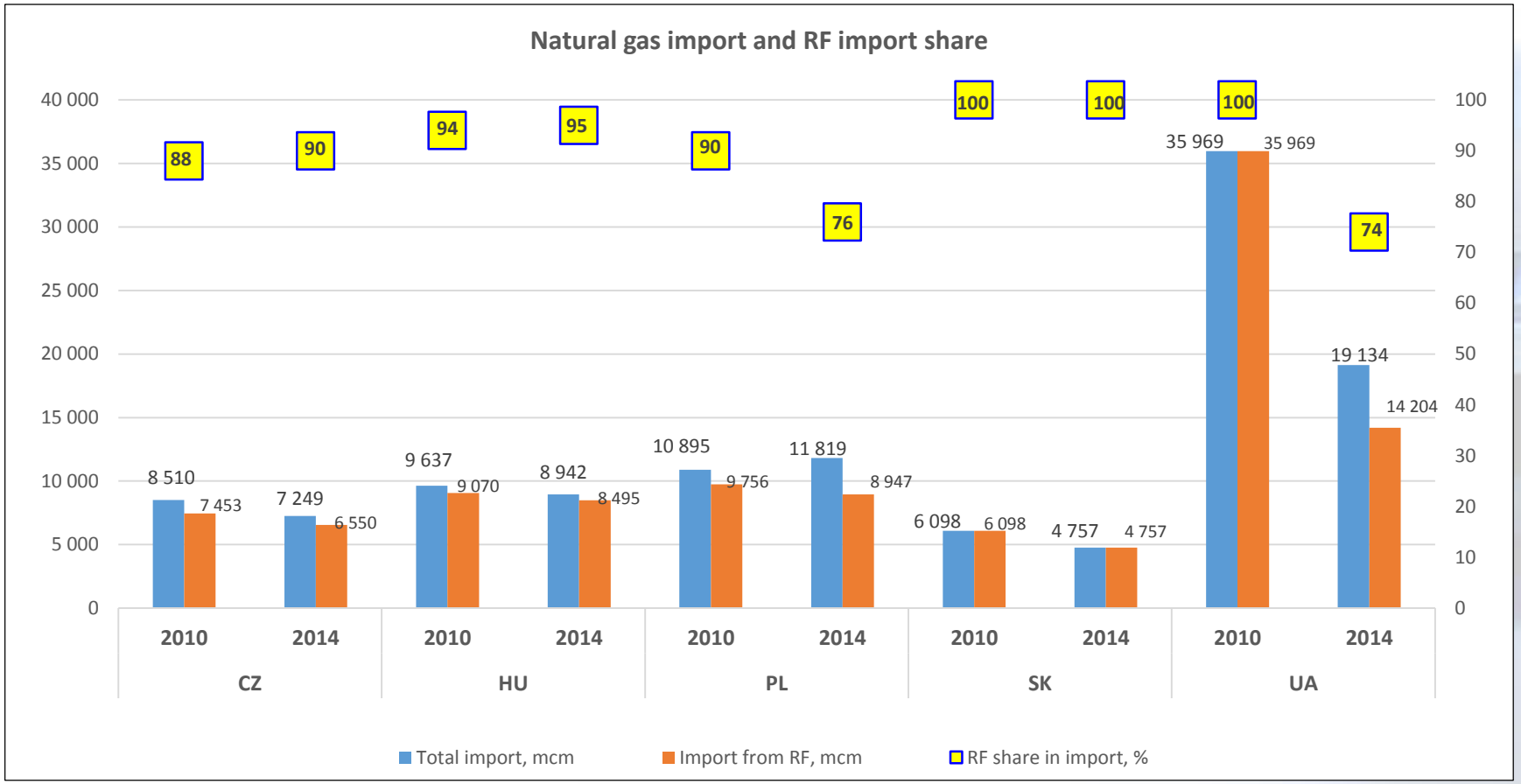
Energy Security Dimension: RF Factor in Oil Import Share



- **EU does no prescribe the limitation of the crude oil and petroleum products supply from one source but Directive 2009/119/EC imposes 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**

4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors

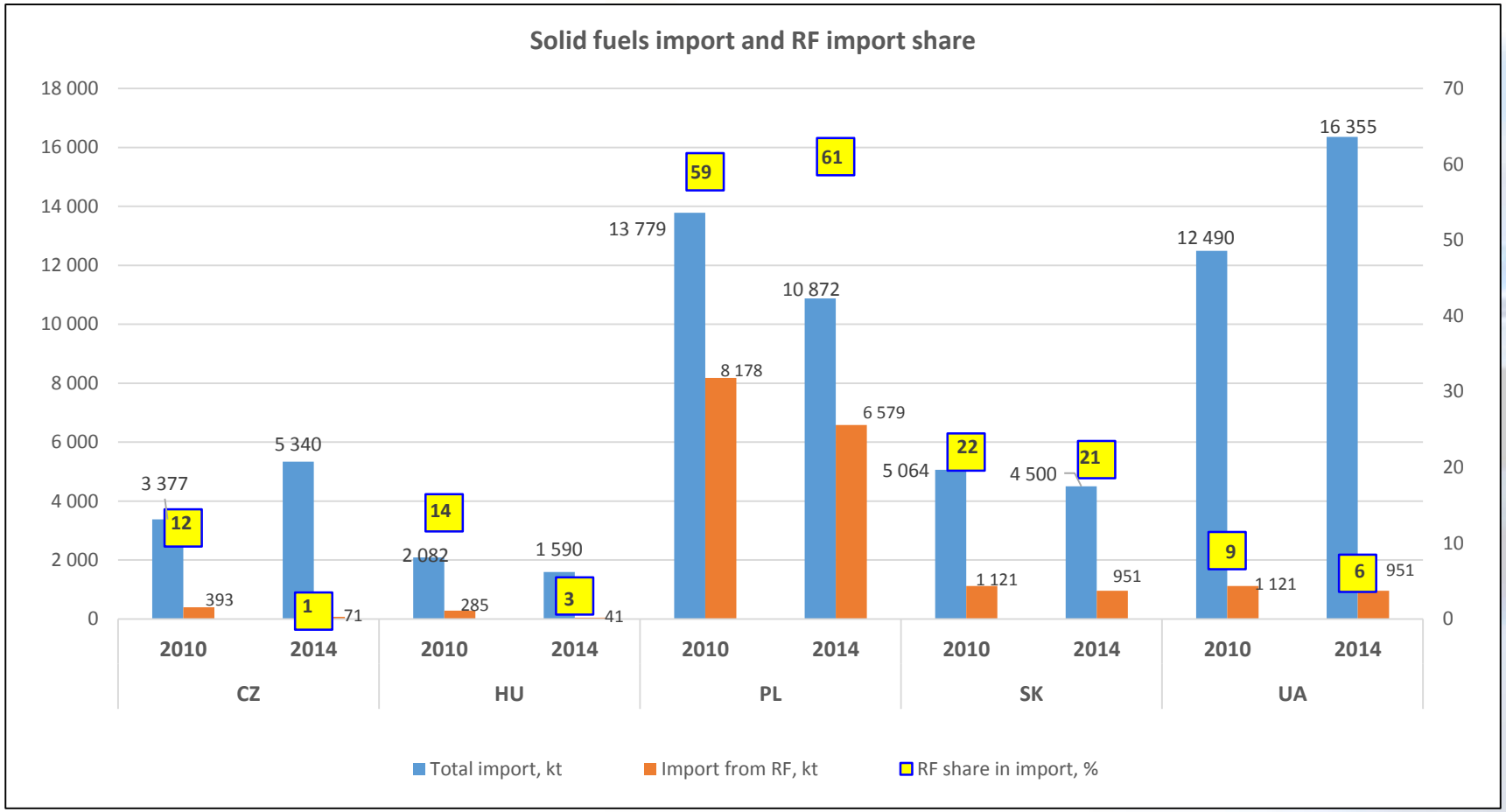
Energy Security Dimension: RF Factor in Gas Import Share



- **The Directive 2009/73/EC establishes the criteria for identification of natural gas markets: isolated market (main supplier market) – more than 75% supply from the one external source; opened market – less than 33% of the total amounts of inland consumption have one source; emergent market - one source of supply occupies from 33 to 75%**

4. Comparative Analysis of V4 Countries' and Ukraine's Energy Sectors

Energy Security Dimension: RF Factor in Solid Fuels Import Share



- **Ukraine increased import of specific types of energetic coal due to loss of internal supply source in Donbass**

5. Proposals for Institutional Development of Ukraine's Energy Sector (1)

National Energy Regulator (NER)

- Depoliticization of the question of NER's formation and activity
- NER embedding to executive branch => Prime Minister should appoint the Chairman of the NER
- More coordination with other state authorities (Antimonopoly Committee, State Service of Ukraine on Issues of Food Safety and Consumer Protection etc)
- NER's efforts concentration upon on regulation over natural gas, electricity and heat markets. Potable water/sewage and wastes regulation should be transferred on local level according to reforms of decentralization
- Transition from Collegiate Decision Making principle to the One-man Management and Individual Responsibility principle in NER's decision making process
- Introduction of Incentive Tariffication Approaches instead of "Cost +" method
- Development, approval, adoption and implementation of the law on NKREKP

5. Proposals for Institutional Development of Ukraine's Energy Sector (2)

National Energy Regulators: Decision Making Principles

One-man management or individual responsibility

The countries following:
- *Czech Republic*
- *Hungary*
- *Poland*

Main characteristics:
- Simplified decision making procedures
- Fastest response upon new challenges for regulation
- No "blurring" responsibility
- Very strong requirements and nomination criteria to the Chairperson

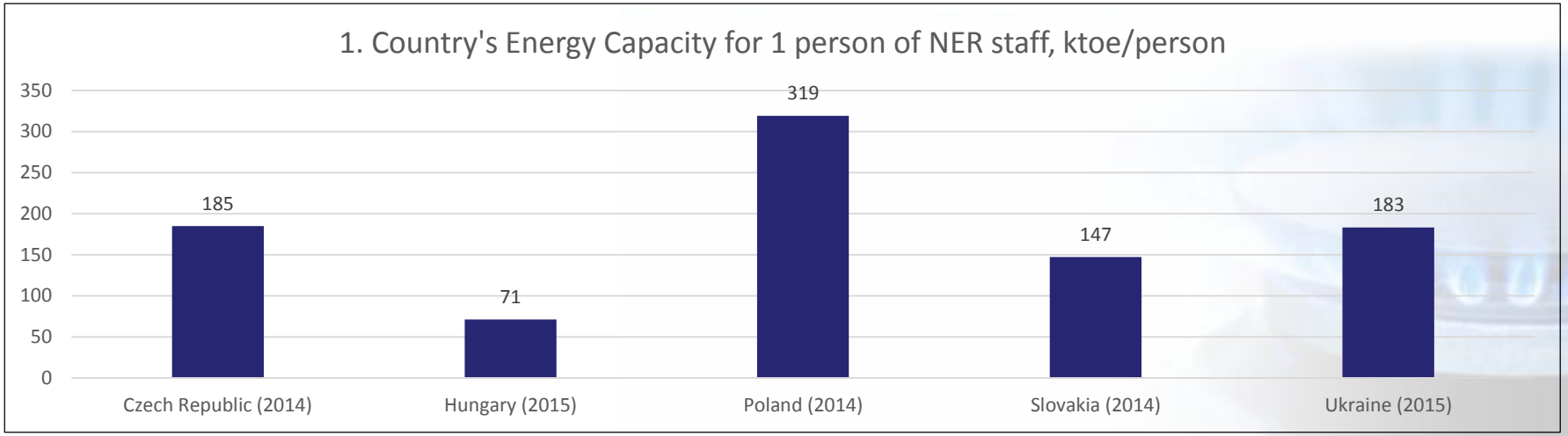
Collegiate decision making

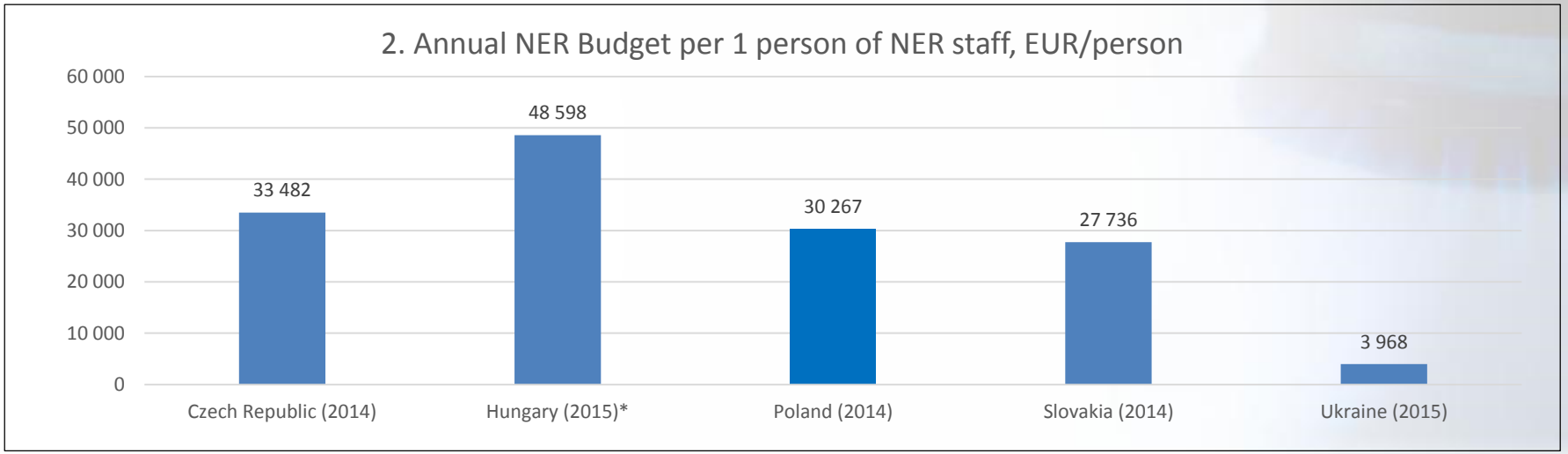
Main characteristics:
- Decision making procedures are more complicated
- More slow response on new challenges for regulation
- Create preconditions for "blurring" of responsibility for collegiate decisions
- Requirements and nomination criteria to the Chairperson are less stronger

The countries following:
- *Slovakia*
- *Ukraine*

5. Proposals for Institutional Development of Ukraine's Energy Sector (3)

V4 and Ukraine's National Energy Regulators: Comparative Criteria



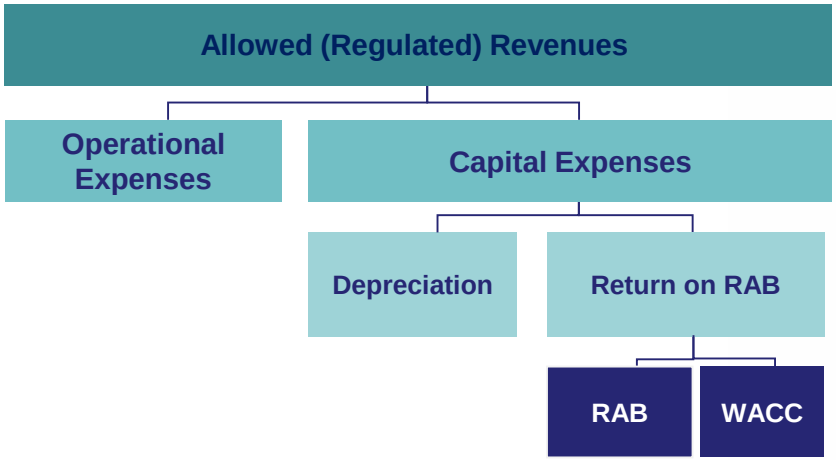


** Cleared from extraordinary expenses occurred due offices relocation*

5. Proposals for Institutional Development of Ukraine's Energy Sector (4)

Incentive Tariffication Approaches Instead "Cost +"

1. Regulatory Assets Base (RAB)

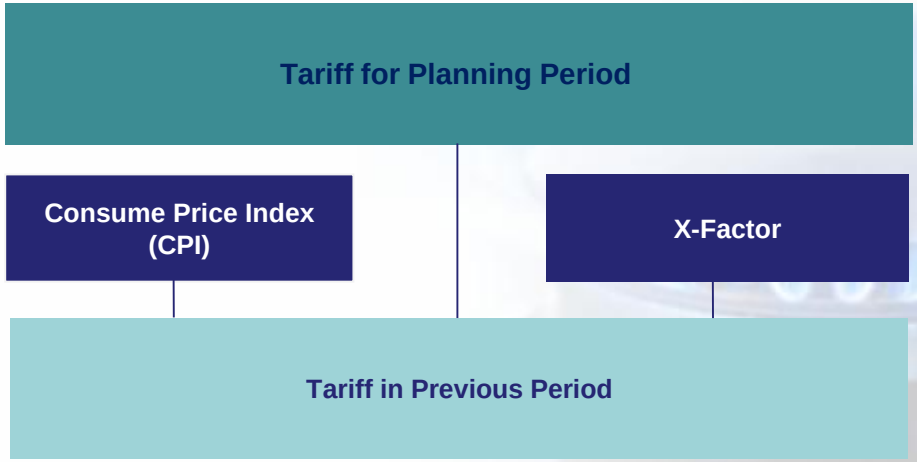


Allowed Revenues = OPEX + Depreciation + RAB * WACC

RAB approach is the base for the financial and economic substantiation when creating (design and construction) new objects, because determines the so-called maximum revenues allowed to the operator or investor of infrastructure facility and ensure him his investments repayment within a certain period of time (not exceeding the life cycle of the object). This so-called "fully regulated" business model means that means the repayments of investments expenses for these projects are through regulated revenues, i.e. the project costs are directly "socialized" and the infrastructure object users pay regulated tariff. Therefore, RAB approach requires the achievement of economically reasonable social consensus on a final investment decision at least among the investing parties.

In order to create economic incentives for the infrastructure facility as a business project, determination of the maximum revenues on RAB base allowed to be recovered by operator or investor is needed. These Allowed Revenues are determined over a pre-defined regulatory period as sum of the CAPEX (Invested Capital), the relevant remuneration on a pre-defined rate of WACC (Weighted Average Cost of Capital) and OPEX (Operating Costs).

2. Price-Cap Regulation



$$P_t = P_{t-1} * (CPI_{t...(t-1)} - X_{t...(t-1)})$$

Price-cap regulation is used for regulating the prices of network services that will remain monopolized (so-called "natural or regional monopolies"). It appears to be successful in its main aim of establishing incentives within the regulatory period for cost efficiency.

Generally, a retail or consumer price index (CPI) measures changes in the price level of a market basket of consumer goods and services purchased by households.

X-Factor means expected efficiency savings and is based not only a firm's past performance, but on the performance of other firms in the industry. The ratio of potential savings are divided between customers and operator and approved by regulatory authority.

5. Proposals for Institutional Development of Ukraine's Energy Sector

Energy Efficiency Funds/Programmes

Promotion the different funds and programmes for energy efficiency in the country

Development, approval, adoption and implementation of the general energy efficiency law in accordance with EU directives: 2013/27/EU, 2010/31/EU, 2010/30/EU

Environmental subtext attributing to the energy efficiency funds and programmes to provide synergetic effect

More coordination between state authorities, local-central coordination

Mass media support, informative and explanatory work

Clear goals and appraisable results for estimation of activity

Independent control and external auditing over funds'/programmes' operations

Thank You for Your Attention!

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