



COUNTRY REPORT SLOVAKIA

Veronika Oravcová

Energy Without Russia

The Consequences of the Ukraine war and the
EU Sanctions on the Energy Sector in Europe

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About the author

Veronika Oravcová works as an SFPA (Slovak Foreign Policy Association) analyst and science and research fellow at the Department of Political Science of the Comenius University in Bratislava. She deals with the issue of energy transition and energy security in Central and Eastern Europe. She is the co-author of the book *From Economic to Energy Transition. Three Decades of Transitions in Central and Eastern Europe* (Palgrave: London, 2021).

Veronika Oravcová

Energy Without Russia: The Case of Slovakia

The Consequences of the Ukraine War and the EU Sanctions
on the Energy Sector in Europe

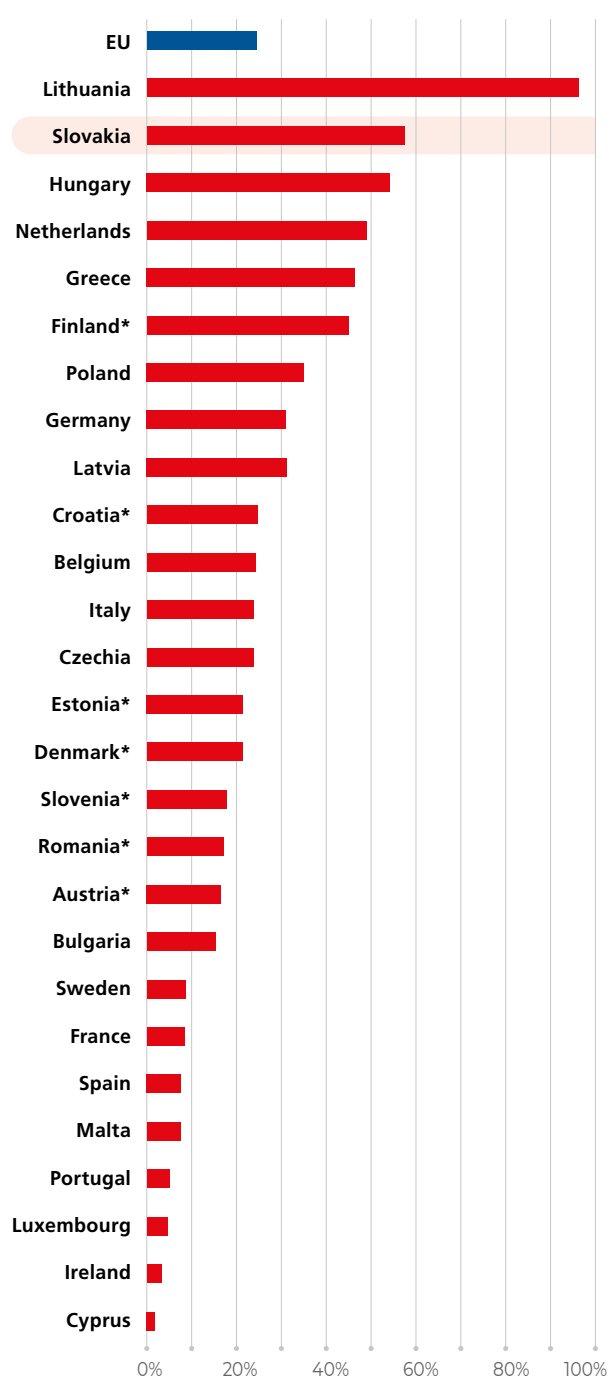
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INTRODUCTION

Before the outbreak of Russian invasion in Ukraine in February 2022 Slovakia was fully dependent on Russian energy imports. Slovakia was almost 100% dependent on Russian imports of natural gas, oil, and nuclear fuel. The country also imported Russian coal, accounting for around one third of solid fuels imports. After the invasion Slovakia began to diversify its natural gas suppliers, and so far it has succeeded in substituting around one third of Russian gas. In February 2022 Slovakia contracted the first LNG import. Diversification efforts have continued, and the country has concluded several new contracts with different suppliers. Coal is important, especially for Slovak industry (US Steel), which already ended Russian coal supplies in April 2022.

In the case of oil and nuclear fuel, the country was less successful. Slovakia still processes Russian oil at the Slovnaft refinery and imports nuclear fuel from the Russian company TVEL. However, both sectors have been adjusting their use to other than Russian sources. Slovnaft is trying to decrease its dependence on Russian oil by up to 60% in 2023 and has been adjusting its technologies for processing different types of oil. The substitution of Russian nuclear fuel is more complicated due to certification processes; however, by the end of the year the company Slovenské elektrárne, which operates nuclear power plants, will have launched a tender for new suppliers.

Figure 1
Imports from Russia in gross available energy, EU, 2020



Source: Eurostat, Including estimates for non-reported data for countries with*

1

SLOVAKIA'S ENERGY SYSTEM BEFORE FEBRUARY 2022

The energy sector in Slovakia relies especially on natural gas, oil, and nuclear power (see Table 1). Domestic production of oil and natural gas are negligible and the country imports these sources through the Druzhba and Brotherhood pipelines. The main domestic sources of energy are renewables (dominated mainly by biomass and hydro production) and brown coal. As for the degree of dependence on third countries, Slovakia is highly dependent on all the main energy sources, with Russia being the main supplier: before the outbreak of full-scale war, Slovakia imported nuclear fuel, natural gas, and oil from Russia.

Coal is used especially in industry (steel production), but also electricity generation and the heating sector. The country is heading towards a coal phase-out, as in 2023 state subsidi-

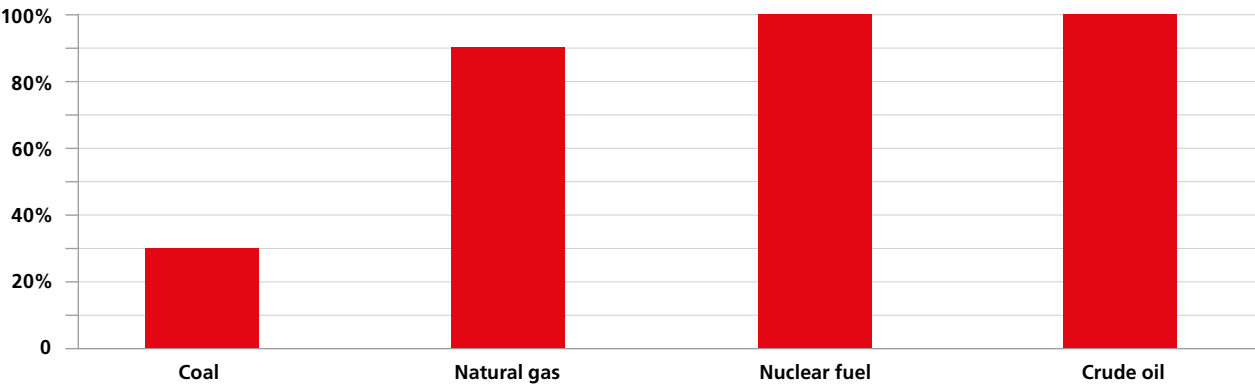
dies for the production of electricity from domestic coal will end, which basically also means the end of coal mining in Slovakia.

Oil is crucial not only for the transport sector, but also for industry (see Figure 3).

Oil deliveries are provided by Russia.¹ Slovakia has one refinery – Slovnaft – located in the capital city, Bratislava, producing a range of products, mainly motor fuels, for domestic consumption and for export to neighbouring countries (es-

¹ Integrated National Energy and Climate Plan for 2021 to 2030 (2019). European Commission: https://energy.ec.europa.eu/system/files/2020-03/sk_final_necp_main_en_0.pdf

Figure 2
Imports from Russia in energy supply before the war (2021)



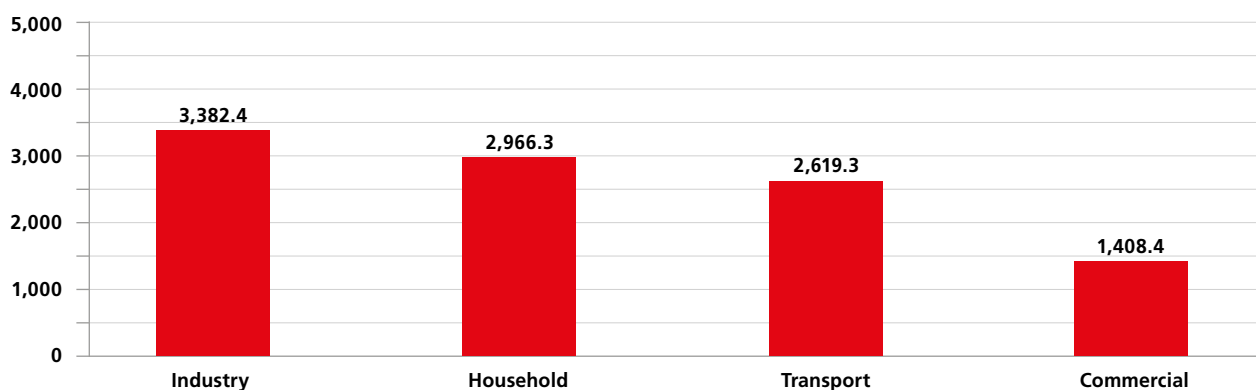
Source: Statistical Office of the Slovak Republic, Eurostat

Table 1
Total energy supply by product (2021; in ktoe)

Natural gas	4,551.1	26%
Nuclear	4,051.1	23%
Oil and petroleum products	3,714.4	21%
Solid fossil fuels	2,823.3	16%
Renewables and biofuels	2,325.1	13%
Non-renewable waste	273	1%

Source: Eurostat

Figure 3
Final energy consumption by sector (2021; in ktoe)



Source: Eurostat

pecially Czechia). Slovnaft has been part of the Hungarian MOL Group since 2004. Slovakia is also dependent on natural gas imports and has very limited domestic production that covers around 1% of overall consumption. Domestic production has been gradually falling. The bulk of gas consumption is mostly used for heating and electricity generation in the steel and iron industries, and also as a feedstock in the chemical and petrochemical industries. Currently, around three quarters of Slovak municipalities are connected to the gas infrastructure, which accounts for more than 94% of all inhabitants of Slovakia. Gas is the predominant heating source in more than 1.48 million apartments, which accounts for 66.2% of all apartments, while over 68% of houses are connected to the gas infrastructure.²

Nuclear is the most important source in electricity generation (see Figure 4). Nuclear power plants are located at two sites, in Mochovce and Jaslovské Bohunice. Two blocks of the Mochovce power plant were put into operation in 1998 and 1999 with an anticipated lifetime of 50–60 years. Blocks of the Bohunice V2 power plant were put into operation in 1985 and 1986 and should be operational by 2045.

The Bohunice power plant also supplies heat to nearby towns. In 2023, block 3 of the Mochovce power plant was completed and put in operation³ and currently block 4 is planned to be commissioned. After putting block 4 into operation Slovakia will have six nuclear blocks with a total installed capacity of 2,880 MW.

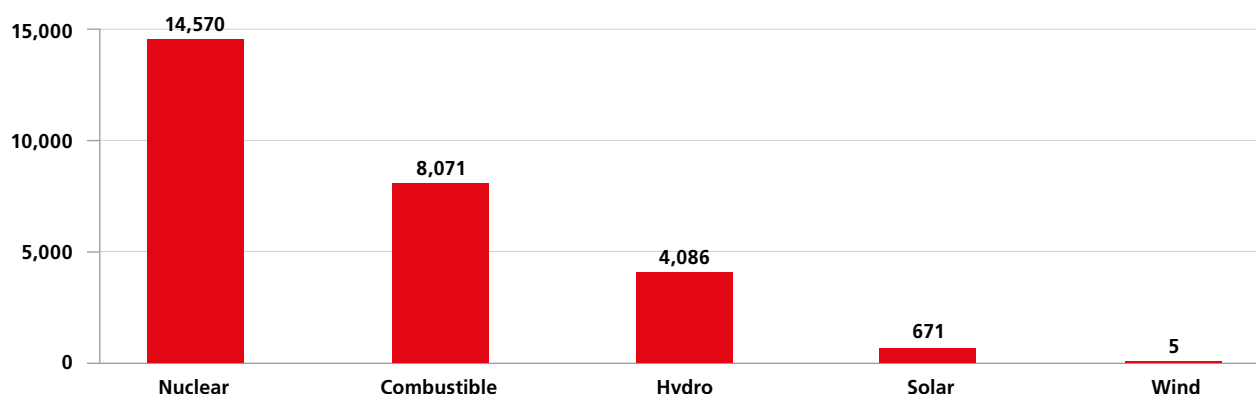
For nuclear fuel, Slovakia is dependent on Russia. In 2018, Slovenské elektrárne company (which operates nuclear power plants) signed a contract for the supply of nuclear fuel with Russian company TVEL. The contract is valid for the 2022–2026 period, with the option of extension to 2030, and allows programmes for the introduction of nuclear fuel from alternative suppliers. American Westinghouse was also part of the tender, but it offered a higher price and therefore the TVEL company was chosen. Price was the main criterion of the tender and aspects of energy security have not been considered and addressed properly.⁴

² Plyn ako prevažujúci zdroj na vykurovanie využíva 66,2 percenta bytov (2022). Trend: <https://www.trend.sk/spravy/plyn-ako-prevazujuci-zdroj-vykurovanie-vyuziva-66-2-percenta-bytov>

³ Tretí blok Mochoviec zvýšil výkon na 35 % (2023). Slovenské elektrárne: <https://www.seas.sk/tlacove-spravy/treti-blok-mochoviec-zvysil-vykon-na-35/>

⁴ M. Hudec, Expert na jadrové elektrárne: Pri dodávateľovi paliva by sme sa nemali dívať len na cenu (2022). Euractiv: <https://euractiv.sk/section/energetika/news/expert-na-jadrove-elektrarne-pri-dodavatelovi-paliva-by-sme-sa-nemali-divat-len-na-cenu/>

Figure 4
Net electricity production (2021; in GWh)



Source: Eurostat

The role of coal in the overall energy mix has been gradually decreasing. Domestic production in the Upper Nitra region does not cover coal demand, domestic coal is uncompetitive, and the sector is highly dependent on state subsidies, which are to end in 2023. As for coal-fired power plants, the Nováky power plant (Upper Nitra region) and the Vojany power plant (Eastern Slovakia) are currently in operation. The Upper Nitra region is a mining region that has been included among the 14 pilot regions across the EU that are to undergo transition towards a post-coal economy and has also become part of the Just Transformation Mechanism. Support for electricity generation from coal and lignite will be abolished in accordance with the Action Plan for the Transformation of the Upper Nitra Coal Region approved by the Slovak Government in 2019. The Nováky power plant, after its transformation from solid fossil fuels, will remain the primary heat source for the region. In the case of the Vojany power plant, its transformation towards using solid secondary fuel is being considered, along with support for the circular economy in the region. Since 2009 biomass in form of wood chips has also been added to the fuel supply.⁵

Renewables are dominated by biomass that is crucial in the heating sector, and hydro, which is a key renewable energy source in electricity generation. The country is lagging behind in the development of wind energy (having only five turbines), solar, and geothermal as well (see the final section below for a more detailed discussion). According to Eurostat data, the share of energy from renewable energy sources stood at 17 % in 2021.

⁵ Vojany power plants (2022). Slovenské elektrárne: <https://www.seas.sk/elektraren/elektrarne-vojany/>

2

AD HOC RESPONSES AFTER FEBRUARY 2022

Russia's invasion of Ukraine in February 2022 revealed the vulnerability of the Central European region in the energy sector, while two problems have been fully exposed: first, dependence on third countries in energy (which was the case of Slovakia) and second, a more intense use of domestic fossil fuels undermining the EU climate goals (for instance Poland). The immediate reaction of the EU and its member states was unprecedented diversification, especially in the gas and oil sectors. Currently, there is a strong need to further diversify existing energy routes and suppliers, but it is important to focus on decarbonisation and energy efficiency measures. The Russian invasion of Ukraine highlights the need to decouple not only from Russian energy sources, but from fossil fuels in general, which is challenging at both the political and technological levels.

NATURAL GAS

In 2022 Slovakia began to decrease its dependence on Russia by diversification of energy suppliers, especially in the natural gas sector. However, it must be noted that these debates on diversification in the country are not entirely new. These discussions were already on the table in 2009 during the gas crisis. Slovakia has been among the countries that were hit the hardest by the cutting off of supplies through Ukraine. Since the country was completely unprepared for this situation, in terms of physical infrastructure several diversification projects have been introduced since then under the umbrella of the EU initiative projects of Common Interest.⁶ Slovakia has now been connected to all its neighbours including interconnection projects with Hungary, and reverse-flow projects from the Czech Republic, Ukraine, and Austria. The country has also developed underground gas storage sites. The last project was the Polish-Slovak gas interconnector that was put in operation in November 2022, gaining access to the Polish LNG terminal in Świnoujście. However, despite all of the building up of infrastructure, the main supplier has remained the same: Russia. Therefore, since 2022 the main measures in the natural gas sector have been dedicated to the diversification of energy suppliers.

SPP (Slovakia's largest gas supplier) has concluded contracts on Norwegian gas and also LNG for the first time and considered taking a share in LNG terminals in the countries of the Baltic Sea. Despite initial estimates by the Ministry of Economy that Slovakia could cover two thirds of its natural gas imports with non-Russian sources,⁷ by the end of the year around 60% of natural gas was still coming from Russia.⁸ There have also been several negotiations at the ministerial level to gain access to LNG from Qatar, Asia, Africa, and the United States.⁹ Diversification efforts have continued, and SPP signed a Memorandum of Understanding with Italian companies ENI, Snam, and Enel¹⁰ and German RWE¹¹ on commercial cooperation in the gas and LNG sector. The Italian Memorandum was also discussed during the visit of Italian President Sergio Mattarella in Slovakia with his counterpart President Zuzana Čaputová.

Diversification efforts have been more successful than emergency supplies and measures to economise. Slovakia has been failing to address proper energy efficiency measures and despite there having been a risk of gas shortages in Europe before the heating season (2022/2023, with the next two winters also being critical), Slovakia was not able to conclude solidarity agreements with its neighbouring countries that would provide emergency gas supplies. The EU countries agreed to reduce gas consumption by at least 15 per cent between August 1, 2022, and March 31, 2023, as part of the REPowerEU agreement in Council Regulation (EU) 2022/1369 on coordinated gas demand-reduction measures within the Save Gas for a Safe Winter initiative. Several countries have managed to get opt-outs, including

⁶ Projects of Common Interest (2013). European Commission: https://energy.ec.europa.eu/topics/infrastructure/projects-common-interest_en

⁷ Sulík: SPP podpísal nový kontrakt na plyn, ktorý pokryje 65% spotreby (2022). TASR: <https://www.teraz.sk/slovensko/spp-podpisal-zmluvu-na-dodavku-norske/636585-clanok.html>

⁸ D. Funtíková and T. Grečko, Zmluva s Gazpromom platí do roku 2034, dovtedy musíme za ruský plyn platiť, hovorí šéf SPP (2023). Denník N: <https://e.dennikn.sk/3210323/zmluva-s-gazpromom-plati-do-roku-2034-dovtedy-musime-za-ruskyy-plyn-platit-hovori-sef-spp/?ref=inm&ga=2.147535031.1253148166.1682318304-1258735783.1661247989>

⁹ Korčok rokoval v Katari aj o dodávkach skvapalneného plynu (2022). Trend: <https://www.trend.sk/spravy/mzvez-korcok-rokoval-katare-aj-dodavkach-skvapalneného-plynu>

¹⁰ SPP podpísal memorandá s kľúčovými spoločnosťami talianskej energetiky (2023). TASR: <https://www.teraz.sk/ekonomika/spp-podpisal-memoranda-s-klucovymi/709091-clanok.html>

¹¹ SPP podpísal s nemeckou spoločnosťou RWE memorandum o porozumení (2023). SPP: <https://www.spp.sk/spp-podpisal-s-nemeckou-spolocnostou-rwe-memorandum-o-porozumeni/>

Slovakia because of the size of its industrial sector and sufficient gas storage levels.¹² However, in April 2023 Eurostat released a document showing that natural gas consumption had dropped by 17.7 per cent from August 2022 to March 2023 in the EU. All the countries were able to save gas with the exception of Ireland (−0.2%), Slovakia (−1.0%), Spain (−10.8%), Poland (−12.5%), Slovenia (−13.8%), Belgium (−14.5%), and Malta, which actually saw a 12.7% increase.¹³ Several state institutions launched their own information energy saving campaigns, for example the Slovak Innovation and Energy Agency together with the Ministry of Economy and a government office which provided tips on how to reduce household and office energy bills. The Ministry of Environment came up with the own initiative, setting a savings target of 15 per cent and issuing energy saving guidelines for public buildings,¹⁴ but despite the monthly reporting commitment, there is no data monitoring and the amount of savings are not being tracked.

OIL SECTOR

Similar to the natural gas sector, the 2009 gas crisis also brought several lessons with regard to the oil sector. The main project was the connection of the Družba pipeline (from Russia through Belarus and Ukraine to Slovakia) to the Adria pipeline, thus also connecting Slovakia to Croatia and gaining access to the Omišalj terminal. Although the project was completed in 2015 and the Slovnaft refinery began to test non-Russian oil back in 2016,¹⁵ the refinery has still not substituted Russian oil. Therefore the Družba pipeline was not included in the sixth package of the EU sanctions towards Russia, which gained time for Slovakia to address the refinery technological problems with oil processing.¹⁶ (See the next section for detailed discussion on oil sanctions.) However, Slovnaft has announced that it has started to process oil from Arab countries and the Caspian Sea and expects to process around 30–40% of non-Russian oil in 2023.

NUCLEAR FUEL

For years, nuclear has been considered a domestic energy source in Central and Eastern European countries, although the fuel is imported from third countries.¹⁷ The fuel for both

of Slovakia's nuclear power plants – Jaslovské Bohunice and Mochovce – is supplied by the Russian company TVEL. The need for fuel diversification only began to be debated properly in 2022, following the arrival in March of Russian planes carrying fuel for the nuclear power plants despite the EU's and the government's decision to close the airspace. Until then the price of the nuclear fuel had been the deciding factor, without considering safety and supplier reliability. For example, American Westinghouse has been testing nuclear fuel designed for VVER 440 reactors (found in Slovakia and other EU countries – Bulgaria, Hungary, Finland and the Czech Republic). Fuel diversification has become a priority for the Ministry of Economy, and in 2022 Slovenské elektrárne initiated a tender for a nuclear fuel supplier;¹⁸ however, the process of certification of new nuclear fuel will take several years.

¹² Council Regulation (EU) 2022/1369 of 5 August 2022 on coordinated demand-reduction measures for gas (2022). Official Journal of the European Union <https://eur-lex.europa.eu/eli/reg/2022/1369/oj>

¹³ <https://ec.europa.eu/eurostat/web/products-eurostat-news/w/DDN-20230419-1>

¹⁴ Verejná správa ide príkladom (2022). Ministry of Environment of the Slovak Republic: <https://www.minzp.sk/files/aktuality/verejna-sprava-ide-prikladom.pdf>

¹⁵ Slovnaft sa chystá testovať inú než ruskú ropu (2022). SITA: <https://www.energia.sk/slovnaft-sa-chysta-testovat-inu-nez-rusku-ropu/>

¹⁶ O. Világi, Ako je to s kapacitou (2022). HN Online: <https://hnonline.sk/komentare/komentare/96017670-ako-je-to-s-kapacitou>

¹⁷ J. Osička and F. Černoch, Anatomy of a black sheep: The roots of the Czech Republic's pro-nuclear energy policy, Energy Research & Social Science, 2017, 27, pp. 9–13.

¹⁸ Vymenia slovenské atómky ruského dodávateľa jadrového paliva? Signálov pribúda, tak skoro to však nebude (2023). Zoznam: <https://openiazoch.zoznam.sk/energetika/vymenia-slovenske-atomky-ruskeho-dodavateľa-jadroveho-paliva-signalov-pribuda-tak-skoro-to-vsak-nebude/>

3

MAIN CONSEQUENCES OF THE CONFLICT AND SANCTIONS SO FAR

The full-scale war in Ukraine revealed the vulnerability of the energy sector, as demonstrated especially by the hesitant approach on the part of the EU countries (especially those of Central Europe) to introduce economic sanctions towards Russia. While the agreement of the EU leaders to ban Russian coal, which came with the fifth package of EU sanctions,¹⁹ was relatively unproblematic, much more intense debates occurred regarding natural gas (that have not yet materialised in the form of sanctions) and oil sanctions (coming up in the sixth round of sanctions with several opt-outs for Central European countries including Slovakia²⁰). In addition, for the first time debates on nuclear fuel and the need for its diversification appeared in the broader discourse in Slovakia.

Debates on energy sanctions have been very intense in Slovakia since the outbreak of full-scale war. Generally, there were two views adopted: one arguing that we should cut off Russian fossil fuels, especially natural gas, as soon as possible²¹ and the second arguing that cutting them off would have severe consequences, especially for industry.²² The second view was presented in particular by the former Minister of Economy Richard Sulík. Although there were fears that Europe would not have enough gas for the 2022/2023 heating period, these concerns proved to be unfounded due to the mild winter. Slovakia was able to fill its underground gas storage capacities in a few months, reaching up to 90% of the storage capacities before the heating season.²³ However, around two thirds of gas consumption in the country in 2022 still came from Russia.²⁴

At the same time, high gas prices were of an important concern in Slovakia. Rising energy prices have been challenging not only for households (where there is a risk of increased energy poverty), but also for industry (due to risk of suspension of production or of higher costs) and municipalities. While financial compensations of high energy bills could be among short-term solutions (financial compensations for industry, households, and municipalities were agreed by the government by the end of 2022²⁵), it is unsustainable from the point of view of long-term public finances. Well-targeted measures and policies to protect vulnerable consumers on the one hand and decreased energy demand on the other should be among the key solutions. In December 2022 the government had debated the materials drafted by the Regulatory Office for Network Industries, which proposed a definition of energy poverty,²⁶ pointing out that nearly one out of four Slovak households live in energy poverty and presented several financial, legislative, and supportive measures for tackling the issue. The material has been met with positive feedback from the expert community and it is the first step towards more targeted financial compensations.

With regard to oil sanctions, it was important to make some exception for the oil sector in Slovakia. Therefore the sixth package on sanctions contains a complete import ban on all Russian seaborne crude oil and petroleum products covering around 90% of the oil imports from Russia.²⁷ Although seaborne oil imports were subject to sanctions, Slovakia, Hungary, and the Czech Republic were awarded an exemption and could continue buying Russian crude oil supplied via the Druzhba pipeline until the end of 2023. The main argument for the sanctions opt-out came from the Slovnaft refinery, which stated it would need more time to adapt the technology to process a different type of oil.²⁸

¹⁹ Ukraine: EU agrees fifth package of restrictive measures against Russia (2022). European Commission: https://ec.europa.eu/commission/presscorner/detail/en/IP_22_2332

²⁰ Russia's war on Ukraine: EU adopts sixth package of sanctions against Russia (2022). European Commission: https://ec.europa.eu/commission/presscorner/detail/en/ip_22_2802

²¹ M. Hojsík, Koniec Putinovho plynu (2022). Denník N: <https://dennikn.sk/2759023/koniec-putinovho-plynu/?ref=inm>

²² Sulík: Žasnem nad detinskou úvahou o odpojení ruského plynu. Tým si iba zlikvidujeme priemysel (2022). Trend: <https://www.trend.sk/ekonomika/sulik-zasnem-detinskou-uvahou-odpojeni-ruskeho-plynu-tym-iba-zlikvidujeme-priemysel>

²³ The storage level in proportion to the overall gas consumption in Slovakia is almost 67%. Slovakia has also an underground storage facility in the Czech Republic, in Dolní Bojanovice, connected only to the Slovak infrastructure.

²⁴ D. Funtiková and T. Grečko, Zmluva s Gazpromom platí do roku 2034, dovtedy musíme za ruský plyn platiť, hovorí šéf SPP (2023). Denník N: [https://e.dennikn.sk/3210323/zmluva-s-gazpromom-plati-do-roku-2034-dovtedy-musime-za-rusky-plyn-platit-hovori-sef-spp/?ref=inm&_](https://e.dennikn.sk/3210323/zmluva-s-gazpromom-plati-do-roku-2034-dovtedy-musime-za-rusky-plyn-platit-hovori-sef-spp/?ref=inm&_ga=2.147535031.1253148166.1682318304-1258735783.1661247989)

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²⁵ Dotácie na energie (2022). Ministry of Economy of the Slovak Republic: <https://energiodotacie.mhsr.sk/>

²⁶ ÚRSO otvára verejné pripomienkovanie návrhu koncepcie ochrany odberateľov pred energetickou chudobou (2022). Regulatory Office for Network Industries: <https://www.urso.gov.sk/urso-otvara-verejne-pripomienkovanie-navrhu-koncepcie-ochrany-odberatelov-pred-energetickou-chudobou/>

²⁷ Russia's war on Ukraine: EU adopts sixth package of sanctions against Russia (2022). European Commission: https://ec.europa.eu/commission/presscorner/detail/en/ip_22_2802

²⁸ M. Hudec, Business as usual for Slovakia as EU oil embargo comes into effect (2022). Euractiv: <https://www.euractiv.com/section/politics/news/>

According to Prime Minister Eduard Heger, the outcome of the negotiations provided good news for Slovakia, as the country negotiated sanctions on Russian oil and Slovakia's demands were accepted, which means that the country will be able to use Russian oil until it has a full-fledged alternative.²⁹ The Ministry of Economy argued that a complete ban on Russian oil would have a direct impact not only on Slovakia, but also on the region in which the Slovnaft refinery operates.³⁰ Thus Slovakia would suffer extremely by hastily cutting off the supply of Russian oil.³¹ It therefore asked for a three-year transition period during which it will be required to strengthen the oil pipeline, modifying storage tanks with estimated costs of approximately €160 million, strengthening the Adria pipeline, and preparing Slovnaft for the change in the quality of imported oil. These measures are also expected to cause a smaller share of diesel production at this refinery, leading to further price increases. Thus the effects of sanctions on Russian oil are questionable in Slovakia so far, as they have not yet materialised. A price spike in fuel prices occurred in mid-2022, but since then the price has been decreasing.

business-as-usual-for-slovakia-after-eu-oil-embargo-comes-into-effect/

- 29** Heger: Dohoda EÚ na ropnom embargu pre Rusko je pre Slovensko dobrá (2022). Government Office of the Slovak Republic: <https://www.vlada.gov.sk/heger-dohoda-eu-na-ropnom-embargu-pre-rusko-je-pre-slovensko-dobra/?csrt=9015442639516943591>
- 30** Schválené embargo výrazne zníži príjmy Ruska, v rámci solidarity by sme mali mať osobitný prístup k zdrojom z REPowerEU (2022). Ministry of Economy of the Slovak Republic: <https://www.mhsr.sk/top/schvalene-embargo-vyrazne-znizi-prijmy-ruska-v-ramci-solidarity-by-sme-mali-mat-oso-bitny-pristup-k-zdrojom-z-repowereu?csrt=6573360287388248777>
- 31** Slovensko podporuje ďalšie sankcie proti Rusku, požaduje iba prechodné obdobie pri rope (2022). Ministry of Economy of the Slovak Republic: <https://www.mhsr.sk/top/slovensko-podporuje-dalsie-sankcie-proti-rusku-pozaduje-iba-prechodne-obdobie-pri-rope?csrt=6573360287388248777>

4

MEDIUM- AND LONG-TERM ANSWERS

MEDIUM-TERM ANSWERS

In terms of physical infrastructure, Slovakia has good gas connections with all of its neighbouring countries, as it engaged in a diversification programme supported by Projects of Common Interest (PCI) launched by the European Commission in 2013. Slovakia installed reverse flows with neighbouring countries (the Czech Republic, Austria, and Ukraine), completed new interconnectors with Ukraine (in 2014), Hungary (in 2015) and then Poland in October 2022, providing access to the LNG terminal in Świnoujście, with the first tender in mid-November.³² Another large diversification project was the Easting pipeline to connect the Slovak transition system with Bulgaria via Hungary and Romania. Although the project was withdrawn from the PCI list, gas stakeholders began discussing its possible revival, arguing that Russian gas had to be replaced.³³ Similarly, there has been discussion about expanding domestic gas extraction, which currently covers approximately one per cent of consumption, but it could reach approximately 10%. Further expansion of underground gas storage facilities (operated by the Nafta company) and also discussion on building an LNG terminal in Bratislava port (close to the city centre)

have been revived.³⁴ However, all the discussed measures in the gas sector have been met with strong opposition, calling for focusing on gas savings instead and the gradual ending of fossil fuels. So the future of other gas infrastructure projects is rather questionable. Regarding biogas, the estimations are that it could cover approximately 10% of gas consumption.

Since the war broke out, energy policy strategy has not changed remarkably. Slovakia has completed the third block of the Mochovce power plant and has been working on putting block 4 into operation, and continues to phase out coal from electricity generation. With regard to oil, the Slovnaft refinery must invest in technologies and processes that enable a shift from Russian oil. When it comes to energy savings strategies, there are several small initiatives, but a long-term vision of energy consumption decrease has been lacking. For instance, households will receive a substantial share of Slovakia's Recovery and Resilience Plan, about €528 million for upgrading buildings under the Home Renovation programme, which includes home renovation grants by 2026. The grant is conditional on achieving at least a 30 per cent saving in primary energy, including home insulation, replacement of windows, replacement of heating source, green roofs, installation of shading technology, and asbestos removal.³⁵

32 "Booked capacity (2023). Eustream: <https://tis.eustream.sk/TisWeb/#/?nav=bd.cap>

33 P.Jurkovič, J. Klepáč: Z hľadiska energetickej bezpečnosti SR netreba nahrádzať zemný plyn v energetickom mixe, ale jeho zdroj, Rusko (2022). Slovgas: <https://www.slovgas.sk/aktuality/j-klepacz-hladiska-energetickej-bezpecnosti-sr-netreba-nahradat-zemny-plyn-v-energetickom-mixe-ale-jeho-zdroj-rusko/>

34 T. Bakoš, V Bratislave chcú postaviť nový LNG terminál. V blízkosti nových mestských štvrtí (2023). Pravda: <https://ekonomika.pravda.sk/energetika/clanok/662965-v-bratislave-chcu-postavit-novy-lng-terminál-v-blizkosti-novych-mestskych-stvrti/>

35 Opatrenia, na ktoré môžete získať príspevok (2022). Slovak Environment: <https://obnovdom.sk/opatrenia.php#A>

Table 2
Energy consumption per capita (2020; in kgoe/cap)

	EU	Slovakia
EU 27	3,266	3,123
Slovakia	2,996	3,013

Source: European Commission

When it comes to renewables, the largest industry players are already responding by shifting basic electricity production to renewable sources. For instance, Železiarne Podbrezová (ironworks and metalworks) are to invest €3 million into a new rooftop solar power plant, which will be the largest solar installation in the country. Duslo Šaľa (fertilisers producer and the largest industrial gas consumer in the country) are to become the first industrial factory to use large scale wind energy (37 to 43 MW) with a planned €60 million investment. SPP also presented a project on wind development in the Western part of the country; however, so far it has not met with positive feedback from the citizens living in the areas where large-scale wind energy development is being considered.³⁶ By the end of April 2023 the first geothermal power plant received its permit from the Ministry of Environment.³⁷

LONG-TERM ANSWERS

NUCLEAR ENERGY

Slovakia plans to maintain a high share of nuclear energy in its electricity mix, arguing that if the construction of the new nuclear power plant is not implemented, Slovakia may face a real danger of lack of electricity power sources to cover its own consumption by around the year 2035.³⁸ Although nuclear is a long-established industry for Slovakia and the country could offer its long-term expertise in this sector (for example cooperating with Poland, which plans to develop nuclear facilities), Slovakia is still dependent on Russian nuclear fuel and must work on diversification. Moreover, there have been discussions about further expansion of nuclear facilities: for example, state company JESS (Nuclear Energy Company of Slovakia) has applied for a permit to build a new nuclear power plant by 2039.³⁹ However, there has been no public discussion on spent nuclear fuel management and a permanent repository.

DECARBONISATION

Decarbonisation brings with it opportunities to not only shift away from Russian fossil fuels, but away from fossil fuels in general. Within renewables the government plans to focus on geothermal development, but also to electrifica-

tion in the transport sector and the modernisation of electricity networks. However, coherent strategies on low-carbon development have been lacking. In the coming years the heating sector and, in particular, district heating, will be important for the transformation of the energy sector. The high degree of centralisation of heat supply creates good technical preconditions for the use of biomass, biomethane, and geothermal energy.⁴⁰

HYDROGEN

Hydrogen is a challenging technology due to its uncertainty, but also an opportunity for decarbonisation, especially in industry, research and development, and business. When drafting hydrogen strategy of Slovakia the former Minister of Economy Richard Sulík even stated that the prospects for electromobility are limited and that the future lies in hydrogen cars instead.⁴¹ Hydrogen was also of great focus during EXPO 2022 in Dubai and there are several smaller initiatives and projects in transport and industry, but the coherent national strategy has not been updated.

³⁶ I. Haluza, Veľký veterný park chystá už aj prvá štátna energofirma. Plynári z SPP naň chcú vynaložiť 63 miliónov eur (2023). Denník N: <https://e.dennikn.sk/3264667/velky-veterny-park-chysta-uz-aj-prva-statna-energofirma-plynari-z-spp-nan-chcu-vynalozit-63-milionov-eur/>

³⁷ I. Haluza, Prvá geotermálna elektrárňa u nás získala súhlas envirorezortu. Energiu vyrobí pre najmenej 20-tisíc domácností (2023). Denník N: https://e.dennikn.sk/3345924/prva-geotermalna-elektren-u-nas-ziskala-suhlas-envirorezortu-energiu-vyrobi-pre-najmenej-20-tisic-domacnosti/?ref=list&_ga=2.72038419.1253148166.1682318304-1258735783.1661247989

³⁸ Why a new nuclear power plant (2023). JESS: <http://www.jess.sk/en/home/why-a-new-nuclear-power-plant>

³⁹ Projekt novej atómkvy v Jaslovských Bohuniciach je o krok ďalej, firma JESS podala žiadosť o vydanie povolenia (2022). SITA: <https://sita.sk/venergetike/projekt-novej-atomky-v-jaslovskych-bohuniciach-je-o-krok-dalej-firma-jess-podala-ziadost-o-vydanie-povolenia/>

⁴⁰ Integrated National Energy and Climate Plan for 2021 to 2030 (2019). European Commission: https://energy.ec.europa.eu/system/files/2020-03/sk_final_necp_main_en_0.pdf

⁴¹ I. Jenčová, Vláda nevidí po kríze budúcnosť dopravy v elektromobilite, staviť chce na vodík (2020). Euractiv: <https://euractiv.sk/section/energetika/news/vlada-nevidi-po-krize-buducnost-dopravy-v-elektromobilite-stavit-chce-na-vodik/>

5

FORESEEABLE CONSEQUENCES WITH REGARD TO EU CLIMATE GOALS/TARGETS?

The main focus of RePowerEU strategy is on energy efficiency and renewables deployment in order to decrease dependence on Russian fossil fuels. Although both areas are crucial for increasing energy security and decreasing fossil fuels dependence, they have been problematic for Slovakia for many reasons. For example, for years the country has been struggling to implement more renewables into its energy mix. As can be deduced from Table 3, Slovakia was committed to achieving a renewables share of 14% in 2020. For years it seemed that there was no way Slovakia could meet this goal, as its renewables share was around 12%;⁴² however, the situation changed once the figures on biomass use were corrected and by the end of the year Slovakia reached 17.3 %. The correction reflected the change in the methodology used to calculate biomass use to include households and small companies, which had not previously been part of the official statistics and Eurostat reporting.⁴³

Even the 2030 target on renewables share has been challenging for Slovakia from the beginning. Slovakia's National Energy and Climate Plan (NECP) is far from ambitious re-

garding renewables deployment and was not even able to meet the 2030 renewables target calculated using the formula in Annex II of Regulation (EU) 2018/1999 (Governance Regulation), as the proposed 19.2 % in its final National Energy and Climate Plan (NECP) is below the Commission's recommended 24 %. Moreover, the EU target within the REPowerEU initiative has been increased substantially in 2023, to at least 42.5 %, which is requiring much effort.

The untapped potential lies in geothermal and wind energy. Although there has been an increasing interest in individual deployment of renewables (in households and industry) in 2022 due to rising energy prices, there are also several obstacles, which include a lack of financial motivation for prosumers, high initial costs that prevent low-income households from entering the renewables market, frequent legislative changes resulting in legal uncertainty of the market, a limit on distribution system capacity, and a lack of information.⁴⁴

By the end of April 2023 the government decided to add a new RePowerEU chapter with €403 million in its Recovery Plan, dedicated to the simplification of environmental permit processes, support of sustainable energy, the creation of two pilot zones for the development of wind energy in Slo-

⁴² Share of renewable energy in the EU up to 18.0% (2020). Eurostat: <https://ec.europa.eu/eurostat/documents/2995521/10335438/8-23012020-AP-EN.pdf/292cf2e5-8870-4525-7ad7-188864ba0c29>

⁴³ I. Jenčová, Analytička SHMÚ: Číslo o spotrebe biomasy nesedeli už roky, nikoho to nezaujímalo (2021). Euractiv: <https://euractiv.sk/section/energetika/interview/analytika-shmu-cisla-o-spotrebe-biomasy-nesedeli-uz-roky-nikoho-to-nezaujimalo/>

⁴⁴ P. Čakovská, Slováci si chcú vyrábať energiu sami. Bráni im v tom byrokracia a slabá podpora štátu (2022). Euractiv: <https://euractiv.sk/section/budovy/opinion/slovaci-si-chcu-vyrabat-energiu-sami-brani-im-v-tom-byrokracia-a-slaba-podpora-statu/>

Table 3
2020 and 2030 renewables targets

	2020		2030 targets			
	targets	values	NECP drafts	EC - NECP evaluation	NECP final	Fit for 55
Slovakia	14	17.3	18	24	19.2	32
EU total	20	22	30.4–31.9	32	33.1–33.7	40–42.5

Source: European Commission

vakia, a better use of geothermal energy and bio-waste processing, and modernisation of transmission lines and investments in regional distribution systems.⁴⁵

Similarly, there is a lack of a systematic approach in energy efficiency measures that would lead to a decrease in dependence on natural gas. Although Slovakia claims that energy efficiency is the priority, there is a lack of information on how the measures will be applied in practice. For example, there is no long-term renovation strategy for buildings, which should be included among the key measures. According to the 2022 report of the Supreme Audit Office of the Slovak Republic, around 75 % of public buildings require deep renovation; however, there are several barriers to that, including a fragmentation of the funding system and subsidies among several ministries and institutions, a lack of professional capacities, the lack of a national database, and lack of involvement of owners and managers of public buildings.⁴⁶ All these problems must be addressed in order to succeed in meeting energy efficiency goals.

While Slovakia is on track to phase out coal from electricity generation, successful decarbonisation in Slovakia also requires the decarbonisation of the transport sector and industry. That would also lead to a decrease in dependence on natural gas and oil. In industry there are several sectors that require special attention: iron and steel, cement, and chemicals production. Significant investments are required, especially in the steel sector, in order to meet the EU-wide target, which is a 55 % decrease of greenhouse gases in 2030 compared to 1990.⁴⁷ Transport is an especially risky sector not only in the EU, but also in Slovakia with regard to reaching climate neutrality due to increasing emissions and a preference of cars over public transit. There has been a growing number of new car registrations, a relatively high average age of the car fleet in Slovakia, an underdeveloped charging infrastructure for electric cars, and a low proportion of electric cars. In Slovakia, a significant increase in the uptake of electric vehicles will be needed alongside the measures of redirecting transport to public transit solutions.

⁴⁵ Slovensko pridáva do plánu obnovy nové zelené opatrenia v hodnote 403 miliónov eur (2023). Government Office of the Slovak Republic: <https://www.planobnovy.sk/aktuality/slovensko-pridava-do-planu-obnovy-nove-zelene-opatrenia-v-hodnote-403-milionov-eur/>

⁴⁶ Správa o výsledku kontroly 2022: Obnova verejných budov (2022). Supreme Audit Office of the Slovak Republic: <https://www.nku.gov.sk/documents/10157/18210a5a-740a-4470-b910-45a813c6bc70>

⁴⁷ Decarbonization of the Slovak economy by 2030 (2022). Value for Money Department: https://www.mfsr.sk/files/archiv/35/Decarbonization-of-the-Slovak-economy-by-2030_study-062022.pdf

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Email: fesbp@fesbp.hu

Responsible for content and editing:

Ernst Hillebrand, Head, European Economies of the East

ernst.hillebrand@fes.de

Orders/Contact: fesbp@fesbp.hu

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