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GERMAN ENERGY TURN: THE INFLUENCE ON NEIGHBOURING STATES

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The new UN report 'World Economic Situation and Prospects 2020' was presented at the World Economic Forum (WEF) in Davos in January. The report outlines the need to make large-scale changes in the energy sector in order to achieve climate change goals. The energy sector currently accounts for three-quarters of global greenhouse gas emissions. The main way to prevent an increase in emissions is to change the structure of energy consumption, with an increase in the share of renewable energy sources.

At WEF Ursula von der Leyen, the President of the European Commission, along with General political topics also mentioned the European Green Deal's investment Plan for sustainable development. According to the plan, the EU should become the first climate-neutral region by 2050. Germany is a prime example of its first steps.

The term "energy turn" was first used in 1980 in a publication of the Environmental Institute in Germany called 'Energy turn. Growth and prosperity without oil and uranium' ('EnergieWende. Wachstum und Wohlstand ohne Erd?l und Uran'). This paper proved the possibility of economic growth and sustainable energy supply without the use of nuclear energy and hydrocarbons - due to renewable energy and energy efficiency. According to Dr. Patrick Ryan, Director of the Agora think tank in Berlin, "Energy turnaround is the restructuring of the German energy supply, the abandonment of oil, coal, gas and the atom, and the transition to renewable energy sources" [1, p.15].

In other words, 'energy transition' is a translation of the German term "Energiewende". As one of the most ambitious projects to decarbonize the energy sector within an entire state (reducing greenhouse gas emissions by 40% by 2020 and by 80-95% by 2050 from 1990 levels), Energiewende has undoubtedly become an example for large-scale transformations around the world. From a technological point of view, energy Transition is a global transformation of energy systems, consisting of four elements - energy efficiency and the so-called "three D" - decarbonization, decentralization and digitalization [1, p.15].

The development of alternative energy sources has changed the structure of the energy sector itself. Before that, the architecture of power systems had remained largely unchanged for many decades. Centralized power systems successfully, reliably, and at a reasonable price provided consumers with electricity. Because of improving technologies, the consumer from the situation of power supply only from centralized energy sources came to the possibility of choice. The appearance of many new small generators has complicated the processes of their integration into a single power system, management and regulation processes. Increasing renewable generation of magnitude requires intensive restructuring of the distribution network, as well as the presence of a significant reserve of heat capacity or storage, which most of the time remain underloaded. New technologies were required for flexible network construction and intelligent management, which are known now as Smart Grid. The consumer of electricity is beginning to play an increasing role in the power system, adopting new roles - generator and storage of electricity. The freedom of consumer choice increases dramatically. At the same time, there are wide opportunities for managing demand and energy efficiency both at the level of a particular household and at the level of the economy as a whole.

In 2017, the problem became even more apparent. The excess of "green" electricity

that Germany exports to neighbouring countries causes them problems with excessive voltage in the networks. However, as Germany also uses gas and coal-fired stations, as a result, it generates excess electricity on sunny and windy days, which is exported to Poland and the Czech Republic. Power grids in Czechia and Poland may not be powerful enough to transmit the electricity. German companies confirm that volatile electricity flows are a pressing problem. Nonetheless, they insist that overloads occur primarily because of outdated power grids on both sides of the border. At the same time, Germany itself cannot build high-voltage lines to transfer energy from windmills in the north of the country to factories in the south that need it. This forces Germany to use the networks of its neighbours, which overloads them and creates the threat of power outages.

That means the Czech Republic and Poland have to invest a lot of money in high-voltage wires designed for higher voltage, as well as install transformers at the border to redirect energy back to Germany. Czech CBPS and Polskie Sieci Elektroenergetyczne spent about 115 million euros on massive transformers. Poland also invested $300 million last year in upgrading its electricity networks and substations [2]. German operators are also actively engaged in modernization. For example, 50Hertz, an operator of cross-border power lines, is installing transformers in two locations on the German side of the border to help deal with excess energy. However, the installation of one of them was delayed for three years and costs increased by about 100 million euros due to litigation. Local Czech and Polish companies that generate electricity using coal remained the most affected in this situation, as they cannot sell their own electricity due to the presence of German. In the Czech CEZ Group, they say that they cannot sell electricity across the border to Poland, where a megawatt-hour costs 6 euros more, because their power grid can no longer accept it. Moreover, since 2008, when Germany began actively developing wind and solar energy, Polish power plants use 4 million tons less coal annually than before. This is equivalent to closing one large thermal power plant. As for companies, the cost of correcting the imbalance should be equally divided between both parties, according to the EU rules. However, larger damage, such as the loss of business or the need to upgrade equipment, is already considered as apart of the business, as Polish energy officials say [2].

Germany floods Europe with excess energy from its wind and solar installations, often at dumping prices. In a bad time, the process is the opposite: Germany has to buy energy from its neighbours [3]. This happens because of the high dependence on the weather conditions, as a significant part of German energy comes from wind and the sun. A solution is found: now the country has to import nuclear energy from France or the Czech Republic.

In spite of the above-mentioned unfavourable results of "green" energy usage, there is data, which proves the efficiency of renewable energy sources. On January 1, 2018, the electricity needs in Germany were 95 percent supplied by renewable sources for the first time [4]. This was due to a strong wind, a bit of sunny weather and relatively low needs due to the holidays, but it still is an evidence of capacity of new sources to provide a whole country with green energy.

Despite the fact that this kind of energy can be a way to resolve ecological problems, the instability of renewable energy sources remains a huge problem. It is expensive and sometimes impossible to store such energy when there is more than enough of it, that is why there are more cons than pros for now. Thus, Germany has turned the instability of its renewable energy into a pan-European problem.

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