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ENERGY HIGHLIGHTS

The Synchronization of the Baltic States': Geopolitical Implications on the Baltic Sea Region and Beyond

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INTRODUCTION

The Baltic States remain the last countries within the Euroatlantic space whose electricity grids continue to operate synchronously with the Russian Integrated Power System/Unified Power System (IPS/UPS). On 28 June 2018, after a long marathon of multilateral negotiations and decades of prior discussions, Lithuania, Latvia, and Estonia had finally agreed to synchronize their power systems with the Continental European Network (CEN) through Poland. With European Union allocating €323 million in January 2019[1] and additional €720 million in October 2020[2] for synchronizing Lithuanian, Latvian and Estonian power systems, the Baltic flagship energy project gains momentum.

Given the joint Baltic and Polish political commitment reinforced by financial aid and political support from the European Union, Russia's capabilities in opposing the Baltic withdrawal from the IPS/UPS are diminishing rapidly. Nevertheless, there should be no room for complacency. The Kremlin is interested in maintaining electricity trade with Lithuania, Latvia and Estonia after their synchronization with CEN that goes directly against the principles outlined in Political Roadmap on the synchronization of Baltic States.[3] With the launch of Ostrovets nuclear power plant (NPP) in early November 2020, Belarus also wants to gain access to the Baltic energy markets that Lithuania, Latvia and Estonia collectively denied just two months before the operational start of its NPP.

In here, one should note that both Belarus and Russia have specific cards to play in achieving their aims. For example, Russia has a competitive edge in the Baltic electricity market as the country does not follow the EU's environmental policies. Free of environmental regulations, Russia can apply pressure on the Baltic States by positioning the withdrawal from electricity trade with the 3rd countries as an economically irrational decision. Russia's experience in framing negative opinion towards strategic energy projects in the neighbouring states is plentiful.

Moreover, Russia is moving faster with its preparations for the desynchronization of the Baltic States from IPS/UPS than they are doing so themselves. Russian authorities have already narrowed the BRELL[4] ring by building additional transmission lines along its borders with the Baltic States and Belarus. The Kremlin has also installed reinforcements in other parts of its circular transmission system to increase the electricity transfer capacity between North-Western and Central regions of IPS/UPS. Most importantly, Russia has doubled Kaliningrad's generation capacities, diversified its natural gas supply (primary fuel in electricity generation) and successfully tested its capabilities to operate in an isolated mode twice. The Baltic States are lagging as critical infrastructural projects enabling their synchronization with CEN will only be completed during 2022 – 2025. To make matters worse, the Baltic States' capabilities to operate their power

systems in isolation from IPS/UPS remains untested.

Having completed the first unit of Ostrovets NPP, Belarus will also try all means at its disposal to persuade the Baltic States to open its markets for electricity trade in the short term and long term perspectives. In here, Minsk will strive to offer cheap electricity for the Baltic market even if the proposed price will be lower than its nuclear generation costs. Since the majority of expenditures (90 %) on the construction of Ostrovets NPP are financed by the Russian loan that Belarus will start paying back in April 2023,[5] Minsk has room for manoeuvre in offering electricity price that temporarily does not fully incorporate capital costs.

Given the following processes, the paper studies geopolitical implications on the Baltic States' synchronization with CEN with a specific emphasis given on the Russian and Belarusian behaviour. First, the study exposes the interconnection between tectonic geopolitical shifts and the establishment, development and disintegration of synchronous interstate power networks. Second, it introduces Russian response to the synchronization of the Baltic States, its current objectives and means to achieve them. Third, it discusses Belarusian prospects in gaining access to the Baltic electricity market. The paper concludes that the Baltic States should strive to move quickly not only in proceeding with the synchronization but also in increasing their readiness to operate in an isolated mode and to establish an emergency synchronous interconnection with Poland if needed. With researchers and policymakers mostly focusing on the classical themes of Russian energy geopolitics, i.e. natural gas and oil, the paper hopes to shed more light on another important object of study – the geopolitics of synchronous interconnections.

SYNCHRONIZATION AND GEOPOLITICS

To recognize the geopolitical implications associated with Lithuanian, Latvian and Estonian withdrawal from the IPS/UPS, one first needs to grasp the strategic significance of synchronous power grids operating beyond national borders. An interstate synchronous power system, therefore, should not be understood merely as national power grids functioning together under the same frequency and management principles or as a system sharing standard regulations. One should also perceive such a system as a geopolitical bond between countries either trusting each other enough to enter into an interdependent relationship in the strategic power sector or being forced to do so by finding themselves under the sphere of influence from a foreign power. Even if economic, infrastructural, technological, managerial and legal factors have a role to play in explaining the emergence, development and disintegration of interstate synchronous networks, European history shows that these processes cannot be fully understood without analyzing geopolitics.

During the Cold War, the emergence of interstate synchronous power systems in Europe was influenced by the great power rivalry. It is not a coincidence that today one finds three major interstate synchronous areas in Europe as they were created by countries that shared a similar strategic environment. For example, West Germany, France, Italy and the Benelux countries not only have signed the Treaty Establishing the European Coal and Steel Community in 1951 but, together with Austria and Switzerland, they have also established the Union for Coordination of Production and Transmission of Electricity (UCPTE) that is now known as Continental European Network.[6] Seven years later, their power grids began operating synchronously, and most of these countries were NATO members (Austria and Switzerland excluded).[7] The first significant enlargement of the CEN occurred in 1987 when three NATO members and contemporary newcomers to the European Union – Portugal, Spain, and Greece – together with Albania and Yugoslavia synchronized their power grids with CEN. In here, one should note that the West had previously supported the development of asynchronous interconnections with Yugoslavia 'to lure Yugoslavia further away from the socialist block',[8] thus further highlighting the importance of geopolitics as opposed to contradicting the argument.

A similar process took place behind the Iron Curtain. During 1957 – 1960, the power systems of German Democratic Republic, Poland, Hungary and Czechoslovakia were interconnected, paving the way for the establishment of the Мир (Mir) synchronous area in 1962 – a predecessor of IPS/UPS. During the same year, these Central Eastern European countries were synchronized with the Soviet Union, while Romania and Bulgaria joined the synchronous operation shortly afterwards.[9] At first, Moscow permitted the dispatch centre in Prague to manage the synchronous area outside the Soviet Union on a day-to-day basis. In contrast, a similar dispatch in Moscow was more focused on the core Soviet territory, even though it was hierarchically superior to the one in Prague. The control centre in Moscow, however, became more involved in regulating the system frequency in the Central Eastern European countries since the 1970s, thus centralizing Kremlin's control over the common synchronous area within its sphere of influence.[10]

Northern European countries have also synchronized their power grids into a separate system. In 1963, the transmission system operators (TSOs) of Denmark, Finland, Iceland, Norway and Sweden founded NORDEL leading to a creation of a synchronous power grid interconnecting Finland, Sweden, Norway and a small portion of Danish territory.[11] The interconnectivity between the Nordic, Eastern and Western synchronous areas remained negligent throughout the Cold War as the period sought the construction of high-voltage interstate power lines only on the Czechoslovakian – Austrian, Finnish – Russian and Bulgarian – Greek borders. Hence, not only the Iron Curtain existed in Europe during the Cold War, but the 'Electric Curtain' was present as well.[12]

As the international system started to reshuffle after the collapse of the Soviet Union, changes in geopolitical alignment translated to the transformation of the Western and Eastern synchronous areas. In 1995, Poland, Hungary, Czech Republic and Slovakia joined the CEN, while Romania and Bulgaria followed their footsteps in 2004. With Romania and Bulgaria also came the resynchronization of Bosnia and Herzegovina, Croatia, Greece, Macedonia, Montenegro and Serbia that were temporarily disconnected from CEN because of the Yugoslav Wars.[13] Notably, Turkey had also synchronized its power grid with CEN in 2015. Most of the countries mentioned above either belonged to the Euroatlantic space via memberships in NATO or the EU or had aspirations of joining it by the time they have synchronized their power grids with CEN. Others eventually expressed their willingness to join either both organizations or one of them.

These developments happened against the Russian will. Russia wanted to maintain the synchronous operation with its former subjects and reorganized Mir into IPS/UPS in February 1992 through the newly established Commonwealth of Independent States (CIS). As of a consequence, CIS countries became the core participants within the IPS/UPS. The Central Eastern European states, however, were not optimistic about continuing their synchronous operation within IPS/UPS due to economic (export possibilities to Western Europe), technical (reserve capacities, emergency support and frequency stabilization) and geopolitical (membership aspirations in NATO and the EU) reasons.[14] Highlighting the last point, Poland, Czech Republic, Slovakia and Hungary established a separate CENTREL synchronous area in November 1992 as opposed to continuing to operate within the IPS/UPS until their synchronization with CEN.[15]

Despite the Euroatlantic aspirations, the Baltic States had many obstacles in their way for synchronizing their power systems with CEN during the 90s. Having no cross-border power lines with Poland and the Nordics and dealing with political instability and a bumpy economic transition from the centrally planned economy to a free market, the Baltic States were forced to remain in IPS/UPS. As of a consequence, the Baltic TSOs signed the so-called BRELL agreement in 2001, formalizing their synchronous operation within the Russian power system.

For the Baltic States, desynchronization from the IPS/UPS is first and foremost a strategic matter. Having the first-hand experiences of Russian energy geopolitics and dealing with its revisionist and expansionist policies, Lithuania, Latvia and

Estonia aim to loosen its ties with Russia and enjoy the full benefits of European integration in a rules-based synchronous area. Synchronization will end a central Russian oversight on the Baltic power grids that gives the Kremlin a very detailed and up-to-date picture on the situation of Lithuanian, Latvian and Estonian power systems. It will also help the Baltic States to enforce their boycott on Belarusian electricity. The Baltic States plan to stop the electricity trade with the so-called third countries (Russia and Belarus) after their synchronization with CEN is finished, thus preventing the electricity generated in Ostrovets NPP from entering Lithuanian, Latvian and Estonian markets. This capability is crucial as the current political consensus among Lithuania, Latvia and Estonia still lacks proper implementation mechanisms and paves the way for interstate disagreements and political friction.

The synchronization also brings economic and infrastructural benefits. As mentioned before, synchronization comes together with significant financial support from the European Union that continues to be an essential asset for growing three small Baltic economies and their industry. During the next five years, the Baltic States, together with Poland, will use more than one billion euros of EU's funding for the development of their power grids not only allowing for smooth synchronization with CEN but also improving the reliability and interconnectivity of their power networks. Implementing synchronization project will allow making reinforcements to internal Lithuanian, Latvian and Estonian power lines, strengthening interconnectivity among them and significantly enlarging joint transmission capacity with Poland through interconnections with Lithuania (from 600 MW currently to 2700 MW once LitPol link begins synchronous operation (2000 MW), and high-voltage direct current (HVDC) interconnection Harmony link (700 MW) starts working). After synchronization, therefore, the Baltic States will find themselves not only firmly integrated to the Western geopolitical space but also having modern, secure and reliable power grids.

Sharing national security concerns with the Baltic States regarding the reliance on Russia, Ukraine (together with Moldova) is also set to withdraw from the IPS/UPS. In June 2017, Ukrenergo and Moldelectrica signed agreements with the European Network of Transmission System Operators for Electricity (ENTSO-E) to synchronize Ukrainian and Moldavian power systems with CEN.[16] For Ukraine, the need to synchronize its power grid with CEN stems from strategic concerns (reliance on its rival – Russia) and enhanced economic opportunities (expanding electricity export to Western Europe from 5 TWh to 18–20 TWh).[17]

All in all, the synchronization will eventually end a geopolitical anomaly – Baltic States' reliance on Russia (a primary threat to their national security) to maintain the stable functioning of their power systems. IPS/UPS will continue to contract beyond the former borders of the Soviet Union following the macro geopolitical processes – the shrinkage of the Russian sphere of influence. It is a strategic loss for Russia as Lithuanian, Latvian and Estonian synchronous operation in the BRELL ring remains the last significant Russian advantage in their energy systems, allowing the Kremlin to exert influence and creating potential to undertake various malevolent activities.[18]

RUSSIAN APPROACH TO THE BALTIC SYNCHRONIZATION

Looking from the Russian perspective, the synchronization of the Baltic States with CEN is disadvantageous due to three reasons that eventually became apparent during different stages of the project development. As illustrated in the last chapter, Baltic withdrawal from the IPS/UPS removes their dependence on Russia that contradicts with Kremlin's strategic interest of maintaining influence in its close neighbourhood. Second, the shrinkage of IPS/UPS forces Russia to choose between investments in Kaliningrad's autonomy and its dependence on Lithuanian and the EU. And finally, the synchronization is set to deny Russia's access to the Baltic electricity market that reduces their reliance on its electricity supply and removes a valuable market segment.

Even if the Kremlin consistently perceived the Baltic synchronization as disadvantageous, its responses changed over time. When Lithuanian, Latvian and Estonian prime ministers declared

the synchronization with CEN a mutual strategic priority in 2007, Russian authorities did not believe that such an undertaking was possible and started developing nuclear projects in Kaliningrad and Belarus. As the relations with the European Union deteriorated following Russian military aggression against Ukraine, the synchronization of Baltic States received more attention from Brussels with the opening prospects of significant European financial contribution. Reacting to the changing strategic realities, Russian leadership eventually became more active in opposing the Baltic synchronization. Even if the future perspectives of successful Baltic synchronization were far from being certain by that point of time, Russia decided not to take any chances and started upgrading its power system with a specific emphasis given to upgrading Kaliningrad's power grid.

Russia ultimately failed in preventing the synchronization from moving forward. Still, the decision to invest in its power grid was beneficial from a strategic point of view. By the time Lithuania, Latvia and Estonia agreed to synchronize their power systems through Poland as opposed to doing so through Finland, Russia was already mostly finished upgrading its power system. Most importantly, Russia showcased Kaliningrad's capabilities to operate in an isolated mode in May 2019, when the Baltic States were only starting to build the necessary infrastructure for synchronizing their power systems with CEN and will continue to do so in the mid-term perspective.

Having a chronological advantage over the Baltic States allows Russia pursuing two broad policy options. First, to desynchronize the Baltic States from the IPS/UPS prematurely either by upholding the six-month warning outlined in the BRELL Agreement or doing so unexpectedly. Second, to use all available tools in persuading the Baltic States and the EU to maintain electricity trade with Russia after its neighbours start operating synchronously with CEN. The paper argues that keeping electricity export routes open will be the main Russian focus in the years to come. That does not knock-out its capabilities, however, to use its chronological advantage as political leverage until the Baltic States either prepare for operating their power grids in an isolated mode for a prolonged time, or they are ready for emergency synchronization with Poland. In the following sections, the paper outlines this case by discussing Russian diplomacy and internal policies towards the Baltic States' synchronization with CEN, presents the importance of maintaining electricity with the Baltic States once their synchronization is complete and discusses Russia's possible instruments in doing so.

VOCAL OPPOSITION AND SILENT PREPARATION

The Russian approach to the Baltic synchronization was twofold. On the diplomatic level, Russia opposed synchronization by framing it as a costly and unnecessary project that causes a plethora of problems for Russia. Even the Russian President Vladimir Putin denounced the Baltic synchronization project on several occasions while giving interviews to the European and the US media outlets.[19] Despite such a diplomatic façade, Russia behaved as if Lithuanian, Latvian and Estonian desynchronization from the IPS/UPS is only a matter of time and started upgrading its power system in 2014 – 2015 to prepare for the upcoming break-up in advance.

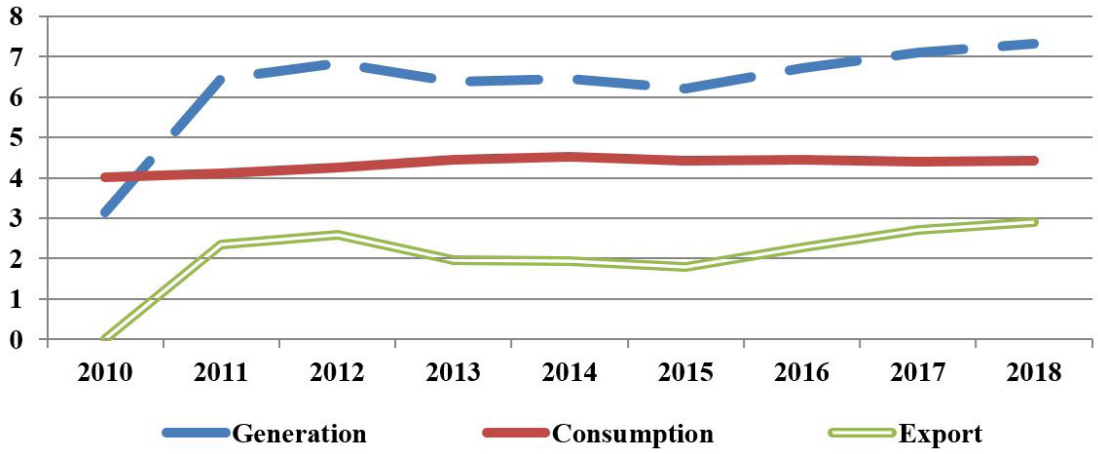
Russia's preparations were twofold as the Kremlin started reinforcing its transmission grid in the mainland and preparing Kaliningrad to operate in an isolated mode. Starting from the former, it is worth mentioning that Russia has 'narrowed' the BRELL ring by building two additional 330 kV transmission lines: 271 km long Novosokolniki – Talashkino[20] and 150 km long Pskov – Luzhskaya[21] along the borders of the Baltic States and Belarus. In preparation for the Baltic withdrawal from the IPS/UPS, Russia has also implemented many other infrastructure projects, including the construction of a 450 km long 750 kV transmission line Belozerskaya – Leningradskaya. These upgrades have increased the electricity throughput between the North-West and the Central part of the IPS/UPS by 50 %, thus compensating for the upcoming loss of the transmission capacity associated with the Baltic power lines.[22] To understand the significance of the latter, one needs

to briefly overview the history of Kaliningrad's power system and changing Russian perceptions towards its future development.

Following the initial assumption that the synchronization of Lithuanian, Latvia and Estonia with CEN is a strategic utopia, Russia made plans for Kaliningrad's infrastructural integration as opposed to thinking about its remote operations. Reacting to talks between the Baltic States and Poland about the construction of a regional nuclear power project – Visaginas NPP – that was supposed to replace Ignalina NPP already scheduled for closure at the end of 2009, Russia decided to construct a directly competing nuclear power plant in Kaliningrad – Baltic NPP. By doing so, Russia not only tried to oppose Visaginas NPP but also attempted to exploit the emerging interconnectivity between the Baltic States, Sweden (NordBalt), Finland (Estlink 2) and Poland (LitPol link) power grids to its benefit (exporting electricity generated in the Baltic NPP to additional markets).[23] Together with the construction of Baltic NPP, came Russian proposals for building power lines to interconnect Kaliningrad with Poland and Germany and to enhance its transmission capacity with Lithuania.[24] After failing to reach agreements with the countries mentioned before, Russia had no other options but to freeze the construction of Baltic NPP in 2013 and to rethink its strategy for the Kaliningrad region.

By the time Rosatom has frozen the construction of Baltic NPP, Russia has substantially improved Kaliningrad's generation capacities. Until 2005, Kaliningrad's internal generation could cover less than 10 % of its electricity needs, but the region compensated its shortages by electricity transfers from continental Russia through Lithuanian power lines. Kaliningrad had decreased its electricity generation gap in October 2005, when Russia constructed the first block of Kaliningradskaya central heating and power plant (CHPP)-2 (450 MW). After building its second unit (also 450 MW) in December 2010, Kaliningrad became a surplus region that started exporting its excess electricity to Lithuania (please see the graph below).[25]

1 Graph. Dynamics of power generation, consumption and export in Kaliningrad, 2010 – 2018.



Source. Lohse, et. al.[26]

Even if Kaliningrad acquired more than sufficient indigenous generation capacities to satisfy its power demand, the region was yet not capable of operating in an isolated mode for an extended time. For example, in August 2012, Russia disconnected Kaliningrad from the IPS/UPS, running its power grid twice for 10 minutes in isolation from the rest of the synchronous area. To a certain extent, the media described this experiment as a success, showing that Kaliningrad's power

system can function independently from the BRELL ring. Still, such a conclusion was not entirely correct. Russian authorities had conducted this isolated system test during the summer night, when the electricity demand was low, as opposed to doing it during the working hours and under the freezing conditions when the demand is considerably higher.[27] The short time span has not allowed accessing how the power system reacts to demand fluctuations during peak hours. Moreover, by the time of testing Kaliningradskya CHPP-2 had no indigenous back-up capacities that would have left Kaliningrad with no tools to mitigate any unforeseen incidents in the power supply chain if the region operated in isolation for a prolonged period.

One year later, real events validated the argument made above. On 8 August 2013, at approximately 9 pm, a malfunction in the high-voltage power line linking of Kaliningradskaya CHPP-2 with the power grid caused a blackout in Kaliningrad, affecting roughly 1/3 of the region's population. After 45 minutes, the authorities restored the system by electricity flows from Lithuania.[28] Since the continuous isolated operation was not possible and constructing additional power lines between Kaliningrad and the neighbouring countries was out of the question, the Kremlin had to develop a new vision for its strategically important exclave.

According to the Joint Research Centre, the Baltic withdrawal from IPS/UPS left Russia with three general options for Kaliningrad's power system: *European integration, negotiation* and *autonomy*. European integration foresees joint synchronization of Lithuania, Latvia, Estonia and Kaliningrad with CEN. *Negotiation* envisages diplomatic dialogue between Lithuania and Russia for constructing an additional power line interconnecting Kaliningrad with IPS/UPS through Lithuanian territory. *Autonomy* calls for making Kaliningrad capable of functioning independently from IPS/UPS.[29]

Each policy option established a different kind of balance between economics and national security. From the economic point of view, synchronizing Kaliningrad and the Baltic States was the most cost-effective option as it allowed avoiding substantial investments into its power grid. It also offered the best conditions for maintaining electricity trade between Kaliningrad and the Baltic States. Following this logic, Rosatoms' program director Sergey Boyarkin even stated at the 9th CEE Energy Forum in Warsaw that 'Electricity transmission systems of Lithuania and Russia's Kaliningrad region cannot operate one without the other, hence the Kaliningrad region will seek to become part of ENTSO-E together with Lithuania, which has decided to synchronize its electricity transmission grids with the continental European system'.[30] From the political point of view, however, European integration seemed controversial (especially after Russian military intervention in Ukraine in 2014) because it would have subjected Kaliningrad's power system to EU's regulations, thus strengthening its dependence on the European Union and Lithuania.

Once again, the economics favoured the negotiation scenario, but national security considerations argued on the contrary. Joint Research Centre estimated that establishing a direct interconnection between Kaliningrad and Belarus through Lithuanian territory would cost €28 million and additional €150 million would have to be spent on the back-to-back (BtB) converter on Lithuanian – Kaliningrad border for electricity trade.[31] This scenario would have transformed the interdependent relationship between the Baltic States' and Kaliningrad's power systems to the one of dependence when the latter is depending on the former.[32]

The third option was the most expensive but offered the highest degree of autonomy and security for Kaliningrad. According to JRC's estimates, establishing an autonomous power system in Kaliningrad would require investing €378 million in a flexible power generation capacity (450 MW) and €150 million – to a BtB converter on Kaliningrad – Lithuanian border for exchanging power reserves. Additional investments in Kaliningrad's transmission network were also necessary, but the price was not significant compared to the costs mentioned above.[33]

In the end, Russia has chosen to create an auton-

omous power system in Kaliningrad, but went well beyond JRC's vision, installing larger generation capacity and diversifying Kaliningrad's natural gas supply routes at the same time. In October 2015, the Government of Russia had ordered to build three gas-fired and one coal-fired power plants (1000 MW generation capacity in total) in Kaliningrad. A joint venture of Rosneftgaz and Inter RAO, Kaliningrad Generation, started implementing these projects in 2016.[34] In 2018, Russia finished building two natural gas-fired TPPs: Talakhovskaya (161 MW)[35] and Mayakovskaya (157 MW).[36] One year later, Russia completed its flagship generation project – a natural gas-fired Pregolskaya TPP (454 MW).[37] At the moment of writing, it is also close to finishing a coal-fired Primorskaya TPP (195 MW).[38] In total, these power plants add additional 967 MW generation capacities to Kaliningrad, thus increasing it by more than twofold (please see table 1).

Table 1. Electricity generation capacity in Kaliningrad by unit and fuel

No	Generation Unit	Location	Fuel Type	Installed Capacity
1.	Kaliningradskaya CHPP-2	Kaliningrad	Natural gas	900 MW
2.	Pregolskaya TPP	Kaliningrad	Natural gas	454 MW
3.	Primorskaya TPP	Svetly	Coal	195 MW
4.	Talakhovskaya TPP	Sovetsk	Natural gas	161 MW
5.	Mayakovskaya TPP	Gusev	Natural gas	157 MW
6.	CHPP-10	Sovetsk	Natural gas	24 MW
7.	Gusevskya TPP	Gusev	Natural gas	8,5 MW
8.	Ushakovskaya wind farm	Ushakovo	Wind	5,1 MW
	Total			1905 MW

Source. The Governor of the Kaliningrad Region [39] and Inter Rao [40]

Together with upgrades in the transmission network, investments into generation capacities have fulfilled their strategic purpose – making Kaliningrad independent from the IPS/UPS as two isolated power system tests have shown. In May, Russia successfully operated Kaliningrad's power system in isolation from IPS/UPS for 72 hours. Russia conducted the test during the timespan that included regular working days, thus accounting for fluctuations in electricity demand.[41] On 19 September 2020, Russia has performed another isolated power system test in Kaliningrad that lasted eight hours, using all of the newly built gas-fired power plants for regulating the frequency.[42]

In addition to building new gas-fired generation units, Russia diversified Kaliningrad's natural gas supply and expanded its storage facility. In December 2017, Russia built two underground natural gas reservoirs that expanded Kaliningrad's natural gas storage capacity to 174 million cubic meters and plan to increase the storage capacity further to 800 million cubic meters by 2024.[43] Despite having a natural gas transit contract with Lithuania until 2025 involving a "take or pay" clause,[44] Russia inaugurated a floating storage regasification unit FSRU Marshal Vasilevskiy in January 2019 as an alternative to natural gas transit through the Lithuanian pipeline system.[45] This ship is capable of storing 174,000 cubic meters of liquefied natural gas (LNG) that is equivalent to 100 million cubic meters of natural gas. With the annual natural gas consumption in Kaliningrad hovering around 2.5 billion cubic meters, the combined underground and LNG storage ca-

pacity can supply the region approximately for a month depending on the daily demand intensity (less during the winter, more – during the summer). This number will increase to three months after the underground storage reaches full capacity allowing to utilize Marshal Vasilevskiy for commercial operations and to sail it back to Kaliningrad when needed.[46] On top of that, Russia is also building Portovaya LNG plant in the Leningrad region that will provide LNG for Kaliningrad if required.[47] After multiple delays, Russia should finish the plant next year.[48]

Energy security, however, came with the price-tag. Russia has invested 37.2 billion roubles (412 million euros) in strengthening the ties between the North-West and the Central regions of the IPS/UPS.[49] Besides, Russia spent approximately 1.3 billion euros for the construction of additional generation capacities in Kaliningrad[50] and 800 million euros on the Marshal Vasilevskiy FSRU.[51] Even though Russia moved quicker than Lithuania, Latvia and Estonia, its investments in Kaliningrad alone (2.1 billion euros) have substantially exceeded the estimated costs of the whole Baltic synchronization project (1.5 billion euros).[52]

It means that by the end of 2020, Kaliningrad finds itself in an ambiguous position. Additional generation capacities lived up to the expectations[53] as two consecutive tests have shown that Kaliningrad is capable of operating autonomously. Looking from the economic perspective, Russian investments in Kaliningrad's energy security were enormous. It is important to note here that Russia decided to make substantial investments in Kaliningrad's energy system not because the European Union and the Baltic States forced the Moscow to make them, but because Russian leadership chose to do so. The Baltic States, European Commission and Poland maintain that they will guarantee system services for Kaliningrad's power system if they are proven necessary to the functioning of the system.[54] At the same time, JRC's had more cost-effective suggestions for the development of the Kaliningrad's power system, and even its proposal for its autonomy was significantly cheaper than the actual Russian project.

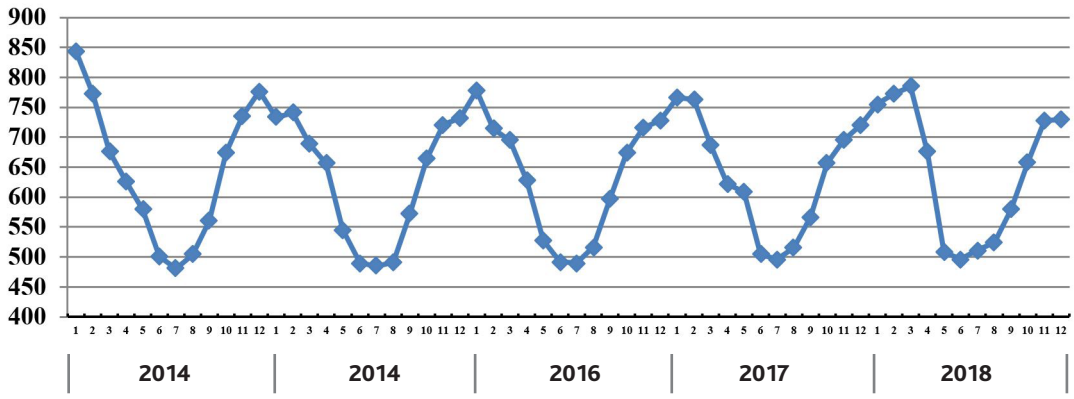
KEEPING ELECTRICITY TRADING ROUTES OPEN

Given the following discussion, one can reasonably make a case that investments in Kaliningrad's strategic energy infrastructure will be one of the drivers in steering Kremlin's policy towards persuading the Baltic States and the EU to maintain trade between Russia and the Baltic States. Even though Kaliningrad is important, but it is not the only factor explaining why Russia continues to be interested in maintaining electricity trade with the Baltic States. In here, one should also consider the usual suspects. First, maintaining electricity trade with the Baltic States is a rather large and profitable business. Second, keeping electricity trade helps to maintain a degree of Baltic dependence from Russia. In this section, the paper analyses all three factors simultaneously.

Starting from Kaliningrad, Russia cannot find much use for the majority of its power generation capacities for most of the time. The data shows that Kaliningrad's peak demand (heavily influenced by the weather conditions) can reach between 700 and 800 MW during the winter months, between 600 and 700 MW during spring and autumn and only around 500 MW during the summer. It means that during spring and autumn, Kaliningrad will never utilize more than approximately 37 % of its generation capacity to cover the peak electricity demand. During the summer, this number will decrease to around 25 %. During the winter, it can increase to roughly 40 %. For most of the time, however, the load will be significantly smaller as the percentages mentioned above only indicate the maximum demand and does not deal with daily averages (please see graph 2).

Currently, Russia can mitigate the generation surplus to a certain extent by exporting electricity to the Baltic States (600 MW capacity for trading purposes is available on Lithuanian – Kaliningrad border). In 2019 alone, Kaliningrad exported 2,623 TWh of electricity to Lithuania, a number that constitutes more than half of its annual electricity demand. Due to this reason, Russia continues to be interested in exporting Kaliningrad's surplus electricity to the Baltic States after they synchronize with CEN.[56]

2 Graph. Monthly peak demand in Kaliningrad, 2014 – 2018.



Source. The Governor of the Kaliningrad Region.[55]

Maintaining electricity trade is also important for Russia because of the volume and financial gain that this operation brings. In 2019, Russia exported 6,377 TWh of electricity to Lithuania (3,754 TWh indirectly through Lithuanian – Belarusian interconnections and 2,623 TWh directly through Kaliningrad),[57] making it the second most important export market for Russia (please see the second table).[58] Russian electricity export to Lithuania constitutes about 1/3 of its total electricity exports (19,338 TWh). In 2019, Inter RAO's revenue from electricity trading in Lithuania amounted to 20.5 billion roubles (226 million euros) also constituting a significant portion of its total revenue (77 billion roubles – 770 million euros) from electricity trading.[59]

The last point concerns the energy independence of the Baltic States. In general, Russia aims to maintain a foothold in the Lithuanian, Latvian

2 Table. Russian electricity exports by country and year

Indicator	2019	+/-	2018	2017	2016	2015	2014
Export, billion kWh	**19.338**	**+15.7%**	**16.711**	**+15.7%**	**17.002**	**17.492**	**14.044**
Finland	7.023	+1.7%	6.903	+1.7%	5.2816	3.383	2.995
China	3.099	-0.3%	3.109	-0.3%	3.320	3.299	3.376
Lithuania	6.286	+42.4%	4.415	+42.4%	3.019	2.995	3.216
Belarus	0.031	-3.7%	0.049	-3.7%	3.181	2.815	1.425
Kazakhstan	1.437	+6.7%	1.347	+6.7%	1.164	1.542	1.644
Georgia	0.525	+154%	0.206	+154%	0.369	0.511	0.607
Mongolia	0.372	-10.5%	0.416	-10.5%	0.3	0.284	0.39
Azerbaijan	0.091	+19.3%	0.076	+19.3%	0.0596	0.055	0.053
Other	0.474	149%	0.19	149%	0.2716	2.608	0.318

Source. Inter RAO[60]

and Estonian energy systems. Having a strong presence in the Baltic electricity import structure, Russia can indirectly influence electricity generation patterns in Lithuanian, Latvia and Estonia. It is easier for Russia to compete with the indigenous power generation in the Baltic energy market as the country does not have to follow EU's environmental regulations. As a case in point, EU CO2 emission dues constituted 50% of the overall cost the electricity generated from the fossil fuels in Estonia in 2018, making it uncompetitive with Russian electricity.[61] Russia's competitive edge also makes it harder to justify building new generation units in the Baltic States and creates possibilities for shaping a negative public attitude towards strategic Lithuanian, Latvian and Estonian energy projects.

Given the following reasons, it seems natural that the Kremlin will safeguard its electricity trading routes between Russia and the Baltic States. To a certain extent, Russia is already starting to oppose Lithuanian, Latvian and Estonian regulations. The Baltic TSOs have recently prepared a new methodology for electricity trade with the third countries to better prepare for preventing the Belarusian electricity from entering their market after the launch of Ostrovets NPP. The revisions of the methodology also influence the Baltic electricity trade with Russia. The methodology relocates trading with continental Russia from the Lithuanian – Belarusian power lines (1300 MW capacity) to the Latvian – Russian interconnection reducing the trading capacity to approximately 600 MW.[62] So far, the methodology reduces the maximum trading capacity on Latvian – Russian border by 38 %, but the discussions are underway to lower it even further. For example, the National Energy Regulatory Council of the Republic of Lithuania[63] and Eesti Energia suggest that the capacity should be decreased by 72 %,[64] thus potentially reducing it to 266 MW.[65]

Responding to the new methodology drafted by the Baltic TSOs, Russian energy minister Alexander Novak called upon Lithuanian energy minister Žygimantas Vaičiūnas to revise the regulations regarding the electricity trade with third countries in October 2020. He requests to remove the 38 % reduction.[66] Lithuanian counterpart, however, replied that such Russian position shows that the Baltic States are working in the right direction and is not planning to make concessions. Inter RAO Lithuania have also joined the Russian official by asking not to reduce the trading capacity on the Latvian – Russian border.[67] If Russia opposes the slight reduction of the trading capacity now, it will continue to push for keeping the electricity trading routes open after the Baltic States will join CEN. The question remains, however, how can Russia persuade the Baltic States and the EU to change their mind?

INSTRUMENTS OLD AND NEW

In making its case for the electricity trade, Russia will likely proceed in the following fashion. First, it will try to persuade the general public and the critical decision-makers in the Baltic States that removing electricity trade with the third countries is a wrong decision from an economic point of view. Second, it will try to use the diplomatic instruments by making the case that removing electricity trade will be disadvantageous to Russia and especially to the Kaliningrad region. The third tool is geopolitical blackmail that stems from Russia's chronological advantage in preparing for the desynchronization of the Baltic States from the IPS/UPS.

Framing negative public opinion towards strategic Baltic energy projects has a longstanding tradition in Russian energy geopolitics towards Lithuania, Latvia and Estonia. From the construction of LNG terminal Independence to the implementation of the Visaginas NPP project, Russia was consistent in trying to discredit the need for such projects and aiming to prevent their construction by proposing itself as an alternative. In doing so, Russia framed its energy supply as economically beneficial to the Baltic end consumers, while denouncing potential energy infrastructure upgrades in Lithuania, Latvia and Estonia as economically detrimental and irrational. Given its competitive edge in the Baltic electricity market, Russia will continue using such tactics by trying to persuade the general public in the three Baltic countries that maintaining electricity trade with the third countries serves their interests. As the Lithuanian security services point out, Russia will

utilize all available tools at its disposal to frame a negative public opinion regarding the projects that increase the energy independence of the Baltic States from Russia.[68]

The effectiveness of such framing largely depends on three factors. First, the general economic situation in the Baltic States as the extent of damage caused by the COVID-19 will only be exact in the years to come. The worse is the economy in the Baltic States; the easier it is for Russia to spread its message across. Second, the extent and the quality of the information provided by the Lithuanian, Latvian and Estonian authorities explaining why it is necessary to discontinue the electricity trade with the third countries. As the Lithuanian Energy Security Research Centre (ESRC) points out, the more consistent and frequent is the communication regarding energy policy, the more support from the society the governments can muster.[69] Third, it is the political unity among the Baltic States. In principle, it is enough to persuade one Baltic country to establish asynchronous interconnections with Russia to maintain electricity trade after they will join CEN.

Russia will also continue to lobby Brussels in an attempt to safeguard its electricity trade with the Baltic States as the political sensitivity surrounding Lithuanian, Latvian and Estonian withdrawal from the IPS/UPS mostly stems from the Kaliningrad question.[70] Even after Russia showed that Kaliningrad could function independently from the rest of IPS/UPS, ENTSO-E still follows closely how the Baltic synchronization project will impact Kaliningrad's power system. In the August draft version of the 2020 Regional Investment Plan Baltic Sea, ENTSO-E claims that 'one of the most serious challenge standing in the way of the synchronization project development is the unclear solutions regarding the operation and status of the Kaliningrad electrical enclave. This issue will require a lot of political willpower and might influence the technical outcomes and schedule of the synchronization process'.[71] It remains to be seen, however, what specific arguments advocating for the extension of electricity trade with the Baltic States Russia will bring to the table having in mind two successful independent operations' tests in Kaliningrad.

The final Russian tool is geopolitical blackmail – threatening the Baltic States with premature desynchronization. Given the infrastructural upgrades in the North-Western and Central parts of IPS/UPS and Kaliningrad, Russia can disconnect its Baltic neighbours and to do so in compliance with the procedures outlined in the BRELL agreement. The document binds its signatories (the Baltic, Russian and Belarusian TSOs) to inform about the intention to withdraw from the Agreement six months in advance and to coordinate the steps of withdrawal. The remaining parties cannot prevent the withdrawing party from discontinuing the agreement, and they cannot demand any compensation from the withdrawing party.[72]

Russia can use its chronological advantage in another course of action – unexpected desynchronization of the Baltic States from the IPS/UPS. In doing so, Russia can choose to maximize the damage and to desynchronize the Baltic States when their largest generation units or major interconnections are undergoing scheduled maintenance, or they are not working due to other reasons. If pursued, such an action could lead to a blackout in Lithuania, Latvia and Estonia that would cause socio-economic damage of majestic proportions. For example, Elering maintains that a three-day blackout in the Baltics would cost €2.3 billion[73] not to mention other national security issues it would cause.

It is not to say, however, that Russian decision to desynchronize the Baltic States prematurely will not have high political and economic costs for the Kremlin. Nor it is to argue that Russian attempt to desynchronize the Baltic States before 2025 is likely. Premature desynchronization would cause political resonance that would hurt the prospects of implementing other strategic energy projects abroad, especially in the EU. Even if Kaliningrad is capable of functioning as an isolated power system, its stand-alone operation will cost more.[74] It is only to say that Russia can exploit its infrastructural readiness in advancing its case for electricity trade, depending on the underlying geopolitical and economic circumstances.

THE OSTROVETS' FACTOR

Belarus shares Russia's interest in maintaining electricity trade with the Baltic States that mostly emanates from the recent launch of the first unit of Ostrovets NPP and the undergoing construction of the second one (installed generation capacity in each reactor is 1200 MW). In here, it is essential to note that Belarusian electricity production exceeds its demand since 2018 even without launching Ostrovets NPP. Initially, Belarus exported its surplus electricity generation to Lithuania and Ukraine and planned to expand its foothold in these markets once Ostrovets NPP is fully operational. Despite such ambitions, Ukraine has decided to halt its electricity imports from Belarus in 2020 due to fallen electricity demand during the COVID-19 pandemic. Lithuania, on the other hand, enforced its law banning electricity trade with Belarus after Ostrovets NPP became operational, while Latvia and Estonia eventually made a respective political commitment.

With Lithuanian, Latvian, Estonian and Ukrainian markets closed for the time being, the future outlook does not look promising for Belarus either. On the one hand, the upcoming shrinkage of the IPS/UPS will not allow Belarus to circumvent the Baltic ban on its electricity by camouflaging it as Russian in the future. On the other hand, a similar process is taking place on Belarus' southern border. Moldova and Ukraine will synchronize with CEN by 2023 putting the southern export route in permanent jeopardy. Current interconnections on Belarusian – Ukrainian border (Chernobyl NPP – Mozyr and Chernihiv – Gomel)[75] allows maintaining 900 MW trading capacity. Still, they will cease to function after Ukraine's synchronization with CEN unless Belarus and Ukraine agree to construct converter stations, thus maintaining their functionality.

Even in the absence of trade restrictions, electricity produced in Ostrovets NPP can hardly compete with the market prices in the Baltic States that were rarely higher than 5 euro cents/kWh over the last five years. Russian and Belarusian experts have estimated that the electricity produced by Ostrovets NPP should cost 7.7 euro cents/kWh to break even.[76] Such a price would be sufficient to cover the capital costs, operating, maintenance and nuclear fuel during the lifetime of a nuclear power plant. In such a setting, Belarus could only sell its generation surplus to the Baltic States for a price that is significantly below the estimated generation costs, thus failing to make a profit.

One can make the case, however, that the actual generation cost will be somewhat cheaper. Belarus have recently managed to lower the capital costs of Ostrovets NPP (the main component of the total cost structure for the nuclear generation) by renegotiating the terms of Russia loan. The original agreement between Russia and Belarus regarding the 10 billion US dollar loan for Ostrovets NPP established two separate interests' rates. One half of the loan had a fixed annual interest rate of 5.23% while the other half had a fixed annual interest rate of 1.83% plus a six month USD LIBOR interest rate. Under the conditions of the agreement, Belarus had to start repaying the loan in April 2021 and to return it in full by 2036. On 14 July this year, however, Russian and Belarusian prime ministers have renegotiated the terms. First, the parties agreed to change the interest rate to 3.3 % for the entire loan. Second, Belarus persuaded Russia to postpone the start of the repayment until April 2023.[77]

Given the current political and economic circumstances, Belarus has one card to play in advancing its electricity exports to the Baltic States that mostly stems from the distribution of expenditures between Russia (9/10) and Belarus (1/10) in building Ostrovets NPP and the loan repayment schedule. Since the majority of spending on Ostrovets NPP are so far Russian and Belarus will start repaying its loan only in April 2023, Belarus can temporarily offer an electricity price that mostly does not account for its capital costs. To put this argument in perspective, one should remember the case of Ignalina NPP. During its operations, the Lithuanian NPP generated electricity for slightly cheaper than 2 euro cents/kWh.[78] The price was so low because the capital costs were absent as the Soviet Union built the NPP. Similarly, the Belarusian authorities will be capable of temporarily operating the first unit of Ostrovets NPP with negligent capital expenditures

that allow baiting the Baltic States to rethink their trade restrictions. It is clear, however, that Belarus will not be able to sustain such a price for a long time.

Another widely discussed possibility for the Belarusian electricity to enter the Baltic market is to camouflage it as Russian with Inter RAO working as an intermediary for its sales.[79] Even though such a tactic is possible in principle, it faces several limitations. With the shrinkage of the trading capacity between the Baltic States and Russia due to the new trading methodology that relocates the trade on the Latvian – Russian border, Russia should prioritize its own electricity exports as opposed to worrying about the Belarusian energy producers. In here, it is crucial to consider that both continental Russia and Kaliningrad has generation surpluses. At the same time, the trading ban on Belarusian electricity does not change Minsk's obligations to repay the loan.

On the other hand, Inter RAO Lithuania became quite vocal in making the case that the company is not going to be involved in any electricity trading schemes with Belarus as it views Ostrovets NPP as a competitor. The company also considers the risks of losing a trading license because of smuggling Belarusian electricity.[80] Belarusian and Russian prime ministers Mikhail Mishustin and Roman Golovchenko discussed the issue of Ostrovets NPP in September 2020.[81] Still, it remains unclear wherever Russia will help Belarus to circumvent the Baltic electricity ban as it should prioritize its interests, leaving Belarus alone in its attempts to persuade the Baltics in opening the electricity trade.

DISCUSSING THE BALTIC RESPONSE

Having outlined the interests of the Lithuanian, Latvian and Estonian neighbours, it is time to consider how they can best protect the synchronization project from foreign meddling. The most immediate assignment for the Baltic States is countering Russian capabilities to use geopolitical blackmail. In doing so, the Baltic States must better prepare to operate their power systems independently from IPS/UPS, test their readiness and do to it as quickly as possible.

Initially, the Baltic States were supposed to perform an isolated system test in June 2019. Despite the previously agreed date, Latvian and Estonian TSOs decided to delay the testing as were there some doubts regarding its success (the official reason for postponement – similar test in Kaliningrad that took place a few weeks earlier).[82] The trial would have allowed to scrutinizing the weaknesses and strengths of the Baltic power systems in practice. The failure to perform the joint test means that the Baltic States have accumulated limited field experience in maintaining their power networks independent of Russia.

The Baltic States, Belarus and Kaliningrad tested their joint ability to operate independently from the IPS/UPS in April 2002. At that time, however, Baltic States' energy systems were different from the contemporary ones, and they conducted the test together with third countries and their territories.[83] Lithuania and Estonia have also gathered some experience on the national level. Estonia has separated sections of its power grid in November 2006 and April 2009,[84] while Lithuania conducted similar tests in May 2019 and August 2020.

For example, just a week before Russia tested Kaliningrad's power system, Lithuanian TSO Litgrid created a couple of energy islands in the national power grid by desynchronizing them from the IPS/UPS. During the test, Lithuanian generator units maintained the system frequency in the selected islands with the assistance of converter stations on HVDC lines LitPol link and NordBalt. After the trial, Lithuania successfully reconnected the artificial energy islands with IPS/UPS.[85] Lithuania repeated a similar test one year later. The results of Lithuanian tests are promising, but they were during the weekends, thus sparing the dispatch from dealing with the full magnitude of challenges. Moreover, they cannot serve as a replacement to the joint isolated system test of the Baltic States that will involve disconnecting all power lines interconnecting them with Russia (including Kaliningrad) and Belarus.

Recent Plan of Measures for Strengthening the Independence and Reliability of the Electricity System of the Republic of Lithuania provides

a blueprint on how the Baltic States can nullify Russia's political pressures. The document calls for strengthening the joint emergency preparedness by taking a couple of essential steps. First, making multilateral political agreements with Finland and Sweden regarding their assistance in case of an emergency in the power system. Second, preparing for emergency synchronization with Poland. Third, conducting an isolated system test not later than 2023 as opposed to just barely making the deadline in 2025.[86]

By setting these goals, Lithuania aims to lead by an example. Lithuanian Government seeks to be ready for synchronous emergency operation with the Polish energy system in the first half of 2021 as the necessary upgrades for the LitPol link interconnection are underway. Until the end of the same year, Lithuania plans to test its capabilities to work synchronously with Poland. In parallel, Lithuania will work towards strengthening its capabilities to work in an isolated mode individually by blowing the dust of its older power generation capacities and investing in electricity storage. For this purpose, Vilnius will restore the capabilities of 7th and 8th units of the Lithuanian power plant in Elektrėnai (600 MW total generation capacity) and the first unit of the 3rd Vilnius power plant (180 MW). Both power plants can use heavy oil and natural gas for electricity generation. Besides, Lithuania will integrate a battery system capable of storing 200 MWh of electricity. By the end of 2022, these measures should lead to Lithuania conducting a national isolated power system test.[87]

Not having to worry about premature desynchronization, the Baltic States can better defend its interests. As far as the electricity trade is concerned, the Baltic States are capable of decreasing Russian presence in their electricity market and to better prevent the 'smuggling' of Belarusian electricity. For one thing, the Baltic States can gradually lower the trading capacity between Latvian and Russian border and the discussions are already underway. Lithuania, Latvia and Estonia can also proceed in implementing the long-discussed infrastructure tax on the electricity imported from the third countries that are not subject to EU's environmental regulations.

The combination of these measures allows for achieving three results. First, further reduction of trading capacity on Latvian and Russian border makes it much harder for Belarusian electricity 'contraband' to enter the Baltic market. Smaller trading capacity forces the Kremlin to choose between exporting national electricity surplus and helping Belarus to sell its electricity by disguising it as Russian. In here, one can make a reasonable argument that such a bottleneck would result in Russia choosing the former. Second, reducing trading capacity smoothens the Baltic transition to the total elimination of electricity trade with Belarus and Russia by 2025. Third, the proposed infrastructure tax on Russia will mitigate is a competitive advantage and create fairer conditions in the electricity market.

Last but not least, the Baltic States should learn from the experience (Visaginas NPP, LNG terminal, unconventional hydrocarbons, etc.) and develop a coherent public information strategy that clearly explains why specific decisions in relation with the synchronization project are necessary. Naturally, they should emphasize the electricity trading questions, emergency preparedness and Ostrovets NPP. Suppose the Lithuanian, Latvian and Estonian governments will not devote sufficient resources for public relations. In that case, their societies will seek alternative information sources and Russia and Belarus will be more than happy to provide them and thus take the initiative in organizing the public debate in a manner that serves their interests.

Hence, just as Russia and Belarus have specific tools in advancing their national interests, the Baltic States have the necessary instruments to counter their pressure. In here, emergency preparedness, electricity trade regulations, and consistent public communication are vital in protecting the synchronization from foreign meddling.

CONCLUSION

The paper shows that the Baltic States are consistently getting closer to achieving a historic feat – synchronizing their power systems with the Continental European Network. What not so long ago seemed as a distant political ambition

now resemble a coherent energy project. With the European Union and Poland supporting the Baltic plug to the European energy system, the project continues to gain momentum.

Russian and Belarus, however, will continue to put pressure on the Baltic States to keep the electricity trade open. In advancing such an interest, Russia will combine diplomatic means with misinformation and threats, while Belarus will argue that importing electricity from Ostrovets NPP is beneficial for the Baltic States.

The Baltic States, however, are capable of responding to the threats posed by Belarus and Russia if it proceeds in four steps. First, the Baltic States need to boost emergency preparedness that mitigates Russian capabilities to desynchronize them prematurely. Second, the Baltic governments should consider further decreasing trading capacity on the Latvian – Russian border as this would make Belarusian electricity smuggling much harder and provide a transition period to full decoupling in 2025. Third, to introduce the long-debated electricity infrastructure tax to make the competition between the Baltic and Russian power generation fairer. Finally, the Baltic States should not neglect public communication and explain the particularities of the synchronization to their citizens.

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