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Energy Security Pathways in South East Europe: Diversification of the Natural Gas Supplies, Energy Transition, and Energy Futures

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1 Determinants of the Energy Policies in South East Europe

This chapter contemplates the potential role of the development of the natural gas pipeline infrastructure, especially the Southern Gas Corridor

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(SGC), and its broad ramifications on the energy security and transition to the low carbon energy complex in the region of South East Europe (SEE). The present analysis covers eight countries: Albania, Bulgaria, Bosnia and Herzegovina, Croatia, Kosovo, FYR Macedonia (North Macedonia), Montenegro, and Serbia.[1] We exclude Romania from the scope of this inquiry because of its natural gas abundance, high level of gasification, and hence, the differences of Romania's gas market fundamentals from the above mentioned smaller countries of the broader Balkans (Giamouridis and Paleoyannis 2011).

Europe-wide, the region of the SEE has the highest per capita greenhouse gas (GHG) emissions in power and heat generation (OECD 2018). Lignite and hard coal have a 48% share in the energy mix of SEE, followed by hydropower with 46%, natural gas with 4%, and oil with 2% (CEE Bankwatch Network 2018). Only 9% of the European population lives in the SEE region and its gross domestic product consists only 5% of the European total. Nevertheless, the SEE could develop into one of the major producers of the GHGs on the continent if the region does not transform its coal-dominated energy mix or start the decarbonization process (Pirani 2018). That is why explorations on SEE energy futures, and more particularly projections on the regional gas market, become compelling exercises (Gerner 2010).

Hence, decarbonization without exclusion of energy security in the SEE region is a priority of the EU foreign and environmental policies (Elbassoussy 2019). The reduction of the dependence on political factors related to the Russian natural gas supplies and the promotion of coal-to-gas transition are two strategic and complementary targets pursued by both the EU and the SEE countries. These objectives have been challenging the composition of the regional energy mixes, the level of integration of the energy markets within the region, the level of integration of energy supplies with the energy hubs of the EU, and the level of diversification of the existing gas supplies since the late 1990s and early 2000s (Honore 2010).

This fact is paramount when it comes to the gas market. The SEE lags behind the rest of Europe in terms of gasification. The aggregate gas demand of Albania, Bosnia and Herzegovina, FYR Macedonia, and Serbia is currently less than 1 billion cubic metres (bcm) per year

(Gerner 2010). Albania, Kosovo, Montenegro, and Bosnia and Herzegovina have no natural gas pipeline networks and no domestic natural gas resources (CEE Bankwatch Network 2018). Natural gas occupies 0% of Albania, 1% of FYR of Macedonia, 2% of Bosnia and Herzegovina, 15% of Serbia, 25% of Bulgaria, and 26% of Croatia's energy mixes (Giamouridis and Paleoyannis 2011). Thus, despite its long history of serving as one of the major natural gas transit corridors to Western Europe, the SEE region has not been a destination of large quantities of Russian natural gas and it does not have a well-developed gas distribution network. The existing natural gas demand is entirely met by just one major supplier—Gazprom—and its intermediaries.

The existing and emerging natural gas pipelines are not properly connected to the key nodal points, and especially one of the EU's central gas hubs, Baumgarten, in Austria. Four import points of the eight SEE markets for Russian gas are assuring supply security within the gas networks connecting the regional gas market to the EU. These are Rogatec at the Slovenia–Croatia border, Kiskundoroszma at the Hungary–Serbia border, Mediesu Aurit at the Ukraine–Romania border, and Isaccea on the Ukraine–Romania border (Gerner 2010). However, this infrastructure alone is not sufficient to connect SEE gas markets with the gas system of the EU without harmonization with the EU's energy market rules.

The SEE countries have already shown their commitment to close cooperation in energy and climate issues with the EU by signing the Athens Memoranda with the European Commission (in 2002) as well as the Stability Pact (in November 2002) together with its extension in December 2003.[2] By signing the Athens Memorandum of Understanding, countries of the SEE set out a roadmap of the development of the regional electricity market in the region. The Memorandum envisaged accelerated morphing of the SEE's regional energy market into an internal part of the EU's internal energy market, even before the accession of the individual countries to the EU (Karova 2009). In 2003, the original Athens Memorandum has been extended also to the natural gas market, networks, and storage facilities. Hence, the document calls for cooperation and harmonization in the fields of electricity and gas supplies, network, and storage development.

The central aim of the Athens Memorandum was setting up institutions such as the National Regulatory Agency (NRA) and Transmission System Operators (TSO) by June 2003. By 2005 the parties formally committed to establish the Distribution System Operators (DSO) and open their electricity markets by 2015. These institutions would assure the creation of the regional energy market and operate in accordance with the regulations of the energy market of the EU. Despite clear political commitment expressed by signing these documents, they had no binding power for the parties. Thus, in the Athens Memorandum' amendment signed in 2003, the parties expressed the intention to replace the memorandum by legally binding agreements. The Athens Memorandum's legal binding came to its own with the establishment of the Energy Community for South East Europe on 25 October 2005. The Energy Community Treaty (EnCT) has been signed between the European Community and nine SEE countries. Within the documents SEE countries agreed to implement the *acquis communautaire*, especially the EU Gas Directive 2003/55/EC and Electricity Directive/2003/54/EC on electricity, gas, renewable energy sources (RES), and competition.

The cornerstone of the regional gasification of the SEE is the "Energy Community Gas Ring" (EnC Gas Ring) concept, which has been proposed by independent experts in the "SEE Regional Gasification Study" in 2007 (Energy Institute Hrvoje Požar 2007). In the meanwhile, this strategy has been completely internalized by the EnCT. The EnC Gas Ring envisages both gas network connectivity and the reduction of the incremental transmission costs to deliver gas to the small urban and rural areas of the SEE region (Energy Community Regulatory Board 2010). Due to the small size of the countries, the gasification and electrification projects of the individual SEE countries could lack attractiveness for private investors. The establishment of the Gas Ring could trigger the scale effects and contribute to the attractiveness of private investments in the energy infrastructure.

The SEE region exhibits the greatest dependence on Russian natural gas (Roberts 2018). Russia supplies gas to the region mainly via the Trans Balkan Pipeline, which passes over Ukraine. The Turk Stream pipeline commissioned in 2019 is supposed to reduce Russia's dependency on Ukraine on the one side, and dependency of the region upon Ukrainian transit on the other side (Kovács 2017). Alongside with Russian gas and hydropower, hard coal and lignite-based power plants are one of the three pillars of the power and heat generation of the SEE (Szabo et al. 2018). Furthermore, there are twelve coal-fired power projects in the pipeline at the moment (Asenov 2018).

The risks associated with the monopolistic position of Russia in the SEE gas markets have a dualistic effect on the region's energy mix. The Russian–Ukrainian disputes that took place after 1998 only formally viewed the supplies, debts, and prices of natural gas. In essence, Russia used its dominance in the European natural gas market as political pressure (Mišík and Nosko 2017). Ukraine exploited its transition corridor for the gas pipelines connecting Russian gas fields and the EU's major natural gas hubs to gain political and economic benefits from both sides, i.e. the EU and Russia. Consequently, each dispute contributed to the increasing awareness of the imminent political risks related to Russian natural gas supplies (Goldthau and Sitter 2020).

The latest crises of 2009 and 2014 particularly highlighted energy vulnerability connected to these kinds of disputes and revealed substantial energy security risks for the EU (Dickel et al. 2014; Gatto and Busato 2020; Oravcová and Mišík 2018). Increased sensibility to these vulnerabilities triggered further policy efforts to increase the energy resilience of the EU and the SEE (Gatto and Drago 2020a, b). The Russian–Ukrainian conflict that has been ongoing since March 2014 triggered the establishment of the Central and South Eastern Europe energy connectivity (CESEC) group by Austria, Bulgaria, Croatia, Greece, Hungary, Italy, Romania, Slovakia, and Slovenia on 15 February 2015. The major target of the CESEC group is the diversification of the natural gas supplies in the region and integration of the Central and South-Eastern gas and electricity markets. Later, the members of the Energy Community also joined the CESEC (Bowden 2019). On the one hand, the CESEC contributes to the accelerated development of renewable energy generation facilities (such as solar, wind, biomass, and hydropower) and the development of pipelines, integrated energy connectivity, storage, reverse links, and the common energy market (Asenov 2018). At the same time, Russia's use of gas supplies as means of political pressure contributes to opting for coal to balance the volatility of energy supplies, caused by the intermittent nature and the lack of storage possibilities of RES.

The political tensions which emerged between the two countries posed not only a threat to the energy security of the EU. There is also another side to the coin: the dispute endangers the revenue generation capacity of the Russian energy sector. Thus, Russia decided to diversify its gas transit routes to Europe via the Nord Streams I and II, and the Turkish Stream (TurkStream). Nord Stream I, an offshore gas pipeline along the bottom of the Baltic Sea was commissioned on 8 November 2011 and has an annual throughput of 55 bcm. To double the capacity of the route, an agreement to construct Nord Stream II has been signed between Gazprom, Royal Dutch Shell, E-ON, OMV, and Engie in 2015. Turkstream, a natural gas pipeline connecting Russian Anapa and Turkish Kıyıköy, was commissioned in 2015 and finalized on 8 January 2020 (Gazprom 2020; Nordstream 2020), shipping natural gas to Bulgaria and North Macedonia and thus replacing the Trans-Balkan pipeline via Ukraine. TurkStream has an annual capacity of 31.5 bcm. Rettmann (2018), based on a qualitative analysis of Gazprom's business correspondence, finds that Nordstreams I and II negatively affect the gas supplies and gas prices in the small gas markets of Europe. This has severe repercussions not only for energy security but also for the decarbonization of the small European economies (Pflüger 2019).

Michel (2018) shows that, especially in the republics of the former Yugoslavia, related geopolitical risks and favourable contracting conditions for the coal-fired power plants undermine the expansion of renewable energy. This, in combination with lignite abundance, contributes to the further growth of lignite in the energy mixes of SEE countries. Several lignite power plants are in the phase of construction in the region. A 700 MW lignite power plant in Kolubara, Serbia, and a 450 MW coal power plant in Pristina, Kosovo, is going to be implemented in the coming years. Another recently approved 600 MW lignite power plant will be built in Pristina by the US power plant operator, ContourGlobal PLC. In 2016, Bosnia and Herzegovina commissioned the first privately-built coal-fired power plant in the Western Balkans—300 MW Stanari plant (Vladimirov 2019).

This section presented the factors that shape the energy system of the SEE in the broader context of the European energy policy and politics, and the energy supply imbalance, that emanates from the strong position of Russia both in the EU and SEE natural gas markets. To tackle both energy security and climate change issues, we mentioned the relevance of decarbonization and the surge of renewables, such as solar and wind energy. Further, we showed that to back-up the volatility and storage problems, natural gas plays an important role and the diversification of its supplies from the Caspian basin could contribute to the balancing of the power relation of the European continent in general, and to energy security and decarbonization of the SEE in particular. The presented narrative, with a myriad of factors, is admittedly complex. In the following sections, we clarify how energy transition contributes both to climate targets, energy security, and the balancing of power relations.

2 The Role of Natural Gas in the Transition to a Low-Carbon Economy

2.1 Robustness of Decarbonization and the Weak Sustainability Hypothesis with Natural Gas

Within this analysis, we assess the role of natural gas in the energy security of the SEE region, whereby we account for the dynamic character of the essential changes of the region's contemporary energy systems. Energy transition is characterized by the shift from the pollution-intensive energy mixes dominated by hard coal, lignite, and oil towards RES and natural gas. According to Finley (2019), the contemporary notion of energy security is not confined simply to the diversified energy supplies. Therefore, the authors propose a broader definition of diversification in the context of energy security in the EU and SEE and in the face of the general strive of decarbonization on the European continent. Diversification of the energy portfolio contemplates also the ability to switch to other fuels, efficiency gains, and flexibility of the supply contracts (Giamouridis and Paleoyannis 2011).

The displacement of fossil fuels by RES in the energy mix corresponds to the increasing volatility of energy supplies (Gatto and Drago 2019). Due to the limited storage capability and relatively high volatility of renewable energy supplies, renewable energy mix has to be balanced by additional energy sources. This volatility poses a severe problem for the energy systems (Busato and Gatto 2019; Sadik-Zada 2004). Hence, electricity systems necessitate the back-up capacities to equalize the supply to the actual demand. Due to their fast rump-up times and modularity, gas and diesel turbines have been used to bridge this gap. In light of higher capital costs and slower reaction times, nuclear and coal-based power plants are more energy-consuming and carbon-intensive for baseload production (Verdolini et al. 2018). Their employment for variability smoothing corresponds to the prohibitively high costs for any energy system (Bhattacharyya 2011). This problem is even more severe in the case of solar and wind power plants (Carrara and Marangoni 2017). According to E-ON, 10 MW of solar energy capacity requires 8 MW of back-up capacity (Verdolini et al. 2018).

Conventional natural gas-based combined cycle gas turbine (CCGT) technologies are mid-merit order. They require low capital commitment and have low ramp-up times. The mentioned technologies are referred to as fast-reacting fossil generation facilities. Verdolini et al. (2018) find in their influential survey that, in twenty-six OECD countries, a 1% increase in the share of fast-reacting fossil capacity leads to a 0.88% increase in the share of RES in the energy mix. Therefore, natural gas plays a central role in the energy transition toward low-carbon economies and energy security of the decarbonized economies by balancing the supply volatility and confined storage systems (Morningstar et al. 2020).

According to expert interviews conducted by the International Bank for Reconstruction and Development (IBRD) in Bosnia and Herzegovina, Montenegro, Macedonia, Croatia, and Albania, gasification is deemed to be the only way to achieve compliance with the decarbonization strategy of the Energy Community (Gerner 2010). The mentioned interviews have been conducted in the framework of the comprehensive analysis of the EBRD and the World Bank to assess the determinants of the natural gas supply and demand in the SEE. In comparison to other fossil fuels (coal and oil), natural gas has a lower carbon intensity and thus, could contribute to the reduction of carbon emissions which is mostly responsible for anthropogenic climate change (Aguilera 2012; Aguilera and Aguilera, 2020). This is why natural gas is considered as a transition energy source, especially within the energy mixes dominated by coal (Safari et al. 2019).

However, notable critiques are brought against this view. Most prominent is Howarth's (2014) claim that both shale and natural gas have a greater contribution to climate change when compared to oil and coal. Only natural gas-based electricity generation corresponds to a moderate reduction of the GHGs. In heating and transportation, natural gas has a greater GHG footprint. Howarth's main argument is related to methane emissions from shale and natural gas. Natural gas has a lower carbon dioxide emission, but a greater methane emission factor. Even small amounts of methane are far more detrimental to global warming than CO_2 emissions (ibid.). The argument is, nevertheless, less relevant in the face of the development of the methane-saving natural gas-based power generation. Hence, the positive role of gasification in the energy mix arises as the dominant stance in the literature (Sadik-Zada and Gatto 2019).

Gasification is considered as a strategy that could replace coal and lead to the reduction of CO_2 emissions by 20–55% in a relatively short time (Roberts 2018). According to Kramer (2018), switching from coal to natural gas has the greatest potential for a rapid reduction of atmospheric pollutions by 40%. Due to the expensiveness of RES for the SEE countries, natural gas could serve as a carbon-saving bridge fuel until the surge of renewable capacities and the coal phase-out. Furthermore, it is expected that natural gas will continue to be the essential component of the energy mix in the advanced stages of decarbonization too. This, as already mentioned, would countervail electricity and heat outages due to the volatility of wind, solar, and hydropower (Busato and Gatto 2019; Roberts 2018). The coal-to-natural gas transition could contribute to a substantial carbon savings over the shift to less carbon-intensive, natural gas-fuelled power plants and connected stagnation or termination of the coal and lignite mining in the SEE (see Sadik-Zada and Gatto 2020). Natural gas has a default carbon content of 15.3 kg/GJ. This is much less than that of coal, which is between 25.8 and 26.2 kg/GJ, and crude oil with a default carbon content of 20 kg/GJ (IPCC 2007). The difference in the carbon intensity is even greater in electricity production, heavy industry, and construction. CCGT has two times fewer carbon emissions than coal-fuelled power plants. The same holds for the residential heating and agricultural sector (Safari et al. 2018; Townsend 2019).

Moreover, natural gas is superior to other fossil fuels used for balancing with respect to its GHG footprint (Abrell et al. 2019). Nevertheless, keeping natural gas in the energy mix is not in line with the zero-carbon target, i.e. sustainable economies without atmospheric pollution and climate change. Keeping fossil fuels in the energy mix for stabilization of the energy supplies implies a positive net GHG-effect of the economy, i.e. weak sustainability. However, in the long run, pushing natural gas as the balancing fuel and replacing coal and lignite by gas has the potential for a smooth transition to a completely renewable energy mix. The existing natural gas pipelines can already be used for carbon-neutral biogas. This means that the gradual fossil phase-out during the coming decades corresponds with the heritage of the gas pipeline system that could be used in combination with the European waste management policies and the circular economy package (Gatto et al. 2017).

2.2 Economics of Coal-to-Gas Switching

The recent shale gas revolution in the US implied a substantial decrease in natural gas prices in the US and an accelerated transformation of the electric power sector. Low natural gas prices and constant coal prices in the US led to the displacement of the coal plants with the greatest carbon-emission factors (Bowden 2019; Sadik-Zada 2020). On the other hand, the rapid decline of the OECD European member states' gas production and supply insecurities caused a gradual increase in coal consumption (Kopalek and Raghuveer 2013). This has been stopped by the Large Combustion Plant Directive of the EU (European Commission 2001) that led to the shut-down of most emission-intensive coal plants in 2012 and 2013 (Rentier et al. 2019).[3]

First, the availability of diversified gas pipelines, storage infrastructure, and prices of other fuels play a decisive role in the coal-to-gas switching.

Wilson and Staffell (2018) attribute the rapid GHG reduction to the stringency of environmental regulations—above all carbon pricing. The authors attribute this reduction in the first line to the substitution of the shrinking coal power plants by the natural gas-fuelled power generation. Second, the relatively low capital commitment of the natural gas-fuelled power plants could contribute to a fast-track displacement of coal-fuelled ones. This factor is especially relevant in the context of brand-new plants. In this regard, natural gas plants have a clear comparative advantage (Rifkin 2002). But this fact only holds for the gas combustion plants since it cannot be applied to the pipeline infrastructure. In the face of pipeline availability, switching to natural gas is a less costly strategy than the persistence of coal for business-as-usual.

Furthermore, due to a relatively large share of capital costs, coal power plants are more sensitive to capital cost variations than natural gas plants. Also, natural gas plants are twice less sensitive to carbon tax than coal plants (National Research Council 2009). This implies that in the phases of low-interest rates, coal plants are more comparative than in the high-interest phases. Hence, to countervail low-interest rates, the policy has to adjust the carbon tax (Agaton and Karl 2018).

3 Extension of the Natural Gas Infrastructure in South East Europe

The Southern Gas Corridor plays an important role in the increasing resilience of the SEE's energy security. SGC is an interconnected pipeline project that consists of three major pipelines. These are the South Caucasus Pipeline Expansion (SCPX), the Trans Anatolian Pipeline (TANAP), and the Trans Adriatic Pipeline (TAP; Kovacevic 2017). The SCPX is a 692 km pipeline, which crosses Azerbaijan (443 km) and Georgia (249 km) and connects Azerbaijani Shah Deniz gas field with the Turkish border region. The capacity of the SCPX could be extended up to 31 bcm per year.

TANAP is an 1804 km long pipeline that connects directly to the SCPX at the Turkish–Georgian border. The pipeline has a capacity of 16.2 bcm per year. This capacity can be expanded up to 31.7 bcm per year without building further gas pipelines. TANAP has already been completed and started operation on 30 November 2019. The pipeline plays a strategic role in the transport of Azerbaijani gas from different gas fields including Absheron, Babek, Umid, Shafaq-Asiman, Sharg, Nakhichevan, or Zafar-Mashal. The 828 km long TAP connects to TANAP at the Greek–Turkish border. The pipeline has a capacity of 10 bcm per year and can be expanded to 20 bcm per year. TAP is a bi-directional pipeline and could be employed for the transportation of North African natural gas via Italy to the SEE (SGC 2020).

Further, there is the 5 bcm bi-directional Ionian Adriatic Pipeline (IAP) project, a branch of TAP. IAP is supposed to start in Albania and cross over to Montenegro and Bosnia and Herzegovina. IAP connects further to the existing Croatian gas transmission system. A joint venture with Montenegro Bonus, Albgas, BH-Gas, and Plinarco is supposed to construct this pipeline. The preliminary design stage will be finalized in 2020 (Morningstar et al. 2020). IAP is capable of enhancing the gasification of the Western Balkans over its connection to TAP. In addition, over its connection to the Croatian network, IAP connects TAP to Baumgarten gas hub (Roberts 2018). According to the Energy Community IAP will play a decisive role in the gasification of Albania, Montenegro, the south of Croatia, and Bosnia and Herzegovina and will provide supply diversification and security, market integration, and competition for the region (Economic Consulting Associates 2018).

Originally, the SGC was supposed to supply natural gas only to Western Europe. The energy markets of the SEE are formally integrated with the EU energy market. Transit routes for natural gas from Azerbaijani Shah Deniz to Western Europe pass through the SEE. Cooperation between Turkmenistan and Kazakhstan in natural gas deliveries through the SGC leads to sufficient gas supplies and creates additional potential for large-scale gasification of the SEE. According to the World Bank (Gerner 2010), the additional gas from Turkmenistan could facilitate partial or even full gasification of the SEE and the replacement of coal by natural gas. A major bottleneck for fast-track gasification is the absence of the required infrastructure. Bothe and Janssen (2019) show that the critical infrastructure created for the transportation and storage of natural gas could play a decisive role in the energy security of a carbon-neutral scenario for Europe.

To diversify the natural gas supplies of Bulgaria, the European Energy Programme for Recovery (EEPR) in the aftermath of the economic crisis of 2008 financed the construction of the 182 km long bi-directional gas interconnector (ICGB) between the Greek and Bulgarian high-pressure natural gas systems. The pipeline will be commissioned in October 2020, around the same time as the TAP pipeline. The ICGB will connect the Greek Komotini with the Bulgarian gas grid in Stara Zagora and will have a transmission capacity of 3 bcm per year. Installation of a compressor station could extend the capacity up to 5 bcm per year. In addition, the European Commission supports further interconnections, such as the interconnector Bulgaria–Serbia and the Croatia–Serbia interconnector (Bowden 2019).

The development of the bi-directional pipeline infrastructure in Europe, the integration of the SEE and EU gas networks, and the harmonization of the EU and Energy Community policies in questions related to decarbonization pave the way for a long-run energy transition in the SEE. Relatively low capital commitment and weighted average capital costs (WACC) of the natural gas-fuelled plants indicate that the most important and costly step on the way toward gasification is the creation of a diversified pipeline infrastructure. Hirth and Steckel (2016) compare WACCs of coal, wind, and natural gas and come to the conclusion that natural gas-fuelled power plants have a much lower WACC than that of the wind and coal-based plants. Also, the SGC being an additional supplier on the European and especially SEE markets contribute to the competition between Gazprom and alternative producers, especially gas-rich Azerbaijan, Kazakhstan, and Turkmenistan. Price competition contributes to the pressure on gas prices and real option value of gas in Europe. Nevertheless, Pirani (2018) claims that the project has only the capacity of meeting a small share of the European gas demand. He also indicates that SGC will cover just 2% of the European gas market and argues that it could have only a marginal effect on the European energy system.

The central idea behind the current gasification strategy is, however, not finding the source, which would replace the Russian natural gas supplies, but rather create an additional source of natural gas, which could facilitate the stabilization of the supplies in the whole EU. Hence, this makes clear that the strategy of the European Commission is not as small-minded as some observers claim (Pirani 2018). The completion of the megaproject, such as SGC, with a value of more than $45 billion, was by no means a prestige project. The project has the capability of shaping the European gas markets by increasing local competition. Particularly, in the case of the SEE, the improved connectivity is supposed to increase the price pressure on the gas suppliers, the Russian Gazprom, and the Azerbaijani SOCAR. The price discrimination in the natural gas markets indicates that there is no unified world gas price and gas prices are highly fragmented. The intervention of SOCAR to the regional natural gas markets leads to strong price competition and contributes to the speed of proliferation of natural gas in the new, previously not gasified, areas.

4 SEE Energy Futures: Exploring Alternative Regional Scenarios

In the previous sections, the advantages of natural gas from the lens of environmental upgrading, i.e. carbon-saving, has been delineated. We have identified the emergence of the diversified natural gas supplies, further ramifications of the natural gas pipelines, and regional integration of the small individual SEE energy markets coupled with the compliance with the EU's energy policies as a strong basis for the transition of the SEE energy system towards low carbon economies. The investments in the natural gas infrastructure during the last decade and the creation of the ramified pipeline infrastructure are the reality as most new pipelines connecting the SEE region to main gas exporters start functioning in 2020. The regional integration within the SEE and harmonization of the energy market institutions of SEE countries with that of the EU seems to be no more irreversible.

The only powerful and real-world factor that could alter the course of the energy transition is the strong surge or shrinkage of the natural gas prices. Hence, to assess the energy futures of the SEE, following Gatto

(2020) and Gerner (2010), we analyse two alternative scenarios with a potential to decisively shape the energy futures:

i. the persisting status quo with moderate economic growth and stable energy markets
ii. the case of the global recession with low energy prices.

Due to the end of the current commodity supercycle's boom phase, the study excludes the possible third foresight scenario of increasing energy prices. It is well established that commodity prices go through the extended phases of boom and bust. This regularity is known as the commodity supercycle. Since the 1900s, there have been four supercycles. The world entered the latest supercycle in the mid- to end-1990s. There are indications that, since the early 2010s, the cycle has entered the contraction phase (Büyüksahin et al. 2016). This is the result of increasing investments in the extractives and pipeline infrastructure. In the absence of the substantial, growth-enhancing shocks, we could expect a constant or decreasing natural gas prices in the world gas market.

Further integration of the SEE region with the energy market of the EU is likely to contribute to the competition on the European gas market and the elimination of the intended supply and price shocks induced by Russia. In addition, the harmonization of the environmental and energy policies with that of the EU should remarkably lead to increasing environmental policy stringency and the creation of economic conditions for decarbonization over the increasing share of renewables in the energy mix. A long-run energy transition strategy contemplates, as already discussed, the emergence of natural gas-based power and heat generation facilities as a back-up option for RES. Nonetheless, the gasification is only possible if the SEE region will possess a highly branched pipeline infrastructure. The gas pipelines, which have been enabled by the realization of the SGC, decisively contributed to the pipeline density and the potential for the further gasification of the region. Hence, the continuation of the status quo with moderate economic growth rates, enhanced pipeline infrastructure, stable or decreasing natural gas prices, and increasing carbon pricing, would pave the way towards gradual, but sound decarbonization.

We scrutinized the status quo confronted with a strong macroeconomic shock. A deep worldwide recession could alter two components of the above-delineated system—the prices of the natural gas, and commitment to integration and harmonization of the SEE with the EU. A strong global shock could lead to the slash of the global fossil fuel demand, including natural gas. In terms of decarbonization, this would not be bad news. A strong decrease of natural gas prices and a moderate recession could even help accelerate gasification of the region with relatively low investment requirements. Such a scenario is, nevertheless, only possible in the face of the enhanced gas pipeline infrastructure. Sustaining the decarbonization priority in the recession, or at least keeping focused on environmental targets could decisively accelerate the long-run decarbonization. Both the EU and SEE countries must follow the energy transition commitment even under conditions of an international recession and not fall back to lignite- and hard coal-fuelled power and heat generation options. Thus, the legislative and international documents of the Energy Community must assure the resilience of the energy transition in the cases of global and regional recessions.

5 Conclusion

In this chapter, we analysed the role of the diversification and increasing interconnectivity and ramifications of the natural gas infrastructural development on the SEE energy security. We employed the broad and a rather dynamic definition of energy security, whereby energy supply security contemplates not only the security of the energy supplies to meet the existing or growing energy demand. Following Giamouridis and Paleoyannis (2011), the ability to switch to other fuels, efficiency gains, and flexibility also belong to the constitutive traits of energy security. Considering this definition, an energy system that overcomes the transition from more carbon-intensive to a less carbon-intensive one, without losing the capability to adapt to changes in the energy supply area, is a secure one. Such a system is superior to the static carbon-intensive energy system because of ignoring the increasing shadow prices of the environmental amenities and climate change as a global common-pool resource.

The chapter shows that in such a conceptual framework, natural gas is the central element of a resilient energy system. The intermittency—i.e. the supply volatility—of the RES necessitates natural gas as the stable and least carbon-intensive back-up energy supply. With the currently available energy storage systems, a fully renewables-based power and heat generation system cannot assure energy security for the modern industry. This necessitates a substantial share of natural gas in the energy systems during energy transition and beyond. Moreover, the chapter showed that the further improvement of renewables supply stability caused by the development of the storage systems could lead to the utilization of the existing natural gas infrastructure for the transit of renewable biogas and morph into an element of the circular economies of the future. We showed that a mega-project—the Southern Gas Corridor—decisively intervened in the energy system of the SEE region. This happened by creating the necessary infrastructure for the gasification of the region, and also by enhancing the competition between Gazprom and the new suppliers on the market—such as SOCAR. This will contribute to the pressure on the natural gas contracts in the region. As a secondary effect, this would also squeeze out more emission-intensive fuels such as coal and oil from the energy mix of the SEE countries.

It has been argued that, due to lowest capital commitment, both among fossil-fuelled and renewable-based energy generation, the development of the natural gas infrastructure—i.e. the bidirectional pipeline infrastructure—and their connection to the major gas hubs is a necessary step in the efficient decarbonization of the region (Hirth and Steckel 2016). The gasification could also contribute to the reduction of cumulated CO_2 emissions of the SEE region by 25–30% in the time interval between 2020 and 2050. Besides, natural gas is the prerequisite for clean fast-reacting fossil technologies. Consequently, secure natural gas supplies also imply energy security for the rising renewables—solar, wind, and hydro energy—in the region. It is expected that in the coming three decades, the confinement of the energy storage systems would make gas-fuelled adjustment systems necessary.

Energy insecurity and higher natural gas prices emanating from Russia's dominance on the energy markets of the SEE could lead to a resurgence of coal- or lignite-fuelled power generation and a coal lock-in in the face of local coal and lignite deposits. Hence, the projects connecting the natural gas riches of the Caspian Region (and in the long term also the Middle East) could serve as important stabilizers of the supply side in the European gas market. Being in the proximity of these alternative pipeline networks, the SEE region gains a unique chance of enhancing its energy security and diversifying its energy supplies. Thus, despite scepticism, it is claimed in this chapter that the implementation of new pipeline projects pushed mostly by the EU is the prerequisite for a more energy-secure and clean energy mix in the SEE.

The world witnessed a great leap forward during the latest commodity supercycle that started in 1996. During this supercycle, the world economy was mostly booming and, by doing so, kept fossil fuel prices high. The governments had access to substantial revenue surpluses that they could use for subsidization of renewables. The commodity price recession commenced in 2014 and led to the plunging of the prices of fossil fuels (Büyükşahin et al. 2016). This could lead to the recarbonization of the economy in the face of lacking adjustments of carbon taxation. To ensure the continuation of energy transition the governments must adjust in a way that price changes do not alter the competitiveness of the renewables and natural gas. To this end, the legal documents on the creation of the SEE regional energy market, integration of the energy markets of the EU and SEE, and harmonization of the energy transition policies in the SEE region and the EU have to assure the resilience of the energy sector development to the global macroeconomic shocks and temporary policy shifts. Any relapse to hard coal- or lignite-fuelled power and heat generation in the crisis could pave the way for coal lock-in, and substantially delay transition to a low-carbon economy.

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Notes

1. For a comprehensive discussion on different criteria for defining the region of the SEE see Moraliyska (2016).
2. Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, FYR Macedonia, Montenegro, Romania, Serbia, and Turkey were the first countries signing the Athens Memorandum.
3. The Directive is no longer in force. It was replaced on 31/12/2015 by the Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (European Parliament and European Council 2010).

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