Background Paper

"SE Europe's Changing Energy Direction"

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SE EUROPE'S CHANGING ENERGY DIRECTION

BACKGROUND PAPER

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Introduction

Today, global and European energy and environment strategy is to a large extent guided by concerns over climate change and an emphasis on sustainable energy systems of zero or low CO_2 emissions. The energy sector appears to be in a dynamic mode as a result of its transformation, based on efficient and sustainable energy systems, with direct impact on market operation. But energy market transformation has a long way to go during the 21st century. New ideas and innovative technologies combined with skilled human resources will undoubtedly pave the way to cleaner and affordable energy for the next generations.

It is widely assumed that actions in promoting renewable energy sources (RES) and energy efficiency will lead to clean energy and sustained, pollution free, economic development. Electricity is emerging as the main energy source in Europe with new areas of applications, as almost everything becomes electrified, such as transport, heating and cooling. RES and decentralized power generation combined with provision for storage facilities are rapidly changing the electric grid with transformation of networks and the market, where grid operators must respond to new challenges.

New ideas and concepts are being introduced in the organization and management of energy systems focusing on electricity, such as smart grids, microgrids, eco-mobility, virtual power plants, smart cities with new services provided to consumers. A huge amount of investment will be needed over the next decades for the development of the future electricity networks for clean energy and more efficient European networks and market operation.

In 2019, total RES reached a new peak satisfying 35% of the EU electricity demand. We should mention that aggregated wind and solar power generation surpassed for the first time the corresponding coal-fired one, supplying 18% of EU power production in 2019, more than doubling their market share since 2013. This is a clear sign that a transformation in Europe is underway with positive influence in the countries beyond the continent, but we need to go further and faster if we are to achieve large-scale clean and affordable electricity.

SE Europe

While market integration and transition to cleaner fuels is progressing well at European level, this is not the case for SE Europe. In most SE European countries, regional energy cooperation has been perceived as a necessary part of the European integration process. At the beginning of the present decade, the main targets of EU energy policy were incorporated in the long-term strategies of SEE countries. Lately, the focus has been redirected towards modernisation of energy infrastructure, the construction of new facilities, including electricity and gas interconnections, improvement of energy efficiency and increased use of RES.

However, SE Europe, in contrast to the rest of Europe, still remains, to a large extent, committed to continuing coal use. Based on IENE's estimates, the share of solid fuels for power generation is anticipated to increase steadily in several countries of the region (most notably in Serbia, Kosovo*[1], Bosnia and Herzegovina and Turkey) over the next 10-15 years, as they will struggle to meet increased energy demand. Hence, the road towards decarbonization and the transition to a "greener" future in SE Europe, with higher use of

*Throughout this Background Paper, this designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo declaration of independence.

natural gas and RES, appears difficult and with considerable constraints, in comparison with the rest of Europe.

1. Energy Market Transition and Integration in SE Europe

As the economies of SEE countries are developing with the view of catching up with those of the rest of Europe, energy plays an important role both from financial/investment perspective, but also in terms of market development (i.e. liberalization, competition, etc.). The region of SE Europe, as defined and covered by IENE, includes 15 countries from Slovenia in the North-West to Israel in the South-East, 12 countries of the Balkan Peninsula, plus Turkey, Cyprus and Israel (see Map 1). From these countries, 7 are EU member states, 8 are NATO members, 5 are OECD members and only 3 are members of the Paris-based International Energy Agency (IEA), including Greece, Hungary and Turkey.

Map 1: The SE Europe Area Defined

Source: IENE

Although politically, culturally and economically diverse, these countries are related and bound in different degrees each to EU energy strategies, policies and objectives. Their economies appear widely divergent in terms of structure and level of development, but they share several challenges, which appear to be common to all. Among them, it is the priority they all give to the development of the energy sector, both in terms of infrastructure, energy mix and market operation. Six countries in the Western Balkans, known as WB6, are contracting parties of the Energy Community and hence in the process of fully adapting their energy legislation to EU Directives, while Turkey had made significant progress in adapting its legislation and market operation to EU requirements.

Climate Targets Help Forge Common Energy Approach in SE Europe

More specifically, the EU, along with the vast majority of the international community, has pledged to meet the climate targets laid down by the 2015 Paris Agreement. In addition, the EU has begun to push for an integrative approach to climate and energy policy in the region, setting specific targets, which in addition to its cohesive climate element, will help narrow the divide between Western Balkan countries and the SEE EU member states and between SE Europe and the other European regions.

With the exception of Albania, the countries of SE Europe have high shares of electricity generation from an ageing fleet of coal-fired power units with quite low efficiencies. Energy planning-related decision-making regarding whether to modernize or replace a significant share of this old generating capacity has to be fixed within a global clean energy transition context. At the same time, the SEE region as a whole has a huge potential for RES deployment and energy efficiency implementation.

With the objective of facilitating the energy transition of a power system from a fossil fuel-based one towards one where RES will be the components, emphasis should be put on promoting flexibility by all possible means. Power system flexibility spans from more flexible generation to stronger transmission and distribution systems, more storage options and more flexible demand-side management **(1)**.

The Rising Role of RES

Based on actual 2019 data **(2)**, total RES reached a new peak satisfying 35% of the EU electricity demand. We should mention that aggregated wind and solar power generation surpassed for the first time the corresponding coal-fired one, supplying 18% of EU power production in 2019, more than doubling their market share since 2013. This is a major development, which shows the strong dynamics of solar and wind power generation. Meanwhile, coal-fired power generation decreased by 24% in the EU during 2019. In particular, hard coal-fired electricity production dropped by 32%, as well as lignite-fired one by 16%. This evolution can be attributed to CO_2 emission allowances price increases and development of RES. Natural gas has substituted around 50% of the coal's share, as well as solar and wind power has covered the remaining part. The shrinkage of coal is set to continue, since both Greece and Hungary have announced commitments in 2019 for coal phase-out, raising the number of the member states with coal phase-out plans to 15, and leaving Bulgaria, Croatia, Poland, Romania, Slovenia as well as other Western Balkans countries (i.e. Bosnia and Herzegovina, Kosovo*, Montenegro and Serbia) with the exception of North Macedonia where the coal exit strategy is under discussion, as the only countries that have yet to take relevant measures. **(3)(4)**

The increasing penetration of variable RES has proven to exert significant influence on the electricity market prices. Sorknæs et al. **(5)** employed the EnergyPLAN model to investigate the effects of wind power and photovoltaics on future electricity day-ahead system prices. Reichenberg et al. **(6)** proposed an optimization framework in order to optimally determine variable RES capacity additions along with transmission expansion. The results highlight the importance of transmission expansion for the effective integration of variable RES with baseload electricity production. In addition, the risk facing power utilities taking part in the whole electricity value chain, including wholesale and retail markets, under various market circumstances and with different energy generation portfolios, as well as with several customers' representation percentages on the demand side can have significant impact on the portfolio structure of market participants **(7)**. The increasing penetration of electric

vehicles can also exert significant influence on the optimal energy mix of the power systems, as highlighted by Bartha et al. **(8)**. Also, the increasing dependence on the imported gas was studied by Deane et al. **(9)**. In particular, the authors utilized the PLEXOS model for the annual operational scheduling of the integrated EU-28 power & gas systems, highlighting the influences of a series of gas supply interruption scenarios on the power system. This work focuses on indicating the significance of gas system for power system's stability.

Electricity Market Integration in SE Europe

The Price Coupling of Regions project of the European Power Exchanges has developed the Pan-European Hybrid Electricity Market Integration Algorithm (EUPHEMIA), which awards cross-border interconnection capacity and implements the electricity market clearing across Europe. The EUPHEMIA algorithm has been adopted by most of the power exchanges and electricity market operators within the EU. The main contribution of the markets coupling is to improve market liquidity and to reduce the electricity prices volatility. Atănăsoae et al. **(10)** provided a series of numerical examples for the analysis of the coupling mechanism and the influences and characteristics of the coupled operation of electricity markets. A key aspect of the EUPHEMIA algorithm is that it is an economic dispatch algorithm, in comparison with highly technical approaches, namely the unit commitment ones. A noticeable benefit of those methodologies comprises the determination of a robust operational scheduling, guaranteeing in that way the system's stability and reliability.

With regard to the SEE power system, a large part of the features of its energy infrastructure are dated and require replacement within the next decade. Hooper and Medvedev **(11)** presented an overview of the electricity generation in 10 SEE countries during the period 1995-2004. The analysis highlighted the different characteristics of electricity generation in each country, indicating also the low gasification levels, the low share of nuclear power industry, and the dominant role that hydroelectricity has in some countries. One potential solution for reducing the capital investments in new power generation facilities could be the regional electricity trade. The significant utilization of carbon-intensive indigenous lignite resources will have to harmonize with national climate commitments and local air pollution improvement, which can facilitate the investments in RES capacity due to their shrinking cost and the introduction of RES and energy efficiency targets. Since the 2000s, electricity demand has grown slightly in SEE, mostly due to the electrification of the industrial sector, offsetting the demand reduction caused by energy efficiency measures.

IRENA **(12)** has provided a discussion regarding the challenges and opportunities for RES market with regard to West Balkan countries, as well as development strategies and new support measures. In order to support the energy transition in the Western Balkans region, six issues have to be addressed, according to Energy Community Secretariat & Agora Energiewende **(13)**, including: (i) commitments for greenhouse gas (GHG) emissions mitigation, (ii) measures for energy efficiency increase, (iii) frameworks for rapid enhancement of the RES capacity, (iv) measures for energy markets improvement, (v) a just transition framework, and (vi) education and innovation programmes.

According to REKK Foundation **(14)**, security of supply in the SEE power systems with 50% RES towards 2030 is guaranteed by a mix of conventional power units and cross-border electricity trading. The enhancement of interconnection capacities, market integration and regional cooperation will be of paramount importance for the maximization of national security of supply and minimization of the power system costs. Due to the fact that SEE countries have a relative high number of interconnections, an integrated approach for climate and energy planning can maximize the potential for enhancing energy security, cost

competitiveness and alleviating climate change impacts **(15)**. The case of RES as contributor to energy security is becoming increasingly relevant for SE Europe as Stambolis has observed. **(16)**

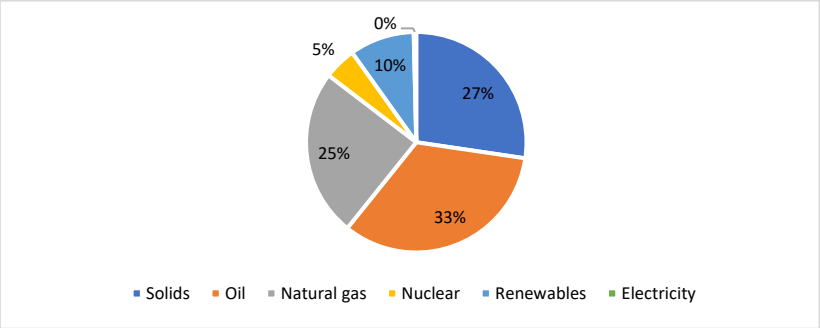
If we look at the region as a whole, we observe the following:

- Energy market liberalization (electricity and gas) and market integration are moving ahead, but in widely diverging directions.
- RES are definitely entering into the country and regional energy mix, but at a slow pace
- Energy efficiency is also moving ahead, but cannot be quantified yet, with hundreds of projects under development in all countries. It is not at all sure that EU's goal for 32.5% energy efficiency by 2030 will be met.
- Electricity grid infrastructure is expanding and upgraded across the region.
- However, carbon-based power generation is also moving ahead, adding substantial capacity from now until 2025 (1.5 GW per year for SEE and 2.5 GW for Turkey, i.e. total 4 GW per year over the next 7-8 years).
- Carbon-free new nuclear capacity in SEE over last few years is zero.

The Changing Energy Mix

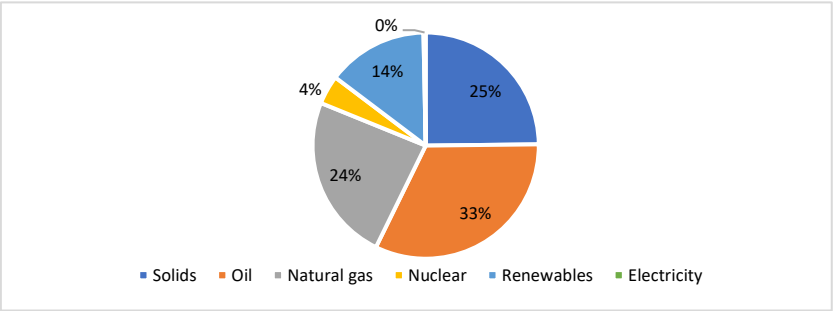
The energy mix in SE Europe as a whole, including Turkey, is changing but slowly. In summary, as seen over a 10-year period and comparing 2008 and 2018 (see Figures 1 and 2), there is lower use of coal (lignite), gas and nuclear, more RES and the same use of oil, given the different total gross inland consumption (2008: 264 Mtoe and 2018: 299 Mtoe).

Figure 1: Gross Inland Consumption (%) in SE Europe, including Turkey (2008)



Source: IENE

Figure 2: Gross Inland Consumption (%) in SE Europe, including Turkey (2018)



Source: IENE

In order to advance the energy transition and to reduce GHG emissions, the countries of SE Europe, including the Western Balkans, should over the next few years:

- Develop plans and set concrete dates for phasing out coal- and lignite-fired power generation in line with the commitments under the Energy Community Treaty and the Paris Agreement
- Develop regulatory, administrative and financing frameworks to enable a massive and rapid scaling of RES, in particular wind and solar PV
- Cooperate to make best use of the highly interconnected transmission infrastructure within the Western Balkans and with the EU and tap the potential for creating one integrated power market in the region. Indeed, cross-border and regional cooperation will strengthen security of electricity supply and significantly reduce the costs and practical challenges of decarbonizing the power sectors in the Western Balkan Region.

2. Latest EU Energy and Environmental Policies and Regional Priorities

On July 8, 2020, the EU adopted strategies for energy system integration[2] and hydrogen[3], aiming to become climate-neutral by 2050. The plans will transform Europe's energy system, which accounts for 75% of the EU's GHG emissions, paving the way towards a more efficient and interconnected energy sector, driven by the twin goals of a cleaner planet and a stronger economy. **(17)**

According to the European Commission, the two strategies present a new clean energy investment agenda, in line with the Next Generation EU recovery package and the European Green Deal[4]. According to EU officials, the planned investments have the potential to stimulate the economic recovery from the coronavirus crisis. In their view, they will create millions of new European jobs and boost the bloc's leadership and competitiveness in strategic industries, which are crucial to Europe's resilience.

EU Executive Vice-President for the Green Deal, Frans Timmermans, said if Europe wants to become the first climate neutral continent by 2050, it needs to switch its energy systems from fossil fuels to clean. He said the strategies adopted on July 8 will bolster the European Green Deal and the green recovery, and put the EU firmly on the path of decarbonising its economy by 2050. "The new hydrogen economy can be a growth engine to help overcome the economic damage caused by COVID-19. In developing and deploying a clean hydrogen value chain, Europe will become a global frontrunner and retain its leadership in clean tech," Timmermans said.

At the same time, EU Energy Commissioner Kadri Simson noted that with 75% of the EU's GHG emissions coming from energy, the EU needs a paradigm shift to reach the 2030 and the 2050 targets. "The EU's energy system has to become better integrated, more flexible and able to accommodate the cleanest and most cost-effective solutions. Hydrogen will play a key role in this, as falling RES prices and continuous innovation make it a viable solution for a climate-neutral economy," Simson said, according to the European Commission.

[2] https://ec.europa.eu/energy/sites/ener/files/energy_system_integration_strategy_.pdf
[3] https://ec.europa.eu/energy/sites/ener/files/hydrogen_strategy.pdf
[4] https://eurlex.europa.eu/legal-content/EN/TXT/?qid=1576150542719&uri=COM%3A2019%3A640%3AFIN

The EU Strategy for Energy System Integration will provide the framework for the green energy transition, the European Commission said, adding that the current model where energy consumption in transport, industry, gas and buildings is happening in 'silos' – each with separate value chains, rules, infrastructure, planning and operations – cannot deliver climate neutrality by 2050 in a cost efficient way; the changing costs of innovative solutions have to be integrated in the way we operate our energy system. New links between sectors must be created and technological progress exploited.

In EC's view, energy system integration means that the system is planned and operated as a whole, linking different energy carriers, infrastructures, and consumption sectors, and so by becoming connected and flexible, the system can become far more efficient and can reduce costs for society. "For example, this means a system where the electricity that fuels Europe's cars could come from the solar panels on our roofs, while our buildings are kept warm with heat from a nearby factory, and the factory is fuelled by clean hydrogen produced from off-shore wind energy," they note, according to the European Commission.

Hence, EC's Energy System Integration strategy sets out 38 actions to link different energy carriers, infrastructures and sectors and exploit technological progress, while the Hydrogen strategy will support the decarbonisation of industry, transport and more across Europe, through investments, regulation, market creation, and research and innovation. **(18)**

According to the European Commission, this gradual transition will require a phased approach. From 2020 to 2024, the EU will support the installation of at least 6 GW of renewable hydrogen electrolysers in the EU, and the production of up to 1 million tonnes of renewable hydrogen. "From 2025 to 2030, hydrogen needs to become an intrinsic part of our integrated energy system, with at least 40 GW of renewable hydrogen electrolysers and the production of up to 10 million tonnes of renewable hydrogen in the EU. From 2030 to 2050, renewable hydrogen technologies should reach maturity and be deployed at large scale across all hard-to-decarbonise sectors", the Commission said.

EU Internal Market Commissioner Thierry Breton said the European Clean Hydrogen Alliance launched on July 8 will channel investments into hydrogen production. "It will develop a pipeline of concrete projects to support the decarbonisation efforts of European energy intensive industries such as steel and chemicals. The Alliance is strategically important for our Green Deal ambitions and the resilience of our industry," Breton said.

On July 8, WindEurope hailed the EU's decision to promote direct electrification across the whole economy and the use of renewable hydrogen in hard-to-abate sectors. "It's good these new EU Strategies recognise the primary role of direct electrification," WindEurope CEO Giles Dickson said. "Electrifying heating, transport and industry directly via RES is the cheapest and most efficient way to decarbonise energy. RES are well over a third of Europe's electricity and rising. We now have to get renewable electricity into heating, transport and industry," he added.

2030 EU Climate and Energy Targets

For reference purposes, the current key EU Climate and Energy targets for 2030 are summarized as follows **(19)**:

- At least 40% cuts in GHG emissions (from 1990 levels)
- At least 32% share for renewable energy
- At least 32.5% improvement in energy efficiency

Figure 3: Current 2020 and 2030 EU Agreed Climate and Energy Targets

Source: European Commission

All three targets of climate and energy legislation will shortly be updated with a view to implement the proposed 60% net GHG emissions reduction target. The European Commission will come forward with specific proposals by June 2021.

Achieving at least 55% GHG emission reduction by 2030 requires an increased share of RES in the range of 38% to 40% of gross final consumption, according to Commission President Ursula von der Leyen in her first State of the European Union speech **(20)**. The power sector will continue to move away from fossil fuels, which would generate less than 20% of the EU's electricity by 2030, while RES would supply around two-thirds of the EU's electricity. The Commission's Impact Assessment indicates that final and primary energy consumption would further fall by 2030, while achieving savings of 36%-37% on energy efficiency.

In heating and cooling, RES could achieve around 40% penetration in 2030, mainly through switching fuels towards renewable heating solutions of which heat pumps are the fastest growing application area. In line with this policy, buildings will become more energy efficient and rely less on fossil fuels for heating and cooling. As a result, by 2030, emissions from buildings would decrease by around 60% compared to 2015, the European Commission notes.

In the transport sector, as calculated in the Renewable Energy Directive, RES could reach around 24% through further development and deployment of electric vehicles, advanced biofuels and other renewable and low carbon fuels. Simultaneously, revised CO_2 emission standards for cars and vans will ensure enough clean cars are available in the market. Supporting this transition will require a corresponding roll-out of recharging and refuelling infrastructure by 2030. As part of the Green Deal, the European Commission wants to place 1 million new charging points across the EU.

Currently, the 2030 target for GHG emissions reduction, compared to 1990 levels, in the EU is 40%. On September 17, 2020, the European Commission proposed to raise that to 55%, but the EU Parliament on October 6 voted to update the bloc's climate target even higher to 60%, putting capitals under pressure.

To finalize the law, Parliament and all the EU Member States will need to agree on it. This may prove not that easy because not everyone agrees on how ambitious this new target should be. The law also obliges each of the 27 member states to be carbon neutral by 2050. The text has been forwarded to the EU Council of Ministers for final approval. They aim is to wrap up negotiations by the end of 2020. A political agreement on the climate law before

December 12, the fifth anniversary of the Paris Agreement and the entry into force of this agreement, is expected by the European Parliament.

However, some Member States argue that the European Commission's proposal to increase the 2030 target to at least 55% does not adequately reflect their different starting points. Moreover, they consider that the proposal does not provide sufficient burden-sharing mechanisms based on the compensation for Member States with coal-dependent economies.

The latest vote in the European Parliament in favour of increasing the target to 60% brings an even bigger challenge for the Member States with higher GHG emissions and lower GDP per capita. These Member States are concerned that the burden of the transition cost will not be evenly distributed across the European Union which might reinforce or even create new inequalities within the EU.

The Case of SE Europe

Far from being tuned to EU's bold energy and climate targets, SE Europe is still struggling to develop electricity grids and interconnections in order to enable greater RES penetration and seek fast decarbonization through expanded gas use. Today, EU's hydrogen grand standing appears quite remote to SEE's actual energy needs.

The current energy issues of the SE European countries, including EU and Energy Community member states, concern primarily the further utilization of indigenous resources, both conventional and renewable, which inevitably give rise to strong differences on views and approaches at local level, often leading to conflicting policy views that cannot be easily reconciled.

A major such issue is the further and sustained development of coal and lignite resources, which are abundant in Greece, Bulgaria, Kosovo*, Serbia, Bosnia and Herzegovina and Turkey. Solid fuel extraction and use in the power generation sector in these countries are responsible for many thousands of jobs, while it forms the basis of an extensive industrial base. Yet, there is a disturbing lack of well thought out regional policies in SE Europe in such areas as Carbon Capture and Storage (CCS) and Carbon Capture, Utilization and Storage (CCUS) that could see the prolongation in the life of local coal and lignite industries and the smooth transition to decarbonized power generation.

Today, regional energy policies, as defined in the context of the Energy Union, do not leave much room for developing or maintaining regionally advantageous policies, including coal use through CCS, as the phasing out of all CO_2 generating plants by 2030 latest, is a clear target pursued by the EU. Therefore, we have a potentially explosive situation with wide ranging social implications if lignite- and coal-fired power plants start closing down en masse, sending thousands of people to early retirement and eventual unemployment.

As political factions in the EU and SE Europe tend to polarize over the last few years, mainly fueled by refugees and poverty issues, potential conflicts arising by the forced closure of coal- and lignite-fired power plants and mines in many countries, this will certainly help to undermine further economic development and will most likely give rise to widespread social unrest. A similar but less disturbing situation may arise with oil and gas exploration and production activities as several countries in the SE European region are actively seeking to explore oil and gas deposits, despite the ongoing COVID-19 pandemic and the huge impact on oil demand and prices, since this region as a whole is a net hydrocarbon importer. Almost

all countries in the region are reporting promising hydrocarbon deposits, with some of them, notably Albania, Croatia, Serbia and Romania, having developed extensive production facilities and with Greece, Montenegro, Bulgaria, Cyprus and recently Turkey[5] having announced ambitious plans for oil and gas exportation and production.

A potentially conflicting situation may arise too in the benign field of RES as many countries in SE Europe have abundant solar, wind, geothermal, biomass and hydro potential (see Table 1), which they will seek to develop further to the fullest possible extent. With the SE Europe as a whole possessing a huge excess capacity of RES, its further exploitation in the near future may lead to incompatible situations as the various countries will be seeking ways to export competitively priced RES generated electricity to central and northern Europe.

Table 1: Technical Potential for Utility-scale Solar PV, Wind and Hydropower in the Electricity Sector in SE Europe (TJ)

	Utility-scale solar PV	Onshore wind	Hydropower
Albania	13 342	49 154	56 059
Bosnia and Herzegovina	14 886	94 810	88 193
Bulgaria	36 468	190 264	48 071
Croatia	15 682	104 951	30 600
Kosovo*	3 006	13 860	4 853
Montenegro	3 874	23 332	18 079
North Macedonia	8 014	27 558	14 421
Republic of Moldova	21 758	180 450	12 099
Romania	92 902	554 522	136 800
Serbia	33 509	188 590	64 800
Slovenia	1 613	8 266	58 539
SEE	245 052	1 436 156	532 515

TJ = Terajoule

Source: IRENA[6]

Even if we were to overcome the present lack appropriate transmission infrastructure, at one point, potential RES electricity sellers will be confronted with the need of offering extremely low tariffs or electricity market operators will simply refuse Mediterranean electricity inputs as if it has already happened in the case of the ill-fated Helios project **(21)**. If we were to examine regional energy policies and prioritize them according to stated plans by national political leaderships, we shall soon realize that we end up with an inverted pyramid arrangement, compared to stated and pursued official Energy Union policies.

[5] Bektas, C. (2020), "Turkey discovers 320bcm of natural gas reserves in Black Sea", https://www.icis.com/explore/resources/news/2020/08/21/10543949/turkey-discovers-320bcm-of-natural-gas-reserves-in-black-sea

[6] https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Dec/IRENA_Market_Analysis_SEE_2019.pdf

As analysed in IENE's "SE Europe Energy Outlook 2016-2017" study **(22)**, the energy policy priorities of most countries in the SE European region would then appear something like that:

1. Further large-scale development of coal and lignite resources without any recourse CCS/CCUS provisions and plans
2. Promotion of oil and gas exploration activities onshore and offshore aiming towards maximizing production in the mid- and long-term
3. Develop further RES in all application areas – solar, wind, biomass, hydro and geothermal – without necessarily adhering to the specific ceiling targets set by the EU
4. Promote energy efficiency, focusing primarily in the building sector
5. Develop interconnectivity of electricity and gas systems
6. Diversify energy supply routes and supplies
7. Reduce CO_2 levels

The West Balkans

At this point, we should note that the West Balkans have attractive assets for supporting Europe's energy transition, such as: (a) large coal mining areas with excellent grid infrastructure that can be used for industrial solar, wind, geothermal and biomass activities, (b) lower labour costs, (c) engineering skills and (d) geographic proximity to advanced industrial economies with rising energy demand. With the right incentives, these assets could attract investments in the new wave of low-carbon industries and further contribute to the European industrial transition.

The EU could deploy several international cooperation initiatives so as to include Western Balkans in the European Green Deal. Among them are the Energy Community, the European Network of Transmission System Operators for Electricity, the Regional Cooperation Centre, Central and South Eastern Europe Energy Connectivity, the Berlin Process, and others. Each of these brings value and tools for achieving the required energy transformation, and for guiding the SEE region towards hosting modern low-carbon, high added-value industries.

International financial institutions, such as the EIB, the EBRD and the World Bank, are expected to play key role in the energy transformation of SE Europe. Most of these organisations follow strong climate-aligned policies. Recently, the EIB branded itself the "European climate bank", pulled out of investment in fossil fuel projects and announced that it "will align all financing activities with the goals of the Paris Agreement from the end of 2020". **(23)**

If the EU really wants to maximise the impact of the European Green Deal and make it economically more attractive to all governments, it should incorporate the Western Balkans as a party to it and ensure the countries there are part of the negotiation process. In this way, the EU will not only guide the region towards the 2030 and 2050 targets, but it would also be able to extract the maximum value the Western Balkans could offer. This will make the European Green Deal an all encompassing one, one based on a clear mutual interest in which the Balkans will not fall into the usual role of a policy taker and reluctant regulations follower, but will instead be an active contributor.

This transactional side of integrating Western Balkans into the European Green Deal will not only accelerate the region's transition, but it could also increase the chances of success of the EU climate-neutral agenda right across the continent. The EU should therefore negotiate

such a deal with the Western Balkans on the basis of the contributions and the assets that the six aforementioned countries could bring into the deal and their existing cooperation with the EU country members of the region.

To achieve this, the West Balkans countries themselves should come together to form a government negotiating group. They should assemble an international technical assistance team that would help negotiators evaluate the clean economy assets of the region and identify the most economically beneficial paths towards rapid GHG reduction.

3. The Road Towards Decarbonisation in SE Europe

Lately, decarbonization as a concept and a coordinated set of actions has come to dominate Europe's current and long term (i.e. 2030 and 2050) energy strategies. When considering SE European energy policy, decarbonization will come to play an important role as it affects the whole spectrum of energy - from power generation to transport, building, industry, trade and services sectors. The ultimate objective is the reduction of GHG emissions. In this context and as far as SE Europe is concerned, the power sector is expected to play central role in the decarbonization process, as it is in a position to deliver much quicker and more visible benefits, in view of the much higher volumes of gases involved.

Decarbonization in the case of power generation means reduction of the sector's carbon intensity, which in turn means decline of the emissions per unit of electricity generated. Decarbonisation is of particular importance for coal-intensive regions, such as SE Europe, in order to transit into a "cleaner" energy mix. A gradual decarbonisation of the power sector can be achieved by increasing the share of low-carbon energy sources, like renewables and nuclear, as well as by capping GHG emissions from fossil fuel power stations through Carbon Capture and Storage (CCS) technology and Carbon Capture and Utilisation (CCU). A shift from "dirtier" fossil fuels, like coal (which emits on average 900g CO_2/kWh), to lower emissions fuels, like gas (which emits about 400g CO_2/kWh) and renewables, can also help to reduce power plant emissions. **(24)**

Reaching climate neutrality by 2050, as envisioned by the European Commission's strategic long-term vision, requires timely decarbonisation of the European energy sector, including a complete phase-out of coal (see Map 2). This will particularly affect regions which are dependent on the coal sector and other high-carbon industries, as they will have to follow a transition phase to low-carbon economies in the coming decades. This briefing offers a deep dive into the positioning of key stakeholders as well as opportunities and challenges for a transition away from coal in the coal-dependent SE European region.

Most governments in SE Europe, in contrast to the rest of Europe, remain committed to continuing coal use. Greece is until now the only country in SE Europe that is expected to shut down all its lignite-fired power plants by 2028[7], as it has already announced and put into practice an aggressive decarbonization programme, while North Macedonia's coal phase-out plan is still under discussion[8]. Based on IENE's estimates, the share of solid fuels

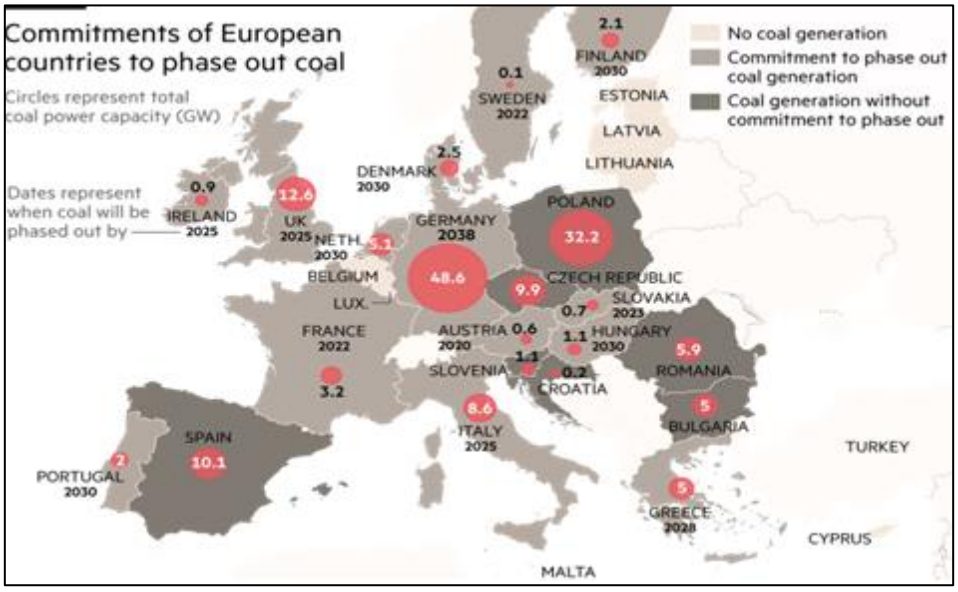
[7] In December 2019, Greece's Public Power Corporation (PPC) decided to cease operating all its existing lignite-fired power plants by 2023. The only lignite-fired power plant remaining until 2028 is Ptolemaida V, which is currently under construction. PPC is now looking for a fuel conversion at the facility for lignite-free operation beyond 2028. Natural gas, biomass and waste-to-energy incineration, even a combination of all three generation methods, have been included as possible options in state-controlled PPC's new business plan.

[8] In February 2020, North Macedonia adopted a ground-breaking new energy strategy, making it the first country in the Western Balkans to name concrete date options for a coal phase-out. Two of the strategy's scenarios entail a coal exit by 2025, with the third delaying closure of the Bitola lignite-fired power plant until 2040. A final decision on which pathway to take will be made later in the year.

for power generation is anticipated to hold its present position if not increase in several countries of the region (most notably in Serbia, Kosovo*, Croatia, Bosnia and Herzegovina, Montenegro and Turkey[9]) over the next 10-15 years, as these countries will struggle to meet increased energy demand. Hence, the road towards decarbonization and the transition to a "greener" future in SE Europe, with higher use of natural gas and renewables (RES), appears difficult, if not uncertain, in comparison to the rest of Europe. It seems that a far more realistic approach towards decarbonization is required in the case of SE Europe. The necessity for such an approach is based on the fact that reforms are not easily being implemented, as there is either lack of social acceptance or lack of governmental willingness or both.

The Paris agreement marks the latest step in the evolution of the UN climate change regime, which originated in 1992 with the adoption of the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC established a long-term objective, general principles, common and differentiated commitments, and a basic governance structure, including an annual COP. The Paris agreement (COP21) is proving to be an important reference point and an accelerator for global energy transformation.

Map 2: Commitments of European Countries to Phase Out Coal



Sources: Europe Beyond Coal, Financial Times (25)

Therefore, the main question arising for the countries in SE Europe, including the Western Balkan ones, is whether they are ready and willing to substitute coal with other energy forms, taking also into account the existing bias for the use of coal (i.e. lignite) in the region. SE Europe as a whole is a carbon-intensive region, with the exception of Albania whose energy sector is remarkably low carbon, as its system relies almost fully on hydropower for electricity generation. In the case of Albania, the goal will be to diversify its hydropower-dependent energy mix without increasing CO_2 emissions, while taking into account adequate measures to preserve biodiversity. As far as the rest of the countries in SE Europe are concerned, which are rich in solid fuels, the challenge will be how to diversify progressively their energy mix by minimizing coal use for power generation.

[9] Currently, all these SEE countries do not have any coal phase-out plan.

In this context, an appropriate energy mix appears to be the best vehicle towards achieving decarbonization. Only through a combination of low-carbon energy sources (i.e. renewables and nuclear), as well as CCS/CCU technology, a "greener" energy mix can be achieved. However, in a carbon-intensive region, such as SE Europe, detailed studies (currently lacking) must be conducted in order to identify what is the optimum energy mix, taking into consideration the persistent use of coal (i.e. lignite) in the years ahead, as already mentioned.

In order to achieve an optimum energy mix, a detailed strategy for the entire SEE region needs to be worked out, with short-, medium- and long-term targets. It is only by following such studies that a clear roadmap for SE Europe's transition to a decarbonized state can be established.

Although no much progress has been made for CCS applications in SE Europe, in view of SEE's high energy intensity and carbon imprint and the challenges posed for decarbonization, a comprehensive overview of currently available techniques and technologies is necessary in order to be able to assess the availability and applicability of the CCS option in the region.

In almost all the SEE countries, local actors are driving the transition, while national governments remain committed to coal as a basic energy source and so maintain close ties to the coal industry. In Greece, local mayors are looking for alternative ways for the West Macedonia region to develop, while in Kosovo*, protests have formed in villages affected by the expansion of mining activities. While transition strategies benefit from being driven by local stakeholders, guidance and policy frameworks from the national level are key as they provide stability and enable long-term planning. Among civil society voices, labour unions tend to be vocal opponents of measures that could impact the coal sector and are often well connected with the government.

The EU has a central role in supporting these processes. Kosovo*, North Macedonia and other countries in Western Balkans share the aspiration of joining the EU and as part of the Energy Community they are already influenced by the Union's climate and energy policy. In its Member States, the EU, through the National Energy and Climate Plans (NECPs), sets targets for national climate and energy policy and through its budget, the EU has a powerful tool at hand to support a transition away from coal.

Large amounts of indigenous coal and lignite deposits, which provide relatively cheap and easily accessible energy supplies for most countries in the region, are preventing a determined move towards decarbonization. As shown in Table 2, most countries in SE Europe have well defined plans and running projects for new coal/lignite-fired power plants which over the next 8-10 years will add some 10 GW of new electricity capacity. Hence, the region's dependence on solid fuels is likely to increase, notwithstanding commitments for increased RES use.

Table 2: Under Construction and Planned Coal Plants in SEE Countries (MW)*, as of July 2020

Country	Announced New Plants	Pre-permit	Permitted	Announced + Pre-permit + Permitted	Under Construction	Shelved	Operating	Cancelled (2010-2020)
Turkey	13,460	12,925	5,680	32,065	1,610	5,670	17,717	65,867
Bosnia & Herzegovina	1,830	600	1,100	3,530	0	550	2,073	1,020
Serbia	1,000	350	0	1,350	350	375	4,405	1,070
Romania	0	600	0	600	0	0	4,675	5,105
Kosovo	650	0	0	650	0	0	1,290	830
Hungary	0	0	0	0	0	0	944	3,520
Israel	0	0	0	0	0	0	4,900	1,260
Bulgaria	0	0	0	0	0	0	4,829	2,660
Greece	0	0	0	0	660	0	3,175	1,250
Slovenia	0	0	0	0	0	0	1,069	0
North Macedonia	0	0	0	0	0	0	800	730
Montenegro	0	0	0	0	0	0	225	1,664
Croatia	0	0	0	0	0	0	210	1,300
Albania	0	0	0	0	0	0	0	800

***Note:** Includes units 30 MW and larger

Sources: EndCoal (26), IENE

In Europe, there are initiatives towards a "greener" energy future such as the EU "Coal Regions in Transition Platform", which was launched in 2017, as a key part of the coal and carbon-intensive regions in transition initiative and included as a non-legislative element of the "Clean energy for all Europeans' package". The platform works as an open forum, gathering all relevant parties, local, regional and national governments, businesses and trade unions, NGOs and academia. It promotes knowledge sharing and exchanges of experiences between EU coal regions, and represents a unique bottom-up approach to a just transition, enabling regions to identify and respond to their unique contexts and opportunities. Since 2019, a secretariat has been set up to manage platform activities, covering events, provision of support materials and technical assistance to coal regions, including Czech Republic, Germany, Poland, Slovakia, Spain and the SE European countries of Greece, Romania and Slovenia. In October 2019, a group of 41 mayors from 10 coal regions in 9 European countries launched a statement supporting a just transition to the post-coal era. **(27)**

On March 4, 2020, the European Commission adopted European Climate Law proposal[10], which will enshrine into EU legislation the European Union's commitment to achieve net zero GHG emissions by 2050. The 2050 objective reflects commitments under the Paris Agreement and is central to the European Green Deal[11], published in December 2019, which sets out the Commission's commitment to tackling climate change and environmental-related challenges.

To date, most SEE countries have relied heavily on conventional generation technologies. However, over the next decade, countries in this region will have to replace around 50% of their existing capacity for age-related reasons. However, renewable energy development in SE Europe has been limited until now.

[10] https://ec.europa.eu/info/files/commission-proposal-regulation-european-climate-law_en
[11] https://ec.europa.eu/info/files/communication-european-green-deal_en

Map 3: Signatories Declaration of Majors on Just Transition

Source: WWF

One impediment to scaling up renewables is their higher up-front capital intensity, compared to investment in coal or natural gas. Higher up-front costs make renewable energy investment more sensitive to political and regulatory conditions than projects with lower capital intensity. And since private investors typically consider ventures in SE Europe riskier than, let us say, investment in Germany or France, this kind of projects in the region face relatively higher financing and capital costs. The "risk premiums" demanded by investors have a significant effect on the price of renewable power. Past research has shown that higher financing costs could render a wind project in, for instance, Croatia, twice as expensive as the same project with similar resource conditions in Germany. Bloated financing costs have two effects: (a) they support the perception that renewables are costly to consumers and taxpayers and (b) in a high cost of capital environment, renewables may not outcompete fossil-fired generation, even given cheaper system costs. **(28)**

Policy Inconsistencies Concerning Gas Use in SE Europe

If we are to take EC stated energy and climate policies and strategic directions with respect to 2030 targets at their face value, there is a clear prejudice against any further investment in gas infrastructure in view of the prospect of its full abandonment over the next 10-15 years and its substitution with hydrogen and RES. Meanwhile, all countries in SE Europe have firm plans encouraging further gas use for power generation, industrial and commercial use and for domestic applications. Almost all governments in SE Europe consider gas use as the fastest and most efficient way for decarbonization. Already we witness much increased gas use in the region. Hence, we are witnessing a strong inconsistency in the region between pursued EU policy targets with regard to gas use – with EU arms such as EIB and EBRD already implementing negative investment decisions towards new gas infrastructure projects – and locally applied energy policies, which very much favor further gas use. Sooner or later, the EU will have to address this serious policy discrepancy and decide on strategy correction and associated medium- and long-term action plans. In other words, to what extent is Brussels willing to prohibit gas use and what fuels is ready to propose as alternatives?

It is no coincidence that last May a group of eight EU countries from the Balkans and the east have joined forces to defend the "role of natural gas in a climate-neutral Europe"[12]. In a joint paper, the group of eight calls for "combined electricity – gas solutions" in the transition to net-zero emissions by 2050. "A transition based solely on renewable energy sources does not consider the need for a diversified energy mix in the EU," says the paper.

The paper – titled "The role of natural gas in a climate-neutral Europe" – is signed by Bulgaria, Czech Republic, Greece, Hungary, Lithuania, Poland, Romania, and Slovakia. It makes the case for fossil gas in the transition away from coal power, which is a dominant form of electricity in many eastern EU member states. "When replacing solid fossil fuels, natural gas and other gaseous fuels such as bio-methane and decarbonised gases can reduce emissions significantly," the paper argues.

The European Commission reckons that electricity will meet 53% of the bloc's energy demand by 2050 as the bloc moves towards reducing emissions to net-zero. That leaves at least 40% for other energy carriers such as gaseous fuels that Brussels says will have to be fully decarbonised in order to reach the EU's stated goal of becoming climate neutral by 2050. Natural gas has been a major driver of Europe's rapid transition away from coal power and is also proving a valuable back-up for variable renewable electricity generation from wind and solar power.

4. The Expanded South Corridor

As European energy demand is likely to grow over the next few years, there will be a need for increased imports as indigenous oil and gas production has reached its limits and is already declining. In 2018, EU-27 is more than 58% energy import dependent **(29)**, with this figure likely to increase in the years ahead; in addition to oil and gas, there is going to be a further decrease in locally produced coal and lignite in view of stringent environmental considerations. The South Corridor will play a pivotal role as an alternative entry gate for gas which will help Europe diversify both its energy supplies and its energy routes. Hence, South Corridor is expected to strengthen the security of energy routes.

The TANAP-TAP gas pipeline system is the foundation of the South Corridor. A number of alternative plans for channeling this gas to SEE countries, especially Greece, Bulgaria and Albania, are now being implemented with gas to be used for domestic consumption. These plans now include additional gas pipelines, liquefaction plants for LNG export and FSRU terminals to be tied up into the TANAP-TAP system.

Another option, apart from the TANAP-TAP system, is the East Med pipeline which again, due to the significant technical challenges, could only accommodate limited gas quantities in the region of 8 to 12 bcm per year. Meanwhile, EC is actively exploring the possibility of massively increasing the member countries' LNG capabilities as part of Energy Union priorities.

The Turkish Stream is also considered as a vital gas supply route. Furthermore, the Turkish Stream raises the prospect for the stalled ITGI (Interconnector Turkey-Greece-Italy) resurfacing and actually being developed.

[12] Simon, F. (2020), "Eight EU states back 'natural gas' in net-zero transition", *Euractiv*, https://www.euractiv.com/section/energy-environment/news/exclusive-eight-eu-states-back-natural-gas-in-net-zero-transition/

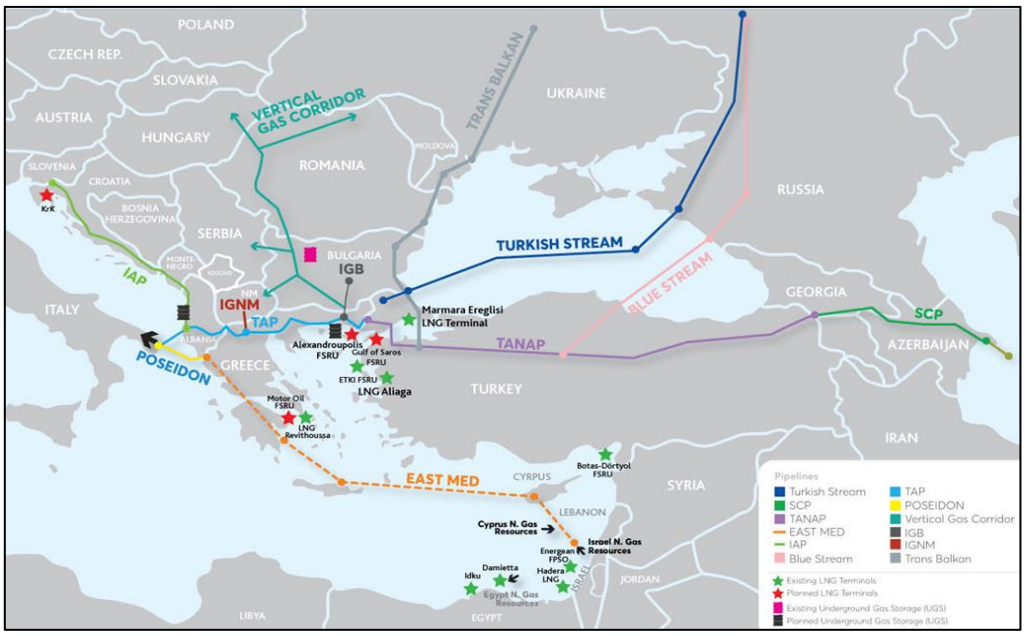
Alongside of the East-West route, the Vertical Corridor is a gas system that will facilitate the connection between existing national gas grids and other gas infrastructure in the East Balkans in order to secure easy gas transiting, thus contributing to energy security and market liquidity. Such a gas system (which will bring together national grids, underground gas storage facilities, interconnectors, LNG terminals) will form an important new corridor from South to North whose operation will be fully aligned with EU Directives and European energy policy.

In view of several new projects under development in the region, it is time to redefine the South Corridor by including these new potential gas supply sources and routes. Therefore, an Expanded South Corridor should be considered and defined as such, to include all major gas trunk pipelines and terminals which will feed gas into the system that will then be directed towards the main European markets (see Map 4). Finally, an Expanded South Corridor with its multiple of gas entry points and linked underground gas storage and LNG facilities will provide the necessary background for the operation of regional gas trading hubs.

5. The Emergence of Gas Trading Hubs in SE Europe

It is worth noting that there is a definite trend in European gas markets for gas volumes to be traded through gas hubs, several of which have been established and are operating successfully in many EU countries. Already fourteen (14) such hubs are in operation and more are planned over the next few years.
Today, there is not one gas trading hub (or hubs) serving the needs of the SE European region. The Vienna-based CEGH is the nearest such hub which at present serves the needs of Central European countries. Vienna's CEGH, in view of its geographical position and trade volume and origin, can play pivotal role in enhancing gas trading in SE Europe and also act as a benchmark (to the regional gas hub(s) to be developed).

Map 4: An Expanded South Gas Corridor

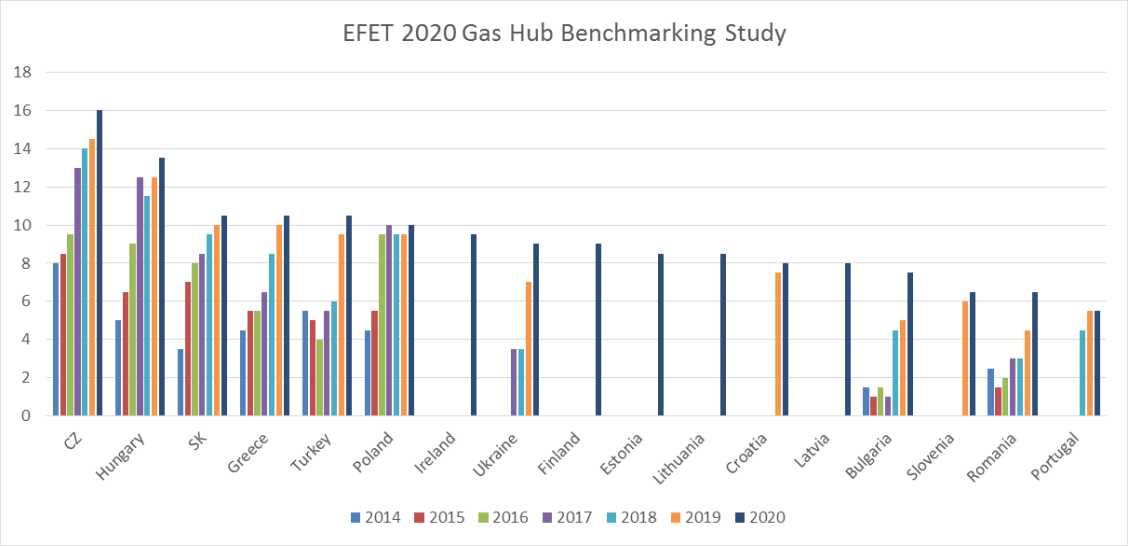


NB.: The TANAP has been completed, while TAP, Turkish Stream, BRUA and IGB are under construction. The IAP, the IGI Poseidon in connection with East Med pipeline and the Vertical Corridor and the IGF are still in the study phase. Blue Stream and Trans Balkan are existing pipelines.

Source: IENE

The background is already set for the planning and establishment of one or more gas trading hubs which will serve the needs of the broader SE European region enabling market participants in Greece, Bulgaria, Romania and Turkey to actively participate in gas trading activities. Already, there is a number of nascent gas trading hubs in SE Europe, which include those in Greece, Turkey, Bulgaria and Romania. According to the EFET's Annual Scorecard 2020 (30), Greece, through the Hellenic Trading Point (HTP), is the frontrunner in SE Europe in its attempt to establish a regional gas trading hub.

Figure 4: 2020 Gas Hub Benchmarking Study



Source: EFET

The research undertaken concludes that several and not a single regional gas trading hub will emerge in the medium term. Inevitably, competition between gas hubs in the region will ensue and successful gas trading hubs will be able to attract business on account of their ability to provide cost-competitive and high-quality services. Gas trading hubs can play an important role in facilitating regional market integration and trading activity in general.

6. Regional Energy Integration: The Case of Greece

Electricity Integration

After several years of delays and the repeated postponement of the starting date, the new electricity market, operated by Greece's Energy Exchange (HEnEx), was launched on November 1, in adherence to EU's Target Model, while no major issues concerning procedural or technical matters have been reported as yet.

The implementation of the Target Model includes the Day-Ahead Market (DAM), the Intraday Market (IDM), the Balancing Market and the Futures Market, already in operation since March this year. It is anticipated that the new markets will lead to increased competition, greater transparency and an integrated market for the benefit of participants and end consumers alike.

The launch of the day-ahead market took place on November 1, through the submission of bids by suppliers and producers, while the operation of the intraday market and the balancing market followed the next day (2/11). More specifically, the launch of the intraday market was reported smooth, with prices clearing at levels set by the day-ahead market as

no serious corrections were made. Greece's day-ahead electricity market is expected to couple with the Italian market in December 2020 and with the Bulgarian market in March 2021. Regarding the balancing market, which is operated by IPTO and cleared by HEnEx Clear, prices formed as anticipated, at levels set during the dry-run testing in the lead-up to the Target Model's launch.

Greece's Environment and Energy Minister, Costis Hatzidakis, hailed the launching of the new market as a major reform of the energy sector in view of the wide-ranging implications which are expected in terms of market operation and price rationalization. The reform is part of the so-called Target Model, the wholesale electricity market model for building a single European energy market. Greece was the only EU member state that had not implemented that model yet and, therefore, until recently it registered the highest wholesale electricity price in the bloc. The new model will boost competition and transparency in the Greek electricity market, helping reduce energy costs for households and businesses and increase power exports.

Another important development is the establishment of the **Regional Security Coordinator (RSC) for SE Europe (SEE)**. This is yet a further step towards European electricity market integration in a synchronous zone, by integrating two capacity calculation regions: Greece-Italy and SE Europe. The SEE RSC was established in Thessaloniki by the Greek, Bulgarian, Romanian and Italian transmission system operators (TSOs). The company will provide services to the TSOs, such as a regional model of the grid for advanced calculations, and indicating to TSOs which remedial actions are the most cost efficient, without being constrained by national borders.

Therefore, the company will allow for a significant increase in secure system operations, additional transparency in calculations and maximization of the capacity provided to the market and an overall reduction of market and operation costs for its shareholders and service recipients. This is a big step towards electricity system and market operations coordination in the SEE region and an example of regional cooperation.

Gas Market Integration

The setting up and operation of one or more regional gas trading hubs will undoubtedly have some economic implications for the countries involved. However, the precise impact of an operating gas trading hub on market conditions is hard to predict at this stage and even harder to quantify. The reason is the introduction of a completely new approach, together with a new and inclusive price-setting regime into a market where none existed before; other than bilateral agreements based on strict oil-indexed contracts. These bilateral arrangements still determine, to a large extent, gas prices in SE Europe (e.g. Bulgaria, Serbia, Romania, Greece and Turkey), which is predominantly supplied via pipelines.

The Case of Greece

In order to discuss the economic implications from the operation of a proposed fully-fledged regional gas trading hub, let's say, based in Greece, a number of assumptions need to be made in terms of geography, infrastructure and cost, prospective gas supplies and their origin and anticipated trading conditions. These assumptions are summarized as follows:

(1) In terms of geography, the trading will initially take place between market participants in Greece, Bulgaria, Romania and Turkey.

(2) In order for cross-border trading to evolve, the following infrastructure should be in place:

I. The Greek-Bulgarian Interconnector (IGB)

II. The TANAP-TAP pipeline system, linking Turkey, Greece, Albania and Italy (already operational)

III. The gas interconnection between Greece and North Macedonia (IGNM)

IV. The underground gas storage facility in South Kavala

V. At least one floating LNG storage and gasification unit (FSRU), such as the Alexandroupolis FSRU or the Motor Oil FSRU (i.e. Dioryga Gas) in Agioi Theodoroi

The cumulative cost for these projects, based on company information, can be estimated as follows:

Table 3: Cost of Planned Gas Infrastructure Projects

Natural Gas Project	Status	Cost
IGB	Under construction	€220 million
TANAP	Completed	€805 million (with TANAP's cost corresponding only to Turkey's European ground route)
IGNM	Under planning	€50 million
TAP	Completed	€4.5 billion
South Kavala UGS	Under planning	€350 million
Alexandroupolis FSRU	FID	€380 million
Total		€6.305 million

Source: IENE

We must point out that the above cost estimate is specific to the nascent regional gas trading hub based in Greece and is not characteristic of infrastructure costs in general for the setting up of gas trading hubs. We should also point out that most of the above infrastructure is already in place, while the rest is under various stages of completion.

(3) The origin of natural gas will be as follows:

I. **For pipeline gas:** This will originate in Azerbaijan and transport, through the TANAP-TAP system and in Russia through the Turkish Stream.

II. **For LNG:** Qatar, Nigeria, Algeria, Norway, US, East Med, etc.

(4) In view of currently available information concerning gas volumes corresponding to long-term contracts through the TANAP-TAP system, the existing capacity of the pipelines involved (i.e. IGB, IGT) and gas demand projections for 2030, one could safely assume that some 1.0 bcm of gas will become available for trading as early as 2021, rising to 2.0 and possibly to 3.0 bcm and more by 2025. In addition to that, one should take into consideration a realistic churn ratio of, let's say, 1.0 to 2.0; however, hard this may be to predict. Given the experience of European trading hubs, churn ratios may vary from 1 up to 20.

(5) Additional gas quantities for trading at the Hellenic Trading Point up to 3.0 bcm could become available from other sources such as Russian gas (via Turkish Stream), from Turkey's system (Turkish basket) and LNG until 2025.

Conclusion

In addition to energy market transition and integration, COP 21 targets and commitments are now complicating further regional issues. EU member countries in the region (i.e. Bulgaria, Croatia, Cyprus, Hungary, Greece, Romania and Slovenia) have no great difficulty in abiding to EU Directives and targets, in comparison with the Western Balkans. Although it should be stressed that the transition process for most of the EU countries is fraught with difficulties.

The transition to decarbonized power generation is not an easy regional issue, as in most of the SEE countries electricity generation, which is mainly based on coal and lignite, supports thousands of jobs, while it forms the basis of an extensive industrial plexus. Although all countries in the region to a larger or to a smaller extent are committed to RES and energy efficiency programmes and specific targets, at the same time, they are pursuing a parallel coal-centered agenda as we have several coal-fired power plants under construction or at an advanced planning stage. In short, carbon-based power generation is also moving ahead, adding, in parallel, substantial capacity from now until 2025 (1.5 GW per year for SEE and 2.5 GW for Turkey, i.e. total 4 GW per year over the next 7-8 years). As a result, there is a substantial gap between new coal-fired power plants and anticipated RES installations.

To ensure sustained RES investment, it is essential to create an enabling environment by introducing appropriate and dedicated policies. The region has indeed proved that it can attract investment when supporting policies and measures are in place. These measures should go beyond mere direct RES and energy efficiency support and include, in addition, system regulation and in step integration with the everyday life of energy consumers.

The transformation of the existing polluting SEE energy system into a sustainable one should be based on localized policies and differentiated energy sources of higher energy efficiency and with the view of tapping in the long term the potential for hydrogen generation. Energy cooperation between the various countries in the region is of paramount importance and necessary in order to introduce lasting changes aiming towards sustainability. Hydrogen produced from renewables, among others, could play a decisive role in achieving such sustainability and should be examined in detail for each different country of the region.

IRENA estimates that shifting the regional energy system to RES would grow the economy of SE Europe by 2% until 2040 and 1% from then until 2050, compared to a business-as-usual (BAU) scenario, translating into a cumulative gain of more than $485 billion. With the creation of new jobs in the renewable energy sector, the energy transition would also help tackle long-standing unemployment and brain drain issues. The inclusion of social welfare benefits, such as improvements in health and air quality, ensures that potential gains further outweigh additional costs.

According to certain scenarios, current commitments and policies at global level are considered inadequate and could lead to a global temperature increase of 3°C-4°C by the end of the century, with estimated welfare losses for the EU alone of more than €175 billion every year by mid-century, based on European Commission's estimates. To keep the 1.5°C goal of the Paris Agreement in reach and thus prevent dangerous climate change repercussions, the EU says that a substantially increased climate target of at least 65% emission cuts by 2030 should be adopted, which, according to EU rationale, is the only target in line with the latest science available and the United Nations' equity principles. This is well beyond the "at least 55% target" proposed by the European Commission, which has already gained support from a majority of EU countries, including Central and Eastern

Europe. Now, other countries are calling for more. Recently, the European Parliament called for 60% emission cuts and Denmark, Finland and Sweden pledged their support for 60%-65% in the Council discussions to come. **(31)**

However, in a recent joint CAN Europe and Ember study **(32)**, which has analysed the NECPs of seven EU Member States (i.e. Bulgaria, Croatia, Czech Republic, Germany, Poland, Romania and Slovenia), which are in line to receive the lion's share from the Just Transition Fund, it is pointed out that these countries do not have any specific plans to phase-out coal in the next decade. In addition, the NECPs show that a number of them are also planning an increased role for gas, as part of decarbonization, in their electricity transitions. Moreover, of the eleven countries expected to phase-out coal by 2030, the analysis of the aforementioned study indicates that only four countries (i.e. Greece, Hungary, Ireland and Italy) are planning a significant coal-to-gas transition.

At this point, one should mention the apparent inconsistency which exists between stated EC energy and climate policy (as already implemented by EIB and EBRD), which aims towards lessening the use of gas, and the plan of all SEE countries and locally pursued policies, which aim towards greater use of gas as the fastest road towards decarbonization.

Energy market integration and transition in SE Europe is moving on, but at slower pace than initially anticipated. There is a plethora of gas and electricity infrastructure projects that are expected to be implemented in the region over the next five years, such as gas and electricity interconnections, LNG terminals and FSRUs, gas storage facilities, etc., making SE Europe an interesting and important part of Europe. The emergence of gas trading hubs will increase liquidity, transparency and competition and will facilitate market integration and transition in SE Europe.

According to latest euro thinking, the EU must achieve climate neutrality by 2040 in order to do its fair share under the Paris Agreement and to limit global temperature increase to 1.5°C. This means that all Member States should phase out coal by 2030 and all fossil fuels by 2040 at the latest, according to the CAN Europe/Ember study. A close look at the NECPs shows that several Member States are not in line with the European 2050 climate neutrality objective, the proposed new high targets by 2030, let alone compatible with the current, "low", targets for 2030. To sum up, although the new 2030 EU Climate and Energy Targets sound really ambitious, the current status of most EU Member States indicates that a lot more work needs to be done. Hence, it is highly debatable if these new sky-high targets can actually be achieved under present policies. A situation which is further accentuated in the case of SE Europe.

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