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A Look Ahead to 2019 and Beyond

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1. Introduction

It is customary at the start of the year to make predictions on how things are to develop in the months to come and even further ahead. Although we are nearing the end of the first month of 2019, we believe it is still timely to express some views and estimates on how energy matters will shape up globally, but also in SE Europe. IENE's research team has therefore compiled some interesting assessments by abstracting relevant information from well-known published sources, but also by contributing original material in the case of SE Europe.

2. The Global Scene

Aside of broad political and economic projections which foresee big gains for populist parties in the elections to the European Parliament in May and an escalation of the trade war between the US and China, all such exercises, including more formal forecasts with numbers attached, are more useful as ways to organise expectations about possible futures than as oracular prophecies of the world to come, notes Financial Times in its Energy Source column (5/1).

The following are five trends which we believe will be important to watch in the world of energy in 2019.

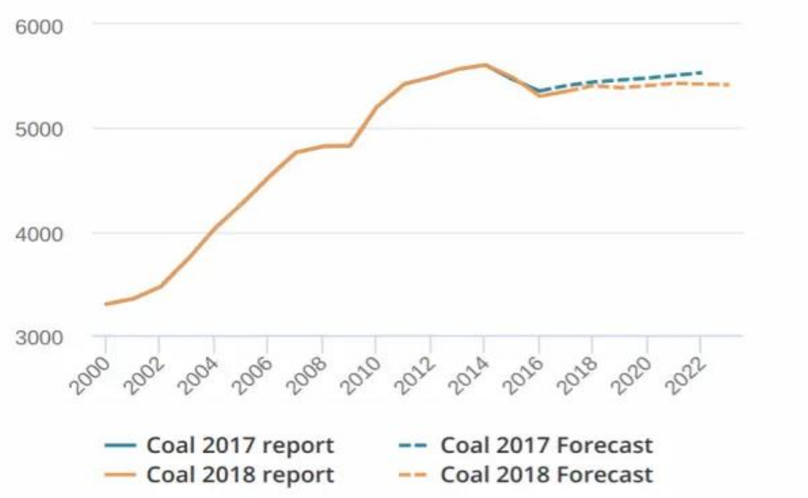
(1) Global coal demand will remain stable

World coal consumption has never been higher than it was in 2013-14, but it seems that that level was a plateau rather than a peak. After declining over 2014-16, global coal demand started to pick up in 2017, and rose again last year. From now until at least 2023, the International Energy Agency has predicted, it will remain roughly stable, rising or falling only slightly each year.

China, which accounts for about half of the world's coal consumption, has been at the heart of global demand reductions as a result of its drive to improve urban air quality. Concerns about the impact of its policies on coal mining and other industries have led the government to ease off on its strategy of tightening air quality regulations, and China's coal consumption is expected to decline only slowly over the next few years. Meanwhile, demand is still growing in India and other countries in Asia, including Indonesia, Pakistan, Bangladesh and the Philippines, offsetting declines in the US and Western Europe.

The longer-term outlook is uncertain. In India, private investment in coal power has ground to a near halt, as many new plants have fallen into deep financial distress in the face of competition from low-cost renewable energy. In China, however, provincial authorities have issued permits that could lead to a "massive surge" in construction of new coal-fired power plants. In the short term, however, demand is more predictable, and a small increase or a small decline from 2018 levels seem the most likely possible outcomes.

Figure 1 - Comparison Between Coal 2017 and Coal 2018 Global Coal Demand Forecasts



Source: OECD/IEA

With global oil and gas consumption continuing to grow, flat coal use implies that total world greenhouse gas emissions, which hit a record high last year, are likely to rise again this year.

(2) The US will be an increasingly important gas supplier to the world, in terms of both deliveries and contracts for the future

This is going to be a big year for the first wave of US LNG export projects. Two large new plants, Cameron LNG in Louisiana and Freeport LNG in Texas, are scheduled to come into service, along with a smaller one at Elba Island in Georgia. Meanwhile, Cheniere Energy's Corpus Christi LNG plant in Texas, which shipped its first commissioning cargo last month, is entering full commercial operation, and aims to have its second production train in service this year. By the end of the year, US LNG export capacity is expected to have more than doubled. The country will be the world's third-largest exporter of LNG, behind Qatar and Australia, with implications for its relationships with gas consumers around the world, and with other large producers including Russia. An excellent overview of the consequences for gas competition in Europe was published last month by Columbia University's Center on Global Energy Policy, arguing that while US LNG has cut Russian gas revenues and forced contract renegotiations, Russia is still "in a good position to defend its market share in Europe".

The significance of 2019 for US LNG exporters goes beyond the imminent project start-ups, however. It is also a crucial year for companies hoping to take part in a second wave of US LNG export developments. There are three projects in the US that are expected to get the go-ahead with final investment decisions in the first half half of the year, according to Wood Mackenzie: Qatar Petroleum and ExxonMobil's Golden Pass LNG, Venture Global LNG's Calcasieu Pass, and an expansion at Cheniere's Sabine Pass. Worldwide, with investment approvals also expected for Novatek and Total's Arctic LNG 2, and at least one project in Mozambique, this could be a record year for commitments to new LNG export capacity, Wood Mackenzie believes.

The critical factor in global demand is again China. The drive to shift away from coal has meant a surge in its demand for LNG, and it last year overtook Japan to become the world's largest gas importer. That means that for other aspiring US LNG exporters also hoping to sign customer contracts and give the green light to their projects this year, a lot depends on the Trump administration's prosecution of the trade dispute with China. As the winter set in, China imported a couple of cargoes of US LNG, but all the indications have been that Chinese buyers will not sign long-term contracts for as long as the trade war remains unresolved. If a settlement can be reached, however, increased US LNG sales seem likely to be part of it, so a resolution could be good news for those export projects.

(3) The costs of renewable electricity and energy storage will continue to fall

The decline in the costs of electricity from renewable sources has not always been smooth. The database kept by Irena, the International Renewable Energy Agency, shows that the global average cost of power from onshore wind levelled off in 2014-16, for example. But over longer periods the decline, driven by economies of scale and incremental improvements in the technology, has been inexorable, and there is no reason to expect it to come to an end this year. The falling cost of renewables has already had a huge impact on global investment in power generation. Even in emerging economies, where economic imperatives typically outweigh concern for environmental impacts, wind and solar power in

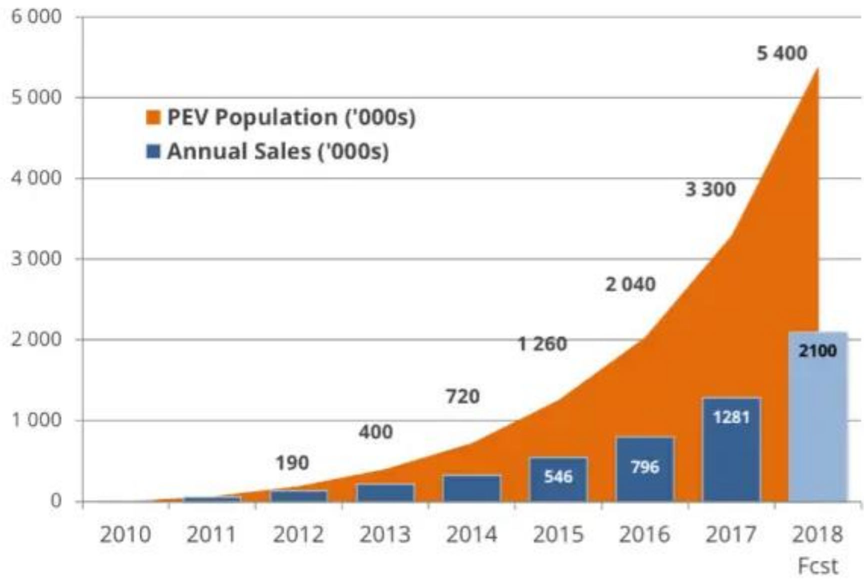
2017 overtook fossil fuels for additions of new capacity in power generation. The pressure on coal power in India, discussed above, comes as developers commit to build solar plants selling power for just Rs2.44 (about 4 US cents) a kilowatt hour. With bids of about Rs3/kWh now common, investing in new solar capacity in India is often cheaper than generation from existing coal plants. NTPC, the government-controlled energy group, which has mostly coal-fired plants, charged an average tariff of Rs3.42/kWh in the first half of this fiscal year. The variability of solar power means that the comparisons are not quite apples-to-apples, but the increasing competitive pressure from the declining costs of renewables is real.

Meanwhile, the costs of energy storage are also expected to decline, if at a slower pace than earlier in the decade. The price of lithium ion batteries dropped by 80% over 2010-17, according to Bloomberg New Energy Finance, opening up a new range of possible uses such as allowing industrial and commercial users to shave the peaks off their consumption from the grid. Even at these rates of decline, lithium ion batteries are a very long way from being a viable complete solution to the problems created by the variability of wind and solar power. But they are likely to find a growing market in niches providing services to customers and to the grid, and the energy storage market is expected to attract $620bn of investment by 2040, again according to BNEF.

(4) Electric car sales will keep rising as a wave of new models hit the market

Electric car sales continued to jump in 2018, blowing past expectations. Total sales of light electric vehicles, including cars, SUVs, and smaller trucks and vans, are expected to have reached about 2.1m, up about 64% from 2018, taking the total number of plug-in vehicles on the roads to about 5.4m. Sales are expected to grow again this year, with Tesla launching its new Model 3 in Europe and China, and a number of new models from manufacturers including Porsche, Mercedes, Audi, Renault, Hyundai and Kia. In China, which is the world's largest car market and accounts for roughly half of all electric vehicles sold worldwide, new mandates for the production of "new energy vehicles" take effect this year. A system of tradeable credits incentivises companies to develop longer-ranged battery electric vehicles, and will penalise manufacturers that do not achieve targets for production of electric cars as a proportion of their sales. Companies including Honda and Daimler are pushing ahead with plans to build electric cars in China.

Figure 2 - Global Plug-in Vehicle Population



Source: EV Volumes.com

It is important to keep the rapid growth of electric cars in perspective. Those 5.4m electric vehicles on the road represent only about 0.4% of the total global light vehicle fleet of about 1.3bn. Even if electric car sales continue to rocket - BNEF expects annual sales of 30m by 2030 - they are projected to remain a minority of new vehicle sales until the late 2030s. Although it has been more bullish than some other forecasters - including OPEC! - BNEF has underestimated the growth of electric vehicles in the past, and it may be doing so again. China's electric vehicle strategy, driven by its ambitions to dominate the global industries of the future, strengthen energy security, and (possibly) improve local air pollution, will be critical. Global sales of cars with internal combustion engines could peak in the mid-2020s, BNEF suggests. Other forecasters think we may have already reached that peak last year. But on any plausible projection there are likely to be hundreds of millions of petrol and diesel fuelled vehicles on the roads for decades to come.

(5) Oil demand will be affected by the health of the world economy

If sales of electric vehicles continue to grow rapidly, it will not be long before they start to have a perceptible impact on global oil demand. The IEA has projected that consumption of oil-based fuel for passenger cars could peak in the second half of the 2020s. That is a very different thing from projecting peak demand for oil overall, however, because petrol and diesel for cars account for only about a fifth of global oil consumption. In the IEA's "new policies scenario", reflecting announced government commitments and existing technologies, total oil demand is projected to keep rising to 2040, albeit at a slower pace than in the past 25 years.

In the near term, a much more important factor for global oil demand will be the health of the world economy. The last time world oil consumption fell was in 2008-09, when demand was hit first by the surge in prices, with Brent crude briefly rising above $140 a barrel, and then by the sharp recession caused by the financial crisis. The world economy shrank by 2.1% in 2009, making it the worst downturn since the Great Depression, and oil consumption dropped by 1.7%.

A repeat of that slump seems highly unlikely, but in October the IEA and OPEC both cut their forecasts for oil demand growth in 2019, because of concerns about the impact of higher prices and a deteriorating economic outlook. Since then, prices have fallen, which will help support consumption, but expectations for the world economy have become more gloomy.

Larry Kudlow, director of US President Donald Trump's National Economic Council, said on January 3: "There's no recession in sight . . . The American economy is growing 3% solid, job gains are huge, and businesses are investing big time." And the health of the US jobs market certainly seems to support that view. But other indicators, such as surveys of manufacturing in China and elsewhere, are not so encouraging. With factors including the US-China trade war and rising interest rates weighing on growth, a slowdown in the world economy certainly seems possible. Goldman Sachs recently cut its forecast for growth in the first half of this year, and suggested the US economy could slow sharply by the end of the year. There will be other factors influencing oil prices in 2019, including the effectiveness of OPEC's attempts to stabilise the market, the strength of the US shale industry, Mr. Trump's decisions on whether to tighten US sanctions on Iran, and the impact of the new shipping fuel regulations from the International Maritime Organization, which come into effect a year from now. But the health of the world economy, and hence the strength of global demand, is likely to outweigh all of those.

Over the coming months, the global oil markets, in spite of rising oil production from non-OPEC producers (including the US, Canada, Brazil), will be affected once again by the US sanctions against Iran. A year ago, Iran was exporting some 2.1m barrels of oil a day. By November 2018, that had fallen to 1.1m b/d. If the sanctions are applied strictly, exports could fall close to zero - the stated intention of the US, designed to bring Iran to the negotiating table over its nuclear plans. If Iran compromises or finds a way around the sanctions, exports will increase again and prices are likely to fall. If the US enforces the sanctions in full, the fall in exports will stretch the current capacity of other producers to the limit, and prices are likely to rise. A variation of $20 or more either way from current prices is perfectly possible.

As seasoned oil market commentator Nick Butler says, “No other single issue has such a potential impact or carries such uncertainty. The other variable has longer-term consequences. Will the energy business make the investment decisions necessary to fund the supplies and infrastructure the world will need over the next decade and beyond? According to the International Energy Agency, some $2.2tn of investment is needed each year up to 2025, rising to $2.8tn a year beyond that.

Over the last 3-4 years, private oil companies such as BP and Exxon Mobil, have achieved remarkable reductions in costs, restoring profitability and the potential for dividend increases even at today’s prices. But the question remains is if are they and the investors in large-scale natural gas facilities or the upgrading and extension of power systems ready to invest in the new capacity that is necessary to replace the old?

The private sector has the capability but may not have access to the resources that lie in politically difficult places such as Venezuela, Russia and Iran. Some might also lack the will to invest in areas of high political risk. At the same time many state-owned national companies are being starved of funds by governments that have not made the financial adjustment to low prices.

At least some of the state companies may not be capable of investing enough to maintain output or to put in place essential infrastructure such as smart grids capable of managing distributed power supplies and maximising the efficiency of energy use”.

3. The View from SE Europe

By necessity, because of time and resource constraints, our overview of how energy markets are likely to perform in our region in the months ahead is partial, in the sense that we only cover certain aspects of market activity.

Natural Gas

The SEE region is an important geostrategic energy corridor and hence there is a strong need for new energy projects in order to ensure energy security and energy transit towards and across Europe. In spite of the strong interest by several SEE countries to invest in energy projects, the implementation has proved to progress very slowly, since no major regionally significant projects in the oil and gas sector were completed during the last decade.

In most SEE 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 the EU energy policy were incorporated in the long term strategies of SEE countries. The focus has been redirected towards modernisation of existing energy facilities and construction of new ones, improvement of energy efficiency and increasing share of renewable energy sources.

Until now, 82.4% of the **Trans Adriatic Pipeline (TAP)** project has been completed, while 10% of the respective offshore part of the pipeline under the Adriatic Sea has also been completed. The overall construction phase of the project is expected to be completed in the second half of 2019, as Italian Prime Minister Giuseppe Conte has given the green light for the completion of the TAP pipeline, expressing his support after many months of negotiations and constant concern over the objections of the Italian side. TAP is a project worth a total of €4.5 billion.

It is worth noting that the TAP AG, a company established to plan, develop and build the TAP pipeline, and the Greek National Gas System Operator (DESFA) signed an agreement on the maintenance of Greek section of the TAP pipeline, which was ratified by the competent Regulatory Authority for Energy (RAE) on December 12, 2018, while the TAP and the Trans Anatolian Pipeline (TANAP) successfully completed their connection in early November 2018 with the final “golden weld”, which physically connected the two pipelines.

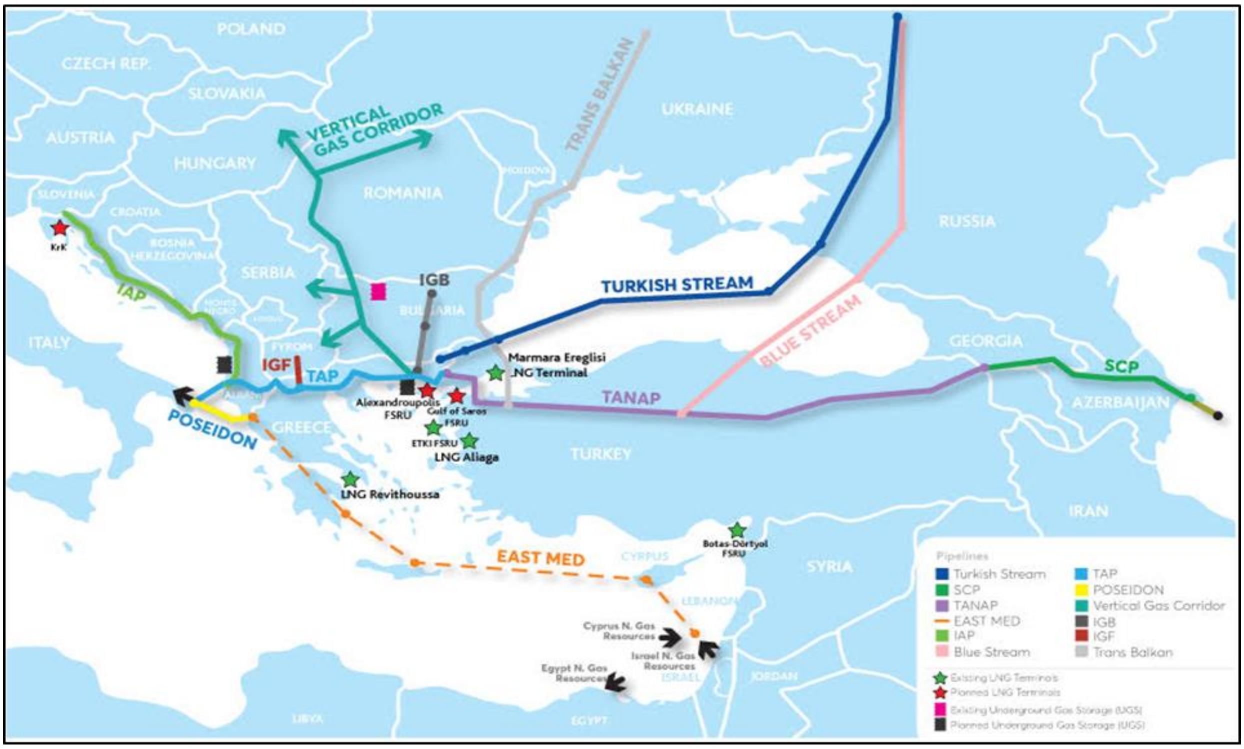
Turkey is currently launching the construction of the onshore part of the **Turkish Stream** on its territory, which is expected to be completed by the end of 2019. On November 19, 2018, Istanbul hosted the ceremony of completion of the construction of the offshore section of the Turkish Stream. The seabed section is to be about 910 km long and the land section will run 180 km into Turkey. The project is estimated at a total of €11.4 billion.

On December 21, 2018, Bulgartransgaz, Bulgaria's gas transmission and storage system operator, launched a public procurement procedure for the construction of the Bulgarian section of Turkish Stream. During the following day, the country's Energy Regulator gave permission for the state-owned company to start pre-selling the pipeline capacity, the funds from which will be used to finance the project. The Bulgarian part of the Turkish Stream envisages over 480 km of gas pipeline and two new compressor stations Provadia and Rasovo.

At first glance, the biggest obstacles to the construction of the **East Med pipeline** include the existence of competitive prices, the ability to ensure adequate gas volumes for exports as well as technical challenges. Recently, Israel's Energy Minister Mr. Yuval Steinitz attempted to ease fears about construction issues and suggests that East Med can be completed by 2025. Also, Greece's Energy Minister Mr. Giorgos Stathakis said in December 2018 that the East Med pipeline is "technically and economically viable", enjoys the support of all the other countries involved as well as the European Commission and would allow Israel and Cyprus to transport their proven hydrocarbon reserves as well as Greece's potential reserves to the European market. Studies conducted so far indicate that the project's construction cost could reach €8 billion, while it is currently classified as a Project of Common Interest (PCI) by the EU.

Even though an intergovernmental agreement was recently reached between the countries that are now interested on this project (i.e. Greece, Israel, Italy and the Republic of Cyprus), there is no guarantee that the East Med pipeline project will be on track soon. This, of course, does not mean that the East Med pipeline project should be re-examined or abandoned, since its existence on paper only helps strengthen a wider strategic alliance among the countries of the East Mediterranean region (including Egypt), which comes against the growing Turkey's provocation and its aspirations of expansion in the region. In this context, the East Med pipeline project will remain for a long time a purely "political" project, with the prospect of being implemented if and only if the necessary conditions for the gas supply and distribution from the under-development gas fields of the East Mediterranean region can be met.

Map 1 – An Expanded Southern Gas Corridor



NB.: The TANAP has been completed, while TAP and Turkish Stream are under construction, with IGB at an advanced planning stage with FID already taken. 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

On September 28, 2017, Bulgaria, Romania, Hungary and Austria signed a memorandum of understanding to proceed with implementation of **BRUA gas link** project. Under the memorandum, all countries have agreed on a reverse-flow gas interconnection. Romania has issued a building permit for the BRUA project on its territory and has conducted procedures for assigning the construction works. The pipeline will have a total length of 528 km.

In addition, Romania's gas TSO Transgaz secured a €50 million loan from the European Investment Bank (EIB) in order to finance the first stage of the BRUA project, which is expected to link the Black Sea gas fields with Austria. The amount refers to the disbursement of the first tranche, as the total amount will be in the region of €150 million.

Map 2 – BRUA Corridor

Source: European Commission

LNG

It appears that LNG prospects in SE Europe and the East Mediterranean in particular, are far better placed than they were five years ago with new projects getting ready to evolve and LNG clearly emerging as a fuel of choice for several industrial consumer groups helped by lower prices and increased availability.

In SE Europe, LNG seems to be the only realistic alternative fuel as it increases security of supply through multiple and independent supply sources, provides the opportunity for new LNG suppliers (e.g. Australia, US, etc.) to export gas to the region, enhances pricing flexibility and safer gas transportation and can support underperforming gas pipeline projects, among others. It is worth noting that on December 30, 2018, Greece's Revithoussa LNG terminal, following an agreement between Cheniere and DEPA, welcomed the first US LNG cargo at its newly build 3rd tank of 95.000-m^3 storage capacity. Thus, the Revithoussa LNG terminal opens up the way for new prospects in gas supply and in differentiating energy sources and security of supply in SE Europe, enabling Greece to become a significant gas hub in the wider region.

It is anticipated that the SE European region will play a significant role in expanding LNG trade in Europe by 2020 through the construction and operation of several new LNG regasification projects such as the FSRU unit that is planned to be located offshore in

Alexandroupolis, in Northern Greece, with the prospect of feeding gas quantities into the Greek, Bulgarian, Serbian and Turkish gas systems, among others.

Greece and Turkey are the only countries in the broader Black Sea-SE European region which at present possess LNG gasification terminals which are well linked and integrated into their national gas systems.

Table 1 shows the gas production and consumption in SE Europe in 2008, 2015 and 2025, highlighting the low gas production and the need for the SEE countries to import increased natural gas volumes. What is evident is the substantial contribution of Turkey in total gas consumption in SE Europe, which is expected to increase further by 2025, corresponding to more than 63% of the total, according to IENE's estimates. Turkey is the region's major gas consumer and importer by far and its interest in natural gas is strong both as a potential producer but also as a transit country to European markets. On the transit side, virtually all of the various gas pipeline projects, which plan to transport Caspian gas to the European markets, involve Turkey as a transit country (e.g. TANAP and Turkish Stream).

Table 1 – Natural gas production and consumption in SE Europe (2008, 2015 and 2025e)

Country	2008		2015		2025e	
	Gas production (bcm/y)	Gas consumption (bcm/y)	Gas production (bcm/y)	Gas consumption (bcm/y)	Gas production (bcm/y)	Gas consumption (bcm/y)
Albania	0.02	0.02	0.0	0.0	0.01	0.22
Bosnia and Herzegovina	0.0	0.31	0.0	0.3	0.0	0.45
Bulgaria	0.31	3.5	0.1	3.1	0.21	4.3
Croatia	2.03	3.1	1.75	2.48	1.52	3.3
Cyprus	0.0	0.0	0.0	0.0	0.0	0.0
FYROM	0.0	0.05	0.0	0.13	0.0	0.6
Greece	0.0	4.25	0.009	3.2	0.0	6.0
Kosovo	0.0	0.0	0.0	0.0	0.0	0.0
Montenegro	0.0	0.0	0.0	0.0	0.0	0.0
Romania	11.2	16.9	10.46	10.6	10.02	14.1
Serbia	0.25	1.92	0.54	2.08	0.51	2.8
Slovenia	0.0	0.51	0.0	0.8	0.0	1.07
Turkey	1.03	36.9	0.37	46.9	0.73	56.0
Total	**14.84**	**67.46**	**13.23**	**69.59**	**13.00**	**88.84**

Sources: IENE[1], IEA, 10-year Development Plans of gas TSOs, BP Statistical Review for World Energy 2017

[1] IENE's "SE Europe Energy Outlook 2011", Athens, Greece.

Electricity Market

Wholesale electricity prices went up in the region during 2018. This trend has been observed in Croatia, while hikes have been announced for 2019 in Serbia, of about 20%, and Bosnia and Herzegovina, of around 15%. At the same time, wholesale prices in Romania could increase by 40%. Electricity supply for the business segment in the region has been liberalized, and state-owned companies, which continue to be the dominant suppliers, cite rising prices on power exchanges as the reason to raise their tariffs.

Indicatively, data from Serbia's power exchange SEEPEX shows that the price stood at around €50 per MWh at the beginning of the year, only to rise to nearly €70 per MWh currently. Similar trends have also been seen on the Hungarian Power Exchange (HUPX), which is the benchmark power exchange for some countries in the region. According to forecasts from S&P Global Platts Analytics, power prices across continental Europe's four largest markets will average around €58 per MWh per in 2019, compared to €54 per MWh in 2018 and €37 per MWh in 2016. This translates into an increase of around 56%, with the key driver being the rising CO_2 costs, from €8 to €24 per tonne.

Greece: Greece is much expecting the launch of the Target Model implementation, which is anticipated to rationalize the Greek electricity market. The balancing market is to be launched in June 2019, while the day-ahead and intraday market are expected by the end of the year.

Currently, the most important project in the country is the undergoing interconnection of the islands of the Aegean Sea with the continental power transmission network. The power interconnection of Cyclades islands project is currently undergoing its second phase with the interconnections of Paros-Naxos and Naxos-Mykonos islands, expected to be commissioned by the end of 2019. The Crete-Peloponnese interconnection is under construction and is expected to be commissioned by 2020. While the planning of Crete interconnection project's phase 2 connecting directly Attica to the island with two 500 MW DC cables is expected to be finalized by the end of 2021. More specifically, the direct interconnection project of Attica with Crete is a part of EuroAsia Interconnector project, which is expected to connect Attica, Crete with Cyprus and Israel. Attica-Crete power link is expected to be commissioned by June 2022, while Crete-Cyprus power link by December 2023.

The Attica-Crete interconnection is a very important project for the Greek economy as it will provide reliable and sufficient power supply for Crete and will lead to substantial relief for all electricity consumers through the reduction of the PSO's. The reduction is estimated around €215 million on an annual basis, which accounts for more than 50% of the PSOs currently charged (approx. €300 million). Furthermore, the project is expected to improve the environmental footprint due to the significant reduction of emissions from oil-fired power plants of Crete and encourage new investments in the RES sector.

Cyprus: The interconnection of Cyprus to the European continental transmission system via the EuroAsia Interconnector with a 2,000 MW (1,000 MW in the 1st phase) power link is expected to lift the energy blockade of Cyprus and minimize its energy dependency to hydrocarbon imports, reducing significantly the cost of electricity.

Turkey: The gross electricity consumption in Turkey was 298.1 TWh in 2018 showing a slight increase of +0.47% in comparison to the previous year (2017: 296.7 TWh). The trajectory of the development of Turkey's electricity demand, however, has been offset by the economic crisis and the depreciation of the Turkish Lira. Moreover, Turkey's authorities had predicted electricity consumption rising significantly at a rate between 4.8% and 5.5% annually, reaching by 2023 an annual demand of 350 - 388 TWh, which is already off considering the market performance of 2018. It is possible that electricity demand in the country will stagnate in the upcoming period, which constitutes a substantial characteristic of a depressed economy.

The challenges of the Turkish economy have pushed the average electricity price to 231.63 TRY/MWh for 2018 up by +41.38% in comparison to 2017 (163.84 TRY/MWh). On the other hand, the electricity volumes exchanged on EPIAS have steadily risen, reaching 149.18 TWh for 2018, which accounts for the 50.04% of Turkey's total electricity demand. Moreover, the electricity volume exchange on EPIAS is up by 19.31%, compared to 2017 (125.04 TWh), when it only accounted for 42.14% of the total electricity demand of the country. Furthermore, the volatility in Turkey's power market is reflected by the increased volumes exchanged on EPIAS energy exchange due to the inability of the electricity providers to sustain low cost bilateral contracts with the consumers.

During the first half of 2018, power plants of a total installed capacity of 2,284.1 MW were added to the Turkish system, and as of the end of the first half of 2018 the power generation installed capacity of Turkey has risen to around 87,139 MW. Even though substantial investment efforts have been made in the country towards RES, for the 2018 the majority of power generation came from Coal (38.19%) and Natural Gas (30.77%), while RES including large hydropower plants participated with 28.19% to the electricity mix.

The most important projects on the pipeline for the Turkish system are affiliated with the nuclear power program of the country. The anticipated Sinop nuclear power plant is undergoing an Environmental Impact Assessment (EIA) review by the Environment and Urban Planning Ministry and the Inspection and Assessment Commission. The Sinop NPP, which will add 4,480 MW (4 X 1,120 MW) to the Turkish system, is scheduled for operation at 2023 and is estimated to reach an installation cost of US$44 billion. Moreover, Akkuyu NPP, the first nuclear power plant of the country with 4 reactors and an installed capacity of 4,800 MW (4 X 1,200 MW), is already under construction with plans to have the first unit operational by 2023, while when fully operational is expected to cover 10% of Turkey's electricity demand. Even though the Turkish authorities have forecasted that Turkey's nuclear power program will be required by 2023, the recent economic recession in the country reflected on the slow development of the electricity demand could potentially postpone the plants' commission date.

Bulgaria: Bulgaria's electricity transmission system operator ESO has announced its plan to add additional installed capacity of 647 MW by 2027. This plan includes a total of 146 MW of new thermal power plant capacity, and the reconstruction of two 1,000 MW reactors at nuclear power plant Kozloduy, which will increase the plant's output by 100 MW.

In an attempt to timely allocate Bulgaria's exporting capacity, the auctions for cross-border power capacities at the border with Bulgaria have been assigned to the Luxemburg-based Joint Allocation Office S.A (JAO). The change is part of the agreements between the TSOs of the regional systems, Serbia (EMS), FYROM (MEPSO), Bulgaria (ESO), Romania (Transelectrica), Hungary (MAVIR), Croatia (HOPS), and Bosnia and Herzegovina (NOSBIH) on the procedure and method of the allocation of rights to use cross-border transmission capacities and access to cross-border transmission capacities for 2019. Consequently, the long-term auctions have been conducted by Bulgarian transmission system operator (TSO) ESO will be substituted by annual, monthly and daily auctions under the European harmonized allocation rules.

Romania: In Romania, the most important project on the pipeline is Rovinari's 600 MW lignite-fired power plant, part of the Oltenia Energy Complex (OEC), being built by China

Huadian Engineering Co. Ltd (CHEC) and financed by Romania Exim Bank, CHEC and OEC, with a business plan aiming for exports to Serbia, Montenegro, FYROM, Hungary, Greece, Albania and Turkey. The project, which has being halted in several occasions, has being revamped by the current Energy Ministry in 2017 and is expected to be commissioned during 2020.

Moreover, Romania and Serbia have commissioned in May 2018 a double-circuit 400 kV electricity transmission overhead line between Resita in Romania and Pančevo in Serbia. The realization of the interconnection will allow the elimination of major congestion in the area of the Romanian and Serbian power systems as well as an increase of the transfer capacity between the two countries and throughout the SE Europe, enabling Romania to achieve its mandatory 10% interconnectivity target for 2020.

Serbia: In Serbia, the state-owned power utility EPS is planning to increase its gross electricity production by 4% in 2019, reaching a total of 40 TWh. The utility also plans to increase coal production at Kolubara and Drmn. Moreover, Kostolac coal-fired power plant is being expanded with a new 350 MW unit.

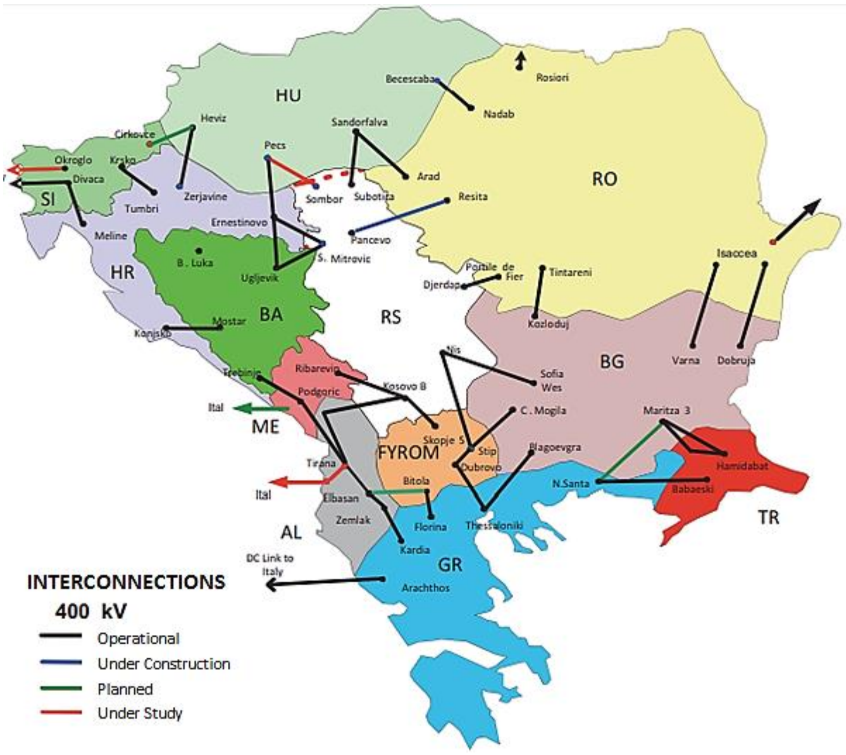
Montenegro: The 600 MW submarine cable, connecting the Italian system to Montenegro, is expected in mid-2019, while the electricity transit in 2019 is planned at 3,593 GWh. The project is expected to enhance the power flows in the region, reducing the marginal price of electricity and encourage the installation of new intermittent RES systems. In addition, Montenegrin DSO, Crnogorski elektrodistributivni sistem (CEDIS), has embarked a €22 million project to upgrade the medium- and low-voltage distribution network of the country.

Slovenia: FutureFlow, a Horizon 2020 project, launched in Austria, Hungary, Romania and Slovenia, has identified 54 MW in available flexible power amongst producers and industrial consumers aiming in the automation of demand response and distributed generation services, which could reduce the costs of providing system services by 23%.

FYROM: The launch of FYROM's day-ahead market is scheduled for the end of November 2019, while the go-live of Bulgaria and Macedonia (BG-MK) market coupling will follow in January 2020. Both projects are detrimental to the development of competition in the market.

Hungary: Hungary plans to expand its Paks nuclear power plant and build two Russian VVER 1,200 MW reactors. Construction on the reactors is expected to begin in 2019, with the first facility expected set for completion in 2025.

Map 3 – Power interconnections in SEE



Source: IPTO

Renewable Energy Sources and Energy Efficiency

Greece: By the end of 2018, Greece had 4,933.69 MW of installed RES capacity in its Interconnected System, which was 2,484.97 MW of wind, 2,139.85 MW of solar PV, 239.47 MW of small hydropower plants and 69.41 MW of biofuel-fired plants[2]. A further 485.31 MW were installed in the various islands of the Greek archipelago. As the average energy prices from RES decline overtime, reaching an average of €58/MWh for wind (tendered January-October 2018) and €286.61/MWh for solar (2017), the RES market becomes significantly more attractive for new projects. The new pricing schemes, feed-in tariffs and sliding feed-in premiums define a much more self-regulated market aiming to incentivize investment. Positive steps for acceleration of RES integration are expected to be the review of licensing and authorization procedures, aiming towards their simplification, as well as the

[2] Source: DAPEEP SA

upcoming tenders for small wind power projects, while a total of 1 GW have been already announced for tendering during the period 2019-2020. Moreover, the Greek authorities are prioritizing for 2019 on the updating the RES spatial planning and promoting of Energy Communities and energy efficiency. In addition, the upcoming National Planning for offshore/marine environment is anticipated in the following years in order to initiate the offshore wind power market of the country. In regards to energy efficiency, the much anticipated legal framework for the operation of the electric vehicle charging market is expected in due time.

Cyprus: Plans by the Electricity Authority of Cyprus (EAC) include the gradual installation of some 400,000 smart meters over an eight-year period. The project is a key component of transitioning to a 'smart grid'. In addition, EAC currently operates 19 electric vehicle charging stations across the island, and plans are afoot to install 13 more within 2019. EAC came also to an agreement with the Church of Cyprus for the construction on the latter's land of a photovoltaic park in the Acheras area with installed capacity of 66 MWp.

Turkey: In its "2023 vision", Turkey's government has set several targets for RES: 34 GW of hydro, 20 GW of wind and 5 GW of solar. Also, Turkey plans to hold 10 GW of solar and 10 GW of wind tenders over the next 10 years, as a part of Turkey's Renewable Energy Resource Zone (YEKA) project. With further efficiency gains and cost decreases expected for wind and solar (10% and 25%, according to the IEA), the high integration of RES will likely continue, as will strong interest from investors in bringing renewables capacity to the Turkey's market. Turkey's plans to materialize its RES goals include holding a series of tenders for various projects across the country. Moreover, installation of 1 GW of solar power is expected to be tendered by January 2019. The Turkish government has stipulated selected projects must incorporate a minimum 60% of PV panels manufactured in Turkey. The certain projects are expected to start commercial operation by January 2024. Additional tenders for 5 more solar park have already been announced by the authorities but not further information are known about the capacities. It is expected that Turkey's windpower capacity will reach 8 GW during 2019, while licensing for 5 projects cumulating 1 GW of installed capacity is expected to be finalized by the end of 2019, while they will be online by the end of 2022.

Moreover, Turkey's Renewable Energy Resource Zone Project (YEKA) inaugurated Turkey's first integrated solar module, cell and panel production factory in December 2017. The photovoltaic (PV) factory will be located in Ankara's industrial zone and will produce components for Turkey's biggest solar plant facility, the YEKA project in Karapınar in the Konya province, which is projected to cover the energy needs of more than 600,000 households.

Bulgaria: ESO, the Bulgarian TSO, announced new RES projects of total installed capacity of 401 MW to be grid-integrated by 2027. Moreover, Sofia is making efforts to boost the appeal of e-mobility to the private sector by drafting a plan for the construction of over 60 electric vehicle charging stations in the city. Currently, a total of 116 chargers are currently active in the country, including about 50 in Sofia and 30 fast charging stations allocated in the road network of the country.

Serbia: Windpower attracts interest as Serbia's EPS gets nod to build 66 MW wind farm in Kostolac, in eastern Serbia. This project is part of the effort to transform the power generation facilities of the country, aiming at 27% of installed capacity to be from RES in 2020 from the 21%, which stands currently and is almost entirely constituted by hydropower plants. Even though a total of 710 MW installed RES capacity, constituting of 560 MW wind farms and 150 MW from other RES, is planned to be on the grid by 2020, Serbia won't meet its renewables target. However, as of late there is movement in the Serbian RES sector, notably, Fintel Energija, a subsidiary of Italy's Fintel Energia, has raised €6.3 million for a new wind farm investment cycle in the country.

Montenegro: The wind power generation of the Montenegrin system is expected to reach 313 GWh in 2019, which is up by 87.4% y-y due to the addition of the new 46 MW wind farm Možura, which is expected to be online in 2019, with an output of 111.8 GWh/year. 2019 will also be the year of inauguration of the first two solar power of Montenegro. The country's authorities expect RES penetration in power generation of 61% (2,094 GWh) for 2019. Future projects are also on the pipeline as Montenegro's state power utility Elektroprivreda Crne Gore (EPCG) plans to launch tendering in the third quarter of 2019 for a project aiming at overhauling and modernizing five small hydropower plants.

Croatia: Croatia's state power utility Hrvatska Elektroprivreda (HEP) plans to invest HRK1 billion (approx. €135 million) in RES on average annually, in what will enable it to increase the RES share from 35% to 50% by 2030. HEP aims to achieve this goal by increasing the existing Hydropower Plants' (HPP) capacity and output, as well as through the construction of new HPPs and investments of HRK600 million (approx. €81 million) in other RES projects, which include a solar power plant on the Cres island and taking over existing mature solar and wind projects.

Albania: Albania's state-owned power utility KESH plans to build a floating solar power plant with a capacity of 12.9 MW on the Vau i Dejes reservoir, aiming to diversify its energy mix, which is almost entirely dependent on hydropower plants. Towards this direction has recently auctioned the country's first solar power plant (50 MW) in the Akerni region near the city of Vlora.

Romania: In Romania, according to a study by Deloitte, the share of electricity from RES will reach 26.8% in 2020, exceeding the European Commission's 20% target. An escalation of the small scale RES installations in the country is expected to be fueled by commercialization of electricity generated from RES by prosumers, which has been regulated in the beginning of 2019. Important step towards RES integration has also been made by EDP Renewables (EDPR) with the installation of an innovative facility for the battery-based storage of wind energy amassed from the Cobadin wind farm.

In regards to energy efficiency, most energy savings in the industrial sector so far have come not from modernizations, but from closures of industrial capacities and according to the latest report, Romania is expected to meet its 2020 energy efficiency target due to a mixture of the economy's restructuring, the impacts of global recession and policy, indicating potential of actual energy efficiency improvement.

Hungary: At present, Hungary has approximately 700 MWp of installed solar PVs capacity, but aims to increase this to 30,000 MWp by 2022 in its RES drive. Moreover, the market is exploiting the KÁT FIT scheme, which expired in 2016, but the deadlines by which projects may be developed have been extended to 2020 across several stages, so the market is experiencing progressively the already approved projects under the scheme. It is estimated that approximately 2 GWp of projects approved are still on the pipeline.

The Oil Markets – Downstream Sector

In **Greece**, although total oil demand has been on the rise since 2014, it is still down on pre-recession levels. It is generally forecasted that demand will stagnate through 2030 because of higher efficiencies and population contraction. The local refining industry remains dominated by the two domestic refiners, Hellenic Petroleum and Motor Oil Hellas. The refiners supply the majority of the inland wholesale market and around 55% of the retail market through their various marketing arms. Many companies have been hard hit by a sharp fall in the consumption of road fuels and heating oil as successive governments raised fuel taxes to meet revenue targets set by international creditors. A number of players have gone bankrupt, most notably Mamidoil-Jetoil in 2016. The government announced in 2018 a tender for the purchase of a 50.1% stake in Hellenic Petroleum as part of a continued privatisation plan, which looks likely to be completed by the end of 2019 following expression of interest by Glencore and Vitol.

In **Turkey**, despite the country's recent geopolitical risks and devaluation of the Turkish Lira, Turkey's oil products demand remains on a solid upward trajectory and is considered to be the largest growth market in Europe. Government actions to stop the fraudulent use of base oil as diesel has reduced illegal fuel sales. SOCAR's 10Mt/year Aliaga refinery opened in 2018 - breaking the long-held Tupras refining monopoly. The retail landscape changed drastically in 2010 and 2015 with the introduction of five-year service station dealer contracts. A key feature of the retail market remains the dominance of the DODO operating model. Price caps introduced by regulators in recent years have raised concerns about the long-term profitability for fuels marketers in Turkey. Poor margins drove Total to sell its retail fuel business in 2016. OMV followed suit in 2017, selling its leading Petrol Ofisi network to Vitol as part of a broader portfolio optimisation programme. A further restructuring of the domestic oil retail sector is likely to continue in 2019 and 2020.

In **Bulgaria**, the rate of economic growth and its impact on oil demand growth (particularly of transport fuels) is the key oil market driver in Bulgaria, alongside the rate of modernisation of the logistical and distribution infrastructure and its impact on unit costs. As the country's sole refiner, LUKOIL dominates the fuels marketing sector and acts as the price setter for inland market pricing. In early 2016 Bulgaria’s Commission for Protection of Competition (CPC) commenced a formal investigation into alleged anti-competitive practices among some of the major fuel retailers.

In **Croatia**, despite improved economic performance, the growth prospects for Croatia's oil products market are limited, as small increases in diesel and jet fuel demand are expected to be offset by continued structural decline in gasoline. Despite the flat oil demand outlook, recently deregulated fuel pricing has improved overall fuels market profitability and attracted interest from new participants. The ongoing legal dispute between the Croatian government and MOL over control of national oil company INA has fuelled uncertainty over the future of the country's two struggling refineries - Sisak and Rijeka.

Following a period of sharp contraction in response to the economic recession, the **Romanian** economy has returned to positive growth, boosting oil demand. More recently, sustained lower fuel prices have further stimulated demand for transport fuels. MOL expanded its footprint in Romania by acquiring Eni's fuels marketing business and OMV Petrom remains the dominant player in overall market share and infrastructure investment. CEFC China Energy Company Ltd acquired 51% of KMG International (KMGI) which includes the Rompetrol downstream business. Some further consolidation in the local oil retail market cannot be ruled out over the next 18-24 months.

Although small, **Serbia** is one of a few European markets with a positive oil demand growth outlook. The liberalisation of the Serbian market in 2011 removed several restrictions which had historically prevented other companies from competing effectively with the market leader, national oil company NIS. Majority owned by Gazprom Neft, monopoly refiner NIS dominates the downstream value chain, but there has been growing competition from international oil companies and domestic fuel retailers in recent years. A moderate demand growth is forecasted in line with the country’s economic growth and increase of trade with neighboring countries. This is expected to continue as NIS expands further its product range and improves quality following latest upgrade of its facilities.

Upstream Sector

Exploration and production activities in SEE’s oil and gas upstream sector have continued unabated throughout 2018, backed by oil price recovery, and companies are already implementing their 2019 research programmes. Exploration activity is now concentrated in three main areas. **(a)** In the **Black Sea**, with Bulgaria’s offshore drilling plans are moving ahead smoothly with the Ministry of Energy preparing a tender for one deep water block and Shell planning to drill one deep water block in 2019. Romania’s activities are at a standstill pending the government’s long-awaited moves with an FID for the Domino discovery likely in the first half of 2019. Turkey is also getting ready to announce a new drilling programme for 2019/2020. **(b)** In the **Adriatic and Western Greece**, exploration is moving ahead in Croatia, Albania, Montenegro and Greece. Exploration drilling activity in Western Greece is expected to move ahead within 2019 in the Patraikos area, but also in Katakolo. Montenegro is also likely to announce a drilling programme for 2020 by companies which have been granted licenses. In Albania, the emphasis is on production maximization in the Patos-Marinza and Driza oilfields, while offshore drilling is likely to take place in 2020 at the Joni 5 offshore oilfield. Croatia is also focusing over the next two years on existing production from its 19 offshore platforms. Plans are being laid for an Open Door tender to be announced in the second half of 2019. **(c)** In the **East Mediterranean**, exploration activity is now concentrated in offshore Cyprus, Israel and Egypt. Companies are advancing their plans within their licensed blocks with a series of new drillings in Cyprus, Israel and Egypt are planned for 2019 and 2020. Turkey is also getting ready in 2019, through its state-owned company TPAO, to carry out a series of drillings in the offshore area between Northern Cyprus and mainland Turkey. Lebanon's plans are also advancing with companies having been awarded licenses in two offshore blocks and exploration plans are under consideration.