TASK FORCE REPORT

Price Surge and Security of Supply

Empowering Mediterranean regulators for a common energy future
ABSTRACT

During MEDREG’s 32nd General Assembly meeting, it was agreed upon that a task force would be assembled to study the impact of the energy price surge on Mediterranean countries, on electricity and gas markets as well as security of supply. The task force is led by the Electricity Working Group (ELE WG).

After describing the recent gas and electricity price dynamics, the report presents an analysis of the impact of the price surge on the energy markets of Mediterranean countries depending on the characteristics of their energy systems. The analysis is complemented by further reflections on the challenges posed by the crisis for both the European Union and developing countries in the Mediterranean.

The situation is very contrasted in the region, between Southern European countries with highly integrated energy systems that have been directly affected by the crisis in both their electricity and gas markets, countries that have been indirectly impacted due to their energy dependence or their proximity to the European market model, and countries that have been relatively protected or that have even benefited from the crisis. This report presents the factors that influence the magnitude of the crisis and assesses the countries’ reactions to mitigate this crisis.
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ABOUT MEDREG

MEDREG is the Association of Mediterranean Energy Regulators, bringing together 27 regulators from 22 countries, spanning the European Union, the Balkans, and the MENA region.

Mediterraean regulators work together to promote greater harmonization of the regional energy markets and legislations, seeking progressive market integration in the Euro-Mediterranean basin. Through constant cooperation and information exchange among members, MEDREG aims to foster consumer rights, energy efficiency, infrastructure investment and development, based on secure, safe, cost-effective, and environmentally sustainable energy systems.

MEDREG acts as a platform providing information exchange and assistance to its members as well as capacity development activities through webinars, training sessions and workshops.

The MEDREG Secretariat is in Milan, Italy.

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In 2021, a sharp rise in commodity and energy prices began, which is largely responsible for the resumption of inflation in the world. In the case of gas and electricity, this rise was observed from the summer of 2021, particularly in Europe, with the drop in gas exports from Russia and the fact that Gazprom did not fill the storage facilities it controls in the European market. This increase was transmitted to the electricity sector, which suffered from problems with the availability of production facilities. This situation continued throughout the winter and was amplified by the conflict in Ukraine in February 2022. The European Union countries were hit hard by this crisis, which spread to all hydrocarbon-importing countries. Inflation is a shared problem in the world today, with all the difficulties it causes for consumers, especially in the Mediterranean.

The purpose of this report is to analyse the impact of the energy price surge, both gas and electricity, on MEDREG members, considering the different characteristics of the Mediterranean countries. It is divided into three parts: a description of the recent energy price dynamics, analysis of the impact on the gas and electricity markets of Mediterranean countries, and reflections on the challenges posed by the crisis for both the EU and developing counties in the Mediterranean. The analysis is complemented with recommendations for the region.

Scope of the analysis

Price developments have a global dimension, but with marked differences between regions and countries. In terms of an analytical grid, we can therefore identify different dynamics that make it possible to characterise exposure to price shocks and the nature of these shocks:

- Global dynamics: linked to phenomena over which no country has any real control, such as the post-COVID economic recovery and its effects on commodity prices. The interaction between Asia and Europe for access to LNG falls into this category.
- Regional dynamics: bilateral or multilateral interdependencies between countries lead to specific vulnerabilities associated with asymmetries and power relations. Interdependence can also be a protective factor.
- National dynamics: The vulnerability of countries is influenced by their position in value chains and their energy mix. Import dependency has proven to be a very important risk factor, amplified by the weight of gas in primary energy consumption.

In terms of governance and regulation, several factors can, depending on the circumstances, amplify the problems or provide solutions:

- Level of centralisation of system management (monopoly versus competition).
- Level of international integration, particularly in terms of market design.
- Weight of market prices in the cost to consumers.
Synthetic Picture of National Situations

Overall, the exposure of countries to the current crisis has been variable, depending on various factors and the choices made by the country, mainly:

- The structure of the energy and electricity mix,
- The energy dependence,
- The interlinks between electricity and gas prices,
- The nature of gas supply contracts,
- The availability and use of electricity interconnections,
- The regulated or deregulated nature of gas and electricity markets.

Looking more specifically at the situation in Mediterranean countries, several peculiarities can be found. In the EU, countries have been confronted with similar price dynamics in their electricity and gas markets due to the common market models and high levels of market integration. Outside the EU, some countries have been indirectly affected by the price surge due to their proximity to European markets or their high energy dependence. In contrast, some Mediterranean countries have been relatively unaffected by the energy price surge due to the nature of their energy supply contracts. Finally, oil and gas exporting countries in North Africa have benefited from higher prices to get higher revenues and market opportunities.
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THE RECENT ENERGY PRICE DYNAMICS
1.1. The sharp rise in gas prices in wholesale markets

After a general decline in commodity prices in 2020 linked to the sanitary measures put in place around the world in response to the COVID-19 pandemic, the strong global economic recovery at the end of 2020, driven by Asian demand, caused a rebound in raw material and energy prices. In Europe, gas markets have been increasingly tight during the year 2021 because of limited global supply, strong demand from the Chinese market due to anticipations of a cold winter, as well as climatic hazards (droughts). In addition, the gas storage filling level in European storage sites has remained limited during the year, because of a reduction in LNG supplies to Europe at the beginning of the year, the low injection level by Gazprom into its storage facilities and cool temperatures in Europe, which contributed to further tightening the gas market.

In the face of growing market pessimism about Russian gas supplies, European gas prices were characterised by strong volatility in the last quarter of 2021. Prices reached unprecedented levels in December (€180/MWh for PEG and TTF day-ahead prices on 21 December), and the geopolitical situation in Ukraine in February 2022 exacerbated these tensions, causing TTF prices to peak again above €200/MWh in March.

In Asia, LNG prices have aligned with European prices in the global competition for LNG. In 2021, Asian prices have remained higher than European gas prices for most of the year to meet the demand of the continent. Prices at the US Henry Hub followed the overall upward trend in global gas prices in 2021 but fell in the last two months of the year amid above-seasonal temperatures in the country.
1.2. Electricity prices in Europe have been directly affected and have reached record-high levels

The gas crisis in Europe spread to the EU electricity market as of the summer of 2021. The surge in natural gas prices translated into higher production costs for gas-fired generation plants, thus driving electricity prices up on the day-ahead market as those power plants often set the price on the merit order. The increase in European electricity prices was also driven by the price of CO₂ allowances, that thermal power plants must buy to cover their greenhouse gas emissions, which experienced an unprecedented surge in 2021 as well (from €30/t\text{CO}_2 at the end of 2020 to €80/t\text{CO}_2 at the end of 2021). Electricity prices on European day-ahead markets progressively increased in 2021, with some country-specific price variations linked to domestic consumption (particularly depending on weather conditions) and production constraints.

The rise in electricity prices intensified in autumn 2021, with daily prices reaching record-high levels in most EU countries, driven by increasing costs of fuels, coal, CO₂ allowances, and most importantly gas, while renewable energy generation has remained relatively low. The crisis worsened in the last two months of the year and the daily price reached around €300/MWh on October 7th in several EU countries, while another peak at €400/MWh was reached at the end of December.

Like gas prices, electricity prices have remained highly volatile at the beginning of 2022, and the tensions in Ukraine in late February-March 2022, causing gas prices to soar to extremely high levels, resulted in a new peak in daily electricity prices in March above €500/MWh. During the summer of 2022, wholesale electricity prices in EU markets increased further, except in Spain and Portugal where a price cap mechanism has been implemented to contain price rises (See Quick Look 2 in chapter 3.2.3). The low availability of power generation units in some countries has also contributed to tightening electricity markets. In France, half of the nuclear power plants have been shut down due to maintenance as well as corrosion problems detected at the end of 2021 on part of the reactors. In addition, hydropower generation remained very low in some countries because of prolonged droughts and high temperatures in Europe during the summer, thus preventing hydro reservoirs to be filled to normal levels. In late July, Spanish and Portuguese hydropower reservoirs were only filled to 36% and 30%, respectively, a historical minimum.
1.3. The energy price surge has impacted other countries that are directly or indirectly linked to the European markets

The alignment between energy costs and prices inherent to the EU market design poses risks not only to EU economies but also to other countries that are directly or indirectly linked to European markets.

1.3.1. EU neighbouring countries in the Balkan region have been impacted by the crisis due to the progressive alignment of their energy markets with the EU market design

Some of the EU’s neighbouring countries in the Balkan region have been impacted by the disruptions that hit EU energy markets because of their progressive alignment with the EU market design. In the Balkan region, Albania and Montenegro are official EU candidates since 2009 and 2010, while Bosnia and Herzegovina, which applied for membership in 2016, does not have the candidate status. Even though their accession or membership has not been confirmed, the three countries have nevertheless started to transpose the EU legislation into national law, especially in the context of their adhesion to the so-called “Energy Community”.

This organisation, which was set up in 2006, gathers EU Member States and their neighbouring countries in Southeast Europe and the Black Sea region to implement a part of the EU legislation in the fields of energy, environment, competition, and renewable energy to those neighbouring countries. As contracting parties of the Community, Albania, Bosnia and Herzegovina and Montenegro have therefore committed to undertake a progressive restructuration of their electricity systems in line with the EU legislation. As such,

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1 Source: REE (Red Eléctrica de España), September 2022
they must transpose the so-called “*acquis communautaire*” in the field of energy, including the Third energy and gas legislative package adopted by the EU in 2009.

The three Balkan countries are therefore in the process of implementing reforms to liberalise their energy systems and align their models with the EU market design. The introduction of competition and the enhancement of interconnections to coordinate exchanges via daily coupling is at the centre of the reforms. For instance, Albania, which transposed the electricity *acquis* into national law in 2016, intends to create a central power exchange where the wholesale electricity price would be set according to the merit order principle.

Thus, by transposing the EU *acquis* into national laws, Balkan countries are switching to a market model that makes them more vulnerable to a surge or increased volatility in fuel prices.

1.3.2. The indexation of gas supply contracts to EU gas prices in some countries has spread the gas price surge

The European market design has also indirectly impacted some Mediterranean countries because of an increased indexation of gas supply contracts to European gas hubs.

While in the past most gas supply contracts in global markets were indexed to the price of oil (the Brent index), a gradual shift from oil indexation to gas hub price indexation has taken place over the past decade. These contracts are typically indexed, fully or partially, to the main benchmark hubs, such as the US Henry Hub or the Dutch TTF (the wholesale price that has emerged as the main price benchmark in the EU).

The so-called “slope” of gas supply contracts, which translates the degree of indexation of gas prices to that of oil, has experienced a declining trend since 2014, meaning that an increasing number of contracts have reduced their indexation to oil. In 2019, 32% of LNG long-term contracts were not oil-linked, according to Bloomberg².

Türkiye is one of the countries that had traditionally indexed its gas supply contracts to oil prices but decided to shift progressively to indexation to European gas prices. The expiry of several long-term gas supply contracts in January 2022 and one LNG contract in October 2021 led the country to sign new contracts with alternative pricing models, which include a full or partial indexation to EU gas hub prices. The contracts that expired in 2021 accounted for 27% of Türkiye’s total oil-indexed long-term contracts (Daily Sabah, 2020)³.

While oil indexation has historically provided some stability to natural gas prices, the move towards EU gas-indexed prices has therefore exposed some countries to increased gas price volatility and unprecedented high price levels as of 2021. In Türkiye, wholesale gas prices have thus quadrupled in the second half of 2021, following EU gas price trends⁴.

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² [https://www.bloomberg.com/professional/blog/lng-contract-expiration-wave-an-opportunity-for-traders-buyers/](https://www.bloomberg.com/professional/blog/lng-contract-expiration-wave-an-opportunity-for-traders-buyers/)


⁴ [*Türkiye: when electricity price ceilings amplify the pain of gas spikes and currency falls - Energy Post*](https://energypost.eu/2021/02/22/turkey-electricity-price-ceiling-gas-spike-currency-fall/)


A comparison between oil and gas recent price dynamics in Europe (respectively TTF spot price and Brent) shows that whereas oil and gas prices have both increased since 2020, the dynamics in both markets have yet been different (Figure 3). While the increase in oil prices led to a price level equal to that reached in 2008, the surge in gas prices has been of a much greater magnitude, resulting in unprecedented price levels.

In contrast, countries that have maintained oil indexation have benefited from relative protection to the current crisis, as this gives them insurance against the volatility of the gas hub market. As a result, debates are emerging to discuss whether the shift from oil indexation to hub-based gas contracts has led to excessive price volatility and whether a return to long-term contracts indexed to Brent crude oil would be beneficial.

Figure 3: Evolution of oil and gas prices in Europe, 2008-2022
UNEVEN IMPACT OF PRICE SURGE ON THE MEDITERRANEAN REGION
2.1. EU countries have been directly impacted, both on their gas and electricity markets

2.1.1. Impacts on wholesale markets

With regards to natural gas, EU Mediterranean countries import most of their needs since they have little or no domestic gas production. They have therefore all been affected by the gas supply crisis which has resulted in a wholesale gas price surge, but at varying degrees depending on the importance of gas in the energy system, the dependence on imports as well as the diversity of supply sources.

Most EU Mediterranean countries have a high dependence on natural gas imports. Italy is the country with the highest dependence, due to the structure of its energy mix. Almost half of its electricity was produced from gas in 2019 (the second highest share in the region, after Malta), while gas is also used for residential, industrial, and commercial purposes, representing overall about 30% of its final energy consumption. With almost 40% of its total energy supply being natural gas imports, Italy is the biggest natural gas importer among EU Mediterranean countries. France, Spain, Portugal, Greece, and Malta also have a strong dependence on natural gas imports. Malta and Greece mainly use it for electricity generation (87% and 40% of their electricity mix, respectively), while gas uses are more diversified in Portugal and Spain. In both countries, gas is consumed for electricity production (34% and 27% of their electricity mix, respectively) as well as for industrial and residential consumers. France, where natural gas accounts for a small share of electricity production, mainly consumes natural gas for industrial and residential purposes.

In comparison, Croatia, Cyprus, and Slovenia are less reliant on natural gas imports. Croatia produces one-third of its gas supply, allowing the country to be less impacted by the gas price surge. Cyprus does not consume any natural gas at all, and Slovenia imports only low amounts of natural gas due to a limited contribution of gas in the final energy consumption. Only 3% of the electricity produced in Slovenia comes from gas-fired power plants, with most of the electricity being produced from nuclear, hydropower and coal.

Concerning import supply sources, the origin of natural gas imports also differs between countries. Italy imports a high share of its gas from the pipeline, and 40% of its gas consumption comes from Russia, which makes the country more vulnerable to any Russian gas supply disruptions (Figure 6). In contrast, Spain, which has the largest LNG capacity among EU Mediterranean countries (60bcm/year), imports mainly natural gas in liquefied form from the global LNG market (Figures 4 and 5). All countries in the region have LNG terminal regasification capacity, except Slovenia. The availability of large LNG terminal capacities in the Iberian Peninsula and in France has resulted in lower gas prices in the South of the EU in 2021 compared with Northern Europe prices, in the context of growing concerns over pipeline gas supply from Russia. Consequently, gas flows in Europe which used to move North-South started to reverse in 2021 (South-North).
UNEVEN IMPACT OF PRICE SURGE ON THE MEDITERRANEAN REGION

**Figure 4** - Annual Regasification Capacity of LNG Large Scale Import Terminals in the Mediterranean Countries, April 2022

*Terminal planned; capacity not specified

**Figure 5** - Natural Gas Imports by Pipeline and LNG in the EU and Balkan Regions of the Mediterranean

5 Source: GIE (2022)

6 Eurostat (2020)
With regards to electricity, even if EU Member States have different electricity mix, with the contribution of gas to electricity generation varying from country to country, they have all experienced an electricity price surge in their wholesale markets due to the way the EU electricity market is designed.  

Quick Look 1: France and Italy have both been impacted by the electricity price surge despite their unequal dependence on gas-fired power plants

France and Italy have very different electricity generation mix structures. On the one hand, France produces most of its electricity from nuclear power plants (70.3% in 2021) and hydropower plants (12%). Gas-fired power plants only accounted for 4% of its electricity production in 2021. On the other hand, Italy is among the countries in Europe whose electricity production is most dependent on gas: 48% of the electricity was produced from gas-fired power plants in 2020 (GSE). Because of the different nature of their power generation mix, the different types of production technologies (and gas-fired power plants) do not contribute to the same extent to the determination of electricity prices on the day-ahead markets in France and Italy. In 2021, the prices of electricity in

7 Eurostat (2020)
Italian day-ahead market were set about half of the time by a CCGT power plant (48% of the hours of the year)\(^9\), while in France gas-fired power plants were estimated to be the so-called “marginal technology” only 19.5% of the time\(^10\). Thus, in theory, electricity prices in Italy should be more aligned with the marginal costs of gas power plants.

However, because of market coupling of day-ahead markets in the EU, which has been implemented in all electrically connected countries of the EU since June 2021, pricing in EU spot markets is not necessarily determined by a single domestic unit of production, but also by electricity trade flows with neighbouring countries. In such a system, market participants submit their offers and requests on a common market handled by a single algorithm, without any consideration of the origin or destination of the electricity that is traded. Electricity trade is made in the direction of price differentials from countries with lower prices to countries with higher prices to maximize the global welfare at the EU level. As such, price should converge in the different market zones if interconnection capacities are not congested. It can be observed that over the last few years, the role of foreign electricity prices for the determination of prices in French and Italian spot markets has increased, due to the stronger integration of EU electricity markets and the growing role of interconnections. In 2021, electricity prices in neighbouring countries set the national price about 28% of the time in France and 24% in Italy (while it has remained under 20% in Italy over the last ten years).

The unprecedented gas price levels in Europe in 2021 and 2022 thus affected not only countries whose electricity mix depends heavily on gas, such as Italy, but also other Member States that are less dependent on gas, such as France. France has been particularly dependent on electricity price levels of its neighbouring countries as of the end of 2021, because the country has been facing an unprecedented low availability of its nuclear power plants after corrosion problems have been detected, forcing the country to suspend some of the plants. While France is often a net electricity importer in winter because of its high temperature sensitivity (and a net exported during the rest of the year), the country had to import higher electricity volumes than in the previous years during the winter 2021-2022 to meet its domestic consumption. Electricity imports in France reached their highest level in a decade in 2021 (43 TWh), representing a +27% increase compared with 2020 and +55% compared with 2019. The power trade balance continued to deteriorate during the first half of 2022, as France has been exceptionally a net electricity importer during five months out of six between January and June 2022. As illustrated in Figure 7, French and Italian spot prices have thus experienced the same dynamics in the last months. Between January and December 2021, prices in France have increased by +362%, while Italian prices have increased by +367%.

\(^9\) GME (2021) Annual report

\(^10\) CRE (2021), Le fonctionnement des marchés de gros de l'électricité et du gaz naturel - rapport 2021
2.1.2. Impacts on retail markets

The surge in wholesale gas and electricity prices has been passed on to consumers (households and businesses) by suppliers to varying degrees depending on Member State's retail market structures and consumers' exposure to spot prices. Consumers' contracts can vary from hourly pricing, which is strongly correlated with market spot prices, to fixed-price contracts enabling customers to be protected against short-term volatility.

In some EU countries, consumers are particularly exposed to market prices and have therefore been strongly affected by the energy price surge. In Spain, for instance, consumer electricity prices are highly correlated with the SPOT price, with the so-called “Voluntary Price for Small Consumers” (PVPC) regulated tariff which is directly linked to the hourly prices of the day-ahead and intraday wholesale markets. Since the end of 2021, Spanish consumers under the PVPC have therefore been directly exposed to the volatility of the wholesale market and have been confronted with record-high prices. On March 8th, 2022, the surge in wholesale electricity prices caused the daily PVPC to soar to €715/MWh, more than twice higher than the average price in February (Figure 8).

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11 https://www.endesa.com/en/blogs/endesa-s-blog/light/pvpc-regulated-tariff#:~:text=The%20PVPC%20regulated%20tariff%20(or,for%20electricity%20production%20is%20calculated
In contrast, some Member States have retail markets where most consumers have been relatively protected against the price surge, especially households. In Portugal, where most electricity and gas suppliers hedge their position in advance, almost all household gas and electricity consumers have fixed-price contracts (99.6% and 99.9%, respectively) which are set for each trimester of the year. Between 2018 end the end of 2021, final electricity and gas prices for households have thus remained stable (at around €180/MWh). However, this price stability does not apply to all types of consumers: electricity and gas prices for small businesses and medium-sized industrials have increased by more than 30% between the last trimester of 2020 and the end of 2021. Large industries have been more impacted and saw their electricity price double in this period.

The impact of the price surge is more contrasted in countries where part of the consumers pays their energy to suppliers on the free market and another part has chosen regulated tariffs. In Italy, households and small businesses can choose to sign electricity contracts either on the “protected market”, where prices are fixed by the regulator each quarter of the year, or on the free market, where prices depend on suppliers’ contracts. Overall, 30% of domestic customers and 25% of small businesses buy electricity at regulated prices, while the remaining part buys on the free market. On the protected market, prices are defined based on the procurement costs of the “Single Buyer” (a public company acting as a monopsonist). However, as the Single Buyer buys electricity on the wholesale market, market prices are in the end reflected in consumers’ regulated prices. This option does provide some protection against short-term volatility for a given period, compared with hourly pricing contracts, but does not shield against the general wholesale price increase. Between the third and the last quarter of 2021, electricity-regulated prices increased by more

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12 Source: data from ESIOS
than 80% (from €106/MWh to €192/MWh), following the sharp rise in wholesale prices (Figure 9). Figure 10 shows the breakdown of electricity prices paid by a typical residential consumer in Italy. The share of energy supply, which accounted for about 45% of the total electricity prices between 2016 and mid-2021, surged as of the end of 2021 to reach about 80% in 2022. To help reduce electricity bills for residential consumers, the government eliminated the system charges as of the end of 2021.

Figure 9 - Evolution of Regulated Electricity Tariffs in the Protected Market and Marginal Price on the Day-ahead Market in Italy, January 2021-September 2022

Source: data from ESIOS
Overall, as shown in Figure 11, the impact of the crisis on retail prices varies among European countries.

The price surge also impacted energy suppliers which have been exposed to wholesale prices. Several suppliers in EU Mediterranean countries had to exit the market due to the unprecedentedly high energy expenditure on energy.

14 Source: ARERA
costs in both gas and electricity markets. In Portugal, seven small electricity and gas suppliers announced between September 2021 and February 2022 they could not ensure the continuity of their activity. Therefore, 15000 electricity and 1300 gas clients had to be transferred to the supplier of last resort. Several energy suppliers also exited the French market, either voluntarily or because they have gone bankrupt. While about thirty suppliers were present in the French electricity retail market in the summer of 2021. In Croatia, one supplier which provided electricity to around 2000 clients (for a total consumption of around 140 GWh/year), of which 112 households, exited the market in October 2021. Its consumers were all moved to the supplier of last resort.

Overall, in all EU Mediterranean countries, non-household consumers have faced a stronger increase in natural gas bills within this period, compared with households. The gas bill for non-household consumers increased by more than 40% in all countries (Figure 12), while the household gas bill grew on average by 15% in the EU.

**Figure 12 - Increase in Retail Gas Prices (Excluding Taxes) in the European Countries between S2 2020 and S2 2021 (Household and Non-household Consumers)**

Source: Eurostat
2.2. Mediterranean countries that have a low dependence to gas imports but that have been indirectly impacted on their electricity markets

2.2.1. Albania and Montenegro

Some neighbouring EU countries have also been affected by the energy price surge. In the Balkan region, Albania and Montenegro have been most impacted in their electricity markets.

In both countries, natural gas has very little contribution to the energy mix, representing a very small share of the total energy supply (0.3% in Albania and 0% in Montenegro in 2019), therefore they do not have any gas market. Electricity in Albania is almost exclusively produced from hydropower plants, while Montenegro produces electricity mainly from coal and hydropower plants. Consequently, both countries did not experience an increase in gas bills. The countries did not have any gas-fired power plants in 2019. Therefore, they were not directly impacted by the gas price surge.

However, Albania and Montenegro have experienced a surge in electricity prices since 2021. Although domestic electricity is not produced from natural gas, both countries are nevertheless dependent on electricity imports from neighbouring countries and have therefore been impacted by the electricity price surge in the EU. Albania has been more heavily impacted as it imports a significant share of its final electricity consumption (39% in 2019, compared with 8% in Montenegro). This is mainly due to the structure of its electricity mix, almost entirely based on hydropower and whose availability is highly variable according to the seasons and weather conditions. Due to the instability of its electricity production, Albania has therefore to import a large part of its electricity needs in dry seasons, purchased at high prices on the international markets, in a context where neighbouring countries suffer from the same problem of structural import dependency. Therefore, imports play the role of supply of last resort, when the domestic production is not sufficient to meet demand, which makes Albania particularly vulnerable to price levels in neighbouring countries. Currently, Albania has regional electricity interconnections with Greece, Montenegro, and Kosovo. The commercial operator OSHEE, in charge of concluding transactions on the interconnections, imports mainly electricity from Bulgaria (nuclear) and Montenegro (coal).

Despite an increase in electricity production from hydropower plants in 2021 in Albania, the country had to import high amounts of electricity in the second semester of 2021 to meet its demand (Figure 13), at a time when electricity prices in neighbouring European wholesale markets were soaring\(^\text{16}\). On the Hungarian HUPX Dam Day-ahead market, where Albania imports electricity, prices peaked in December 2021 at 246€/MWh (Figure 14).

\(^{16}\) https://ere.gov.al/images/2022/04/Raporti%20Vjetor%202021%20perfundimtare.pdf
Consequently, Albania’s energy imports expenditure boomed as of August 2021, reaching a total of €213 million between January and November 2021, the highest on record\(^{18}\) (Figure 14). This price surge was also passed on to consumers as annual energy inflation rates significantly increased in 2021 and early 2022, peaking at 5.2% in April 2022 (Figure 15). In response to the rising electricity import bill and to ensure electricity security of supply, the Government declared a state of emergency between October 2021 and April 2022. System operators were thus requested to review their investment plans and postpone non-urgent investments. The government also announced a €100 million sovereign guaranty for the year 2021 to the distribution system operator OSHEE to guaranty electricity imports even during high prices, and another €100 million was provided for the first quarter of 2022.

\(^{17}\) Source: data from Albania’s Institute of Statistics (INSTAT), Energy balance

UNEVEN IMPACT OF PRICE SURGE ON THE MEDITERRANEAN REGION

Figure 14 - Price of Imported and Domestically Produced Electricity in Albania and Imports Expenditure of the Albanian Commercial Operator in 2021

Source: data from ERE’s Annual report “Situation of the Energy Sector and ERE Activity during 2021” (electricity prices) and from OSHEE (electricity imports expenditure)

Figure 15 - Annual Change of Consumer Price Index in Albania between January 2021 and May 2022

Source: data from Albania’s Institute of Statistics (INSTAT), Inflation

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19 Sources: data from ERE’s Annual report “Situation of the Energy Sector and ERE Activity during 2021” (electricity prices) and from OSHEE (electricity imports expenditure)

20 Source: data from Albania’s Institute of Statistics (INSTAT), Inflation
2.2.2. Israel

In Israel, natural gas prices have not been affected by the global price surge. Between 2020 and 2021, natural gas prices in Israel even slightly decreased (10% reduction between Q1 2020 and Q1 2021), while in the same period, EU prices more than doubled (Figure 16).

The country is relatively protected from the global market dynamics since most of its natural gas consumption is produced domestically (92% of its gross natural gas consumption in 2019). Moreover, Israel started exporting parts of its production in 2019, with the start of the extraction in the Leviathan gas field. Since then, natural gas exports have grown rapidly, reaching 7 bcm in 2021 (representing 37% of its total production). The country exports natural gas to the global market through LNG terminals located in Egypt, but most of the gas supply agreements it has signed over the last three years with partner countries were long-term contracts indexed on the price of oil, therefore Israeli gas prices for exports have experienced only a moderate increase since the beginning of the global energy price surge. Yet, the gas prices in Europe have brought up new export opportunities for Israel. Considering the EU’s willingness to reduce its dependency on Russian gas, the European Commission announced in June 2022 a trilateral agreement between the EU, Israel, and Egypt for the supply of Israeli gas to Europe, from LNG terminals in Egypt.

However, the energy price crisis has impacted Israel’s electricity market. In 2019, almost 30% of its electricity production came from coal-fired power plants, largely supplied with Russian coal. The global coal market, which was already characterized by a shortage before the tensions in Ukraine, became, even more, tighter when European electricity producers purchased high amounts of coal to substitute for Russian coal. Consequently, coal prices reached record-high levels at the end of 2021 (Figure 17). The continued increase

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21 Sources: Data from Natural Gas Authority, Ministry of Energy of Israel (2021); Nasdaq
in global coal prices resulted in an increase in electricity prices in Israel as of January 2022, which further intensified in the following months. Since January 2022, the price of coal purchased by the Israel Electric Corporation utility grew by about 45%, which would translate into a 7% increase in consumer bills without any intervention. In reaction, the government reduced the tax on coal imported and updated the electricity tariff for 2022 to mitigate the impact on consumers.

2.3. Mediterranean countries that are highly dependent on energy imports have been impacted on both electricity and gas markets

2.3.1. Türkiye

The current energy price surge impacted both gas and electricity markets in Türkiye, which is one of the countries in the Mediterranean region most dependent on energy imports. The country imports coal, oil, and natural gas, and 70% of its gross energy consumption was imported in 2019.

Since natural gas accounts for a high share of its final energy consumption (25% in 2019, the third highest share in MEDREG countries) and given that almost one-quarter of its electricity is produced from natural gas (23%), Türkiye was strongly affected by the global gas price surge. Between August 2021 and April 2022, the wholesale gas price has almost tripled in the country (Figure 18). This was mainly driven by the fact that Türkiye has recently conducted gas supply contracts whose prices are indexed on European gas hubs, shifting away from oil indexation. Thus, the volatility and high levels of natural prices in European markets were directly transmitted to Turkish gas prices. When several long-term gas import contracts expired at the
end of 2021 (representing one-third of the total natural gas import volumes), Türkiye decided to shift from long-term oil-indexed contracts to short-term contracts indexed to European hub prices.

With regard to electricity production, Türkiye is highly dependent on coal and natural gas (34% and 23% of its production in 2019, respectively). The global increase in coal and natural gas prices has thus pushed up electricity prices in the country: between August 2021 and April 2022, wholesale electricity prices increased by around 80% (Figure 18). In addition to the global increase in natural gas and coal prices, Türkiye has faced a fall in hydropower output in 2021, which has contributed to pushing up prices further. Therefore, regulated retail electricity tariffs for households significantly increased as of the beginning of 2022. On average, household-regulated tariffs have increased by more than 20% in each quarter of the year 2022. In the fourth quarter of 2022, they were more than twice higher than at the same period in 2021 (Figure 19).

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**Figure 18 - Wholesale natural gas and electricity prices in Türkiye, August 2021- April 2022**

**Figure 19 - Evolution of regulated retail electricity tariff for households in Türkiye, 2020-2022**

*Note: 1 Turkish Lira =100kr.*
In the medium and long term, however, Türkiye may benefit from European willingness to diversify its gas supply routes away from dependence on Russian gas. In July 2022, the European Commission signed a Memorandum of understanding with Azerbaijan to double the capacity of the Trans-Anatolian Natural Gas Pipeline (TANAP) which enables Azerbaijan to export its gas to the European Union (Italy, Bulgaria, and Greece) through Türkiye. This could enable Türkiye to strengthen its position as a transit route for gas flows to Europe.

2.4. Mediterranean countries that have been relatively unaffected by the energy price surge

Several factors can explain the relative protection of some countries in Europe and the Middle East against the current energy price surge, namely the status in terms of energy exports and energy independence, as well as the nature of energy supply contracts.

2.4.1. Jordan

Despite its strong dependence on natural imports, which are exclusively used for electricity production (75% of electricity production), Jordan has been relatively unaffected by the global price surge due to the nature of its gas supply contracts. The country has secured gas pipeline imports (including from Egypt) based on long-term contracts, whose prices have not been affected by the global price surge.

2.5. Energy exporting countries that have benefited from higher prices to get higher revenues and new market opportunities

2.5.1. Bosnia and Herzegovina

In the Balkan region, Bosnia and Herzegovina has been relatively unaffected by its gas market. Globally, the country has a relatively low dependence on energy imports (27% of its gross energy consumption in 2019, mostly oil and coal). Natural gas import volumes are very low since gas accounts for a very small share of the final energy consumption (3% in 2019) and are not used to produce electricity, therefore Bosnia and Herzegovina have been protected from the global rise in gas prices.

Moreover, thanks to its position as the net electricity exported in the region, Bosnia and Herzegovina has remained unaffected by the electricity price surge in Europe, in contrast with Albania and Montenegro which rely on electricity imports from the continent. With its interconnections with Croatia, Montenegro and Serbia, its net electricity exports reached 4755 GWh in 2021, representing 27% of its gross electricity

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22 Source: Türkiye country report

23 Source: EMRA website (October 2022).
production\textsuperscript{24}. Most of the electricity is produced from coal-fired power plants (61% in 2021), while the remaining part is produced from hydropower plants (40%).

Thus, the surge in regional electricity prices has resulted in higher revenues from electricity exports for Bosnia and Herzegovina. In 2021, electricity export revenues reached a record-high level of €424 million, representing a 67% increase compared with 2020\textsuperscript{25}.\textsuperscript{26}. In addition to benefiting from higher electricity prices in the region, Bosnian electricity-producing companies have also taken advantage of the fact that electricity produced from coal is not subject to any carbon price or tax in Bosnia and Herzegovina, thus making electricity more competitive in European markets.

Electricity and natural gas prices for consumers have therefore remained stable in the country (Figure 20). Household electricity prices even slightly declined in 2021 compared with 2020 (a 2.7% reduction between the second half of 2020 and the same period in 2021).

\textbf{Figure 20 – Bosnia and Herzegovina Electricity Balance between 2020 and 2020 (GWh)} \textsuperscript{27}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{balkangreenenergynews.com.soaring-prices-push-up-bih-electricity-exports-to-all-time-high/}
\end{figure}

\textsuperscript{24} Source: Agency for Statistics of Bosnia and Herzegovina (https://bhas.gov.ba/Calendar/Category/26#)

\textsuperscript{25} Balkan Green Energy News: Soaring prices push up BiH electricity exports to all-time high https://balkangreenenergynews.com/soaring-prices-push-up-bih-electricity-exports-to-all-time-high/

\textsuperscript{26} Energy Community (April 2022), “Impact of the electricity price surge in Energy Community Contracting Parties and measures undertaken”
2.5.2. Algeria, Egypt, and Libya

The Mediterranean region also includes countries with large gas resources, such as Algeria, Egypt, and Libya. Natural gas production allows them to cover their own domestic gas demand but also to export part of their production abroad. Thus, the three countries have not only been relatively protected from the global gas price surge, but they have also benefited from higher export revenues and new market opportunities due to an increasing demand from Europe which is seeking to diversify its gas supplies.

Algeria, Egypt, and Libya are, respectively, the first, second and fourth-largest natural gas producers in Africa. Algeria and Libya exported respectively 48% and 40% of their production in 2019, while Egypt exported 7% of it due to an increasing domestic demand.

The three North African countries export natural gas mainly through pipelines. Algeria currently exports gas to Europe, through two pipelines available for commercial trade: the Medgaz pipeline to Spain and the Trans-Mediterranean Pipeline (Transmed) to Italy through Tunisia. A third pipeline, the Maghreb-Europe Gas pipeline, was operational until the end of October 2021 but was closed at that date. Egypt exports

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27 Source: Agency for Statistics of Bosnia and Herzegovina, Energy statistics

28 Source: Agency for Statistics of Bosnia and Herzegovina, Electricity and natural gas prices, January-June 2021, and July-December 2021 reports

29 IEA (data tool)
natural gas through the Trans-Sinai gas line and the Egypt Gas Pipeline (AGP), while Libya uses the Green Stream pipeline to Italy. In addition to pipelines, Algeria and Egypt have also developed LNG capacities to export natural gas in the liquefied form on the global market. Algeria and Egypt have respectively four and two operational LNG export terminals. In 2020, Egypt’s LNG exports were mainly oriented towards Asia and Oceania (71%) while 24% of it was supplied to Europe (source: Country sheet, based on BP’s 2021).

The global surge in gas prices has provided an opportunity for exporting countries to generate higher revenues from gas exports, by aligning their prices to international gas prices and, when possible, by increasing the volumes exported abroad. In 2021, gas exports in Algeria increased by 45% compared with 2020, mainly driven by a strong increase in pipeline exports to Spain and Italy, and despite the reduction in capacity following the closure of the Maghreb-Europe pipeline at the end of 2021. Between January and September 2021, its revenues from oil and gas exports increased to $24 billion, compared with a 15 billion a year earlier (Ministry of Energy of Egypt). In Egypt, gas production increased by 17% in 2021 compared with 2020, to reach 53,1 million MT/year of pipeline gas exports and a record of 1 million MT of LNG exports in the third quarter of 2021. Egypt’s natural gas and LNG export revenues rose by 98% to reach $3,9 billion in the first four months of 2022. In 2022, the price surge in natural gas led the country to export at full capacity from its two LNG terminals.

Given the concern in Europe about a potential disruption of Russian gas supplies and the consequent willingness to diversify gas supplies in the short and long term, the European Commission published the REPowerEU plan in May 2022 to reduce its dependence on Russian fossil fuels. One of the measures is to increase imports of LNG by 50 bcm and pipeline gas imports by 10 bcm from outside Russia by 2030. Europe could therefore look towards North Africa to become an alternative to Russian gas. Algeria is already the third largest gas supplier to the EU, accounting for 12% of EU gas imports in value in 2020, and 8,2% in 2021. The EU is planning to sign new Memorandum of Understandings with partner countries to develop new supply routes, including in North Africa. It recently announced a future trilateral agreement with Egypt and Israel. Bilateral agreements between Member States and North African gas exporting countries have recently been signed, such as between Italy and Algeria in April 2022 for an increased gas supply.

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30 Gas Market Report, Q2-2022 (windows.net)
31 Reuters (Nov 2021) Algeria’s oil revenues up to $24 bln by end of September - ministry | Reuters
32 SPGlobal: Egypt eyeing 7.5 mil mt/year in gas exports this year, set to add 450 MMcf/d in 2022-23 | S&P Global Commodity Insights (spglobal.com)
33 Data from the petroleum ministry according to Reuters
34 Source: Country sheet
35 EU imports of energy products - recent developments - Statistics Explained (europa.eu)
LESSONS LEARNT FOR THE MEDITERRANEAN COUNTRIES
3.1. Factors Influencing the Magnitude of the Energy Crisis

The exposure of countries to the current crisis has been variable, depending on various factors and the choices made by the country with regard to the following factors:

- **The structure of the energy and electricity mix:** The impact of higher gas prices is more important for countries where gas accounts for a large share of total energy consumption. Furthermore, the impact of higher gas prices on the country's economy also varies depending on which sectors consume the most gas (industry, production of electricity, heating, etc.). In countries where natural gas is used to a large extent for thermal electricity generation, the gas price surge may be further passed on to electricity prices. The availability or the re-opening of power plants supplied with alternative fuels, such as coal power plants, may, conversely, offer some protection against soaring gas prices.

- **The energy dependence:** Countries which import a large share of their energy consumption, especially natural gas, have been hit harder by the general increase in gas prices, while oil and gas exporting countries in North Africa have, on the contrary, benefited from higher revenues. The diversity of gas supply sources, via pipeline and LNG terminals, is also a factor of protection against price volatility since it helps ensure the resilience of the gas system and the ability of a country to arbitrate between different supply sources. With regards to electricity, countries that import significant amounts of electricity from EU countries are directly affected by the general rise in electricity prices in the EU, while electricity exporting countries benefit from higher revenues in Europe.

- **The interlinks between electricity and gas prices:** A strong correlation between electricity and gas prices results in soaring electricity prices alongside gas prices.

- **The nature of gas supply contracts:** Oil-indexed gas supply contracts have offered some protection against the current crisis, while the indexation to European gas hub prices leads to a stronger exposure to price volatility. Moreover, the signature of long-term supply agreements with natural gas producers also provides relative protection from the crisis, while short-term contracts lead to higher exposure to exceptional market fluctuations.

- **The availability and use of electricity interconnections:** On the one hand, interconnections in the EU have led to a convergence in wholesale electricity price dynamics in the Member States, meaning that all countries have been experiencing an increase in electricity wholesale prices regardless of their electricity mix. On the other hand, interconnections also allow some countries to benefit from electricity prices cheaper than domestic production, or to mitigate a possible electricity shortage.

- **The regulated or deregulated nature of gas and electricity markets:** The degree to which wholesale prices affect electricity and gas retail prices for consumers depends on the market design. Regulated tariffs for consumers offer some protection against market volatility.

Looking more specifically at the situation in Mediterranean countries, several situations can be identified. In the EU, countries have been confronted to similar price dynamics in their electricity and gas markets due
to the common market models and high levels of market integration. Outside the EU, some countries have been indirectly affected by the price surge due to their proximity to European markets or their high energy dependence. In contrast, some Mediterranean countries have been relatively unaffected by the energy price surge due to the nature of their energy supply contracts. Finally, oil and gas exporting countries in North Africa have benefited from higher prices to get higher revenues and market opportunities.

3.2. The energy crisis raises challenges for the European market design

In Europe, the energy crisis which has prompted Member States to put in place emergency measures to protect consumers and ensure the security of supply has opened discussions on the way the EU energy market model has been designed and the need for it to evolve to make it more resilient to future crises.

3.2.1. The European energy market design and its aims

The organisation of the European energy market was designed with two main aims in mind: the application of competition to gas and electricity and European integration. As a result, the third European legislative package adopted in 2009 laid the foundations for a system where national markets are interconnected and where flows at interconnections are consistent with price differences on national wholesale markets. The concrete translation of these guidelines is the coupling of markets in electricity and the "hub to hub" model in gas. Electricity and gas, therefore, have coherent organisations in terms of their objectives. Energy exchanges are a central element which, by enabling supply and demand to be compared, will produce price signals that are supposed to reflect scarcity and direct flows from the least expensive areas to the most expensive areas.

The concrete translation of the European market models is higher volatility associated with scarcity phenomena. In the case of electricity, this makes it possible to respond to the principle of merit order if the producer's post-offer is consistent with their marginal production costs. In the case of gas, each market area is associated with a virtual hub that allows trade to develop and provides wholesale price indices. The Dutch hub has progressively become the European lead market, concentrating the bulk of futures and derivatives transactions. The other hubs are strongly correlated to the TTF with price differences generally lower than the transport rates between market areas.

The emergence of a liquid wholesale market for gas has led to a change in price formation, with a greater role for short-term transactions. Long-term contracts indexed to oil prices have, for the most part, evolved towards indexation to gas market prices. During the 2010s, this shift resulted in a decrease in the unit cost of EU imports, while oil prices remained at high levels. ACER estimates the gains from the establishment of the internal market at €70 billion until 2021.

However, as European gas production continues to decline, the EU is increasingly dependent on imports, which is why Russia had a market share of around 40% on the eve of the crisis. The market model, which is relevant from the point of view of the organisation of trade between Member States, has introduced a new vulnerability by allowing a dominant supplier to influence prices by reducing its supplies. The drop in deliveries from Russia is thus the main factor in the rise in gas prices in the EU and has been transmitted to
all volumes subject to indexation to market prices. On the other hand, however, high prices have made the European market more attractive for LNG, thus avoiding shortages.

In the case of electricity, the aim of the market model is to allow generation facilities to be called up in ascending order of cost on a European scale and daily. The power exchanges are linked to each other by interconnections and flows at the borders are steered by transactions on the marketplaces. Under normal conditions, prices in the different market areas will correspond to local marginal costs. However, this system has weaknesses: it does not necessarily cover all the costs for all the production assets (this is particularly the case for peak stations) and it tends to increase price volatility, particularly when there are supply problems. Finally, the clearing principle means that all volumes traded on the exchanges are at the same price. With the surge in gas prices, the production cost of combined cycles and gas turbines was passed on in very large volumes, causing a major crisis for European countries. This has had a major impact on countries that rely heavily on gas for their electricity production, such as Italy, but also on countries where gas plays a very marginal role, such as France (as seen in Quick Look 1 in chapter 2.1.1).

3.2.2. In reaction to the crisis, EU countries have intervened in energy markets to implement emergency measures to protect consumers and ensure security of supply.

In the autumn of 2021, the European Commission acknowledged the price crisis and took a series of initiatives to help Member States address the crisis and coordinate the national responses at the EU level. On October 13th, the Commission published a “Toolbox” containing emergency measures that the Member States can implement in compliance with the European legal framework. Those options include immediate measures targeting vulnerable consumers (direct support, delayed payments to avoid blackouts, tax reductions), final consumers (cost reductions) and businesses (subsidies, access to renewable electricity purchase contracts).

With the exacerbation of the gas supply crisis and the further increase of energy prices caused by the geopolitical situation in Ukraine in February 2022, the Commission shared a plan to reduce Europe’s dependence on Russian gas imports (so-called “REPowerEU Plan”) on May 18th, complemented by two documents outlining additional measures for Member States to address the crisis. The first document (“Short-Term Energy Market Interventions and Long-Term Improvements to the Electricity Market Design”) details market intervention options to protect consumers, such as extended regulated prices to small and medium companies or gas cost subsidies for power production. It also highlights mechanisms to finance those measures (e.g., the removal of infra-marginal rents from baseload electricity producers, or the use of the exceptional congestion revenues generated by the increased trade flows between countries).

38 https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A230%3AFIN&qid=165303742483
The second paper presents a new temporary State aid framework\textsuperscript{40} which contains possible actions to ensure liquidity and access to finance for businesses that face economic difficulties (e.g., public guarantees on loans, subsidised interest rates or compensations for extra costs). The Commission specifies that all those measures should be targeted and proportionate to avoid excessive market distortion.

Depending on the structure of national energy retail markets and the exposure of consumers to the price crisis, EU countries have implemented different emergency measures. To reduce energy bills, the Italian government progressively eliminated the share of system charges in electricity prices for households and several industrial customers, and Portugal reduced the network access component in regulated electricity tariffs for 2022. Gas and electricity tariff shields have been introduced in France in late 2021 and February 2022 respectively. The price increase of electricity-regulated tariffs for 2022 has thus been blocked at 4% for residential consumers, with a later extension to small professionals, while gas-regulated tariffs for residential consumers have been frozen at their October 2021 level until the end of June 2022. Without this measure, regulated gas tariffs in France would have been multiplied by two between October 2021 and September 2022\textsuperscript{41}.

EU governments also introduced measures targeting vulnerable households. Croatia extended the definition of “vulnerable customers” and provided an allowance to pay energy bills to those consumers (maximal amount of 400 HRK/month until March 2023, and 200 HRK afterwards). In Italy, a “social bonus” was distributed to 29 million families, expected to reduce 25% the energy bills of vulnerable households. Portugal granted a one-off payment of €60 for vulnerable families who receive the electricity social tariff, and France provided inflation allowances (€100 to 38 million households during the winter 2021-2022) as well as exceptional energy vouchers (€100 to 5.8 million households in December 2021 and €150 in April 2021) to low-income households.

Government intervention has also focused on companies most exposed to the energy price surge. Italy introduced a tax credit for energy-intensive companies, while Portugal provided an additional credit line to targeted companies in the manufacturing and transport sectors that have liquidity needs resulting from rising costs of raw materials and energy. In its Resilience Plan published in March 2022, the French government announced the coverage of 50% of the excess energy costs of targeted energy-intensive companies that have operating losses and whose electricity and/or gas bills increased by at least 40%.

To finance those emergency measures, various measures have been implemented to collect additional revenues generated by higher energy prices. The Italian government introduced a special tax on extra profits generated of energy companies that have recorded exceptionally growing revenues due to the energy price increase, which is expected to raise €10 billion in public revenue. In Portugal and Italy, part of the revenues from the EU ETS auctions have been mobilised to finance emergency measures (€1.9 billion

\textsuperscript{40} EUR-Lex - 52022XC0324(10) - EN - EUR-Lex (europa.eu)

\textsuperscript{41} CRE, Barèmes applicables pour les tarifs réglementés de vente de gaz naturel – Septembre 2022
collected from 2021 auctions in Italy, and €150 million allocated to the financing of the reduction in electricity access tariffs in Portugal).

Finally, EU Member States also undertook specific actions to ensure gas and electricity security of supply. Albania allocated a first €100 million sovereign guaranty to the state-owned energy company OSHEE to guarantee the import of electricity despite high prices, followed by another €100 million in the first quarter of 2022. To avoid electricity and gas cut-offs in the event of a supplier failure, France and Portugal designated a “supplier of last resort” to transfer customers. Italy adopted extraordinary measures to incentivize gas storage filling ahead of winter 2022-2023, including the introduction of specific tariffs for the transportation and supply of gas to storage sites. Finally, some measures were also targeting demand reduction and energy efficiency, such as in France where the energy efficiency allowance for the replacement of gas or oil heating system with heat pumps were increased by €1000 from April 2022 until the end of 2022.

3.2.3. Reflections have been launched to discuss the design of the European energy market

The EU internal energy market, which has been the result of 25 years of consolidation, has often been considered a reference point with regard to the way it is designed. Some reflections on the electricity market design have been taking place in recent years, but most of the debates have focused on the ability of the current model to support the energy transition and the integration of growing shares of renewables into the system.

The advent of an unprecedented price surge in gas and electricity markets, which is primarily caused by a gas supply crisis, has prompted reflection in Europe on the way prices are formed and the need for consumer protection. By discussing the responsibility of the market design in the energy price crisis, several fundamentals of the market model are therefore questioned.

While most EU governments have undertaken market intervention measures to protect consumers, those actions are intended to be short-term targeted measures designed to interfere as little as possible with the functioning of the internal energy market. However, some countries have expressed their views on the need to review the market rules.

In October 2021, the European Council has therefore mandated the European Commission and the ACER (the European Union Agency for the Cooperation of Energy Regulators) to investigate ways to improve the functioning of the electricity market. In April 2022, the ACER published the final version of its assessment of the EU wholesale electricity market design\(^{42}\), evaluating the benefits and drawbacks of the current market design and providing recommendations to improve its functioning. The report concludes that if the current electricity market has been designed for “normal” circumstances, under which it proves to be effective, it is however not adapted to “emergency” situations such as the current crisis. The various interventionist measures that have been implemented in the EU in emergencies demonstrate the limits of the model in times of crisis. The president of the Commission, Ursula von der Leyen, acknowledged in August 2022 that

“the skyrocketing electricity prices are now exposing the limitations of our current market design”, which was developed for “different circumstances”.

To provide further elements to the reflection, some countries shared with the Council their views on the reforms that would be necessary. Spain and France shared a joint statement on electricity and gas markets in November 2021, and Greece developed a non-paper in July 2022 highlighting the necessity to reform the market design and proposing possible solutions to decouple electricity prices from gas prices.

Spain and Portugal, where consumers have been particularly affected by the energy price crisis, submitted to the European Commission in April 2022 a proposal for the implementation of a mechanism specifically designed for the Iberian region to reduce wholesale electricity prices and, ultimately, bring down consumer prices. This so-called “Iberian price cap” mechanism intervenes in the price formation of national wholesale markets by setting a price cap on natural gas (and other fossil fuels) used for power plants. After being approved by the Commission on June 8th, 2022, as an extraordinary measure to reduce the impact of the crisis on consumers until a reform of the Spanish and Portuguese retail markets is implemented, both countries started implementing as of June 14th.

Quick Look 2 - The Iberian price cap mechanism

The possibility for Member States to subsidise temporarily the cost of gas used to produce electricity was included in the measures that the Commission considered could be envisaged in response to the crisis, provided that the country faces a combination of three factors that makes it particularly vulnerable: limited interconnection capacities, a high exposure of consumers to wholesale electricity prices, and the strong influence of gas in electricity price setting.

Considering that these criteria were met in the Iberian Peninsula, the Commission approved the Iberian price cap mechanism requested by Spain and Portugal on June 8th, 2022, for a period of validity of one year until 31st May 2023.

In Spain, for instance, retail electricity prices are strongly linked to the SPOT price, with the so-called “Voluntary Price for Small Consumers” regulated tariff, which uses hourly prices of the daily and intraday markets. Spanish consumers have therefore been very strongly impacted by the price increase on wholesale markets, therefore the reduction of the latter is particularly strategic to protect consumers.

The principle of the mechanism is to lower electricity prices on the wholesale markets exogenously. Power plants that use natural gas (or coal) to produce electricity receive subsidies (direct grants) to cover part of their fuel supply costs. Given that the price of electricity on the day-ahead market is often set by the marginal cost of gas or coal-fired power plants (which are often the last on the merit order), this mechanism enable to lower the clearing price.

43 Communication of 18 May 2022 on Short-Term Energy Market Interventions and Long-Term Improvements to the Electricity Market Design
This subsidy is granted to gas and coal-fired power plants when their gas supply costs exceed a threshold defined by the mechanism. This cap was set at €40/MWh for the first six months, with a gradual €5/MWh increase each month afterwards. The total State aid budget approved by the Commission for this mechanism is €6.3 billion for Spain and €2.1 billion for Portugal.

On the contrary, power plants with low production costs (such as hydropower plants, nuclear plants, intermittent renewable energy installations), which have experienced exceptionally high revenues due to high prices, do not benefit from this subsidy and would theoretically sell their electricity at a lower price than without this mechanism. However, this price cap would not undermine the profitability of these producers since the profitability of the projects already in place was not conditioned on such unanticipated high price levels.

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<td>The energy crisis has shown the vulnerability of some developing economies in the Mediterranean region which have been indirectly affected by the European price surge. This crisis highlights the need for those countries to reduce their exposure to energy shocks and reinforce their resilience.</td>
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<th>3.3.1. Socio-economic effects of the price level</th>
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<td>The energy price crisis tends to have a stronger socio-economic impact on developing countries, which have less room to react to protect consumers against the price surge. In those countries, consumers have less margin to pay increasing energy bills and the impact of a price surge is strengthened if the State is not able to intervene sufficiently to protect them.</td>
</tr>
</tbody>
</table>

The impact of the energy price surge is more significant as energy demand in developing countries is generally increasing to ensure a socio-economic development.

The impact of the energy price surge in these countries has not affected the energy sector but also on other non-energy commodities such as food. Some countries have experienced record high inflation levels as shown in Figure 22.

For developing countries, exchange rate can also be considered as a factor for consumers, e.g., in Türkiye Turkish Lira depreciated too much due to monetary policy and it doubles the effects of energy price surge on consumers.

For developing countries, the exchange rate can also be a factor affecting the purchasing power of consumers. In Türkiye for instance, the Turkish Lira depreciated during the energy crisis because of monetary policy decisions, which has increased the impact of the energy price crisis on consumers. Between August 2021 and 2022, the consumer price index in Türkiye increased by more than 83%.
3.3.2. Emergency intervention measures in developing countries under tight public finances

Developing countries that have been most affected by the energy price surge have implemented emergency measures to protect vulnerable households and ensure security of supply, in a context of reduced public finances.

To support vulnerable consumers, Türkiye has extended its social support programme for vulnerable households, first introduced in 2019, from 2 to 4 million households in 2022. For those customers, the electricity fare has remained unchanged, and a share of the electricity bill corresponding to a certain level of consumption (between 75 and 150 kWh) has been covered by the government. Türkiye has also undertaken measures aimed at reducing all electricity bills, by eliminating the public broadcasting and energy funds components on the bills since January 1st, 2022. Furthermore, and as of March 1st, 2022, VAT in residential and agricultural irrigation consumers was reduced from 18% to 8%. Besides measures regarding the electricity market, similar measures have been taken for natural gas residential subscribers.

In Jordan, the new electricity tariffs that were implemented as of April 2022 were reduced compared with the previous ones, in varying proportions depending on the consumption segments.

Several developing countries in the Mediterranean have also faced energy supply security risks, due to their strong dependence to energy imports and the rising energy import bill. Albania, which has faced security of electricity supply risks due to rising European prices, has declared a state of emergency between October 2021 and April 2022 and requested system operators to review their investment plans and postpone non-urgent investments to ensure electricity security of supply. The government also provided sovereign guaranties for 2021 and 2022 to the distribution system operator OSHEE to guaranty electricity imports even during high prices. To ensure sufficient imports of coal for electricity production, Israel reduced the

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44 Source: Financial Times, 2022
tax on imported coal to its minimum. Israel also started purchasing coal from alternative countries to reduce its dependence on Russia.

Measures to encourage energy savings and foster the development of renewable energies have also been implemented in some developing countries. In April 2022, the Moroccan government announced the launch of a campaign to raise awareness of energy savings. The country plans to introduce peak and off-peak tariffs that could help reduce annual peak electricity demand by 100 MW. A national programme is expected to encourage households to replace 10 million lights with energy-efficient LEDs. In Jordan, the government provided households with grants to encourage the use of renewable energy systems.

Quick Look 3 - UN recommendations for developing countries in response to the energy crisis

In March 2022, the UN established the Global Crisis Response Group (GCRG) to recommend policy measures to respond to the worldwide impacts of the events in Ukraine on food, energy, and finance systems. The report published in August 2022 focuses on energy-related policy measures.

The GCRG identifies that rising energy prices have affected developing countries more severely than developed countries. In developing countries, the issues of energy access and the reduction of energy poverty are central to socioeconomic development objectives, and the energy crisis has resulted in a deterioration of those indicators. The UN Development Programme estimated that up to 71 million people have been pushed into poverty in the 3 months that followed the outbreak of the geopolitical tensions in Ukraine. Although inflation has also affected developed countries, developing countries have experienced even higher levels of inflation, mainly driven by energy and food prices. The crisis has also put pressure on developing countries due to the decline in the financial conditions in these economies, which translated especially into growing public debts, increasing import bills and trade deficits.

In the short term, it recommends governments focus on two types of emergency measures: energy demand reduction (for heating, cooling, and mobility) and the protection of vulnerable populations to ensure access to energy and affordable prices. On the latter, it suggests for instance the taxation of windfall profits of large oil and gas companies to finance public aid directed towards the reduction of energy bills paid for low-income households.

In the medium term, namely within five years, the GCRG calls on governments in developing countries to facilitate the deployment of RES, which implies addressing bottlenecks that prevent from their progress.

In the longer term, the GCRG identifies three main actions to put in place: combatting energy waste (mainly by reducing natural gas flaring and methane leaks), developing policy and regulatory strategies to support the energy transition, and scaling up public, private and multilateral finance for the green energy transition.

45 UN, Global impact of war in Ukraine: Energy crisis, August 2022
3.3.3. Achieving energy independence and energy transition to enhance resilience to price shocks

For developing countries in the Mediterranean, the issue of energy independence and the switch from fossil fuels to a low-carbon economy is key to guaranteeing resilience to energy shocks in the future.

The ability of Mediterranean countries to ensure long-term investments in power generation units that are relevant to the electricity system is crucial to be able to produce electricity when needed. In this regard, the implementation of energy systems, which is a long process and requires significant efforts, must be considered not only in terms of energy produced but also in terms of capacity.

Investment decisions on new generation plants are capital intensive and are made over the long term, in a context of uncertainty (about demand, prices, political and regulatory environment, etc.) and require a certain degree of certainty about the revenues generated in the future to cover fixed costs. Relying on uncertain incentives, for instance, wholesale prices are thus sometimes inefficient to provide sufficient investment. Under-investments can, in the long run, threaten the security of supply.

Several mechanisms have been implemented in the world to address this issue. In the EU, some countries have implemented so-called “capacity remuneration mechanisms” aimed at remunerating generation plants for their availability, to complement revenues from energy markets. Such a mechanism can thus prevent the closure or mothballing of some plants that would not be profitable on the energy market, but which nevertheless contribute to the resilience of the system by providing capacity in periods of tension on the power system. The Brazilian model, which relies on a centralised planning process with competitive bidding for power plants, enables producers to sign long-term contracts that guarantee a stable remuneration over a defined time horizon, thus reducing the risk of revenue uncertainty for producers. These examples constitute ways to reconcile competition and planning to ensure electricity adequacy and consistency in production and network development.

Moreover, the crisis revealed the strong dependence of some Mediterranean countries on fossil energy imports, which makes them highly vulnerable to supply crises and price shocks on fossil fuels. Overall, countries most dependent on fossil fuel imports are those that have been most affected by the energy crisis. In the Mediterranean, some countries import more than 90% of their gross energy consumption. This is for instance the case of MENA countries of limited size with no domestic energy resources such as Lebanon and Jordan. While fossil fuel reserves are concentrated in certain parts of the world, the potential for using renewable energy sources is more widespread across the globe and can provide opportunities for developing countries to increase their energy independence.

Energy-importing countries in the region have already put in place plans to develop their domestic renewable production over the past few years. For instance, the share of renewable energy sources (RES) in Jordan's electricity mix rose from less than 1% in 2014 to 21% in 2021, making Jordan one of the most rapidly growing countries in terms of RES integration. In Morocco, the share of RES in total installed capacity increased by 10% between 2019 and 2021, and renewable capacities now account for 37% of the total capacities. The current crisis is an opportunity for countries that have been vulnerable to external price
shocks to accelerate the development of renewable energy, which implies overcoming some challenges that currently prevent their deployment in some regions. This includes adapting the electricity network, implementing mechanisms to manage renewable generation surplus, ensuring flexibility generation to complement intermittent production and guarantee adequacy, and having financing models that enable it to cover the costs of investments.

Developing the relevant interconnections is also a key factor to ensure the security of supply and affordable energy, by exploiting the complementarities in production and demand profiles of neighbouring countries. Electricity systems in developing countries are often isolated or unable to rely on a strong system like the European interconnected system. However, developing interconnections that are relevant to the power system requires several parameters: a surplus of electricity, a robust system, a relationship of trust between countries, as well as an institutional vision to make interconnections meaningful. In the Maghreb region, for instance, interconnections are mainly used for security purposes as a regional electricity market has not been established. In the Middle East, most countries focus on the development of national networks as their systems are not yet mature.
CONCLUSION
CONCLUSION

The energy price surge has had a very contrasting impact on countries in the Mediterranean. In the EU, where wholesale electricity and gas prices have reached record-high levels and where national markets are strongly integrated, all countries have been impacted both on their gas and electricity markets. Outside the EU, some Mediterranean countries have also been impacted by the price surge due to their links with European markets and their dependence on energy imports. Other Mediterranean countries have been relatively protected from the price surge, thanks to a low dependence to energy imports or the nature of their long-term supply contracts. Finally, gas exporting countries in North Africa have benefited from higher prices to get increased revenues and new market opportunities.

Overall, the exposure of countries to the current crisis has been influenced by various factors and the choices made by the country, mainly the structure of the energy and electricity mix, the degree of energy dependence, the interlinks between electricity and gas prices, the nature of gas supply contracts, the availability and use of electricity interconnections and the regulated or deregulated nature of gas and electricity markets.

In countries that have experienced increases in wholesale electricity and/or gas prices, the impact on consumers (residential, industries, companies) has been variable depending on the way the retail market is organized and the State intervention. In the EU, countries adopted various emergency measures to protect consumers and ensure the security of supply. The socio-economic effects of the price level in developing Mediterranean countries have been more severe due to the limited margin of manoeuvre for public intervention and the spread of the energy price surge to other commodities such as food.

Beyond the short-term effects of the price surge on Mediterranean economies, this crisis has launched reflections on the way countries conceive their energy systems and energy markets for the future. In the EU, reflections have been launched to discuss the responsibility of the current market design in the price surge and to examine potential reforms of the EU model. The crisis also highlights the importance for developing countries in the Mediterranean to increase energy independence and foster the clean energy transition to enhance resilience to price shocks in the future.

In terms of governance and regulation, several factors can, depending on the circumstances, amplify the problems or provide solutions, in particular the level of centralization of system management (monopoly versus competition), the level of international integration particularly in terms of market design, and the weight of market prices in the cost to consumers.

In light of the current energy crisis, the flexibility of regulation and the ability of national energy regulators (NRAs) to adapt the market rules based on the lessons learnt from the current situation is key. NRAs are essential entities for energy policies as they provide means to achieve policy objectives that are specific to each energy system. Their role should be considered according to national specificities, depending on the maturity of the energy system (mature energy systems which can cover the needs of consumers with a high level of certainty do not face the same challenges as non-mature systems where priority is given to energy access and the continuity of supply). In the energy crisis, NRAs are also essential to advise the governments on the technical aspects of the energy market and to assess the implications of potential policy decisions. The price surge has shown the role of regulators in implementing short-term emergency mechanisms to...
protect consumers as well as considering long-term market models to ensure affordability, sustainability, and security of the supply of energy systems.
ANNEX: Additional Data & Information

Net energy imports in Mediterranean countries and share of net energy imports in gross energy consumption, 2019

Source: Data from IEA (2019)

Net natural gas imports by country (TJ) and share in total energy supply in 2019

Source: Data from IEA (2019)
Net electricity imports in Mediterranean countries (GWh) and share in final electricity consumption, 2019

Source: Data from IEA (2019)

Electricity production, share by source (2020)

Source: Data from Our World in Data (2020)

ANNEX

Final energy consumption, share by source (2019)

Source: Data from IEA (2019)

Source: Eurostat (2020)
Source: Eurostat (2020)