



COUNTRY REPORT ITALY

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Energy Without Russia

The Consequences of the Ukraine war and the
EU Sanctions on the Energy Sector in Europe

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Energy Without Russia: The Case of Italy

The Consequences of the Ukraine War and the EU Sanctions
on the Energy Sector in Europe

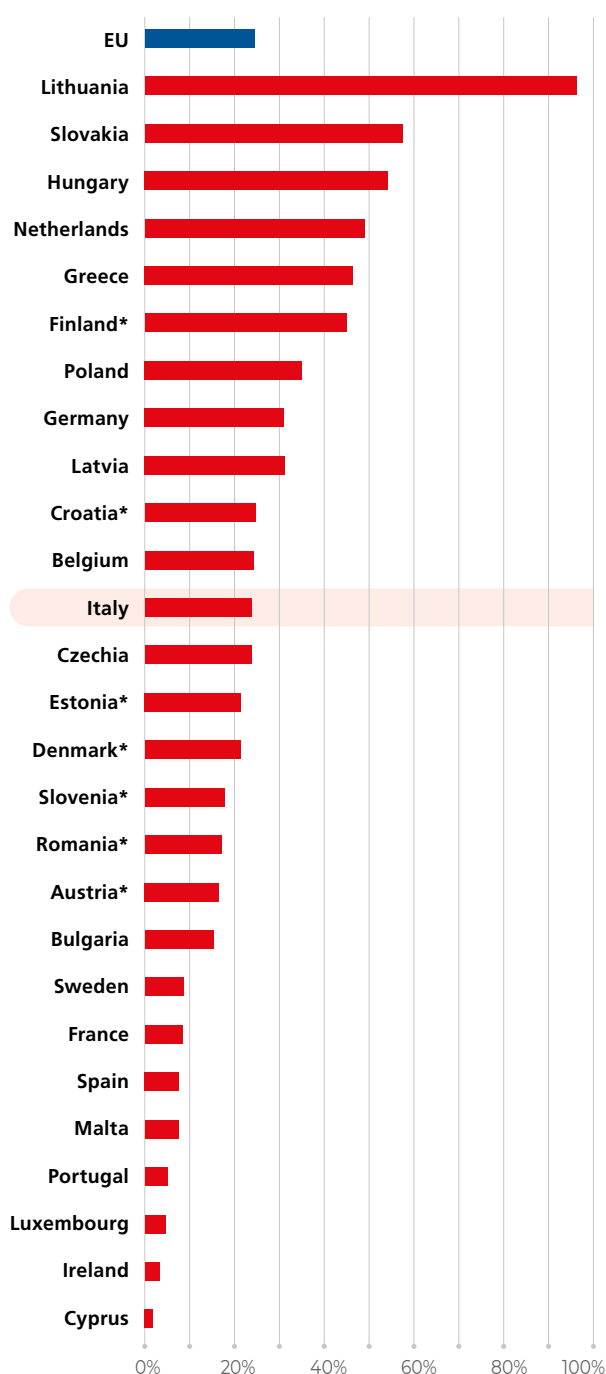
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INTRODUCTION

The Russian invasion of Ukraine and the energy crisis which came in its wake have produced significant impacts on the energy sector in many EU countries, including Italy. In 2021, prior to the war, Italy was strongly dependent on Russian natural gas imports with around 40% of total gas imports (72.6 billion standard cubic metres) coming from Russia. In 2022 Italy halved its Russian gas imports (to 19% of the total) and, at the same time, tripled its exports. Furthermore, whilst at least one fifth of the electricity consumed in Italy in 2021 was generated with Russian gas, this share was reduced to around one tenth in 2022. The government has drawn up a [national plan for the containment of natural gas consumption](#), with energy bill containment measures in Italy estimated to cost €62.8 billion in the 2021–22 two-year period. This study shows that customers reacted to high gas prices by reducing consumption over and above the European target of 15%, with gas consumption dropping 18.6% from August 2022 to January 2023, in the absence of structural measures.

Figure 1

Imports from Russia in gross available energy, EU, 2020



Source: Eurostat, Including estimates for non-reported data for countries with*

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THE ITALIAN ENERGY SECTOR BEFORE THE RUSSIAN INVASION OF UKRAINE

In 2021, Italian gross domestic energy consumption¹ was 153.7 Mtoe². Fossil fuels were the primary source of energy in Italy, although the composition of the energy mix has changed significantly since 1990, when oil and petroleum products were the main component, followed by natural gas and solid fuels. In 2021 natural gas accounted for the greatest share, with 41% of gross domestic consumption, followed by oil and petroleum products at 33%. That same year renewable energy covered 19% of gross domestic consumption, i.e. 29.9 Mtoe.

Final energy consumption – generally 80% of primary energy – was 113.3 Mtoe in 2021.³ The share of natural gas, petroleum products, renewables, and electricity was 30%, 34%, 10%, and 22% respectively. Per capita energy consumption in Italy in 2021 was 0.84 toe, slightly down from the pre-crisis figure of 0.87 toe. When compared to other European countries Italy is within the EU average.⁴

¹ Gross Domestic Energy Consumption in Eurostat.

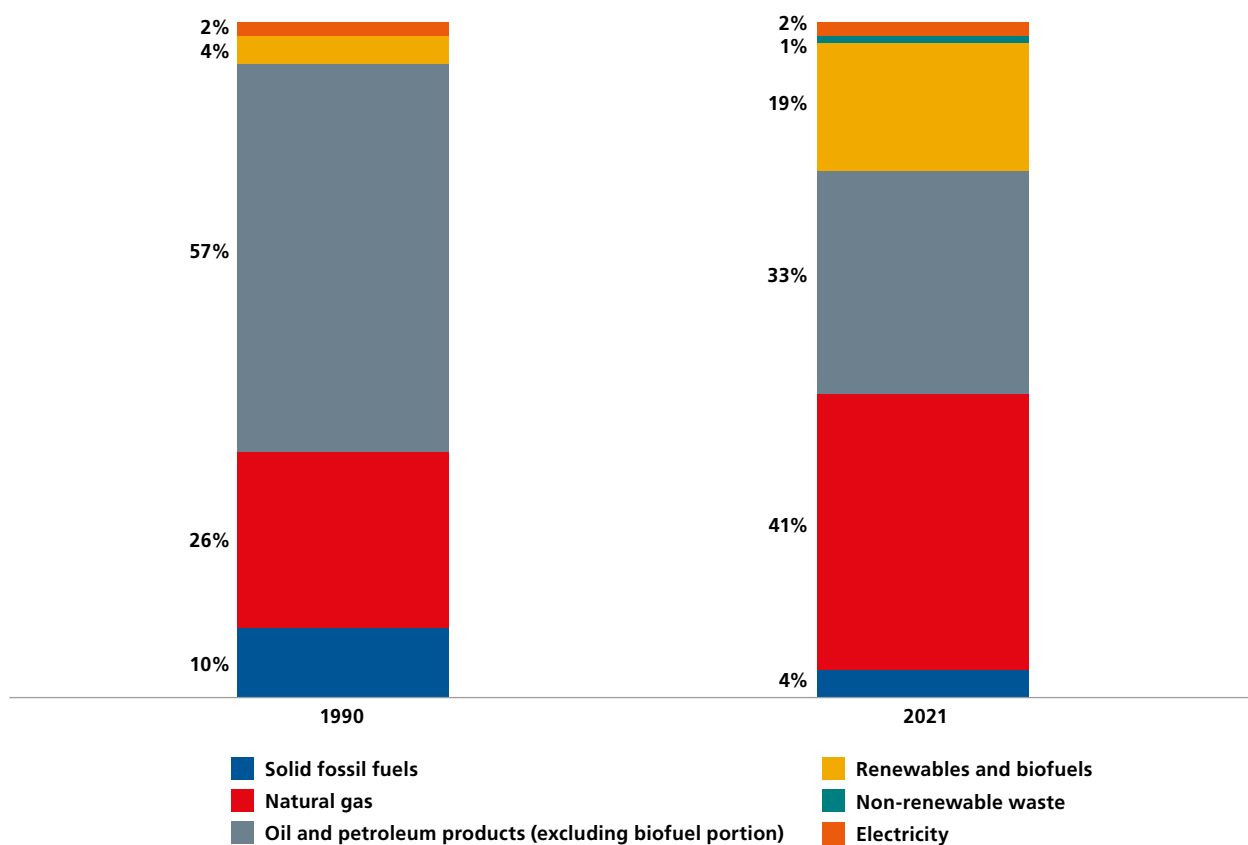
² Mtoe – millions of tonnes of oil equivalent.

³ Source: Eurostat.

⁴ https://dgsaie.mise.gov.it/pub/sen/relazioni/relazione_annuale_situazione_energetica_nazionale_dati_2021.pdf

Figure 2

Share of gross domestic consumption by energy source – comparison between 1990 and 2021



Source: Eurostat

If we look at electrical energy production in detail, in 2021 Italy's net production was 280 TWh.⁵ Fossil fuels accounted for 59% and the remaining 41% came from renewable sources (hydro, wind, photovoltaic, and biomass). 77% of the 164.5 TWh of thermal energy was natural gas and 7.8% was coal.

Net of the energy used for pumping (3 TWh), national production covered 87% of the electricity demand, with the remaining 13% (43 TWh) imported: 19 TWh from Switzerland, 15 TWh from France, 5 TWh from Slovenia, 3 TWh from Montenegro and, to a lesser extent, from Greece, Austria, and Malta.

1.1 DEPENDENCE ON RUSSIA

1.1.1 GAS, PETROLEUM, COAL, AND REFINED PRODUCTS IMPORTS

Prior to the Russian invasion of Ukraine, the Italian energy sector's main Russian import was natural gas. In 2021 Italy imported 72.6 billion standard cubic metres (bn sm³) of methane gas, of which 29 bn sm³ (around 40%) came from Russia. Italy is one of the EU member states which historically imports the largest quantities of natural gas from Russia, whilst its dependence on Russian oil and coal is much lower. In 2021, 193,000 tons of Russian coal (2% of national imports) were imported together with 5.7 million tons of petroleum (10% of the total 57 million tons imported). Material for nuclear energy production is not imported because this technology is not permitted in Italy for power generation.

1.1.2 VARIATIONS IN 2022

In 2022 72.4 bn sm³ of natural gas were imported,⁶ 19% of which came from Russia. With total natural gas imports virtually unchanged, then, Italy's dependence on Russian supplies has been halved thanks to supplies from other countries via pre-existing infrastructure. Compared to 2021, the national production of gas has remained at around 3.3 billion sm³, while exports have tripled, with 4.6 billion sm³ in 2022 as against a 2021 figure of 1.5 billion sm³. This is an increase of over 4 billion sm³ compared to levels recorded in 2019, which were just 0.3 billion sm³.

This is a figure worth highlighting because it shows that, during the period in which gas was more expensive, Italy bought more than it needed and then re-exported it.

Where petroleum is concerned,⁷ in 2022 Italy imported a total of 62.5 million tons (Mt) of crude oil as against a 2021 figure of 57 Mt (+9%), with the percentage coming from

Russia increasing from 10% to 19%. In absolute terms Russian imports more than doubled from 5.7 to 12 million tons. The 2022 total import figure is generally in line with pre-pandemic levels, with crude oil imports of 63.2 Mt, and Russian imports accounting for 14% of this.

With regard to petroleum derivatives, semi-finished and finished products, the comparison between 2021 and 2022 shows a slight increase in the totals, from 14.8 Mt in 2021 to 15.3 in 2022 (+3.3%) and a reduction in dependence on Russian imports, from 17.6% in 2021 to 13.7% in 2022. In 2022 the total consumption of petroleum products was 58.4 Mt compared to 55.4 Mt in 2021. Most of this consumption was accounted for by transport, with 67% of the total, against 61% in 2021.

As far as solid fossil fuels are concerned (coal and pet coke), imports increased significantly from 2021 to 2022, from 9.5 to 13.1 Mt. One of the reasons for this was the greater use of thermoelectric coal as a partial alternative to gas when gas prices were exceptionally high. In this case too, imports from Russia, already low, decreased significantly from 193,000 tons (kt) to around 100 kt, i.e. from 2% to 1% of the total.

1.1.3 ITALIAN ELECTRICITY GENERATION

In 2021, electrical energy demand was 320 TWh,⁸ 51% of which came from non-renewable sources, 36% from renewable sources and the rest from imports. Of the approximately 180 TWh produced from fossil fuels, the lion's share was natural gas, almost all of which was imported. As we have seen with Italian gas imports in 2021, approximately 40% was Russian. Thus it can be said that **if the Russian share of gas imports is divided up equally between the industrial sectors consuming it, at least one fifth of the electrical energy consumed in Italy in 2021 was produced with Russian gas. This dropped to around one tenth in 2022, given the reduction in Russian gas imports as a proportion of total imports.**

In addition to this, electricity generation from coal (which was dependant on Russian imports to the extent shown previously) was of marginal importance in 2021 but increased during the crisis.

⁵ Source: Terna.

⁶ Source: Snam.

⁷ Source: <https://dgsaie.mise.gov.it/bollettino-petrolifero>

⁸ Fonte Terna (https://download.terna.it/terna/Terna_Annuario_Statistico_2021_8dafd2a9a68989c.pdf)

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IMMEDIATE ACTION AFTER FEBRUARY 2022

2.1 UTILITY BILL AND FUEL TAX SUBSIDIES

At the national level the Italian government's first priority in the wake of the Russian invasion of Ukraine was safeguarding families and the Italian manufacturing industry from the effects of soaring energy prices. The main energy price containment measures intervened on the tax and on the regulated elements of the bills. Specifically: VAT was decreased to 5% on gas for domestic and industrial use and most general system charges were suspended for both electricity and gas. Reductions in the fuel excise duty rates were adopted in March 2022 and applied right through the year, a reduction of 25 cents for petrol and diesel, corresponding to discounts of 30.5 cents before VAT.

Overall, **public energy bill containment measures in Italy have been quantified by the Italian Parliamentary Budget Office at €62.8 billion in the 2021–22 two-year period.** 16 billion of this went directly to families while other measures applying to both families and business amounted to around 22.4 billion, and the remaining 24.4 billion went exclusively to businesses.

The 5% reduction in VAT on gas for domestic and industrial use is still in force and amounted to 3.1 billion at the end of 2022, according to the Parliamentary Budget Office. Offsetting the general system charges for domestic use and low voltage consumers cost over €11 billion overall prior to the end of 2022 alone. In addition to tariff measures, support to families also included various forms of money transfers to alleviate the pressure of inflation on family budgets.

The Italian government also set up a series of initiatives with a twofold objective: to ensure high storage levels for the winter of 2022–23 and to diversify gas import provenance rapidly. As a whole, the initiatives adopted are designed to replace around 30 billion sm³ of Russian gas with around 25 billion sm³ of different provenance by 2025, while renewable sources and energy efficiency policies fill the gap.

This was the diversification plan set out in the [national natural gas consumption containment plan](#) (Table 1).

In the second quarter of 2022, national production went down 0.05 billion sm³ compared to the same period in 2021, while imports from Algeria and Azerbaijan (via the Trans Adriatic Pipeline TAP) increased by only 2.7 billion sm³. By contrast LNG imports increased by 3.3 billion sm³. Consequently, adding up these contributions, in the second quarter of 2022 Italy replaced nearly 6 billion sm³ of Russian gas rather than the 7.5 billion sm³ set out in the plan.

2.2 ITALIAN POLICIES IN THE CONTEXT OF EU GAS SAVING POLICIES

In August 2022 the EU adopted an emergency regulation asking member states to voluntarily reduce gas demand by 15% compared to the average levels in the previous five years (2017–22). The Italian government responded with a national natural gas consumption containment plan the goal of which was to save around 8.2 billion sm³ of natural gas, in line with the 15% required by the EU Regulation. The plan was based on:

Table 1
The national natural gas consumption containment plan

	Second quarter 2022	2023	2024	2025	Provenance
GAS	6	8.9	11.9	11.9	Algeria, Azerbaijan (via TAP), National
LNG	1.5	7.9	9.5	12.7	Congo, Angola, Qatar, Egypt, Nigeria, Indonesia, Mozambique, Libya
Total	7.5	16.8	21.4	24.6	

- a) the maximisation of electrical energy production in the thermo-electric sector, using fuels other than gas (especially coal) accompanied by an acceleration of renewable energy uptake in the electricity sector;
- b) consumption reduction measures in the heating sector (reduction of the heating season and building temperatures); and
- c) a package of measures designed to promote energy efficiency behaviours by means of a special institutional awareness-raising campaign (managed by the Italian agency for new technologies, energy and sustainable energy – ENEA) and behavioural measures. At the same time, the Italian government estimated that the measures already in place should contribute by incentivising the replacement of high energy consumption home appliances and air conditioners with more efficient ones, the installation of new electric heat pumps to replace old gas boilers, the installation of thermal solar panels for hot water production and the replacement of traditional light bulbs with LED bulbs. No additional measures or resources are planned, however, on top of those already made available.

In addition to these measures, in the context of the voluntary reduction of consumption in the industrial sector, the government has launched a production sector debate in order to promote all measures with a low impact on production and, in any case, safeguard strategic sectors by reinforcing the “voluntary interruptibility” scheme already present in the system.⁹

Terna (the Italian electricity TSO) has also carried out auctions relating to electricity consumption reduction by sites consuming at least 1 MW of power, which are paid a fixed rate determined via competitive bidding. For 2023, the auctioned power is 3 GW.

2.3 ITALIAN GAS SAVING PERFORMANCE

Measures adopted in Italy over the last six months have generated consumption reductions above the 15% European target and in line with the EU average. Gas consumption decreased by 18.6% from August 2022 and January 2023, compared to a European average of 19.3% ([Eurostat figures](#)). These savings enabled Italy to reach the European goal of filling gas stocks by at least 90% (they were 95% full at the beginning of the winter thermal season). With 17 billion sm³, Italy is in second place in Europe for gas storage capacity, after Germany.

More specifically, the savings achieved in the individual sectors, and the domestic sector in particular, went beyond IEA forecasts at both the European and Italian levels. **In 2022 Italian gas demand dropped by 9.8% compared to**

2021. Total consumption was 68.5 billion sm³ – 7.4 billion sm³ less than the previous year.

[Snam](#) data show a significant drop at the end of the year. From September 2022 to February 2023 consumption decreased 20%, compared to average of the previous three years, and affected all sectors:

- In the **domestic sector**, which recorded **a reduction of 21%** in the period, in addition to mild weather, consumption containment measures (i.e. lowering of indoor temperatures and reductions in the winter heating period) had an impact, which was even larger when it comes to individual energy saving measures prompted by a surge in price.
- A reduction of a similar entity was recorded in the industrial sector, with a certain degree of difference between the various sectors. **The drop in demand (–20%)** was partly due to production cuts which, according to [as yet preliminary](#) data, seem to have impacted to a lesser extent than the switch to other fossil fuels and energy efficiency.
- **Gas demand in the thermoelectric sector dropped by 16%** as a consequence of the reduced demand for electricity ([–1.5%](#) in 2022 as compared to 2021) and the replacement of gas with coal in electricity generation (*gas-to-coal switch*). Electricity production from coal increased by [34%](#) from September 2022 to February 2023 (+61% in 2022 compared to 2021), offsetting lower hydroelectricity production which fell by [22%](#) in the same period (–38% in 2022 over 2021) as a result of the drought.

This result is, however, more the result of reduction efforts primarily driven by high energy prices than the outcome of specific energy-saving policies. The absence in the national natural gas consumption containment plan of high impact and long-term measures capable of incentivising and facilitating structural consumption reduction measures, such as the improvement of the efficiency of public and private buildings or the increase in efficiency/electrification of production process, has meant that the price trends (even when mitigated by government action) were the determinant factor in the reductions. The “110% Superbonus”, the sole potentially high-impact measure in this area, was launched in 2020 and modified in the 2023 Budget Law to cover a lower share of costs for recipients. The effectiveness of this measure was, in any case, doubtful, as its effect on the reduction of emissions proved minimal,¹⁰ but there is currently no alternative, better targeted, and more financially sustainable proposal on the table with the potential to make the energy savings of the last winter structural. A revision of the measure should introduce greater energy efficiency requirements, exclude technologies based on fossil fuels and, even more importantly, include a long-term plan capable of guaranteeing adequate reductions in building sector emissions.

⁹ The service consists of being willing to interrupt consumption when Terna needs to balance the grid. Firms subscribing to this mechanism are paid a fixed annual fee and a variable fee.

¹⁰ https://www.isprambiente.gov.it/files2023/pubblicazioni/rapporti/rapporto_384_2023_le-emissioni-di-gas-serra-in-italia.pdf

3

PRIMARY EFFECTS OF THE WAR AND SANCTIONS

The energy price shock strongly boosted renewables and energy efficiency without the need for public subsidies, in contrast to a dozen or so years ago when the photovoltaic boom was generously subsidised via the so-called “energy accounts”. At the same time, the shock triggered a political reaction which responded to gas scarcity with public investment in gas.

The 9.8% drop in gas consumption in Italy in 2022 is not far from the European average, and the IEA has estimated a reduction of 4.5% in electricity production from gas per year for Italy to 2025 if current policies continue.

In the wake of the Russian invasion of Ukraine and the publication of RePowerEU, **deployment of renewables in Italy accelerated in terms of new installations (which tripled in 2022 compared to the average of the previous ten years)** and the potential remains huge. Elettricità Futura – an energy sector industrial association part of Confindustria – estimated that installing 85 GW in new plants by 2030 is feasible without any public help. In the early months of 2023 the Minister for the Environment and Energy Security, Pichetto-Fratin, announced targets of 10–12 GW of renewable generation installation per year by 2030. But this potential is still being held back by a lengthy and challenging authorisation process and by competition from fossil generation thanks to subsidies which, according to government data, are worth twice as much compared to those destined to renewables. These include the consumption incentives that were introduced at the start of the crisis and have not yet been removed. Subsidies to renewables, by contrast, have further decreased and will continue to do so by design in the near future.

With regard to the electricity generation mix, **coal generation increased by 61% from 2021 to 2022**. This is due both to a governmental consumption reduction strategy designed to maximise electricity production from fuels other than gas, and also to the energy price shock, which made producing electricity from coal plants more profitable than from gas plants. As coal generation increased, **hydroelectric production dropped by 22% from 2021 to 2022 as a result of last year’s drought**. If we look in detail at electrical energy production – 276 TWh in 2022 – 64% was produced by fossil fuel sources (12% of which from coal) and the remaining 36% from renewables (hydroelectric,

wind, photovoltaic, biomass).¹¹ Net of the energy used for pumping (2.5 TWh), the national production covered 86% of electricity demand, with the remaining 14% (43 TWh) covered by imports: 19 TWh from Switzerland, 14 TWh from France, 6 TWh from Slovenia, 3 TWh from Montenegro, and to a lesser extent from Greece and Austria.

No significant effects of the sanctions were detected on Italian energy production, on the other hand. The sanctions did not target the gas imports Italy depends on, but focused on nuclear technology and petroleum and its derivatives. Italy does not generate nuclear energy and, whilst Russian petroleum imports increased from 10% to 19%, they accounted for less than a fifth of supplies of a fuel whose contribution to Italian electricity generation in 2020 was around 1%.¹²

¹¹ Source: Terna.

¹² Source: Mase metodologia Eurostat (https://dgsaie.mise.gov.it/pub/ben_eurostat/BEN%20-%20Italia%20Metodologia%20Eurostat%201990%20-%202020.xlsv)

4

MEDIUM- AND LONG-TERM RESPONSES

The energy price shock and the need for Italy to free itself of Russian fossil fuel sources, and gas in particular, has resulted in responses which prioritised **replacing Russian gas with gas from other sources rather than efficiency and electrification**. The government issued public guarantees for the purchase by SNAM (the gas TSO) of two floating storage LNG regasification units (FSRU) costing a total of over 1 billion Euros (excluding the grid connection and positioning costs) to be installed at the ports of Piombino and Ravenna.

Initiatives of this sort are in line with the longstanding Italian goal of becoming an energy (mainly gas) hub. The crisis brought this objective back to the fore, so that projects that had been shelved, such as the Algeria-Italy continental pipeline passing through Sardinia (and thus linking up the island with the national grid) are now back on the table. SNAM has also proposed relaunching plans to strengthen the Adriatic corridor for the high-pressure gas network, which successfully went through a consultation at the request of the Energy Authority.

The gas energy hub idea is linked to Italy's ambitions to acquire a key role in geo-economic flows and increase its geopolitical weight in the European balance of power. To this end Italian diplomacy, in conjunction with the main controlled energy company (ENI), has led to the signing of a series of agreements designed to expand fossil fuel projects with various producing countries.

The scale and cost of these for state coffers have not been made public but given the considerable need for investment to launch production in many of these projects and the timeframes involved, there is a high risk that EU decarbonisation targets and the strong downward trend of gas consumption will make many of these stranded assets. The increases in gas exports observed in 2022, in the face of price spikes, also raise the question as to whether the huge public investment in these agreements can be justified by real national energy security needs or whether this is actually a commercial strategy, the purpose of which is to re-export gas to northern Europe, with private risk being absorbed by the public purse.

It should be noted that the argument often made about the investment in gas infrastructure not being at risk of becoming a stranded asset due to its possible future use with hy-

drogen is fallacious. In reality the infrastructure would need to be updated in order to carry hydrogen, and the costs of this are similar to the costs of building new dedicated infrastructure. It is also unlikely that the needs of a hydrogen network in terms of capacity and geographic paths will closely match those of the existing or planned gas infrastructure.

4.1 THE FUTURE ENERGY MIX

Irrespective of the success of this gas-based energy hub project, Italy's real energy mix will actually depend on the choices made by consumers, on energy market design and on private investments including the ones in electricity generation. What is at issue is therefore not, for example, the increase in the share of renewables in end consumption – given the acceleration in renewable plant installation and the statements issued by the Minister for the Environment and Energy Security Gilberto Pichetto Fratin indicating its 2030 targets to install 10-12 GW of new renewable capacity. Neither is the Italian government's commitment to overall decarbonisation of the electricity sector, undertaken on the occasion of the G7 in autumn 2022, in doubt.

The permanence of gas as a fuel used in plants that also offer grid-balancing services will depend significantly on the extent to which other balancing technologies are integrated into the market's rules and are then actually built. These alternative technologies include various types of energy storage and demand response (i.e. participation in grid balancing by electricity users via the flexible use of their consumption devices).

The share of electrical energy produced via coal has already diminished due to gas prices normalising and due to the cost of permits to emit CO₂ disincentivising it. This should bring an end to the anomalous competitiveness of burning coal compared to gas during the crisis. Italy had originally set a deadline of 2025 for the closure of all coal-fired plants even though the electricity TSO's (Terna) analysis highlights criticalities in terms of grid security in doing so within this time frame in Sardinia, a region which has two coal-fired plants, one of which is considerably large. The draft Italian NECP now includes an exception to coal closure for Sardinia.

5

POSSIBLE CONSEQUENCES FOR EU CLIMATE GOALS

In the context of EU climate targets, we can identify both risks and opportunities following the Russian invasion of Ukraine and the energy crisis it triggered.

On the one hand the changed geopolitical context would seem to have crystallised the idea that renewable energy generation offers significant advantages in terms of energy costs and geopolitical independence. In this sense a speeding up of renewable plant installation would seem to be an established “no regrets” strategy across the whole Italian political spectrum. It should however be noted that the **benefits of energy efficiency continue to be underestimated**. The Italian government is still displaying uncertainty over the future of a wide-ranging measure (however badly calibrated) such as the “110% superbonus”, as well as hostility towards European measures regarding efficiency, such as the Energy Performance of Buildings Directive (EPBD). In the absence of adequate measures by the government, it is difficult to see how the significant consumption reduction trends achieved over the last year can be made structural in Italy, with a view of reaching the European energy efficiency and saving targets.

On the other hand, the war and the crisis have brought back into the spotlight a vision of energy security based on the idea that gas has a long-term part to play and that an Italian gas hub in Europe is possible. This has prompted Italy to see the need to break away from Russian gas primarily in terms of replacing the source of gas rather than in consumption reduction terms, a strategy which implies economic, geopolitical, and climate-target-achievement risks. Investing considerable capital in infrastructure and agreements linked to plans for a gas energy hub may serve the purpose of replacing Russian gas in Italy and Europe in the short term, but in the middle and long term its effect is to delay and disincentivise the decarbonisation of the Italian energy and production system, jeopardising the achievement of climate targets. Furthermore, in a European framework which is moving towards a rapid reduction in fossil fuel consumption, such infrastructure and agreements – paid for through public funds – risk not providing a return on the initial investments and becoming stranded assets or even locking in policies inconsistent with the climate targets.

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