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**Energy security in the Mediterranean:
Italy's strategic response post-Russian
invasion of Ukraine**

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À la vie

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INTRODUCTION

The Russian invasion of Ukraine, which began on the 24th of February 2022, has created new geopolitical scenarios and overturned the international equilibrium of recent decades. This turbulent situation has not only raised critical questions about Europe's energy dependence on external sources but also underscored that the European Union, since 2006, has consistently emphasized the importance of diversifying energy suppliers. Despite this longstanding emphasis, some member states, particularly Italy and Germany, did not follow the EU's recommendations.

The crisis has thrust energy into the spotlight, assuming a pivotal role not only in the European context but also resonating significantly in the Mediterranean region.

Unlike the 1973 oil crisis which did not question the role of oil in the energy matrix, today's response involves a much more fundamental transformation of the energy system away from reliance on fossil fuels, which is already underway as a response to the much wider phenomenon of climate change. Indeed, the Russian invasion of Ukraine took place at a crucial moment within a broader process of energy transition and socio-economic transformation driven by the need to reduce emissions of greenhouse gases¹.

The Mediterranean region is currently at a critical juncture. Prime Minister Meloni presented Italy as the natural bridge between Africa and Europe. Italy's strategic aim – outlined in the Mattei Plan – is to connect Europe and Africa, thereby becoming the energy bridge linking Africa to the European market.

Immediate responsiveness is required to address issues such as diversifying energy sources and redefining Europe and Italy's role in the global scenario. Despite the turmoil, the current historical moment presents an opportunity for reassessing the relationship between Europe and its southern counterparts.

In an era marked by geopolitical uncertainties and global conflicts, the nexus between energy security and international crises has become increasingly profound, making collaborative efforts imperative. The Mediterranean, with its inherent risks and yet promising opportunities, demands collective engagement from all stakeholders to foster internal dialogues and forge partnerships with Europe. Italy, relying on its cultural heritage and strategic geographic location, is determined to emphasize the geostrategic

¹ HUGO PASCAL AND VASILE ROTARU, "The Ukraine War and the Energy Transition," *Revue Européenne Du Droit* (Paris: Groupe d'études géopolitiques, 2023).

importance of the region. Through centuries of history, the extended Mediterranean region has the potential to reemerge as a decisive player in shaping Europe's future energy landscape. Italy envisions playing a pivotal role in ensuring stability within this geopolitical arena, striving for a future where the Mediterranean becomes a key driver in shaping Europe's energy security without repeating the patterns of dependence seen in recent crises.

This thesis embarks on a comprehensive journey to unravel the multifaceted aspects of energy security in the Mediterranean, analyzing how Italy aspires to become a Mediterranean energy "hub" thanks to the "Mattei Plan" unveiled by the government to invest in and collaborate with African countries.

The first chapter of this thesis focuses on the immediate aftermath of the Russian invasion of Ukraine and its profound impact on Italy's energy security landscape. Indeed, Italy's unique position in the Mediterranean places it at the heart of a turbulent region that holds critical significance for Europe's energy needs. In order to achieve a comprehensive understanding of Italy's energy security crisis, it is imperative to delve into the broader geopolitical landscape, specifically the Ukrainian conflict and its impact on energy flows. The second chapter takes a closer look at the complex tapestry of Italy's energy security challenges. This includes an in-depth analysis of Italy's energy mix, encompassing oil, natural gas, liquified natural gas, hydropower, and renewable energy sources. The chapter also delves into Italy's energy import sources and the degree of dependence, providing essential background information for comprehending the subsequent chapters.

The third chapter explores the consequences of the Ukrainian crisis on Italy's energy security. This encompasses shifts in the structure of energy supply, price fluctuations, market dynamics, and measures adopted by the Italian government and industries to mitigate the energy security fallout. It also investigates Italy's diplomatic approach, with a focus on the Mattei Plan for Africa and the Mediterranean diplomacy as potential tools in navigating this energy security challenge.

The final chapter is a dedicated case study on Eni, Italy's prominent energy company. It examines Eni's role as a key player in the Italian diversification of supply sources, its strategic responses, and its presence in North Africa, encompassing Algeria, Libya, Tunisia, and Egypt.

Through an in-depth exploration of these chapters, this thesis aims to provide a holistic understanding of Italy's energy security crisis in the Mediterranean region following the Russian invasion of Ukraine. The findings and insights derived from this

research will shed light on the intricacies of energy security in the Mediterranean and the strategic decisions made by Italy in response to the shifting geopolitical landscape.

The programmatic analysis of this thesis has been carried out through the guidance of several research questions, which have been pivotal in assessing this intricate issue:

- What is the current state of Italy's energy security in the aftermath of the Russian invasion of Ukraine?
- To what extent does Italy rely on energy imports, primarily from Russia, and what is the composition of these imports?
- Faced with geopolitical concerns arising from the Ukrainian crisis, what measures has Italy taken to diversify its energy sources?
- How these diversification strategies have been successful, and what obstacles has Italy encountered during their implementation?
- Regarding the development of renewable energy, what policy initiatives has Italy implemented?
- Looking forward, amidst the ever-changing geopolitical scenario and the dynamics of the energy market, what are the anticipated challenges to Italy's energy security in the future?
- And, lastly, what potential scenarios and strategies should Italy consider to guarantee sustainable energy security in the Mediterranean region?

As Italy defines its path toward ensuring energy security in a post-Ukrainian crisis world, this thesis concludes by seeking to address the most important questions concerning the dialogue within the broader Mediterranean area, the African countries, and the best way to make it more effective.

CHAPTER 1

THE ITALIAN ENERGY SECURITY CRISIS IN THE CONTEXT OF THE CURRENT WAR IN UKRAINE

1.1. The energy security amidst uncertainty

A nation's economic and political progress hinges on its ability to access and manage energy resources effectively. Without adequate energy resources for production, domestic consumption, and transportation, no country can achieve industrialization and societal prosperity. Therefore, it is essential for every state to create and maintain conditions that provide access to energy and harness its benefits. This objective is a fundamental component of policy and is closely intertwined with factors that underpin a nation's energy security².

Many countries today heavily rely on energy imports to meet their energy needs, often due to limited domestic resources. Consequently, the energy issue has become intricately linked with a nation's foreign policy, as importing nations must nurture positive international relationships with energy-exporting countries, particularly those supplying natural gas or oil. This involves establishing cooperative models to ensure energy security, making the effectiveness and sustainability of such cooperation a top priority. In this context, energy security takes on significant international dimensions.

Energy security, as defined by the International Energy Agency (IEA), refers to “the uninterrupted availability of reliable energy sources at an affordable price”³. The European Union expands on this definition by incorporating environmental security, aiming for a more resilient Energy Union. Consequently, energy security equates to security of supply. Diversification of supply sources is a fundamental strategy for maintaining an adequate level of energy security, as it reduces the impact of potential disruptions and offers opportunities for supply offsets.

² Energy security falls within the category of public goods provided by each nation. Public goods are those benefits that the population enjoys regardless of their individual preferences and possess a quality of being non-excludable. For more information see Matteo Verda, *Una Politica a Tutto Gas. Sicurezza Energetica Europea e Relazioni Internazionali*, 2011. Bocconi University, 59.”

³ IEA, “Emergency Response and Energy Security”, August 2023.

The concept of energy security can be analyzed under two dimensions, according to the IEA: long-term and short-term. Long-term energy security primarily focuses on timely investments in energy supply to align with economic and environmental needs. Conversely, short-term energy security centers on the ability of the energy system to respond promptly to sudden shifts in the balance between supply and demand. While these definitions share common aspects like ensuring reliability and affordability of energy supply for a nation's security, they often overlook a third critical element: environmental sustainability. Ideally, the energy resources should not harm the environment or the well-being of those who depend on them.

Given the European Union's increasing reliance on third countries for energy supply, the security of energy supply has become a top priority in the development of various national energy policies. Member states have pursued the goal of ensuring a reliable energy supply through different approaches.

Energy security is not an issue of the past but will play a prominent role in the future. Historically, the availability of sufficient supply at reasonable prices has been considered the definition of energy security. However, that straightforward description no longer adequately conveys the reality of the threats the world faces today, which are both more numerous and complex than they were in the past.

The oil crisis in the 1970s spurred significant innovation, giving rise nuclear energy and to today's wind and solar technologies, enhanced vehicle efficiency, and the establishment of new governmental and multilateral institutions to formulate and coordinate energy policies. What now appears as antiquated policies and technologies were once cutting-edge. Similarly, the current crisis has the potential to inspire new ideas and approaches, provided that policymakers fully understand the new realities they confront.

The last two years events have made clear just how intricately linked geopolitics and the energy transition are. Over the past two years, it became evident that certain oil and gas producers were still willing to leverage their energy influence to advance their political and geostrategic objectives. The brutal Russian invasion of Ukraine in February 2022 destroyed hopes that the world had moved beyond this kind of behavior. Following this, Russia progressively reduced its pipeline gas supplies to Europe by almost 75%. This created a crisis that forced European governments to spend 800 billion euros to protect businesses and households from rising energy prices. The initial global response to the

invasion was hindered by the Europe dependence on Russia for energy; for several months, Russian oil flows remained exempt from European sanctions.

At the beginning of the war in Ukraine, the IEA estimated that Russian production would drop by three million barrels per day. Concerns about potential supply disruptions led to an increase in oil prices, enhancing the economic and geopolitical influence of major oil-producing nations, notably Saudi Arabia⁴.

The latter events highlight how the geopolitical landscape can impact the speed and extent of the shift toward clean energy. Prior to the Russian invasion of Ukraine, European countries and the United States made a commitment to change their economies in order to attain net-zero carbon emissions in the upcoming decades. The severity of Russia's actions, coupled with the awareness that these actions were financed by proceeds from fossil fuels, strengthened the determination of many in Europe and the United States to transition away from oil, gas, and coal.

Three primary factors underlie the emerging energy insecurity: the resurgence of great-power competition within a more multipolar and fragmented global system, the endeavors of numerous nations to broaden their supply chains, and the undeniable impacts of climate change. The invasion of Ukraine by Russia and its broader conflict with the West provide a compelling illustration of how the aspirations of a single leader can generate energy insecurity affecting large portions of the world's population.

Since the worldwide pandemic and the invasion of Ukraine, many countries have made efforts to diversify their supply chains, which have contributed to the rise in energy insecurity. These actions make sense in this new geopolitical environment, considering the now apparent risks of overreliance on specific nations, particularly China. However, a globally interconnected energy system remains fundamental to ensuring energy security; markets continue to be the most efficient means of allocating supplies. While greater self-sufficiency could make nations seem more resilient, it can also make them more fragile; An interconnected global market plays a crucial role in mitigating disruptions caused by extreme weather or political instability. More segmented energy markets will inevitably offer fewer options to navigate such circumstances.

Moreover, climate change is poised to become a significant challenge to energy security in the forthcoming decades, introducing risks to both existing and newly developed

⁴ Jason Bordoff and Meghan L. O'Sullivan, "The Age of Energy Insecurity," *Foreign Affairs*, April 10, 2023.

infrastructure. Relying on hydropower, moving fuels, and cooling power plants will become more difficult due to warmer weather and more intense droughts⁵.

In the long term, the shift toward clean energy is expected to enhance energy security by diversifying sources and suppliers. For instance, in a future where about two-thirds of vehicles are electrified, transportation – which presently depends mostly on oil – will be less susceptible to disruptions in the fuel supply since electricity can be produced from a variety of energy sources. Furthermore, as electricity production is typically localized near consumption areas, a more electrified world will also experience reduced exposure to import disruptions caused by disputes between countries.

Nevertheless, new weaknesses and risks to energy security will surface as the shift continues and consumers diversify away from fossil fuels.

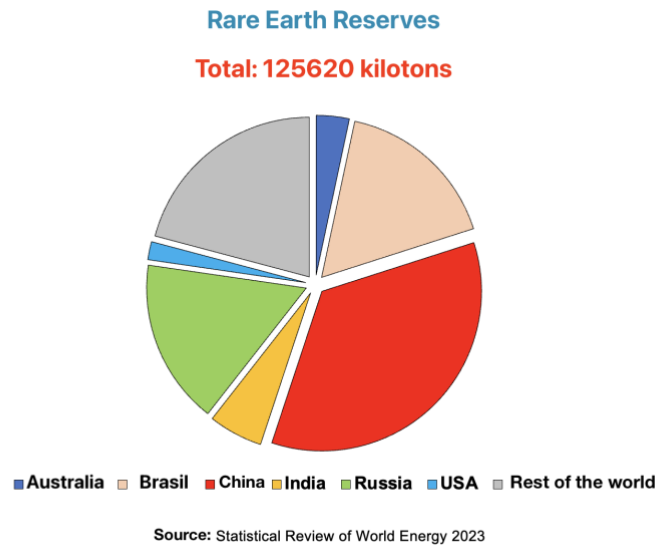
As the world's oil production gets further concentrated in nations that can produce at cheap cost – many of which are in the Persian Gulf – geopolitical concerns may rise even as the world's oil consumption declines.

In the scenario outlined by the IEA, where the world is expected to achieve net-zero carbon emissions by 2050, the portion of the global oil supply provided by OPEC producers is projected to rise from about one-third today to approximately one-half even though with reduce volumes. Based on estimates by the oil company BP, these producers will supply about two thirds of the world's oil supply by 2050, indicating an even higher reliance on them. In the long term, this will constitute a substantial portion of a diminishing resource, but for several decades, oil demand will persist at a high and impactful level, even as annual demand decreases.

In the meantime, it will be considerably harder to diversify the sources of clean energy than it is for fossil fuels. The sources of the necessary components and technology – most notably, the essential minerals for solar panels and batteries – are much more concentrated than those of oil. The top producers of cobalt, the Democratic Republic of the Congo, and rare earths, China, each account for approximately 50% percent of worldwide supply, while Australia is the world's largest provider of lithium, making up around 70% of the global supply. Saudi Arabia, Russia, and the United States, on the other hand, generate the majority of the world's crude oil, accounting for only 10 to 15% of global production.

⁵ Ibidem

Figure 1. Rare Earth Reserves



Source: Statistical Review of World Energy, 2023.

Another sector that requires significant diversification is enriched uranium, a material that will gain increased importance with the global expansion of nuclear power to meet low-carbon electricity demands. The fact that Russia plays a dominant role as a supplier of nuclear fuel services to various countries, including the United States, raises considerable concerns and vulnerabilities in light of the existing geopolitical conditions⁶.

1.2. The evolution of supply strategies in Italy: from past crises to present challenges

The recent events had noticeable effects on European and national economies, leading to inflationary pressures and concerns about energy supply. As a result, energy security has become a focal point in both European and national policies. Ensuring a reliable and sustainable energy supply is vital for economic development, political stability, and the well-being of the population.

The ongoing energy crisis underlines the urgency of transitioning to clean energy, as it can significantly enhance energy security. Italy's energy sector has historically relied heavily on Russia for fossil fuel imports, accounting for a significant portion of the

⁶ Ibidem

nation's energy supply. Natural gas plays a predominant role, making up 42% of Italy's energy consumption. Natural gas also holds a central position in electricity generation, contributing 50% to Italy's total power production.

In the past ten years, Italy has broadened its gas supply routes and sources while enhancing the capacity of existing liquefied natural gas (LNG) and pipeline import infrastructure. This has effectively mitigated the country's significant reliance on Russian gas, bringing it down to approximately 3% of total gas imports by November 2022. By actively reducing the overall demand for natural gas through a swift shift to alternative energy sources and a heightened emphasis on energy efficiency, Italy aims not only to reinforce energy security but also to achieve its emissions reduction objectives⁷.

New commercial agreements for gas procurement with various countries have enabled the redirection of gas supplies and the utilization of various entry points on the Mediterranean Sea, including international pipelines such as Transmed, TAP, GreenStream, and the three LNG terminals. Additionally, Italy has authorized the installation of two new floating LNG units for regasification and gas storage, further reducing reliance on Russian imports.

Safety considerations also warrant the evaluation of expanding the number of LNG terminals. Italy's well-developed infrastructure and geographic position present an opportunity for the country to serve as a "hub" in the Mediterranean, facilitating gas transit to other European countries through strengthened cross-border and internal infrastructures. The flexibility of Italy's gas supply system is further supported by one of the most developed and adaptable storage systems in Europe, providing a crucial resource to meet high consumption in winter period⁸.

The gas system plays a pivotal role in maintaining consistency between the development of renewable energy sources and meeting energy demand in Italy and interconnected European countries, particularly during times of high demand and low renewable energy production. Consequently, the current context underscores the importance of rapidly deploying renewable energy sources to decarbonize the economy and reduce Europe's reliance on non-renewable energy sources. Biomethane development plays a key role in

⁷ IEA. *Italy 2023 - Energy Policy Review*, May 2023.

⁸ Ministero dell'Ambiente e della Sicurezza Energetica, "Piano Nazionale Integrato per l'Energia E Il Clima", June 2023.

achieving these objectives while promoting sustainability and resource circularity through “sector integration”⁹.

Finally, there are plans to replace pipelines that have reached the end of their useful life to modernize the transport network and ensure a more efficient, resilient, and secure infrastructure. These pipelines will be hydrogen-ready, making them suitable for long-term hydrogen transport¹⁰.

The energy crisis stemming from Russia’s invasion of Ukraine holds historical resonance. The use of energy exports as a geopolitical tool has been a concern since the 1970s, becoming prominent during the 1973 oil crisis when certain OPEC member states imposed an oil export embargo. The increase in oil prices and natural gas after the breakout of the war mirrors historical parallels. The strategic decision by Russia to pursue geopolitical goals in an ongoing armed conflict significantly contributes to the current situation.

In contrast to the response to the 1973 crisis, which did not challenge the role of oil, the current response calls for a profound overhaul of the energy system, shifting away from fossil fuels. This energy crisis can be seen as a clash between two competing socio-technical frameworks: one rooted in fossil fuel technologies and the other founded on low-carbon alternatives¹¹.

In the 1970s, ensuring energy security involved not only reducing energy consumption but also diversifying crude oil sources and developing the natural gas industry. The Italian government simultaneously pursued an ambitious strategy aiming at developing an ambitious plan for new nuclear power plants complex. Following the Iranian crisis of 1979-1980, which led to a surge in oil prices, efforts to enhance supply security intensified. This included amplifying the role of the gas sector, establishing import agreements as a substitute for oil in power generation and civilian use, alongside the continuation of the nuclear power plant construction program. However, a series of events

⁹ Sector integration will make it easier to optimize and modernize the EU’s energy system as a whole. Sector integration means linking the various energy carriers - electricity, heat, cold, gas, solid and liquid fuels - with each other and with the end-use sectors, such as buildings, transport, or industry.

Sector integration, on its own, is not a standalone solution but rather a highly effective method for achieving climate and energy objectives in a cost-effective manner. This is achieved through the utilization of existing infrastructure and the promotion of cross-sectoral interactions. The primary goal is centered on the decarbonization of the energy system, which facilitates the integration of renewable resources and enhances overall efficiencies. In doing so, it significantly contributes to making the transition to a low-carbon energy system more economically viable and socially acceptable.

¹⁰ Ministero dell’Ambiente e della Sicurezza Energetica, “Piano Nazionale Integrato per l’Energia E Il Clima” June 2023.

¹¹ Jorge E. Viñuales, The Ukraine war and the energy transition, Jun 2023.

in the 1980s, such as the Chernobyl nuclear power plant accident, prompted a reevaluation of supply security. This led to the abandonment of the nuclear power program in Italy, after the referendum in the following year¹².

During the 2000s, Italy adopted various strategies inspired by the European Union's energy policy frameworks to address the challenge of ensuring energy supply security. Notably, the European Union expressed concerns about the stability of gas supplies from Russia, largely due to Russia's conduct regarding Ukraine.

Therefore, revisiting earlier decades, the oil crises of 1973 and 1979 raised substantial concerns about energy security in European countries, including Italy. In response, policies were implemented to enhance energy efficiency and expand the range of available energy sources. While there was an initial focus on developing the nuclear sector, this was eventually abandoned in 1987. Subsequently, Italy shifted its attention to the natural gas sector. Over the last decade, energy plans concentrated on developing renewable energy sources in alignment with the overarching policy goal of improving security of supply, enhancing energy efficiency, and promoting renewable energy.

1.3. Energy security strategies and policies in Italy

A country, such as Italy, that heavily relies on importing substantial quantities of energy resources must establish relationships with exporting countries that are not only highly dependable but also characterized by stable and harmonious international relations. This reliability hinges on the exporting country's ability to ensure a consistent and long-term supply of the traded energy resource. For instance, the bilateral natural gas trade between Italy and Russia till February 2022. From a foreign policy perspective, before the Russian invasion of Ukraine in 2022, the relationship between these two countries has consistently been amicable, allowing Italy to import natural gas uninterruptedly since 1974, initially from the Soviet Union and subsequently from Russia. Moreover, Russia's substantial and continually growing natural gas reserves, which totaled 37.4 trillion cubic meter in 2020, compared to 34.1 trillion cubic meter in 2010, bolster its reputation as a reliable natural gas exporter¹³. Reliability ranks as the foremost attribute sought by countries that import natural gas. However, in terms of the affordability of natural gas, the matter becomes more complex compared to oil. Natural

¹² ANDREA BONELLI, "35 Anni Dopo Il Disastro Di Chernobyl," *Europa Atlantica*, May 4, 2021.

¹³ BP, *Statistical Review of World Energy 2021*, July 2021.

gas is not traded on the international market to the same extent as oil due to limitations on its transportation, which predominantly occurs through pipelines—a costly infrastructure connecting the two involved countries and necessitating long-term purchase and sale contracts to remunerate the investments made in pipeline construction. Alternatively, natural gas can be transported in liquefied form via special ships by sea. This liquefied natural gas (LNG) transportation differs from the shipment of oil barrels by sea, as it requires both liquefaction facilities at the departure port and regasification plants, which demand also substantial investments.

Italy's primary source of natural gas supply is through pipeline transmission, although liquefied natural gas (LNG) imports also play a role.

When comparing the years 2017, representing a scenario before the Russian invasion of Ukraine, and 2022, a period marked by the aftermath of the conflict, it is evident that in the pre-invasion scenario of 2017, Italy's total natural gas imports amounted to 69.7 billion cubic meters (Gmc)¹⁴. Of this total, 62 Gmc were received through pipeline transport, representing 88.95% of the overall imported natural gas¹⁵, while the remaining 7.7 Gmc arrived in the form of LNG, constituting 11.05% of the total imports.¹⁶ By contrast, in 2022, so after the conflict broke out, Italy's total natural gas imports amounted to 72.6 billion cubic meters (Gmc)¹⁷. Of this total, 57.5 Gmc were received through pipeline¹⁸, while the remaining 15.1 Gmc arrived in the form of LNG¹⁹.

¹⁴ Eni. “*World Gas and Renewables Review 2018*”, 38, 2018

¹⁵ Eni. “*World Gas and Renewables Review 2018*”, 40, 2018

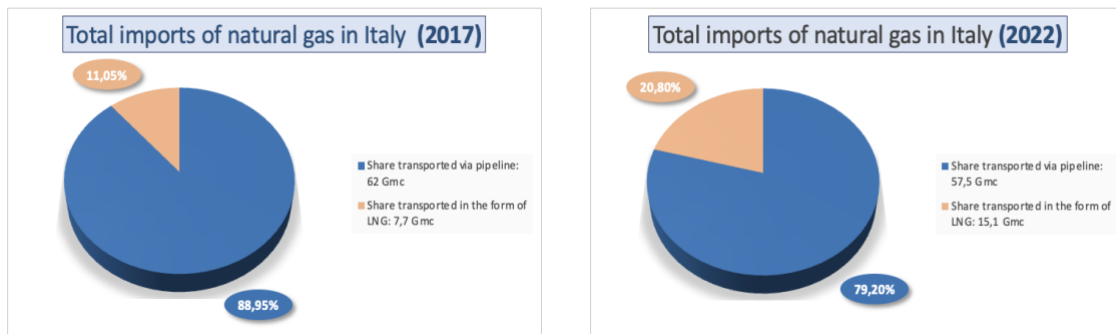
¹⁶ Eni. “*World Gas and Renewables Review 2018*”, 42, 2018

¹⁷ Eni. “*World Energy Review 2023*”, 166, 2023

¹⁸ Eni. “*World Energy Review 2023*”, 168, 2023

¹⁹ Eni. “*World Energy Review 2023*”, 170, 2023

Figure 2. Natural Gas Imports in Italy: 2017 vs. 2022



Source: Data extracted from “Eni: World Gas and Renewables Review 2018” and “Eni World Energy Review 2023”.

The data reveals that in 2022, despite the challenging geopolitical situation resulting from the conflict following the Russian invasion of Ukraine, Italy managed to increase its total natural gas imports compared to the pre-invasion scenario in 2017. This suggests that Italy adapted to the changing circumstances by securing alternative sources and supply routes to meet its natural gas needs, particularly by increasing LNG imports through negotiated agreements, notably with Algeria and the United States. The ability to maintain and even expand natural gas imports demonstrates Italy’s resilience and adaptability in ensuring its energy security, even in complex international environments.

The TAG (Trans Austria Gas) pipeline supplies Italy with Russian gas passing through Ukraine, Slovakia, and Austria before entering Italy near Tarvisio²⁰. Notably, the TAG pipeline presently stands as the exclusive means through which Russian gas is conveyed to Italy, and as a consequence of the abandonment of the South Stream project in 2014 such situation is expected to persist in the foreseeable future.

Italy’s energy landscape further includes the importation of natural gas through two distinct pipelines originating in North Africa. Libyan natural gas is delivered to Italy via the Greenstream pipeline, an underwater conduit that spans the Mediterranean Sea, ultimately connecting to the entry point located in Gela, situated in the province of Caltanissetta. This particular pipeline boasts an extensive length of 520 kilometers, ranking as the most extensive pipeline within the Mediterranean Sea. In contrast, Algerian gas reaches Italy through the Transmed pipeline, which traverses the territory of Tunisia

²⁰ FLAVIA MASCI, “L’Origine Geografica Del Gas Importato in Italia,” April 15, 2022.

and subsequently crosses a submarine segment across the Mediterranean Sea, ultimately arriving at the entry point situated in Mazara del Vallo, in the province of Trapani²¹.

Additionally, Italy bolsters its natural gas supply through resources extracted from the North Sea, located in the territorial domains of Norway and the Netherlands. The delivery of this natural gas to Italy is facilitated through the Transgas pipeline, which seamlessly integrates with the national infrastructure network at the entry point located within the Gries Pass, positioned in the province of Verbano-Cusio-Ossola²².

Concerning liquefied natural gas (LNG), Italy is equipped with four operational LNG regasification plants. These facilities predominantly receive LNG shipments via sea routes, primarily originating from Qatar and Algeria, with supplementary imports, albeit to a lesser extent, sourced from the United States.

The Adriatic LNG Terminal marks a pioneering offshore Gravity Based Structure (GBS) designed for unloading, storing, and regasifying Liquefied Natural Gas (LNG). Situated in the northern Adriatic Sea, off Porto Levante, this facility provides a regasification capacity of 8 bcm cubic meters of natural gas annually, contributing to approximately 10% of Italy's current natural gas needs. This terminal holds strategic significance for Italy as it establishes a new, fully independent natural gas supply route, distinct from pipelines. It represents a significant stride toward diversifying and securing energy supplies.²³

Moreover, there is an offshore regasification facility situated in the Tyrrhenian Sea, off the coastline between Livorno and Pisa. This facility is a converted liquefied natural gas (LNG) ship that has been adapted and permanently moored to the seabed. Operational since 2013, it continuously injects gas into the grid, boasting an annual processing capacity of 3.75 bcm cubic meters²⁴.

The third regasifier in operation is an onshore facility situated in Panigaglia, in the province of La Spezia. The latter has a processing capacity of 3.5 bcm of gas annually²⁵. The last July, the Piombino regasifier officially went into operation, thus kicking off the actual commercial phase for the Golar Tundra. The regasification ship, with a capacity of 5 bcm per year, will be able to contribute 6.5% of the domestic energy demand on its

²¹ Ibidem

²² Ibidem

²³ Edison, "Rigassificatore Di Rovigo".

²⁴ Il Post, "E I Rigassificatori?," February 11, 2023.

²⁵ Ibidem

own, bringing Italian capacity to more than 25% of demand²⁶. In this regard, Snam’s Chief Commercial and Regulatory Officer, affirmed “Thanks to the medium-term interventions put in place to strengthen the national infrastructure system, we have achieved excellent results on the Piombino regasifier whose regasification capacity has been sold at 100% for the current year, 95% for the next two years and 86% for the next 20 years”²⁷.

In Ravenna, however, the installation of the regasifier ship, the BW Singapore, which has also been acquired by Snam, has yet to begin. The construction site is forthcoming. In contrast to the scenario in Piombino, the ship in Ravenna will be positioned close the Petra platform, situated at sea, approximately 8.5 kilometers from the coastline²⁸.

Figure 3. National gas network map and main entry points



Source: Ministero dell’ Ambiente e della Sicurezza Energetica, Piano Nazionale Integrato per l’Energia E Il Clima, 2023.

In this sense, diversifying import routes aims to boost the country’s energy security while elevating Italy’s strategic significance in Europe, positioning Italy as the lead entry point

²⁶ Wired, “Il Rigassificatore Di Piombino è Pronto a Partire,” Wired Italia, June 29, 2023.

²⁷ La Stampa, “Snam, Rigassificatore Di Piombino: Assegnato Oltre l’86% Di Capacità,” October 12, 2023.

²⁸ Wired, “Il Rigassificatore Di Piombino è Pronto a Partire,” Wired Italia, June 29, 2023.

for natural gas in southern Europe. Italy has always relied on its strategic location at the center of the Mediterranean and its favorable relationships with major natural gas suppliers, particularly Russia and Algeria²⁹. Nevertheless, the abandonment of the South Stream project – a collaborative effort between Russia’s Gazprom and Italy’s Eni to build a pipeline traversing the Black Sea to Bulgaria and continuing through the Balkans and through to Italy – undeniably would have hindered Italy’s pursuit of becoming the primary natural gas entry point for Southern Europe.

Having multiple natural gas suppliers is a key factor in boosting a country’s energy security. This provides a layer of protection for the country in case of disruptions in natural gas supply from the main supplier. Furthermore, the construction of regasification facilities – which allow natural gas to be imported via pipeline and liquefied form – is an effective way to enhance energy security. Enhancing a country’s energy security requires strategic reserves of natural gas stored within the country to compensate for fluctuations in consumption and ensure a strategic reserve within the national gas system³⁰. In a country with limited natural resources, such as Italy, the strategic reserves of natural gas are of great importance: they guarantee the satisfaction of the country’s energy needs for a certain period of time in the event of temporary interruptions in the supply of gas to the country, which is crucial. Storage sites in Italy are mainly located in Lombardy, Emilia Romagna, and Veneto, but there are also two storage plants in Abruzzo and one in Basilicata.

Figure 4. List of natural gas storage centers in Italy

Id	Nome centrale	N. pozzi	Minerale	Comune	Provincia	Regione	Operatore	Longitudine	Latitudine	Area (m ²)
101	CELLINO	23	Gas	CELLINO ATTANASIO	Teramo	ABRUZZO	EDISON STOCCAGGIO	13,869178	42,612249	6.880
107	FIUME TRESTE STOCCAGGIO	110	Olio/Gas	CUPELLO	Chieti	ABRUZZO	STOGIT	14,699567	42,022206	104.150
31	GROTTOLE FERRANDINA	15	Olio	SALANDRA	Matera	BASILICATA	GEOGASTOCK	16,356769	40,579972	16.000
103	ALFONSINE STOCCAGGIO	12	Olio/Gas	ALFONSINE	Ravenna	EMILIA ROMAGNA	STOGIT	11,986471	44,532432	6.130
106	CORTEMAGGIORE STOCCAGGIO	57	Olio/Gas	CORTEMAGGIORE	Piacenza	EMILIA ROMAGNA	STOGIT	9,959758	44,998825	78.120
108	MINERBIO STOCCAGGIO	57	Olio/Gas	MINERBIO	Bologna	EMILIA ROMAGNA	STOGIT	11,498458	44,609217	44.585
110	SABBIONCELLO STOCCAGGIO	37	Olio/Gas	TRESIGALLO	Ferrara	EMILIA ROMAGNA	STOGIT	11,899622	44,798986	62.300
115	SAN POTITO E COTIGNOLA	18	Gas	BAGNACAVALLO	Ravenna	EMILIA ROMAGNA	EDISON STOCCAGGIO	11,947643	44,419917	41.946
16	CORNEGLIANO LAUDENSE	14		CORNEGLIANO LAUDENSE	Lodi	LOMBARDIA	ITAL GAS STORAGE	9,461946	45,286726	6.900
104	BORDOLANO STOCCAGGIO	10	Olio/Gas	BORDOLANO	Cremona	LOMBARDIA	STOGIT	9,980156	45,287448	10.810
105	BRUGHERIO STOCCAGGIO	9	Olio/Gas	CINISELLO BALSAMO	Milano	LOMBARDIA	STOGIT	9,233198	45,563219	15.000
109	RIPALTA STOCCAGGIO	40	Olio/Gas	RIPALTA GUERINA	Cremona	LOMBARDIA	STOGIT	9,700819	45,311656	36.590
111	SERGNANO STOCCAGGIO	38	Olio/Gas	SERGNANO	Cremona	LOMBARDIA	STOGIT	9,689169	45,4272	18.675
112	SETTALA STOCCAGGIO	38	Olio/Gas	SETTALA	Milano	LOMBARDIA	STOGIT	9,403481	45,450144	66.990
102	COLLALTO	21	Gas	COLFOSCO DI SUSEGANA	Treviso	VENETO	EDISON STOCCAGGIO	12,189111	45,851602	14.739

Source: Ministero dell’Ambiente e della Sicurezza Energetica, Elenco delle centrali di stoccaggio di gas naturale.

²⁹ CARLO FRAPPI, MATTEO VERDA, ANTONIO VILLAFRANCA, *Monitoraggio della sicurezza energetica italiana ed europea*, “Sicurezza Energetica”, n. 1, gennaio/marzo 2010, 9

³⁰ Ministero dell’Ambiente E Della Sicurezza Energetica. “Gas Naturale – Stoccaggio”

As a definitive step to enhance Italian energy security and contribute to the stability of the European energy system in view of a dynamic future, the government led by Giorgia Meloni has taken a distinctive approach to address issues related to the Southern Mediterranean. Indeed, since taking office in October 2022, the Prime Minister Meloni has undertaken numerous visits to North Africa, engaging in diplomatic initiatives aimed at revitalizing Italian policies in the region.³¹

1.4. Advancing Towards 2030: Italy's PNIEC initiatives to achieve EU climate goals

Italy aligns itself with the European Union's overarching objective of intensifying efforts toward the decarbonization of European energy and economic frameworks. The ultimate goal is to position Europe as the first regional entity to achieve comprehensive net-zero emissions across social, economic, and productive dimensions, showcasing leadership globally and setting an example for other world economies.

Nevertheless, it is essential to recognize that embarking on this trajectory is extremely complicated. Rather, it requires a comprehensive array of measures to stimulate the utilization of all available technologies, behaviors, and energy sources capable of effecting decarbonization within the national economy. These measures must be adaptable, tailored to accommodate the distinct requirements of various productive, economic, and social spheres.

Recent events, including the global pandemic, the conflict in Ukraine, and the significant surge in energy prices, underscore the fragility of interdependence within energy and economic systems. This emphasizes that the imperative for decarbonization, which has been further accentuated by the ongoing climate change – especially evident in Mediterranean regions – must also consider factors of resilience.

A meticulous examination of the emissions scenarios and the attainment of the global and sector-specific targets for the year 2030 within the framework of the PNIEC 2023³²,

³¹ ALISSA PAVIA AND KARIM MEZRAN, "Giorgia Meloni's Foreign Policy and the Mattei Plan for Africa," IAI - Istituto Affari Internazionali, July 26, 2023.

³² PNIEC stands for "Piano Nazionale Integrato per l'Energia e il Clima" in Italian, which translates to "integrated National Energy and Climate Plan" in English. It is a strategic plan developed by Italy in accordance with the European Union's climate and energy framework. The PNIEC outlines Italy's objectives and strategies for reducing greenhouse gas emissions, improving energy efficiency, and transitioning to more sustainable and renewable energy sources in order to meet its climate and energy goals.

reveals a considerable disparity in their realization. This variance can be attributed to several factors, primarily the ambitious nature of these targets in relation to the practical feasibility of achieving them within the constraints of investment and implementation timelines. Additionally, impediments related to the authorization processes for establishing new renewable energy facilities have posed significant challenges and recent economic crises have further contributed to a deceleration of activities, exacerbating the discrepancy.

A heightened level of commitment is imperative to meet the new emission reduction targets established at the European Union level for 2030. These objectives must be formulated pragmatically, ensuring their effective feasibility and attainability.

In the pursuit of updating the PNIEC, Italy endeavors to capitalize on the substantial benefits inherent in the widespread implementation of renewable energy and energy efficiency technologies. These advantages encompass a reduction in air pollution and greenhouse gas emissions, enhancements in energy security, and increasing benefits for both households and businesses. Italy remains resolute in its commitment to advancing along this trajectory by diversifying the available technological solutions for decarbonization and making additional investments in the development and transfer of emerging energy technologies to the private sector.

The update of the PNIEC not only serves as an opportunity to recalibrate the system based on past years' experiences but also offers a chance to bolster its supply security and reinforce its central position at both Mediterranean and European levels. Italy is urged to expedite and fortify its ongoing efforts to evolve into an "energy hub" for both transit and generation. This strategic move positions Italy to gain advantages such as diversification, security, and supply liquidity, opening doors for stronger partnerships with supplier countries. Italy's historical efficiency among European nations, largely attributed to the implementation of policies in response to heightened energy costs and crises, provides a solid foundation for this endeavor.

The challenge of meeting the new 2030 targets is undeniably intricate. While the path to complete decarbonization of the economy is well-charted and presents a valuable opportunity, the trajectory set for 2030 in the European context involves highly ambitious targets, recently elevated through initiatives like the REPowerEU³³ and the Fit For 55

³³ The RePowerEU plan proposed by the European Commission outlines several measures to attain energy independence way before 2030. The aim is to reduce gas imports from Russia by up to two-thirds by the year's end and eventually enhance the energy system's resilience. The plan is primarily based on

Package³⁴. Italy confronts exceptionally ambitious targets, particularly considering the starting point of our country. Similarly, the PNIEC developed by Italy in 2023 has outlined highly ambitious sectoral and global targets, often surpassing mandatory goals. The present context has significantly changed compared to the period of 2019-2020, when the initial plan was formulated. Notably, at the European level, energy security and the acceleration of the decarbonization process have emerged as increasingly relevant dimensions. This shift is underscored by the extraordinary investment plans initiated by the European Union through the National Recovery and Resilience Plan (NRRP also known as PNRR in Italian³⁵), aimed at revitalizing the post-COVID-19 economy and addressing the repercussions of Russia's conflict in Ukraine. Moreover, the strategies aimed at ensuring the sustainability of this transition, particularly concerning the scale of necessary investments, are intricately connected to the choice of the mix of technologies that will be implemented.

The complex geopolitical circumstances affecting Europe, primarily arising from a conflict disrupting natural gas supply routes to Europe, involving what was formerly the European Union's primary supplier, prompted the European Council to endorse the proposed Plan. This regulation aims to fortify the security of Europe's energy supply by diminishing reliance on Russian energy resources and initiating actions within the new RePowerEU Plan. The primary objectives are twofold: firstly, to enhance the resilience, security, and sustainability of the European energy system by rapidly establishing new LNG supply infrastructure through the deployment of floating regasification and storage units; secondly, to expedite the development of renewable energy sources, energy efficiency measures, and energy storage capabilities.

The notable surge in energy prices witnessed since the latter half of 2021, further exacerbated by the Russian-Ukrainian conflict and inadequacies in market operations, has provided a compelling impetus to accelerate the execution of the European Green Deal³⁶

two pillars. The primary objective is to diversify gas supply, which involves boosting LNG imports and sourcing from non-Russian pipeline suppliers. Additionally, there is a focus on increasing the production and importation of biomethane and renewable hydrogen. The second pillar aims to swiftly reduce the utilization of fossil fuels in construction, which includes housing and industry, as well as across the energy system generally. This will be achieved through enhancements in energy efficiency, increased use of renewable energy sources, and electrification.

³⁴ On July 14, the European Commission adopted the climate package "Fit For 55", which proposes legislative proposals to achieve the Green Deal targets by 2030. Specifically, the reduction of greenhouse gas emissions by 55% from 1990 levels, with the goal of achieving "carbon neutrality" by 2050.

³⁵ In Italian the acronym of NRRP is PNRR that is Piano Nazionale di Ripresa e Resilienza.

³⁶ The European Green Deal is a package of policy initiatives that aims to set the EU on the path to a green transition, with the ultimate goal of achieving climate neutrality by 2050.

and reinforce the resilience of the Energy Union by expediting the transition process. While the crisis has expedited certain processes and introduced new tools, available resources, and reforms (such as those seen in the PNRR and RepowerEU plan), it has also ushered in a complex macroeconomic scenario characterized by inflation, supply chain bottlenecks, and labor shortages. These challenges underscore the limitations of over-accelerating infrastructure projects.

The medium-term development of a number of physical infrastructures including enhanced interconnections, network resilience, large-scale energy storage, and carbon capture and storage systems, will be essential for ensuring the stability of the energy system. Implementing these infrastructures will unavoidably require an accelerated authorization timeframe.

For instance, a notable illustration of this imperative is the swift authorization, achieved within six months, for two new floating regasification and gas storage units. This accelerated approval not only facilitates the stabilization of the gas system within a two-year timeframe, even in the absence of Russian gas but also sets a significant precedent. This approach, characterized by rapid authorization and the prevention of potential stranded costs during the final phases of decarbonization, should be the standard rather than an exception. This is particularly crucial in scenarios such as the establishment of wind farms and water storage facilities for energy storage, where without such prompt authorization, the path toward decarbonization would remain unattainable.³⁷.

1.5. Italy's evolving energy landscape: geopolitical implications, Italian initiatives, and the role of Africa in energy security amidst the Russian invasion of Ukraine

The pursuit of energy in Europe carries significant implications for geopolitical alliances, energy stability in developing and emerging nations, and the global pursuit of the climate goals outlined in the Paris Agreement (Paris, December 2015). One outcome of the conflict is the renewed strategic importance of the Mediterranean and African regions, which are now seen as crucial to the European Union's energy security. However, Europe's quest for natural gas supplies might jeopardize its previous endeavors to nurture eco-friendly collaborations with its southern neighbors. In fact, such a situation could prompt a shift in the balance of energy security within the European Union, with

³⁷ Ministero dell'Ambiente e della Sicurezza Energetica, "Piano Nazionale Integrato per l'Energia E Il Clima" June 2023.

southern member countries like Italy and Spain competing to emerge as new gas distribution hubs, thereby redirecting Europe's energy security focus from the East to the South. Concurrently, we witness a strengthening of fossil fuel connections between Europe and the United States. Since June 2022, the United States has been exporting more gas to Europe than Russia³⁸.

In the wake of the Draghi administration, the Meloni government is intensifying meetings and agreements to source gas from other countries in order to replace Russian gas. Indeed, in the aftermath of Russia's invasion of Ukraine, there have been numerous diplomatic missions to natural gas-exporting countries. These missions aimed to swiftly secure agreements for the supply of additional gas volumes, both through pipelines and liquefied natural gas (LNG). The primary objectives were to replenish storage facilities in anticipation of the winter season and to enhance the diversity of gas supply sources. Notably, Italy succeeded in increasing its gas imports via existing pipelines, particularly from Algeria starting in 2022 and from Azerbaijan through the Trans-Adriatic Pipeline (TAP). Italy also managed to secure new LNG shipments from countries like Egypt, Qatar, and Congo³⁹. Additionally, ongoing negotiations may result in the acquisition of additional gas volumes from Angola, Nigeria, Mozambique, Libya, and United States. While these countries each face their own challenges, whether domestic or international, historical and situational, collectively, they offer the prospect of diversifying sources and supply routes, thereby avoiding the emergence of new dependencies. Notably, unlike Russia, these countries do not employ energy as a tool of influence, and they lack the means to do so⁴⁰.

In 2022, the former Italian Ministry of the Ecological Transition announced that new natural gas agreements and political commitments will result in an additional amount of 7.5 billion cubic meters (bcm) in the second half of 2022, 16.8 bcm in 2023, 21.4 bcm in 2024, and 24.6 bcm in 2025⁴¹.

³⁸ PICCIARIELLO, ANGELA, OLIVIER BOIS VON KURSK, GREG MUTTITT, MOHAMED ADOW, ANDREAS GOLDTHAU, DIALA HAWILA, THIJS VAN DE GRAAF, ET AL. "The War in Ukraine and the Geopolitics of Energy Transitions." *Navigating Energy Transitions: Mapping the Road to 1.5°C*. International Institute for Sustainable Development (IISD), October 2022.

³⁹ DI CASTELNUOVO, MATTEO, AND ANDREA BIANCARDI. "Italy's Energy Future at a Crossroads." ISPI, November 23, 2022.

⁴⁰ COMITATO PARLAMENTARE PER LA SICUREZZA DELLA REPUBBLICA. XVIII Legislatura, "Relazione sulle conseguenze del conflitto tra Russia e Ucraina nell'ambito della sicurezza energetica", Doc. XXXIV n.9, April 27, 2022.

⁴¹ DI CASTELNUOVO, MATTEO, AND ANDREA BIANCARDI. "Italy's Energy Future at a Crossroads." ISPI, November 23, 2022.

Therefore, looking toward the African continent as a solution to reduce reliance on Russian energy can be seen as a necessary step, presenting both challenges and opportunities for Italy and, consequently, for Europe. It is essential to emphasize that this approach requires a well-defined Italian and European strategy toward Africa, founded on a partnership model that ensures stability, peace, and development for the supplier nations and the transportation routes. It should be acknowledged that without such a strategy, the transition from dependence on Russia as the primary supplier to the uncertainties of African supply, particularly in the presence of Russia, China, and Türkiye's involvement in Africa today, could be problematic⁴².

Overall, Italy has taken several emergency measures in response to the current energy crisis, but this does not mean that Italy has fully resolved its energy challenges. The efforts to secure new and diverse sources of gas supply carry certain risks. For instance, Algeria, despite its history as a gas supplier, is not a guarantee for the future due to its authoritarian governance and heavy reliance on fossil fuel revenues. According to the World Bank, approximately 90% of Algeria's export revenues come from fossil fuels, with Europe being its primary market. Furthermore, there are significant geopolitical uncertainties associated with other countries from which Italy imports gas, including Libya, Azerbaijan, Qatar, and to some extent, Türkiye as a transit nation⁴³.

Despite Europe's efforts to diversify its sources of gas, supply security remains a concern. For instance, in late 2021, the Maghreb-Europe gas pipeline was closed due to a diplomatic dispute between Algeria and Morocco. A few months later, Algeria threatened to halt gas supplies to Spain if Spain re-exported the gas to Morocco. In September 2022, conflict broke out between Azerbaijan and Armenia, complicating the EU's plans to increase its imports of Azerbaijani gas. Several current or potential gas-exporting nations in Africa are grappling with internal stability issues, notably Mozambique, where the major oil company TotalEnergies SE had to evacuate its staff from an LNG project in 2021 due to the deteriorating security situation⁴⁴.

In this context, Africa offers an attractive alternative for both Europe, allowing it to reestablish the Mediterranean as a pivotal region for its prosperity, and for Italy, which,

⁴² Ibidem

⁴³ DI CASTELNUOVO, MATTEO, AND ANDREA BIANCARDI. "ITALY'S ENERGY FUTURE AT A CROSSROADS." ISPI, NOVEMBER 23, 2022.

⁴⁴ PICCIARIELLO, ANGELA, OLIVIER BOIS VON KURSK, GREG MUTTITT, MOHAMED ADOW, ANDREAS GOLDTHAU, DIALA HAWILA, THIJS VAN DE GRAAF, ET AL. "The War in Ukraine and the Geopolitics of Energy Transitions." *Navigating Energy Transitions: Mapping the Road to 1.5°C*. International Institute for Sustainable Development (IISD), 2022.

due to its inherent qualities of historical significance, geographical location, and access to gas resources through the Italian company like ENI, holds a unique position. The position of ENI connects Italy to countries like Algeria, Libya, and Azerbaijan, as well as Egypt, Qatar, Congo, Mozambique, Angola, and Nigeria. This abundance of connections provides Italy with a distinct advantage and positions the nation as a key player in the quest for Western European countries for energy supply, particularly as a Mediterranean and European focal point, allowing Italy to assert itself as an “energy hub.”

1.6. The picture of Italy’s energy sector at the outbreak of the Russian invasion of Ukraine

Before the Russian invasion of Ukraine, natural gas was the main import from Russia into the Italian energy industry. In 2021, Italy imported 72.6 bcm of natural gas, about 40% of which came from Russia. Italy is one of the EU members that has historically imported remarkable volumes of natural gas from Russia but is far less dependent on Russian coal and oil. In 2021, 5.7 million tons of oil (10% of the total 57 million tons imported) and 193,000 tons of Russian coal (2% of national imports) were imported⁴⁵.

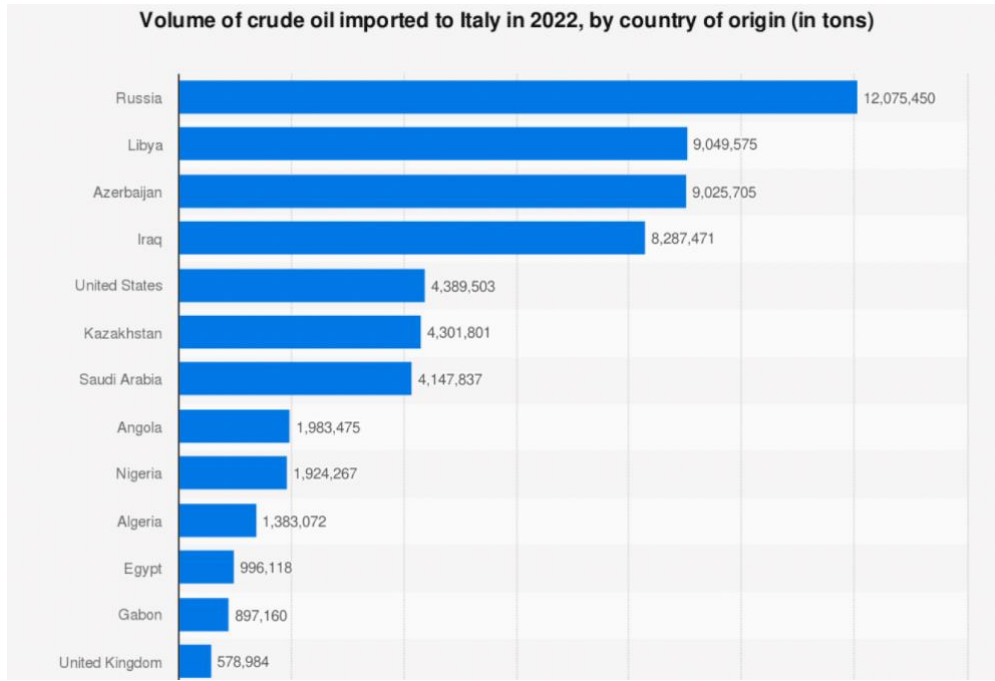
In 2022, Italy imported 72.4 bcm of natural gas, with 19% of this gas coming from Russia. Despite the overall natural gas imports remaining nearly the same, Italy’s reliance on Russian gas has decreased by half due to the increased supply from other countries through existing infrastructure. Comparatively, Italy’s domestic gas production remained around 3.3 bcm, while exports surged to 4.6 bcm in 2022 from 1.5 bcm in 2021, representing a notable increase of over 4 bcm from the 2019 levels, which were as low as 0.3 billion sm³. This is a significant observation as it indicates that Italy purchased more gas than required during a period of high gas prices and subsequently re-exported it.

Regarding petroleum, Italy imported a total of 62.5 million tons (Mt) of crude oil in 2022, a 9% increase from the 57 Mt in 2021, with the proportion sourced from Russia growing from 10% to 19%. In absolute terms, Russian crude oil imports more than doubled from 5.7 to 12 million tons. The total import volume for 2022 closely aligned with pre-

⁴⁵ FRANCESCA ANDREOLLI ET AL., “Energy without Russia the Consequences of the Ukraine War and the EU Sanctions on the Energy Sector in Europe,” August 28, 2023.

pandemic levels, with crude oil imports at 63.2 Mt, and Russian imports accounting for 14% of this total⁴⁶.

Figure 5. Volume of crude oil imported to Italy in 2022, by country of origin (in tons)



Source: Unione Energie per la Mobilità, 2023.

Over time, Italy's imports of crude oil have generally declined and reached 57 million metric tons by 2021. Despite this trend, Italy continues to heavily rely on fossil fuel imports. For instance, in 2020, Italy had a petroleum dependency rate of nearly 92% and a natural gas dependency rate of approximately 94%.

In terms of petroleum derivatives, both semi-finished and finished products, a slight increase is observed when comparing 2021 and 2022, rising from 14.8 Mt to 15.3 Mt, marking a 3.3% increase. This is coupled with a reduction in reliance on Russian imports, dropping from 17.6% in 2021 to 13.7% in 2022. Italy's total consumption of petroleum products in 2022 was 58.4 Mt, a growth from 55.4 Mt in 2021. The majority of this consumption was attributed to the transportation sector, accounting for 67% of the total, as opposed to 61% in 2021⁴⁷.

⁴⁶ Ibidem

⁴⁷ Ibidem

As for solid fossil fuels such as coal and petroleum coke, there was a notable increase in imports from 9.5 to 13.1 Mt from 2021 to 2022. This was partly driven by the greater utilization of coal for power generation as a partial substitute for gas, particularly when gas prices were excessively high. In this context, imports from Russia, which were already low, further decreased from 193.000 tons to approximately 100.000 tons.⁴⁸ As observed regarding Italian gas imports in 2021, approximately 40% originated from Russia. Consequently, it can be inferred that if the Russian gas share of imports is evenly distributed among the industrial sectors utilizing it, at least one-fifth of the electricity consumed in Italy in 2021 can be attributed to Russian gas. In 2022, the percentage decreases to around one-tenth, due to the reduced volume of Russian gas imports compared to the overall imports⁴⁹.

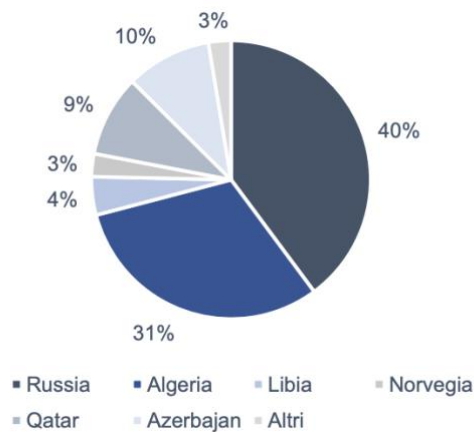
According to data from 2021, Italy's energy mix primarily consists of fossil sources, making up more than 80% of the total mix. These sources include gas at 42% and oil at 36%, with coal contributing a smaller 4%. In contrast, green energy sources make up 18% of the mix, divided into 11% from renewables like photovoltaic and wind power, and 7% from hydroelectric generation.

Shifting focus to 2021 data, when examining the consumption of oil in Italy, it's noteworthy that only 8% of the oil used is domestically produced, while the majority is imported. These imports come from various sources, with 21% originating from Azerbaijan, 17% from Libya, 13% from Iraq, 9% from Russia, 9% from Saudi Arabia, 5% from Nigeria, 4% from Norway, 3% from the US, 2% from Algeria, and 2% from Kazakhstan. The remaining 7% is obtained from other countries in smaller quantities.

⁴⁸ Ibidem

⁴⁹ Ibidem

Figure 6. Natural gas imports, 2021



Source: Ministero dell’Ambiente e della Sicurezza Energetica, 2022.

As is widely recognized, given its significant presence in Italy’s energy mix, natural gas plays a crucial role with unique characteristics. This is particularly due to its role as a transitional energy source in the environmental shift, its substantial impact on determining electricity, and the complex geopolitical situation in Europe, marked by the ongoing Russian-Ukrainian conflict.

After the invasion of Ukraine by Russia, the European Commission developed the Repower EU plan, aimed at reducing EU reliance on Russian gas by 67% before 2023. Nonetheless, it’s crucial to underscore that the gas crisis has brought to the forefront the idea that relying solely on market-driven solutions appears to be inadequate and ineffective. In this sector, it becomes evident that government intervention is essential to provide a balancing force, helping to alleviate the repercussions on both the economic and social aspects. These have been significantly impacted by the sudden and substantial increase in energy prices, especially in a post-pandemic recovery phase. Moreover, an excessively severe slowdown could potentially put at risk the achievement of certain goals outlined in the National Recovery and Resilience Plan⁵⁰.

Following the Russian invasion of Ukraine and the release of RePowerEU, Italy experienced an uptick in the deployment of renewable energy sources, marked by a tripling of new installations in 2022 compared to the ten-year average. The potential for further growth in this sector remains substantial. *Elettricità Futura*, an industry

⁵⁰ COMITATO PARLAMENTARE PER LA SICUREZZA DELLA REPUBBLICA. XVIII Legislatura, “Relazione sulle conseguenze del conflitto tra Russia e Ucraina nell’ambito della sicurezza energetica”, Doc. XXXIV n.9, April 27, 2022.

association within *Confindustria*, estimated that the installation of 85 GW of new renewable energy capacity by 2030 is attainable without the need for public assistance. In the early months of 2023, the Minister for the Environment and Energy Security, Pichetto-Fratin, unveiled ambitious targets of 10-12 GW of annual renewable energy capacity additions by 2030. However, this potential is still impeded by a protracted and intricate authorization process and by competition from fossil fuel generation, aided by subsidies that, according to government data, are twice as substantial as those allocated to renewables. These subsidies include consumption incentives introduced at the onset of the crisis, which have yet to be withdrawn. In contrast, support for renewable energy has declined and is intentionally set to decrease in the foreseeable future⁵¹.

Regarding the composition of the electricity generation mix, there was a 61% increase in coal-based generation from 2021 to 2022. This uptick can be attributed to a government-led strategy aimed at maximizing electricity production from sources other than natural gas. Additionally, the surge in energy prices rendered electricity generation from coal plants more economically viable than from gas-powered facilities. Concurrently, hydroelectric power generation saw a significant decline of 22% from 2021 to 2022, largely attributed to the prior year's drought conditions. In a closer examination of power generation, totaling 276 terawatt-hours (TWh) in 2022, 64% was from fossil fuel sources (of which 12% was attributed to coal), while the remaining 36% was derived from renewable sources, encompassing hydroelectric, wind, photovoltaic, and biomass. Excluding the energy consumption related to pumping, which amounted to 2.5 TWh, the domestic production in Italy satisfied 86% of the electricity demand, with the remaining 14% (equating to 43 TWh) fulfilled through imports. These imports consisted of 19 TWh from Switzerland, 14 TWh from France, 6 TWh from Slovenia, and 3 TWh from Montenegro, along with more modest contributions from Greece and Austria⁵².

With respect to the policies implemented within the framework of the EU gas initiatives, in August 2022, the European Union implemented an urgent regulation, urging member states to proactively curtail gas consumption by 15%, in contrast to the average levels over the preceding five years (2017-2022). In response, the Italian government introduced a domestic strategy for restraining natural gas consumption, with the objective

⁵¹ FRANCESCA ANDREOLLI ET AL., “*Energy without Russia the Consequences of the Ukraine War and the EU Sanctions on the Energy Sector in Europe*,” August 28, 2023.

⁵² *Ibidem*

of conserving approximately 8.2 bcm cubic meters of natural gas, aligning with the 15% reduction mandated by the EU regulation. This plan was built upon:

- a) Enhancing electricity generation in the thermoelectric sector through the use of alternative fuels, such as coal, and accelerating the adoption of renewable energy sources in the electricity sector.
- b) Implementing measures to reduce energy consumption in the heating sector, which includes shortening the heating season and lowering temperatures in the residential sector.
- c) Implementing a comprehensive set of actions aimed at promoting energy-efficient behaviors through a dedicated institutional awareness campaign managed by the Italian agency for new technologies, energy, and sustainable energy (ENEA), alongside behavioral measures. Concurrently, the Italian government anticipated that existing measures would encourage the replacement of energy-intensive household appliances and air conditioners with more efficient models, the installation of new electric heat pumps as replacements for old gas boilers, the adoption of thermal solar panels for hot water production, and the substitution of traditional light bulbs with LED bulbs⁵³.

Today, Italy heavily relies on natural gas for both heating and power generation, primarily through imports. However, in light of Russia's invasion of Ukraine, the Italian government has pledged to gradually eliminate its reliance on Russian gas imports, which currently constitute the majority of its gas supply, by the year 2025. Italy's strategic investments in diversifying its sources of gas over the past decade, including partnerships in the Middle East and North Africa, have enabled a swift shift away from Russian imports. This presents a delicate balancing act, as Italy anticipates ongoing robust gas demand and a potential increase, particularly in the short term, due to the introduction of new gas-fired electricity generation facilities⁵⁴.

In summary, the repercussions of Russia's invasion of Ukraine in February 2022 have underscored the vital need for the European Union and its member states to fortify energy supply and enhance security. Rapid actions at both the European and national levels, including diversifying gas sources, optimizing storage facilities, and expanding regasification capacity, have proven pivotal in mitigating these challenges. Notably, Italy's evolving policy landscape reflects a discernible shift towards renewable energy

⁵³ FRANCESCA ANDREOLLI ET AL., "Energy without Russia the Consequences of the Ukraine War and the EU Sanctions on the Energy Sector in Europe," August 28, 2023.

⁵⁴ IEA, "Italy's Progress on Energy Efficiency Provides Foundation for Meeting Broader Energy and Climate Goals, New IEA Policy Review Says - News," IEA, May 3, 2023

sources, albeit with acknowledged challenges in achieving a well-balanced transition. As the world navigates these complexities, the imperative for resilient and sustainable energy strategies remains at the forefront of global considerations.

The composition of Italy's electricity generation mix showed an increase in coal-based generation from 2021 to 2022, attributed to government strategies aimed at reducing gas consumption. Hydroelectric power generation, on the other hand, experienced a significant decline due to adverse weather conditions in the preceding year. A closer examination of power generation revealed a substantial reliance on fossil fuel sources, with a notable percentage from coal. Renewable sources, including hydroelectric, wind, photovoltaic, and biomass, contributed to the remaining share.

CHAPTER 2

ITALIAN ENERGY SECURITY CHALLENGES

2.1. Overview of Italy's energy mix

Italy's energy system has undergone significant changes since 2010. Currently, the country's energy mixture comprises a higher portion of natural gas and renewable energy and a lower proportion of coal and oil. From a lower base than the IEA average, Italy's energy intensity (energy consumption to GDP ratio) decreased by 15% from 2005 to 2021. This was due to a shift in the economic structure from industrial to the service sector as well as improvements in energy efficiency.

Italy is making good progress towards achieving the emissions reductions and energy efficiency targets outlined in its National Energy and Climate Plan for 2030. However, significant additional efforts will be necessary to attain the more ambitious 2030 targets outlined in the European Union's (EU) "Fit For 55" (FF55) package and to conform to the even more challenging objectives proposed in the REPowerEU plan, which seeks to swiftly reduce the EU's reliance on Russian fossil fuels. Italy has successfully decreased its total greenhouse gas (GHG) emissions by nearly 30% between 2005 and 2019. There was a significant decrease in emissions from 2019 to 2020, mainly attributed to the impact of the COVID-19 pandemic. However, preliminary data indicates a considerable increase in emissions in 2021, though still 4% lower than the levels in 2019. Italy has set a goal of achieving carbon neutrality by 2050⁵⁵.

In 2021, oil accounted for 33% of Italy's Total Energy Supply (TES) and 37% of Total Final Consumption (TFC). A substantial portion of crude oil, approximately 92%, is sourced through imports, with 12% of these imports originating from Russia in 2021. However, Italy's reliance on Russian crude oil has progressively decreased over the past decade and is poised to cease by the end of 2022, coinciding with the enforcement of an EU ban on seaborne imports of Russian crude oil.

Notably, oil demand experienced a significant reduction in 2020 due to mobility restrictions amid the COVID-19 pandemic but exhibited a robust resurgence since mid-2021. The Italian government anticipated a notable reduction in oil consumption over the

⁵⁵ IEA. *Italy 2023 - Energy Policy Review*, May 2023.

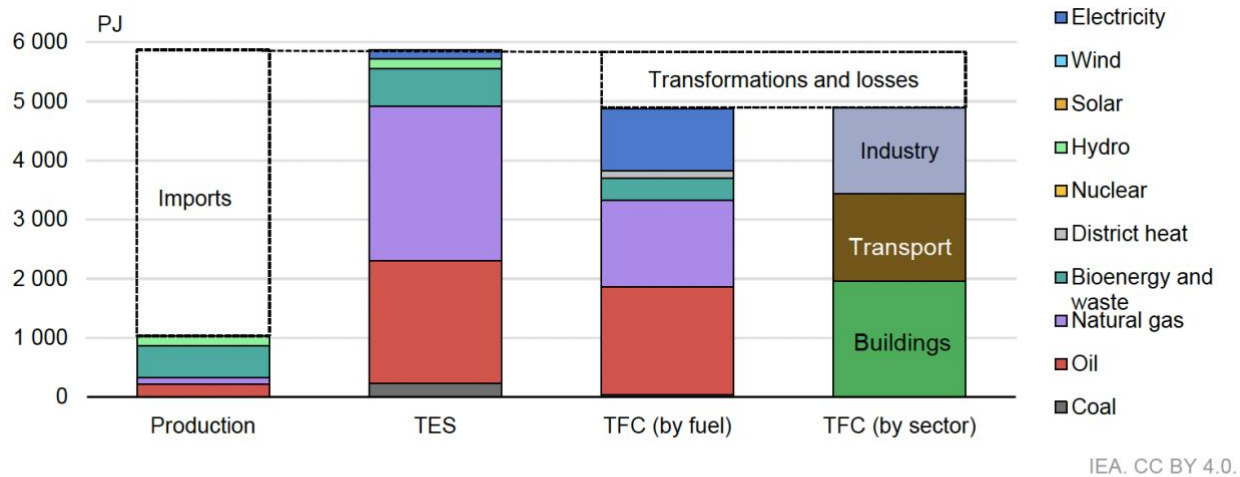
medium and long terms, primarily driven by policies aimed at promoting alternative fuels for passenger cars. The adoption of biofuels in the transport sector receives substantial encouragement, while plans are underway to expand charging infrastructure for electric vehicles (EVs) and maintain the sale of new passenger cars powered by combustion engines, albeit utilizing environmentally friendly fuels, beyond the year 2035. It is worth mentioning, however, that Italy does not have specific targets set for reducing oil consumption. In 2022, in response to rising fuel prices stemming from the Russian invasion of Ukraine, the government introduced a discount on gasoline and diesel excise duty as a measure to mitigate the economic impact on consumers. While this action can be justified from a social policy perspective as a means to counteract price hikes, the government intends to continue implementing other policy measures aimed at reducing oil consumption and has revoked the discount as of January 1, 2023.

Conversely, coal maintains only a minor and steadily diminishing role in Italy's energy composition. In 2021, it accounted for 4% of TES and 5% of electricity generation, while accounting for 7% of energy-related carbon dioxide (CO₂) emissions in the same year. All coal utilized in Italy is imported, with over 50% of coal imports in 2021 originating from Russia. As part of Italy's energy transition strategy, the country has committed to phasing out the use of coal in electricity generation by 2025, with the intention of predominantly replacing it with gas-fired and renewable generation, supported by enhanced transmission infrastructure. Despite opting to temporarily increase coal usage in response to the current energy crisis, Italy remains resolute in its commitment to the phase-out target year⁵⁶.

Italy primarily relies on energy imports, with an average of 80% of its total energy supply being brought in from external sources between 2016 and 2021, predominantly in the form of oil and gas (as depicted in Figure 7). The country's internal energy production primarily stems from renewable sources, including bioenergy, hydroelectric, solar, and wind power. Over the past decade, the contribution of renewable energy sources to domestic energy production has grown, reaching 74% of the total in 2021. Italy's production of oil and natural gas, on the other hand, remains limited, as shown in Figure 7.

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Figure 7. Overview of energy production, supply and demand in Italy, 2021



Italy imports more than three-quarters of its energy needs. Natural gas and oil dominate the energy mix. Buildings are the major end users.

Source: IEA, 2023.

Italy heavily depends on natural gas imports, with a significant reliance on gas imports from Russia, constituting 41% of its total gas imports in 2021. In the same year, approximately 23% of the country’s electricity generation hinged on fossil fuel imports from Russia, marking the second-highest level of dependency among International Energy Agency (IEA) member countries, surpassed only by Hungary. Imports of energy from Russia play a substantial role in final energy consumption (FEC) across all sectors. Natural gas holds a dominant position in Italy’s electricity mix. In 2021, it contributed to 50% of the total electricity generation, ranking as the second-highest share among IEA countries, following Mexico. Hydroelectric power came second, accounting for 16% of the electricity output in 2021, followed by solar at 9%, bioenergy and waste at 8%, and wind at 7%. Coal represented a minor and decreasing share at 5% in 2021, followed by oil at 3%, and geothermal energy at 2%.

Fossil fuels continue to be the primary energy source in Italy, with natural gas and oil making up 42% and 33% of the total energy supply (TES) in 2021, respectively, while coal constitutes a minor portion at 3.7%. The contribution of fossil fuels to TES has decreased from 90% in 2005 to 78% in 2021. The supply of energy from renewable sources has grown to reach 19% of TES in 2021, with bioenergy and waste being the

leading renewable sources, contributing to 38% of power generation and 10% of TES in 2020.

Italy achieved its 2020 renewable energy target, as outlined in the 2009 EU Renewables Directive, which aimed to encompass 17% of gross final energy consumption with renewable sources. This goal was reached six years ahead of schedule, primarily due to a surge in photovoltaic installations in the early part of the decade. Over a span of just four years, between 2010 and 2013, approximately 20 GW of renewable electricity capacity was added, albeit at a considerable cost to consumers.

Nonetheless, the contribution of renewables to Italy's energy mix remained relatively constant at around 17-18% during the years 2014-2019. This was attributed to several factors, including reduced incentives, protracted and intricate permitting procedures, and a growing local opposition. In 2020, the proportion of renewables in the energy mix rose to 20.4% of gross final energy consumption, primarily due to a decrease in energy demand resulting from the COVID-19 pandemic. In 2021, the share of renewables stood at 19%⁵⁷.

In 2022, the demand for electricity amounted to 316.9 TWh (preliminary data), showing a 0.9% decrease compared to the previous year and remaining below pre-pandemic levels by 0.8% when compared to 2019. While traditional thermoelectric sources continued to be the primary energy source, the photovoltaic source in 2022 achieved a historical record, generating more than 28 TWh of electricity. Conversely, hydropower production reached an all-time low, decreasing by 36.6% to 30.1 TWh.

In 2022, 86.4% of the electricity demand was met by domestic production, which, after deducting energy used for auxiliary services and pumping, amounted to 273.9 TWh (1.2% decrease from 2021). The remaining 13.6% was covered by net imports from abroad, totaling 43.0 TWh, an increase of 0.5% compared to the previous year.

The largest contribution to electricity production came from non-renewable thermoelectric sources, which grew by 7.9% compared to 2021, accounting for approximately 64.8% of the total energy produced. This included 9.1% from facilities powered by solid fuels (with a significant growth of 64.9%), 6.9% from petroleum products and other fuels (experiencing an 80.7% increase), and 48.8% from facilities fueled by natural gas (a decrease of 3.7%).

In 2022, renewable energy sources were extensively utilized across all sectors, including electricity, heat, and transportation. However, certain climate-related phenomena affected

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their availability (reduced precipitation, relatively high average temperatures). It is estimated that renewables accounted for approximately 19% of total energy consumption, in line with the previous year⁵⁸.

2.2. Oil

For almost a decade, the oil share in Total Final Consumption (TFC) and Total Energy Supply (TES) in Italy has been gradually declining (Figure 8). As of 2021, oil continues to be the primary energy source in TFC (37%), and it ranks second in TES (32%).

Italy is largely dependent on imports of crude oil, while having a small oil production. The EU's restriction on the import of Russian crude oil by sea went into effect in December 2022, but despite a decline in crude imports from Russia over the previous ten years, the country's reliance on Russian crude oil remained significant.

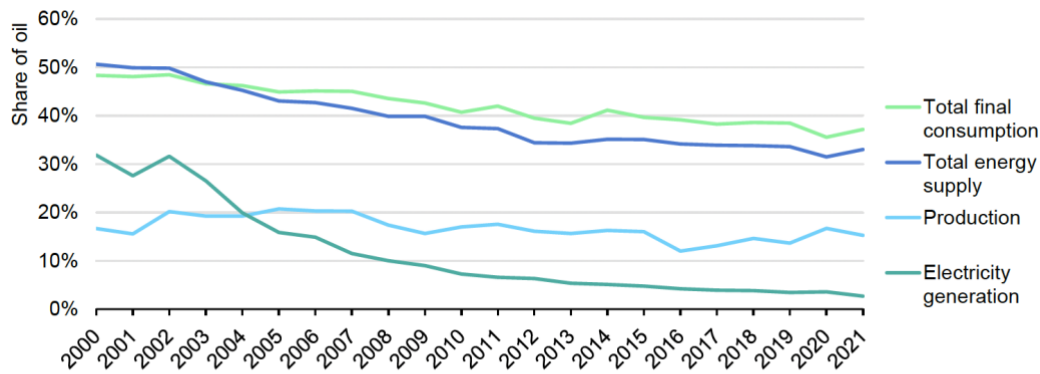
Italy, in the past, was a major net exporter of oil products due to a considerable refining sector. However, from the late 2000s, there has been a significant rationalization of refining capacity, which has decreased Italy's net export position. In the upcoming years, more refining capacity rationalization is probably in store.

Prior to a sharp decline in 2020 as a result of the COVID-19 pandemic, oil demand was reasonably constant from 2015 to 2019. Since the second half of 2021, demand has sharply increased, there is little to suggest that it will reduce significantly. But over the medium to long run, the government estimates a significant decline in the need for oil, mostly due to the adoption of EVs and other alternative fuels in the transportation industry. Yet, Italy has no particular targets for lowering its oil consumption⁵⁹.

⁵⁸ Ministero dell'Ambiente e della Sicurezza Energetica, Dipartimento Energia, Direzione Generale Infrastrutture e Sicurezza, "La situazione energetica nazionale nel 2022" July 2023.

⁵⁹ IEA. *Italy 2023 - Energy Policy Review*, May 2023.

Figure 8. Oil share in the Italian energy sector, 2000 – 2021



IEA. CC BY 4.0.

Oil remains a critical energy source in Italy. In 2021, it was the most significant energy source in TFC (37%) and the second most significant energy source in TES (32%).

Source: IEA, 2022.

2.2.1. Oil trade and production

Italy relies heavily on importing crude oil, bringing in a total of 1,176 kilo barrels per day (kb/d) in 2021. In 2020, net imports dropped by 19% compared to 2019, reflecting lower refinery operations in response to reduced demand caused by the COVID-19 pandemic. However, the trend of declining net crude oil imports had been ongoing for over a decade, driven by refining capacity consolidation and reduced refinery utilization rates. This downward trend was reversed in 2021, with a 12% increase in net crude oil imports from the previous year.

Azerbaijan emerged as Italy’s top supplier of crude oil in 2021, providing 22% of the country’s total net imports. Libya, which once held a significant share of Italy’s crude oil imports, supplied 17% in 2021, a decline attributed to a substantial reduction in Libyan export capacity over the past decade. Iraq, a longstanding supplier of crude oil to Italy, maintained its position, accounting for 15% of total imports in 2021. Saudi Arabia contributed 10% to Italy’s crude oil imports in 2021.

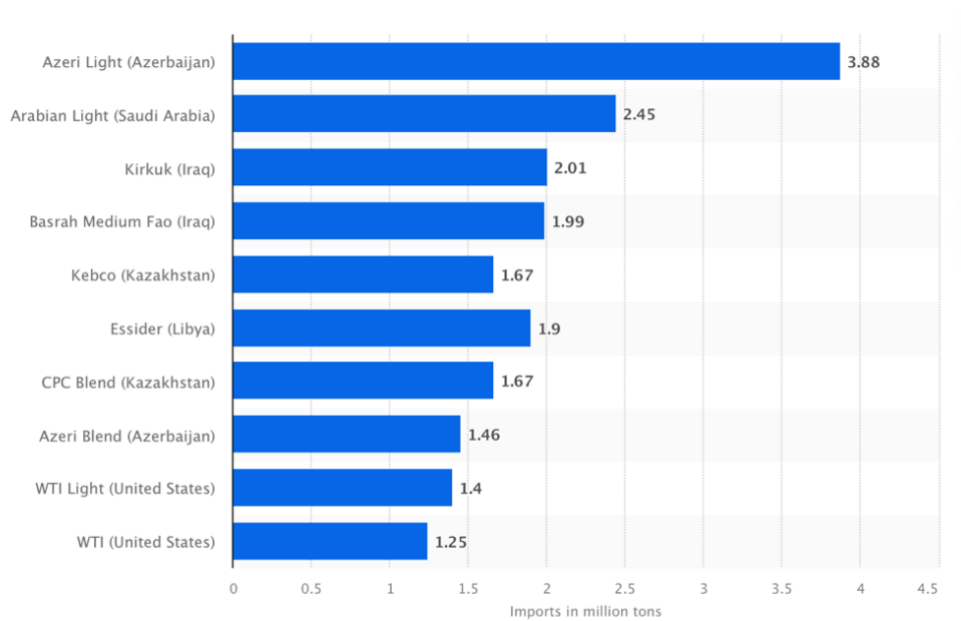
Italy’s dependence on Russian crude oil has decreased markedly over the past decade, with Russia supplying 12% of Italy’s net crude oil imports in 2021, down from a peak of 25% in 2013.

In response to Russia’s invasion of Ukraine, Italy’s largest refiner, Eni, announced in March 2022 that it would stop importing Russian oil. By the end of 2022, Russian crude

oil imports had ceased following the implementation of the EU ban on seaborne imports of Russian crude oil, which went into effect in December 2022⁶⁰.

The Priolo /ISAB refinery, with a daily capacity of 320,000 barrels, is indirectly owned by Russian oil company Lukoil and continued to rely on Russian crude oil for a portion of its feedstock needs in 2022, causing the share of crude oil imports from Russia to rise to 25% in Q3 2022.

Figure 9. Imports of crude oil to Italy ranked by main type in 1st half 2023



Source: Statista, 2023.

2.2.2 Oil demand

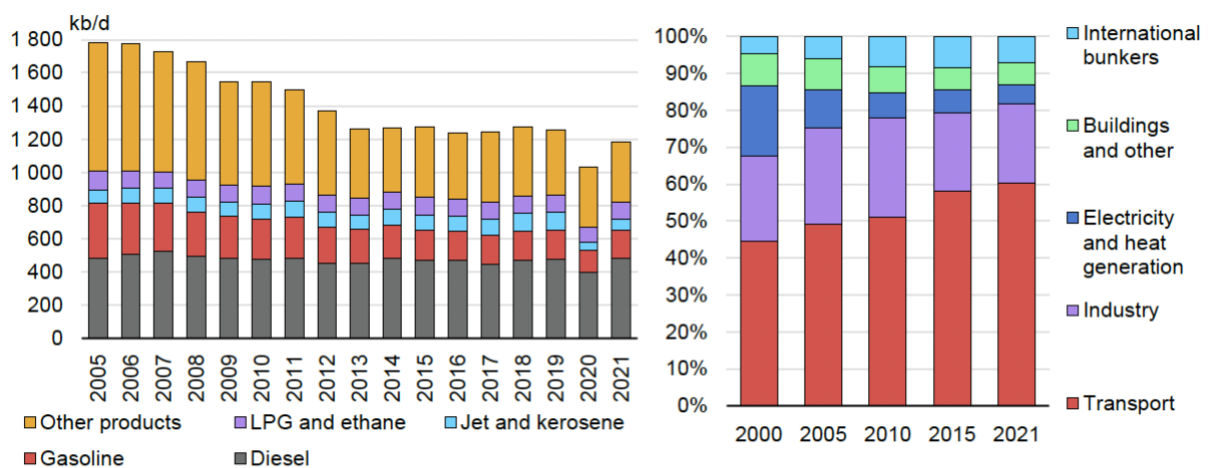
As far as oil products demand is concerned, the latter experienced fluctuations over the years. In 2021, the total demand for oil products reached 1,184 kb/d (as shown in Figure 10). This demand had taken a significant hit in 2020, decreasing by 16% due to COVID-19 related restrictions on mobility and reduced economic activity. However, it rebounded by 15% from 2020 to 2021. Prior to this, there was a sharp decline in oil product demand from 2005 to 2013, followed by a period of stability until 2019.

⁶⁰ Ibidem

The majority of the demand for oil products is concentrated in the transport sector, which accounted for 60% of the total consumption in 2021. Notably, diesel was the most widely consumed oil product in Italy, making up 41% of the total demand in 2021. Diesel demand experienced a robust recovery, with 2021 demand even surpassing 2019 levels.

In 2021, the industry sector was the second-largest consumer of oil, representing 22% of the demand. A significant portion of this demand was attributed to the need for petrochemical feedstocks. Buildings accounted for 6% of the overall demand, while electricity and heat generation contributed 5%. International bunkers, which accounted for 7% of oil product demand in 2021, saw a decrease from the 12% figure recorded in 2019, primarily due to a sharp drop in jet fuel demand during the pandemic⁶¹.

Figure 10. Demand for oil-based products categorized by fuel type and sector in Italy from 2005 to 2021



IEA. CC BY 4.0.

Oil products demand is substantially lower than in 2005; however, aside from 2020, total demand has been largely flat for around a decade.

Source: IEA, 2022.

The year 2022 saw a slight decrease in the gross domestic oil consumption by 0.5% compared to the previous year, amounting to a reduction of approximately 234 Ktep. Fuel consumption for road transport reached 31,596 Ktep, reflecting a 4.8% increase (1,451 Ktep) compared to 2021. Gasoline showed a growth of 11.5%, while diesel increased by 1.4%. Diesel maintained pre-pandemic levels after the decline in

⁶¹ Ibidem

2020. Out of the total demand of 47,817 Ktep, domestic production contributed to about 9%, while net imports (excluding accumulated stocks) met 100% of the demand. Italian imports of crude oil, semi-finished products, and petroleum products, totaling 78,320 Ktep, increased by 8.5% compared to 2021. Crude oil imports (62,515 Ktep) grew by 9.6%, and imports of semi-finished products and petroleum products (15,805 Ktep) increased by 4.3%. The increase affected imports from America (+125%, from 2,531 Ktep in 2021 to 5,686 Ktep in 2022), Europe (+17%, from 17,794 to 20,804), the Middle East (+3%, from 14,815 to 15,197), and Africa (+1%, from 21,736 to 21,926). The only negative variation was observed in purchases from Asia (-4%, from 15,248 to 14,674). Total exports of crude oil, semi-finished products, and petroleum products (28,258 Ktep) increased by 4.2% compared to 2021. In absolute terms, Europe is the region most impacted by the growth, with a +1,011 Ktep compared to 2021⁶².

2.2.3 Refining in Italy

Regarding the oil refineries in Italy, the country currently operates 11 oil refineries, collectively possessing an atmospheric distillation capacity of approximately 1.7 million barrels per day (mb/d). Throughout the past decade, the average utilization rate of these refineries has consistently stood at about 80%. However, in 2020, this rate dropped to a mere 68% due to a sharp decline in demand.

Over the last ten years, Italy has seen a significant rationalization of its refining capacity, resulting in the closure of four refineries. Notably, the Gela refinery in Sicily was converted into a biofuels processing facility, and three other dismissed refineries were converted into storage facilities. Additionally, the 84,000 barrels per day Livorno plant has postponed its closure and Eni is considering transforming the site into a biofuel's refinery.

Given long-term forecasts of diminishing demand for oil products in the European Mediterranean and the heightened competition from new, large-scale refineries in the Middle East and Asia, it is highly probable that further rationalization of refining capacity will occur in the future.

⁶² Ministero dell'Ambiente e della Sicurezza Energetica, Dipartimento Energia, Direzione Generale Infrastrutture e Sicurezza, "La Situazione Energetica Nazionale Nel 2022, July 2023.

Eni stands as the most significant player in Italy's refining sector, owning 4 out of the 11 operational refineries (Sannazzaro, Taranto, Livorno, and Porto Marghera). Eni also shares ownership of the 200,000 barrels per day Milazzo refinery in Sicily through a partnership with KPI.

The largest refinery in Italy in terms of operating capacity is the 320,000 barrels per day Priolo/ISAB refinery, situated in Sicily. Until recently, this refinery was under the ownership of a Swiss-based trader called Litasco, which is controlled by the Russian oil company Lukoil. However, in January 2023, an agreement was reached to sell the refinery to a consortium led by the Cypriot private equity firm G.O.I. Energy, with support from Geneva-based Trafigura. The deal was finalized in March 2023, after the approval from the Italian government.

Other notable participants in the Italian refining sector include Saras, which owns the 300,000 barrels per day Sarroch refinery, and the Algerian national oil company, Sonatrach, which possesses the 190,000 barrels per day Augusta refinery⁶³.

2.2.4 Transportation and storage

With regard to transportation and storage, the majority of Italy's domestic pipeline network, catering to both crude oil and petroleum products, is primarily concentrated in the northern regions. Two pipelines originating within Italy serve to transport crude oil to Italian refineries and refineries in central Europe. The Central European Line, with a capacity of 1 million barrels per day, provides crude to inland refineries in northern Italy, while the Transalpine Pipeline (TAL), boasting an 850,000 barrels per day capacity, delivers crude to refineries in Austria, the Czech Republic, and Germany.

Nonetheless, the majority of Italian refineries are situated along the Mediterranean coastline, where they receive crude oil shipments directly via maritime transport. Italy boasts a total of 16 crude oil tanker ports, and among these, four (Taranto, Milazzo, Ancona, and Augusta) have the capability to accommodate cargo vessels of up to 300,000 deadweight tonnes.

Moreover, Italy maintains a network of about 405 oil storage terminals, collectively offering a storage capacity of approximately 26 million cubic meters or 163 million barrels. This storage capacity is divided with crude oil accounting for 25% and refined

⁶³ Ibidem

products making up the remaining 75%. Currently, there are no specific intentions to make substantial increases or reductions to Italy’s oil storage capacity. However, such plans might be subject to change if further rationalization of refining capacity takes place⁶⁴.

The government has acknowledged that oil will continue to be the dominant fuel in sectors like road freight, aviation, and maritime transportation for at least a decade, and quite possibly even longer. Consequently, ensuring a secure oil supply remains a top priority for Italy.

Looking ahead to the long term, the government anticipates a notable reduction in oil demand, indeed, the introduction of an ambitious target to achieve a certain level of oil consumption reduction could provide clarity and direction to the ongoing efforts aimed at cutting oil consumption while also sending a strong message about the government’s commitment to decarbonize the transport sector.

2.3. Natural Gas

Are we standing at the brink of a genuinely worldwide gas market? “Gas is no longer a scarce, localized, difficult-to-transport resource doled out by energy monopolists (and their affiliated states), not infrequently in expectation of commercial and political concessions under the threat of price hikes or supply cuts. Instead, gas is becoming a freely traded and increasingly available commodity worldwide, and with abundant gas and rising global gas trade, the established modus operandi between importing states and traditional suppliers is changing — strengthening the bargaining position of the former and weakening the leverage of the latter. Markets are increasingly setting the terms of trade, and gas monopolies look “ this is what Agnia Grigas in 2017 wrote in the book “*The new geopolitics of natural gas*”⁶⁵. Several things occurred in the world since then and in 2023, especially in Italy, natural gas is a critical energy source, accounting for almost half of electricity generation. The expansion of natural gas was mainly driven by its crucial role in replacing more polluting fossil fuels, positioning natural gas as a ‘bridge fuel’ during the worldwide shift in energy sources. However, a decade later, this role of

⁶⁴ Ibidem

⁶⁵ AGNIA GRIGAS, *The New Geopolitics of Natural Gas*, Cambridge, Massachusetts, Harvard University Press, 2017.

natural gas is being questioned, potentially weakening its forthcoming role in the energy framework. Higher climate and environmental commitment to address CO₂ and methane emissions, alongside a renewed emphasis on ensuring supply security as a top political concern, constitute the major obstacles confronting the natural gas industry⁶⁶.

Initially, natural gas was considered a byproduct of oil production due to problems connected with transportation. It has predominantly served as a consumer commodity throughout history, while oil played a vital role in military and industrial applications. Simultaneously, natural gas has been subject to greater political influence compared to oil, while facing challenges in long-distance transportation by land or sea. As a result, its global reach is limited, making it more of a regional fuel than a universally interchangeable commodity. Additionally, monopolies have often controlled gas transportation.

Therefore, countries that produce and import gas have had to establish enduring and direct connections through long-term gas contracts and jointly developed pipeline networks. For example, the central aspect of gas geopolitics in the XX century, namely the gas supply dynamics between European states and Russia, began to take shape in the 1960s. This occurred as the Soviet Union expanded its pipeline infrastructure and entered long-term agreements, and this arrangement has persisted largely unchanged to the present day. In contrast, in the international oil markets, intermediaries freely trade oil. Additionally, since gas historically relied on land-based pipeline monopolies rather than competitive sea-based tanker transportation in multiple directions, gas-importing countries had to depend on a limited number of suppliers. Consequently, until recently, numerous countries, particularly in Europe, such as Italy, were entirely reliant on a single gas pipeline, a single gas-producing country, and even a specific company like the Russian gas giant Gazprom. Conversely, gas-producing countries like Russia also had limited export routes through pipelines and fixed consumer relationships. Furthermore, with other countries acting as transit areas for pipelines transporting gas from producing to importing countries, these territorially driven gas trade arrangements have had notable effects on national, regional, and international politics. Nevertheless, at the beginning of the XXI

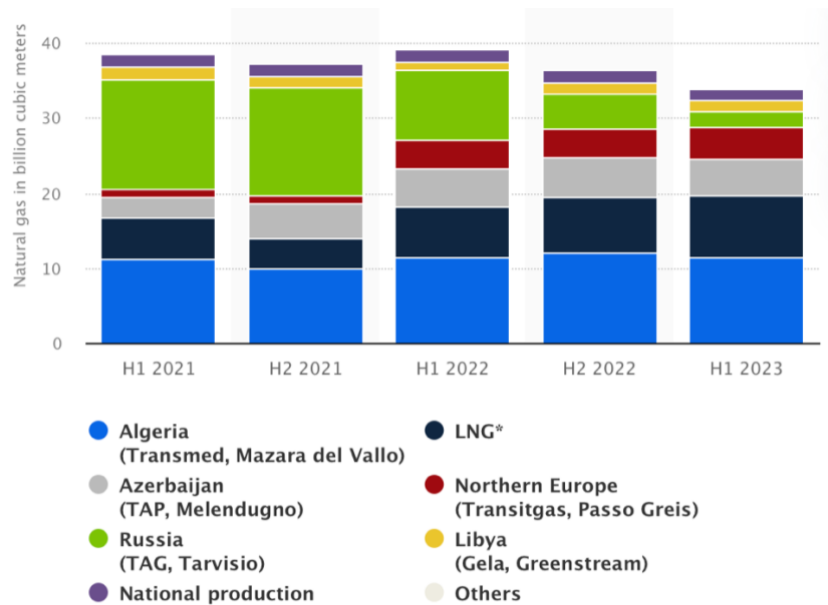
⁶⁶ PIER PAOLO RAIMONDI, “*Natural Gas in Italy: Features and Perspectives in Light of Russia’s War in Ukraine*,” IAI - Istituto Affari Internazionali, September 28, 2022.

century, changes in the global gas sector are disrupting the existing order and reshaping the rules in the emerging geopolitics of gas⁶⁷.

Natural gas holds a crucial position in Italy’s energy landscape, contributing to nearly half of its electricity generation. Over the next decade, it will continue to be a central player in the power generation sector, especially with the gradual phasing out of coal-fired capacity. In the longer-term, natural gas will continue to serve as a key source of dispatchable power and a significant energy source for both residential and industrial sectors, even if biomethane and hydrogen gain prominence.

Given the expected stability in gas consumption and the limited domestic production, Italy will maintain a substantial reliance on natural gas imports for the foreseeable future. The Italian government is actively working to establish and maintain a more diversified range of gas supply sources for the long term, while also ensuring that the necessary infrastructure is in place to support these imports⁶⁸.

Figure 11. Imports and production of natural gas in Italy from 1st half 2021 to 1st half 2023, by country of origin, pipeline, and entry point (in billion cubic meters)



Source: Statista, 2023.

⁶⁷ AGNIA GRIGAS, *The New Geopolitics of Natural Gas*, Cambridge, Massachusetts, Harvard University Press, 2017.

⁶⁸ IEA. “Natural Gas Security Policy – Analysis.” IEA, June 2022.

In 2021, Russia held the top position as Italy's primary natural gas supplier, delivering over 28 billion cubic meters. After the cut-off of Russian deliveries to Europe following its invasion of Ukraine in February 2022, Russian imports dropped to 2.2 bcm in 2023. Consequently, Algeria emerged as the leading gas provider, furnishing approximately 24 bcm of gas to Italy. Notably, there was a substantial increase in imports from Azerbaijan, which doubled in the latter half of 2021, as well as from Northern European countries, primarily Norway and the Netherlands.

Within the EU, Italy is one of the largest gas markets as it consumed around 72.5 bcm of natural gas in 2021, accounting for about 40% of total primary energy supply (TPES).⁶⁹

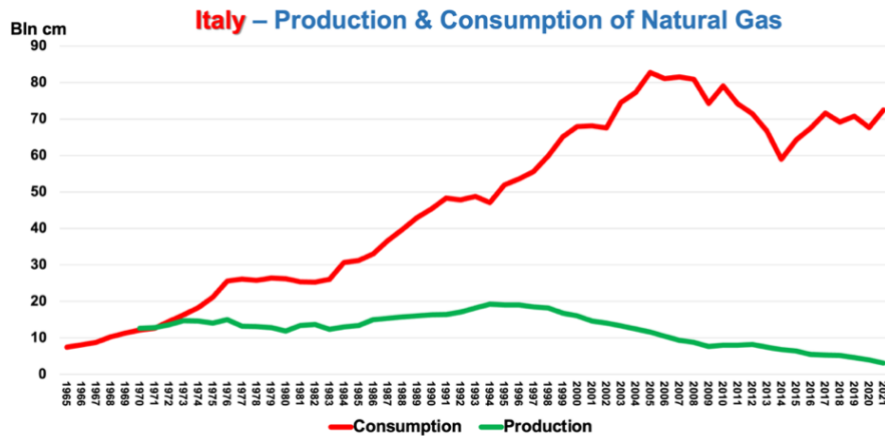
2.3.1. From the “golden age” to uncertainty

The 1973 oil crisis marked a new era in which countries, including Italy, began seeking alternatives to oil. Natural gas gradually emerged as the preferred choice for power generation, especially after the decision to stop nuclear energy production in 1987 following a public referendum. During the 1990s and 2000s, the rise of gas in the power sector resulted from a combination of factors, including the liberalization process, the proliferation of combined cycle gas turbine (CCGT) plants, and national policies like Law 55/02 in 2002 which expedited the lengthy authorization process for constructing new power plants⁷⁰, enabling projects to obtain full permits in less than six months, and it brought about substantial transformations in the power sector.)

⁶⁹ BP, *Statistical Review of World Energy 2022*, June 2022.

⁷⁰ PIER PAOLO RAIMONDI, “*Natural Gas in Italy: Features and Perspectives in Light of Russia’s War in Ukraine*,” September 28, 2022,

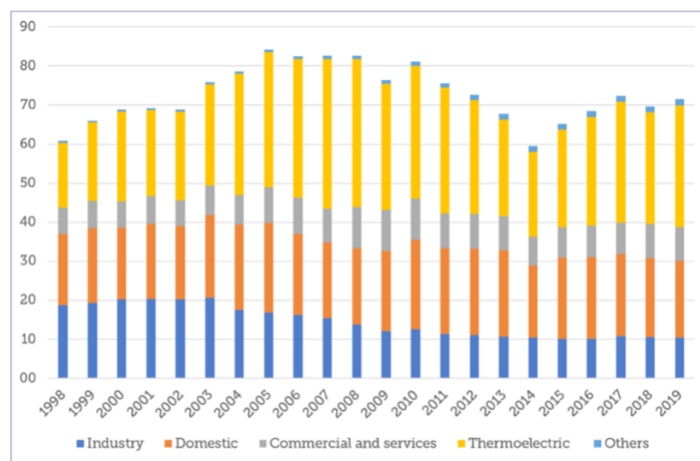
Figure 12. Italy’s gas production and consumption 1970-2020, bcm



Source: BP, Statistical Review of World Energy 2022.

The increase in natural gas consumption encountered a setback due to the 2008 financial crisis, which resulted in reduced demand in the industrial sector. Gas consumption in industry declined from 21 bcm in 2003 to 10 bcm in 2019 (Figure 13), primarily due to stagnant growth⁷¹. Apart the economic crisis, the decline in demand has been attributed to the rising share of renewables (RES) in electricity generation, leading to a halt in the construction of gas-fired capacity, along with improved energy efficiency measures. In 2019, power plants accounted for approximately 40% of gas demand, while households and service sectors used around 39%, with the industry representing approximately 15%.

Figure 13. Italy’s gas consumption by sector, 1998-2019, bcm



Source: Autorità di Regolazione per Energia Reti e Ambiente (ARERA).

⁷¹ IEA, “Energy Policies of IEA Countries: Italy 2016 Review – Analysis,” IEA, December 2016.

According to the Italian transmission system operator (TSO), Snam, gas demand is expected to become more unpredictable in the coming decades due to the different pace of decrease in unabated gas demand and the rise of greenhouse gases⁷².

Italy has witnessed a gradual reduction in its domestic gas production, and this trend has not been mirrored on the demand side. Consequently, there is a heavy reliance on gas imports. While gas demand has remained relatively stable from 2000 to 2020, the supply side has undergone significant changes. Domestic production has decreased from around 17 bcm to 4 bcm during the same period, primarily due to political and regulatory constraints. This has further deepened Italy's dependence on gas imports, which now account for approximately 93% of its gas demand. Italy has established various import infrastructure, including gas pipelines from Russia, Algeria, Northern Europe, and more recently, Libya and Azerbaijan. Additionally, Italy has constructed three LNG facilities. Currently, Italy is exploring alternative gas suppliers in the Mediterranean region to reduce its reliance on Russian gas.

The importance of domestic gas production for enhancing energy security and independence has reemerged as a political concern due to the gas supply shortages that began in the summer of 2021. This issue holds particular importance for countries with high gas consumption levels. According to assessments made by the Italian government, it is feasible to increase production by more than 2 bcm in the coming years through existing concessions. New legislative measures have been introduced to simplify the permitting process with the goal of promoting domestic production. However, there are inconsistencies in the regulations. In 2022, another piece of legislation, known as PiTESAI23, was enacted, with the objective of reducing the areas where such activities can take place by more than two-thirds. In summary, although domestic production has the potential to enhance Italy's energy security, an expansion of domestic gas production appears to face obstacles due to regulatory constraints and opposition from society⁷³.

⁷² SNAM, "Piano Decennale Di Sviluppo Della Rete Di Trasporto Di Gas Naturale 2022-2031," September 27, 2018.

⁷³ PIER PAOLO RAIMONDI, "Natural Gas in Italy: Features and Perspectives in Light of Russia's War in Ukraine," ed. IAI - Istituto Affari Internazionali, September 28, 2022

2.3.2. Storage

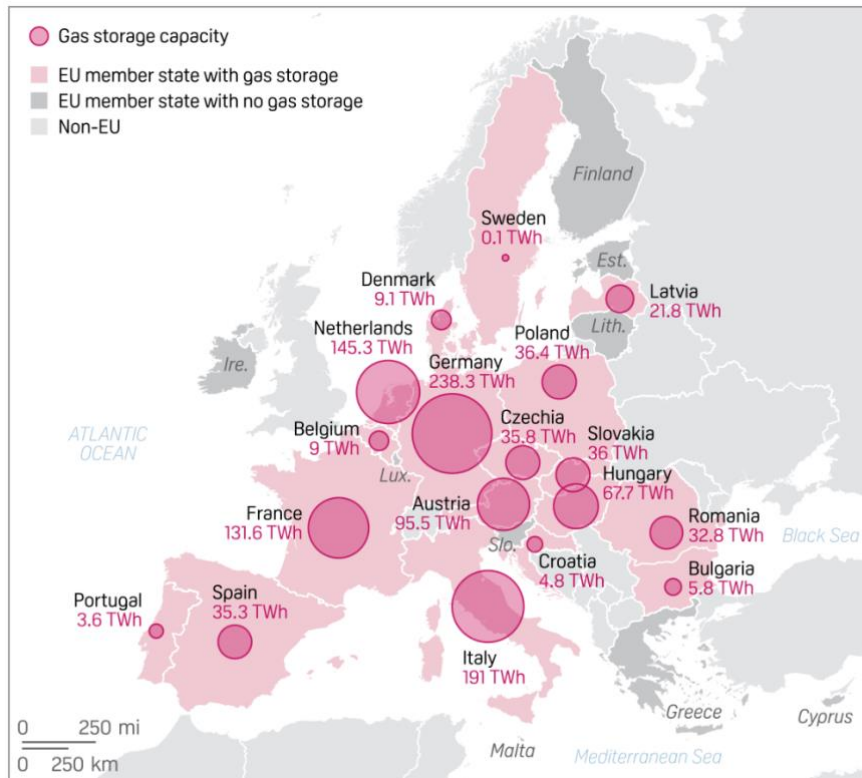
Gas storage plays a crucial role in Italy's energy security strategy. Recognizing its significance in maintaining the balance between gas supply and demand, the government led by Draghi has implemented various incentives to encourage operators to fill gas storage facilities, even in the face of elevated gas prices. This proactive approach aimed at preparing for the winter season and mitigating potential supply disruptions from Russia.

Gas storage is essential for managing the seasonal fluctuations in gas demand, as it typically contributes about 25-30% of the gas consumed during the winter months in the EU. Winter gas consumption in the EU (from October to March) is nearly double that of the summer months (from April to September), primarily due to the demand for heating buildings. Consequently, gas storage serves as a critical source of flexibility for the energy system, enhancing security in a market heavily dependent on gas imports.

Italy possesses one of the most extensive storage capacities in Europe, totaling 197.7 TWh (equivalent to 17.8 bcm) of storage capacity accounting approximately for 17.8% of the EU's total gas storage capacity. These facilities are distributed across 13 storage sites and managed by three different companies⁷⁴.

⁷⁴ Snam which manages a total working capacity of 12.5 bcm (plus the strategic reserves) in nine operative concessions; Edison Stoccaggio which operates three storage facilities with a total working capacity of 1 bcm (of which 140 mcm is allocated to strategic reserves); and ItalGas Storage which operates the Cornegliano Ludente site with a working capacity of 1 bcm.

Figure 14. Gas storage capacities among EU member states



Source: S&P Global Commodity Insight, GIE.

At the outbreak of the Russian invasion of Ukraine, the Italian government has gradually implemented a series of measures in response to the situation. Initially, in March, it eliminated service costs and introduced additional incentives⁷⁵ to motivate operators to fill storage facilities in preparation for winter, addressing potential disruptions in supply from Russia. However, despite these incentives, the pace of filling activities has fallen behind the expected timeline. Consequently, the government has introduced new tools and measures, including the allocation of 4 billion euros for the replenishment of storage facilities to ensure energy security⁷⁶. This step goes hand in hand with the nomination of Snam in June 2022 as the designated entity responsible for filling storage as a last resort. Italy’s energy regulator, ARERA⁷⁷, has granted the possibility for

⁷⁵ The primary measures consist of the “premio giacenza” (5 euro/ MWh), and the “contratto per differenza a due vie” (CD2V), aimed at reaching the 90 % target by November. See: Italian Regulatory Authority for Energy, Networks and Environment (ARERA), *Disposizioni urgenti per il conferimento della capacità di stoccaggio ai sensi del decreto del Ministro della Transizione ecologica 1 aprile 2022, n.138*, Delibera 165/2022/R/gas, 8 April 2022,

⁷⁶ With the Decree law No. 80 at the end of June 2022.

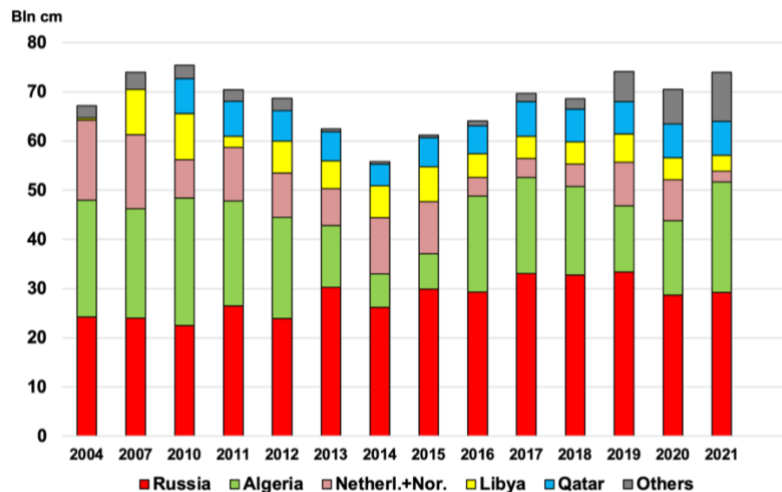
⁷⁷ Autorità di Regolazione per Energia Reti e Ambiente.

Cassa per i servizi energetici e ambientali to provide up to 2 billion euros to Snam for its last resort filling service. Additionally, ARERA has extended the “premio giacenza” and further defined the regulatory framework for storage activities, particularly regarding allocation capacity between June and September⁷⁸.

2.3.3. Imports

Gas imports have experienced a significant upward trend over the past twenty years. The total volume of gas imports has grown from 57.4 bcm in 2000 to 72.7 bcm in 2021⁷⁹, with a particularly notable increase since 2014 to fulfill the greater demand from the power sector. During this period, there have been substantial changes in the relative relevance of each gas supplier.

Figure 15. Natural gas import in Italy



Source: Ministero dello Sviluppo Economico.

Up until 2011, North African countries, led by Algeria, accounted for half of Italy’s gas imports. However, gas flows from Algeria and Libya decreased due to growing domestic demand, declining production in Algeria, and political instability in Libya. Consequently, Russia has emerged as Italy’s primary gas supplier. In 2021, Italy received 28 bcm of gas from Russia, constituting 40% of its total gas imports. To ensure a secure supply, Italy has entered into long-term contracts with multiple gas suppliers, including Russia

⁷⁸ PIER PAOLO RAIMONDI, “Natural Gas in Italy: Features and Perspectives in Light of Russia’s War in Ukraine,” ed. IAI - Istituto Affari Internazionali, September 28, 2022.

⁷⁹ Among them, 10 bcm come from liquefied natural gas.

(contract expiring in 2035), Algeria (contract expiring in 2027, with an additional two years), Libya, Norway, Qatar, and Azerbaijan. Namely, the two thirds of these contracts last more than 20 years⁸⁰.

Nowadays, Italy receives gas through six entry points via pipelines and three LNG regasification terminals. In response to energy security concerns and a diversification strategy, Italy has invested in further import infrastructure during the last twenty years. These additions include the Greenstream pipeline from Libya in 2004 and the TAP pipeline from Azerbaijan in 2020. Additionally, Italy has increased its regasification capacity, particularly with the construction of the Adriatic LNG terminal in 2009 and the OLT LNG Toscana terminal in 2013. Furthermore, there is an onshore regasification facility in Panigaglia, with a processing capacity of 3.5 bcm annually. In July 2023, the Piombino regasification facility became operational, with the Golar Tundra ship contributing significantly to the domestic energy demand. This brings Italy's total regasification capacity to over 25% of the domestic demand. Ravenna is also slated to host a regasifier ship, the BW Singapore, acquired by Snam, but it will come into operation between July and September 2024⁸¹.

These delays have played a part in Italy's heavy reliance on Russian gas and the Ukrainian transit route. However, Russia's conflict in Ukraine and its decision to use gas supplies as a political tool have brought a significant shift in both the energy and political landscapes. Since hydrocarbon volumes from Russia began to flow, Russia has always been considered as a reliable gas supplier. Over the years, Russia and Europe had cultivated a resilient energy relationship that had weathered previous crises, spanning from the Cold War to the gas disputes in 2006 and 2009.

Russia's actions in Ukraine prompted European (including Italian) policymakers to address their excessive dependence on Russian gas and the strategic vulnerability it entailed. In response, Italy swiftly engaged in diplomatic efforts to establish agreements with alternative gas suppliers, both through pipelines and liquefied natural gas, with the aim of reducing reliance on Russian gas⁸².

The Italian response to the crisis has moved in synergy and consistency with the initiatives and measures taken in the EU and has consisted of measures to ensure a high

⁸⁰ PIER PAOLO RAIMONDI, "Natural Gas in Italy: Features and Perspectives in Light of Russia's War in Ukraine," ed. IAI - Istituto Affari Internazionali, September 28, 2022.

⁸¹ IEA. *Italy 2023 - Energy Policy Review*, May 2023.

⁸² PIER PAOLO RAIMONDI, "Natural Gas in Italy: Features and Perspectives in Light of Russia's War in Ukraine," ed. IAI - Istituto Affari Internazionali, September 28, 2022.

filling of storages, diversify the origin of imported gas, increase regasification capacity, enhance domestic production, and reduce gas and electricity consumption.

The Regulation (EU) 2022/1032 of June 29, 2022 set a target for member states to fill gas storage facilities by 80 % by Nov. 1, 2022, and for 90 % by Nov. 1 of each year starting in 2023.

At the national level, Decree Law No. 17/2022, converted, with amendments, into Law No. 34/2022, set a target of at least 90% fill level (considering the usable and available capacity, 10.8 billion cubic meters) as early as 2022 and, during the winter delivery cycle, maintaining of the filled state. To this end, the following measures have been taken:

- holding weekly auctions to allocate storage capacity and incentives for participation, such as hedging the price risk between gas prices during the injection period and prices during the winter delivery period, through two-way contracts for difference and the so-called “premium stock”;
- the purchase of natural gas, by the GSE, for its storage and subsequent sale, for 4 billion euros;
- the establishment of a filling service of last resort, provided by Snam, for the acquisition of gas functional to achieve the objectives⁸³.

Throughout 2022, Italy conscientiously pursued its strategy to diversify its gas supply sources, leading to a significant reduction in its reliance on Russian gas, which dropped from 40% to 19.3% within the same year. Key agreements were entered to increase gas imports from Algeria, which emerged as Italy’s primary partner in 2022, along with Azerbaijan, the United States, and Norway.

This strategy encompassed the utilization of existing import infrastructure such as the Trans Adriatic Pipeline (TAP), Transmed pipeline, Greenstream pipeline, and LNG regasification terminals. Additionally, investments were undertaken to ensure the transportation of gas from Southern Italy to the Northern regions and neighboring interconnected countries through projects like the Adriatic pipeline, doubling the TAP capacity, and expanding regasification facilities.

Furthermore, the Italian government actively pursued an increased volume of LNG imports, fostering agreements with countries like Egypt, Qatar, Congo, and other nations,

⁸³ Camera dei deputati, Servizio studi, XIX Legislatura, “*Politiche per La Sicurezza Energetica*,” February 8, 2024.

including Angola, Nigeria, Indonesia, Libya, and Mozambique. In the year 2023, the volume of gas entering through the Tarvisio entry point, the primary route for Russian imports, dropped significantly during the first seven months, decreasing from 10.5 bcm in 2022 to 2.3 bcm, leading to a considerable decline in the proportion of total natural gas imports from 24% to 6%.

Hence, the replacement of Russian gas became feasible through increased imports via the Algeria pipeline and a significant upsurge in liquefied natural gas (LNG) imports⁸⁴.

2.4. Liquefied natural gas

The beginning of the twenty-first century witnessed a significant shift in energy markets. This transformative period was marked by the emergence of new energy powers, the discovery of new energy sources, and advancements in technologies facilitating the exploration and transportation of gas and oil that were previously economically unviable. At the heart of these market dynamics was the rapid development of unconventional gas and oil, notably exemplified by the “American shale revolution” in North America.

The surge in gas production in the United States and the launch of American liquefied natural gas (LNG) exports, contrary to earlier expectations of substantial US gas imports, led to a newfound abundance of natural gas in global markets. This surplus, combined with the increasing of LNG trade, allowed for the transportation of gas in substantial quantities over long distances across oceans to various regions worldwide. Even before the rise of shale gas, another transformative force was shaping gas markets: the expansion of LNG trade. This development facilitated the delivery of large gas volumes across different regions, contributing to the interconnection of various regional gas markets.

The evolving landscape suggests that we are approaching the threshold of a truly global gas market. Although uncertainties, environmental considerations, and market forces may pose challenges or opportunities, the long-term outlook for gas markets is undergoing a profound transformation.

The trade in LNG is poised to exert a particularly notable influence on the evolution of a global gas market and the degree to which gas is perceived as a highly liquid commodity. Anticipated repercussions of the substantial surge in natural gas volumes entering the market between 2016 and 2018, notably the substantial increase in LNG production from

⁸⁴ Ibidem

the United States and Australia referred to as a “tsunami”, encompass a dismantling of regional pipeline monopolies and heightened competition. This shift signals a departure from exclusively linking gas prices to oil prices, fostering a more diversified gas trade where both traditional and new buyers are no longer reliant on a select few countries for gas supplies. Additionally, the influx of flexible gas volumes is expected to mitigate price volatility by enhancing responsiveness to fluctuations in supply and demand⁸⁵.

Liquefied natural gas has emerged as the dominant force in international energy trade, experiencing unprecedented growth in recent years. From 2008 to 2020, LNG trade exhibited an annual increase of 6.2%, outpacing the 2.3% for crude oil and 4.2% for coal. Concurrently, interregional pipeline trade saw a decline of 0.4% per year.

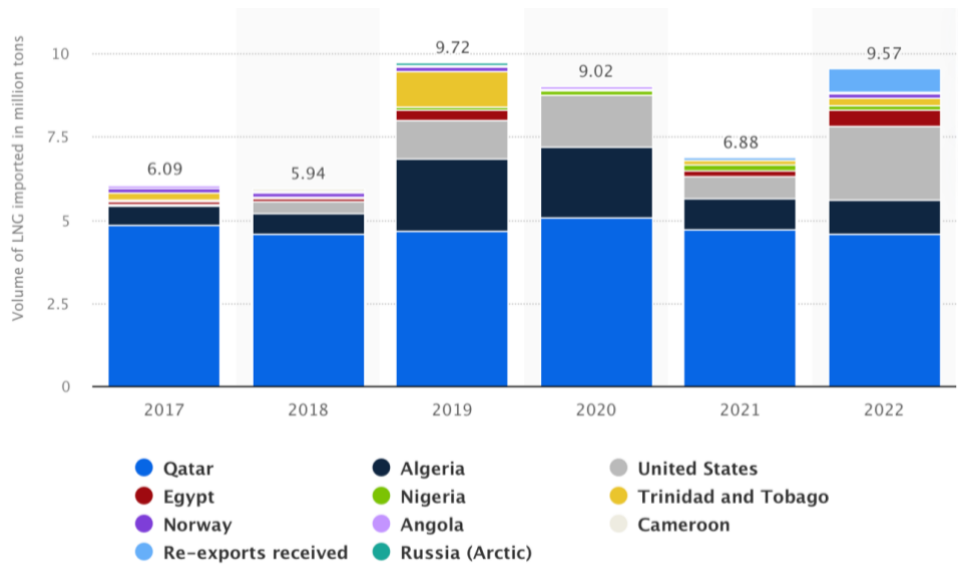
The LNG surge has not only reshaped the dynamics of the gas market but has also transformed its geopolitical landscape. As segmented regional markets integrate into a global gas market, similarities with the crude oil market become increasingly evident. The vital role of LNG in linking exporters to importers facing challenges in accessing pipelines is undeniable. In Europe, where infrastructural connections have roots in the Soviet era, LNG has traditionally played a secondary role to pipelines. However, when geopolitical challenges outweigh geographical opportunities, escalating the costs and risks of supplies, the appeal of LNG grows, despite higher prices and infrastructural constraints, notably the availability of regasification terminals that must be addressed⁸⁶.

In Italy, liquefied natural gas has experienced swift growth in its share of imports, mainly due to the influx of LNG carriers from Qatar, the world’s second-largest exporter after the United States. Italy annually imports 6.5 bcm of liquefied gas from Qatar through a long-term contract signed by Edison, constituting slightly over 10% of total gas imports from abroad. Additional supplies offering more competitive prices, are expected from North Africa – both Algeria and Egypt – and particularly from the United States.

⁸⁵ AGNIA GRIGAS, *The New Geopolitics of Natural Gas*, Cambridge, Massachusetts, Harvard University Press, 2017.

⁸⁶ LEONARDO BELLODI, *Gas E Potere. Geopolitica Dell’energia Dalla Guerra Fredda a Oggi*, ed. LUISS University Press, 2022.

Figure 16. Volume of liquefied natural gas (LNG) imported into Italy from 2017 to 2022, by country of origin (in million tons)



Source: The International Group of Liquefied Natural Gas Importers, 2023.

In the past year, the United States, became leaders in LNG market after the shale gas revolution, increased the number of LNG cargoes arriving in Europe during the peak of the winter crisis in 2021-2022. This contributed to counterbalance the reduction in supplies from Russia.

LNG exports started in April 2016, and since then, over 64 bcm of LNG have been exported, to Europe, experiencing significant growth due to rising prices. By mid-December 2021, numerous cargoes originally destined for Asian markets altered their course midway to seize new profit opportunities in Europe. In January alone, the European Union received 47 shipments of American LNG, marking a monthly record of 4.4 bcm. This contrasts with the 248 landings totaling 22 bcm for the entire year of 2021, which had already seen record-breaking figures.

In February 2021 the former Prime Minister Mario Draghi affirmed that “the outlook is very encouraging” expressing gratitude to U.S. President Joe Biden for his willingness to “assist allies with increased supplies”. Subsequently, on March 21, the U.S. Department of Energy announced its approval of additional exports to Europe from the two major facilities located on the Gulf Coast – Sabine Pass (Louisiana) and Corpus Christi (Texas), the latter having recently undergone capacity expansion. However, obstacles and potential risks abound, particularly in terms of infrastructure, as highlighted by the Prime Minister Draghi himself, who pointed out that “our ability to use LNG is restricted by the

limited number of functioning regasification terminals”. This challenge is not exclusive to Italy but extends across Europe. Only a few EU countries have the capability to receive LNG from LNG carriers, regasify it, and integrate it into their networks, possibly sharing the gas with partners—a strategy in alignment with Brussels’ integrated approach. These countries include Belgium (1 terminal), France (4), Greece (1), Poland (1), Portugal (1), and Spain (7, with 6 in operation)⁸⁷.

In Italy, there are currently three operational regasification terminals: the onshore facility in Panigaglia, located in the province of La Spezia, built at the beginning of the 1970s with a maximum annual capacity of 3.5 bcm. In 2022, this plant regasified over 2 bcm. The Adriatic LNG terminal, an offshore facility off Porto Viro in the province of Rovigo, with a maximum annual capacity of 8 bcm of gas; and the OLT terminal, a Floating Storage and Regasification Unit (FSRU) situated in the Tyrrhenian Sea off the coast between Livorno and Pisa, with a maximum annual capacity of 3.75 bcm. Additionally, there are two regasification ships in Piombino and Ravenna. The first has been operational since May, while the second is scheduled to start operations in the fall of 2024.

Italy is increasing its LNG imports to enhance flexibility and diversify its energy sources. The Draghi administration has entered into agreements with various LNG-exporting countries to secure additional future LNG supplies. The expansion of Italy’s LNG import capacity is necessary for accommodating these additional imports, although it presents challenges such as economic costs, construction time, and social acceptability. Building land-based LNG import terminals is a long lasting and expensive process, typically requiring at least five years for completion.

The Italian government has authorized Snam to acquire two FSRUs. In June 2022, the company successfully acquired the first FSRU, Golar Tundra, boasting a regasification capacity of 5 bcm/y. This facility was positioned in Piombino, strategically positioned near regions with high gas consumption, aiming to prevent potential bottlenecks resulting from changes in gas flows, such as reduced volumes from the North/West. Although initially intended for deployment in Piombino, there has been opposition from the citizens⁸⁸ to the project, potentially posing a challenge to the broader objective of enhancing national energy security. The operational start of Golar Tundra began in the spring of 2023. In July 2022, Snam secured the acquisition of a second FSRU, BW

⁸⁷ Ibidem

⁸⁸ “ANSA, “Gas: Manifestazione a Piombino per Dire No al Rigassificatore”, August 27 2022.

Singapore, with a regasification capacity of approximately 5 bcm/y. This FSRU is designated for deployment in the upper Adriatic Sea, near the coast of Ravenna. Snam has confirmed that operations are set to begin in the third quarter of 2024⁸⁹.

In the past ten years, Italy has taken steps to diversify its gas supply routes and sources, augmenting the flow of both LNG and pipeline import infrastructure. This strategic move has effectively mitigated the nation's heavy reliance on Russian gas, bringing it down to approximately 3% of total gas imports by November 2022. By actively reducing the overall demand for natural gas through an expedited shift to alternative energy sources and a heightened emphasis on energy efficiency, Italy aims not only to enhance its energy security but also to align with emissions reduction goals.

2.5. Hydrogen

According to the International Renewable Energy Agency (IRENA), hydrogen is the oldest, lightest, and most abundant element in the world. It can be found naturally in various elements, including water and fossil fuels⁹⁰.

After multiple unsuccessful attempts, hydrogen is currently emerging as a promising and significant factor in extensive decarbonization efforts. The landscape has been marked by a surge in pilot projects, the formulation of national hydrogen strategies, and the establishment of international collaborations. The International Energy Agency (IEA) emphasizes that achieving net-zero emissions by 2050 requires a substantial increase in hydrogen consumption, rising from 87 MtH₂ in 2020 to 528 MtH₂ in 2050. This would account for roughly 10% of overall energy consumption and result in a 6% decrease in combined emissions from 2021 to 2050⁹¹.

Currently, there is a renewed emphasis on hydrogen as a substitute for natural gas in heating and as a viable fuel cell option, particularly as an alternative to electric vehicles. Despite being the most abundant element, hydrogen rarely exists in its pure form and is usually obtained by breaking up molecules. Presently, the majority of hydrogen is produced from natural gas and coal, where natural gas molecules, containing one carbon atom and four hydrogen atoms, serve as a typical source. Electrolysis, involving an

⁸⁹ BW Group, "Snam Purchases New Floating Regasification Unit from BW LNG to Contribute to Italy's Energy Security and Diversification," BW Group, July 6, 2022.

⁹⁰ IRENA, "Geopolitics of the Energy Transformation: The Hydrogen Factor," January 2022.

⁹¹ GIULI, MARCO. "Italy in the International Hydrogen Economy." IAI - Istituto Affari Internazionali, February 26, 2022

electric current passing through water, is another method of hydrogen production, and this electricity source can be renewable, utilizing excess energy generated by wind and solar power. However, achieving widespread adoption will require technological advancements, cost reductions, and investments in infrastructure.

The majority of hydrogen produced today is “grey” hydrogen, or hydrogen derived from fossil fuels, most notably via gasifying coal or steam methane reforming natural gas. The 95% of the hydrogen produced today comes from these fossil fuel-based production technologies, which have a significant carbon footprint and are incompatible with the goal of net zero emissions⁹².

Hydrogen has the potential to become a significant player, constituting 10 % or more of the energy mix in the future. Some experts draw parallels between the current state of hydrogen development and the early stages of renewables two or three decades ago. Notably, hydrogen appears to be free from significant geopolitical issues, positioning itself as a tool for nations to achieve ambitious decarbonization goals or as an export opportunity, potentially evolving into a globally traded commodity⁹³.

2.5.1. Hydrogen renaissance in Europe

In Europe, the interest in hydrogen as a solution for decarbonizing challenging industrial processes and economic sectors is rapidly gaining momentum, especially in the aftermath of the Russo-Ukrainian war, providing a means to reduce reliance on Russian gas. To diminish the EU’s dependence on Russian fossil fuels, the European Commission introduced the REPowerEU plan on May 18, 2022, which, among its goals, aims to set a target of producing 10 million tons of renewable hydrogen domestically and importing another 10 million tons of renewable hydrogen by 2030. Additionally, on March 16, 2023, the European Commission outlined tools through the European Hydrogen Bank (EHB) to encourage and support investments in renewable hydrogen production.

Hydrogen has the potential to enhance energy security by substituting domestically available resources for those that are imported. If local sources such as wind, solar, hydro, biomass, or geothermal energy are utilized for hydrogen production, it can contribute to reducing dependence on imported fuels. This shift could separate domestic

⁹² IRENA, “*Geopolitics of the Energy Transformation: The Hydrogen Factor*,” January 2022.

⁹³ YERGIN, DANIEL. *The New Map: Energy, Climate and the Clash of Nations*. New York: Penguin Books, 2020.

energy consumption from global market uncertainties, leading to a decrease in national energy import expenditures (Steinberger-Wilckens et al., 2017). According to IRENA's 1.5°C scenario, a significant portion of green hydrogen production in 2050 is anticipated to be used domestically rather than being traded internationally (IRENA, forthcoming-a). However, if natural gas is employed as the primary material for hydrogen production, it may have the opposite effect by potentially prolonging or even increasing natural gas imports. Countries that do not produce natural gas but opt to produce hydrogen from it might find themselves importing similar quantities of natural gas through pipelines or LNG terminals as they did before. While gas-exporting nations could choose to export blue hydrogen directly, this does not alter the energy security equation significantly for importing countries. Existing dependencies on imports might persist or intensify due to continued reliance on a commodity susceptible to geopolitical and market fluctuations⁹⁴.

In Italy, the government intends to inaugurate the decarbonized hydrogen market through the implementation of approximately 5 GW of electrolysis capacity by 2030. This endeavor involves seamless integration with imports or alternative forms of low-carbon hydrogen. This strategic initiative is poised to present a viable solution for the decarbonization of processes in sectors such as synthetic chemistry and oil refining, currently reliant on hydrogen derived from fossil sources. The commitment to accelerated hydrogen development is also evident in the National Recovery and Resilience Plan, allocating a total of 3.64 billion euros explicitly for projects related to hydrogen development⁹⁵.

Italy has intensified its policy emphasis on hydrogen development in recent years. The natural gas crisis triggered by Russia's invasion of Ukraine has elevated the significance of hydrogen, not just as a means for decarbonization but also as an alternative energy carrier aimed at bolstering supply security.

The Italian government believes that Italy has the potential to advance its sizable gas infrastructure and networks to emerge as the hub of hydrogen production in Europe. Furthermore, Italy could act as a bridge between Europe and North Africa and promote hydrogen production from solar energy at a lower cost. The preliminary hydrogen

⁹⁴ IRENA. "Geopolitics of the Energy Transformation: The Hydrogen Factor," January 2022.

⁹⁵ Ministero dell'Ambiente e della Sicurezza Energetica, Dipartimento Energia, Direzione Generale Infrastrutture e Sicurezza. "La Situazione Energetica Nazionale Nel 2022." July 2023.

guidelines propose progressively converting natural gas infrastructures for transportation and distribution of gas-hydrogen mixtures and eventually pure hydrogen⁹⁶.

Italy, being an export-driven economy with a substantial manufacturing sector, presently utilizes hydrogen (480,000 tH₂/yr) predominantly for ammonia production and hydrocracking in the refining industry. The existing market for hydrogen, largely of the grey variety, is well-established within the chemical and refining sectors, providing a strong foundation to stimulate demand for clean hydrogen⁹⁷. The crisis triggered by the war in Ukraine has prompted the European Union and its Member States to substantially revise their energy supply policies, aiming to diversify the source and origin of identified energy vectors. In the REPowerEU plan, the renewable hydrogen has been identified as one of the six key components to decrease fossil fuel consumption, with the Commission dedicating an entire section of the plan to hydrogen. It sets a target of 10 million tons of domestic renewable hydrogen production and 10 million tons of imported renewable hydrogen by 2030. The Commission also underscores the need to expedite the development of hydrogen infrastructure for production, import, and transport to ensure the achievement of the specified targets by 2030⁹⁸.

2.5.2. Italy's energy transition and investment plans

The integrated National Energy and Climate Plan (NECP), also known as PNIEC (Piano Nazionale Integrato per l'Energia e il Clima)⁹⁹ acknowledges the significance of hydrogen, particularly green hydrogen, and underscores power-to-gas (P2G) technologies as a viable option for the long-term storage of renewable electricity. The plan emphasizes leveraging existing technologies and infrastructure assets, recognizing the positive impact of alternative gases in enhancing Italy's supply diversity¹⁰⁰. While exploring various possibilities, including blending as a transitional measure toward developing parallel infrastructures for gas and hydrogen, the PNIEC's

⁹⁶ IEA, *Country Review Italy 2023*. Paris, 2023.

⁹⁷ Georg Zachmann and Ben McWilliams, "A New Economic Geography of Decarbonization?" Bruegel | The Brussels-based economic think tank, November 8, 2021.

⁹⁸ Ministero dell'Ambiente e della Sicurezza Energetica, Dipartimento Energia, Direzione Generale Infrastrutture e Sicurezza, "La Situazione Energetica Nazionale Nel 2022" July 2023.

⁹⁹ NECP are 10-years integrated national energy and climate plans adopted by EU member states for the period 2021-2030 under the Regulation (EU) 2018/1999. See European Parliament and Council of the European Union, *Regulation (EU) 2018/1999 of 11 December 2018 on the Governance of the Energy Union and Climate Action*

¹⁰⁰ Marco Giuli, "Italy in the International Hydrogen Economy," IAI - Istituto Affari Internazionali, February 26, 2022.

specific target is outlined for the transport sector. It envisions hydrogen contributing 1% to the Renewable Energy Sources (RES) target for transport, equivalent to approximately 21,132 tH₂. Within this allocation, the PNIEC proposes that 80% could be injected into the existing grid following prior “methanation”, while the remaining 20% would be utilized in its pure form for buses and trains¹⁰¹.

Hydrogen holds a unique position in contributing to national environmental goals and establishing a more secure and reliable energy supply, especially when produced from renewable energy sources through electrolysis. In the Italian context, hydrogen can play a dual role in the long term, up to 2050: it can support decarbonization efforts alongside other low-carbon technologies, particularly in “hard-to-abate” sectors like high-energy-intensive production processes or aviation. In the short term, until 2030, hydrogen will progressively become competitive in selected applications such as chemistry, mobility, and oil refining, enabling the development of a national hydrogen ecosystem crucial for fully realizing its long-term potential. In the next decade, the Italian government envisions the application of hydrogen in transportation, especially in heavy-duty vehicles, railways, and industry, focusing on segments where hydrogen is already used, such as the chemical industry and oil refining. The blending of hydrogen into the gas network is also considered to anticipate and stimulate hydrogen market growth¹⁰².

The introductory statements within the document including the National Recovery and Resilience Plan, authored under the aegis of President Mario Draghi, distinctly underscore the pivotal role played by hydrogen within the comprehensive framework of reforms and investments endorsed by the Italian government in the summer of 2021. This strategic agenda has exerted a substantial influence on the policies and operational strategies of a majority of industrial entities and public institutions in recent months. The financial commitment earmarked explicitly for initiatives related to hydrogen development amounts to 3.64 billion euros. Hydrogen is also prominently featured in supplementary measures, primarily within the domain of research and development, with the overarching objective of fostering collaboration between academia, research institutions, and industry to expedite the deployment of productive and transport

¹⁰¹ Ibidem

¹⁰² Ministero dello Sviluppo Economico, “*Strategia Nazionale Idrogeno Linee Guida Preliminari*,” December 21, 2020.

applications¹⁰³. Indeed, research, development, and innovation represent three strategically relevant elements within the PNRR and in relation to the hydrogen sector¹⁰⁴. Production is envisioned in the so-called Hydrogen Valleys, which find economic space in the “Disused Industrial Areas” measure of the PNRR: an effort to combine the recovery of degraded or no longer efficiently used areas in favor of new energy production needs. Nationally, 450 million euros have been allocated in 2023 to projects in all regions. The demand for projects has exceeded the available resources.

The use of hydrogen in industry will be financed through the PNRR Hard-to-Abate measure, with a total of 2 billion euros dedicated to enabling energy-intensive industrial processes or converting processes from gray hydrogen to green hydrogen that already use H₂ as a raw material.

In the transport sector, approximately 35 funding requests for road refueling station projects have received approval, while resources for the implementation of hydrogen refueling points for trains have been allocated in the railway sector¹⁰⁵.

2.5.3. Navigating Italy’s hydrogen future: challenges and strategies

The potential for both demand and supply in Italy does not provide a straightforward indication of whether the country will serve as a net exporter or importer of clean hydrogen. This sets Italy apart from other European counterparts such as Spain and Portugal, clearly positioned as exporters, and Germany, the Netherlands, or Belgium, which are poised to become net importers. While Italy’s role in hydrogen trade is still uncertain, additional indicators shed light on the situation. Italy exhibits strength in infrastructure and international connectivity, suggesting a potential role as a regional transit hub between low-cost production in North Africa and the significant demand in North-Western Europe’s industrial clusters. However, the limited availability of storage presents a barrier to achieving the status of a regional hub. Conversely, Italy’s deficiency in fundamental technologies diminishes its export prospects in this field, which is likely to be overshadowed by German and Asian counterparts. In spite of this, the available

¹⁰³ Ministero dell’Ambiente e della Sicurezza Energetica, Dipartimento Energia, Direzione Generale Infrastrutture e Sicurezza, “*La Situazione Energetica Nazionale Nel 2022*,” July 2023.

¹⁰⁴ Ibidem

¹⁰⁵ Ibidem

material assets can be complemented by various supportive frameworks at the national, European, and multilateral levels.

There are notable challenges regarding the funding opportunities provided by the National Recovery and Resilience Plan and Italy's integration into the advanced and intricate European Union market, which is actively pursuing global leadership in hydrogen technologies. These challenges encompass Italy's delay in receiving political support and establishing regulations, a lack of consensus among the country's influential figures and stakeholders regarding the future of hydrogen, and specific contextual obstacles faced by potential hydrogen collaborators in Italy's neighborhood. If left unaddressed, these challenges could contribute to a perception of peripheral involvement in the continent's hydrogen future. To mitigate these risks, Italy must take various measures at both domestic and EU levels. Hence, these actions should focus on offering political guidance, identifying ways to reduce investment risks, adopting scalable and standardized options, and fostering a shared framework with key strategic partners¹⁰⁶.

2.6. Renewables energy

Daniel Yergin, in his book "The New Map", questioned "What will the energy landscape look like in the next two or three decades?"

It is evident that a significant reduction in carbon emissions will be a defining feature; however, the specifics of this system remain unclear. Presently, it appears that the energy system of the future will follow a diverse mix, albeit one that undergoes significant changes, much like its predecessors. This mix will vary considerably from country to country, but it will undoubtedly be more environmentally friendly than the current situation.

A proliferation of solar panels and wind turbines is expected in the future energy landscape. These energy sources are categorized as "modern renewables", as opposed to conventional renewables such as hydropower, wood, and biomass. These modern renewable resources are likely to play a critical role in achieving the environmental

¹⁰⁶ GIULI, MARCO. "Italy in the International Hydrogen Economy." IAI - Istituto Affari Internazionali, February 26, 2022.

objective of shifting from electricity generation that emits CO₂ to a carbon-free generation¹⁰⁷.

2.6.1. Italy's renewable energy landscape: achievements and challenge

The political agenda of the Italian government is centered on energy and climate change. The national energy and climate strategy has very high goals for renewables by 2030, with the aim of achieving 30% of total energy consumption and 55% of power generation from renewables (IEA, 2023). Italy has a firmly pro-renewables energy strategy. The country has successfully integrated significant amounts of variable renewable generation and has seen excellent growth in the renewable energy sector.¹⁰⁸ Facilitating the rapid implementation of renewable energy sources is crucial for Italy to transition to a low-carbon energy composition, diminish dependence on imported fossil fuels, and ultimately achieve carbon neutrality by the year 2050.

According to the IEA, Italy has to elevate its aspirations to align with the outlined objectives of the European Union's FF55 package, which advocates for a 40% proportion of renewables in the overall energy mix by 2030 for the EU as a whole. Additionally, the REPowerEU plan, introduced in May 2022, seeks to diminish the European Union's reliance on Russian fossil fuels by increasing the renewable energy share in the EU's gross final energy consumption to a minimum of 45% by 2030 (European Parliament, 2022).

Although Italy has witnessed growth in renewable energy utilization over the past fifteen years, the momentum has slowed in recent years. This deceleration is attributed to the gradual downward adjustment of generous incentives, protracted permitting procedures, a substantial administrative burden, and limited land availability. Various reforms are currently in progress to expedite the adoption of renewable energy technologies across electricity, transport, heating, and cooling sectors¹⁰⁹.

In 2022, renewable energy sources (RES) maintained their prominent role in the national energy system across all sectors.

¹⁰⁷ YERGIN, DANIEL. *The New Map: Energy, Climate and the Clash of Nations*. New York: Penguin Books, 2020.

¹⁰⁸ IEA (2023) "Italy - Countries & Regions."

¹⁰⁹ IEA. *Italy 2023 - Energy Policy Review*, May 2023.

In the electrical sector, preliminary estimates from TERNA-GSE indicate an overall electricity production from renewable sources of around 100 TWh for 2022. The significant decline compared to the previous year (-14%) is attributed to an exceptional contraction in hydropower production (-38%), driven by low rainfall and snowfall. Additionally, there were minor reductions in bioenergy production (-8%) and from wind and geothermal sources (both around -2%). Solar energy harnessed through photovoltaic technology exhibited a net growth (+12%), though insufficient to offset reductions in other sources. Consequently, the share of RES in the Gross Internal Consumption of electricity (CIL), estimated to be slightly lower than in 2021, experienced a decline from 35.3% to 30.6%.

For the first time, solar energy nearly equals hydropower in terms of contribution to the overall electricity production from RES (both around 28%). Wind energy follows at 21%, bioenergy at 17%, and geothermal energy at 6%. Estimates reveal that in 2022, around 4 billion euros were committed to the establishment of new renewable energy electricity production facilities, representing a substantial rise from the 2021 statistics. The majority of investments were directed towards the photovoltaic sector (approximately 3 billion euros) and wind energy (787 million euros).

Concerning the thermal sector, preliminary estimates for 2022 indicate an energy consumption from renewable sources (RES) of approximately 440 PJ (10.5 Mtep). Of these, 406 PJ stem from the direct use of sources, while the remaining 34 PJ are derived from heat¹¹⁰, for example, supplied by district heating systems. There is a decrease compared to 2021 amounting to -6%, attributed to the reduced use of firewood and pellets (2022 experienced a milder average temperature than the previous year). Conversely, the utilization of renewable energy supplied by heat pumps, encompassing energy extraction for space cooling, and energy generated by thermal solar collectors slightly increased in comparison to 2021. Estimates reveal that for 2022, investments surpassed 4 billion euros, with more than 3.2 billion euros dedicated to heat pumps.

With regard to the transportation sector, early evaluations for 2022 indicate a slight decline in the utilization of liquid biofuels (biodiesel, bioethanol, bio-ETBE) by 2.5% compared to the prior year. Concurrently, there is a notable surge in the

¹¹⁰ Thermal energy produced by energy conversion plants powered by renewable sources and intended for third-party consumption (e.g., biomass plants connected to district heating networks). The data includes both the heat produced by plants operating in a cogenerative configuration, as reported by TERNA, and the heat generated in plants solely dedicated to thermal production.

consumption of biomethane (+36%). The total energy content is approximately 1.57 Mtep. With respect to investment in new biomethane and advanced biomethane production facilities preliminary estimates reveal that investments that have benefited from the incentives provided by the Ministerial Decree of March 2, 2018, throughout 2022, amounting to approximately 250 million euros, marked a slight decrease compared to the previous year in 2021¹¹¹.

Italy not only achieved but exceeded its overall and sector-specific renewable targets for the year 2020, as stipulated by both the 2009 EU Renewables Energy Directive (RED) and Italy's National Renewable Energy Action Plan (NREAP). According to Eurostat definitions, the share of renewables in gross final energy consumption in 2020 reached 20.4%, surpassing the established target of 17%. Remarkably, Italy had already met this target six years in advance.

Bioenergy, encompassing both solid and liquid biofuels for direct utilization and electricity generation, emerged as the predominant renewable energy source, constituting 55% of the total renewables' consumption in 2021. Hydropower, ranking as the second-largest renewable source, revealed variable production dependent on temperature fluctuations and rainfall availability, contributing to 20% of renewables usage in 2021. However, the year 2022 was exceptionally dry, resulting in hydropower generation being 60% lower than historical averages, as reported by Assoidroelettrica (2022)¹¹².

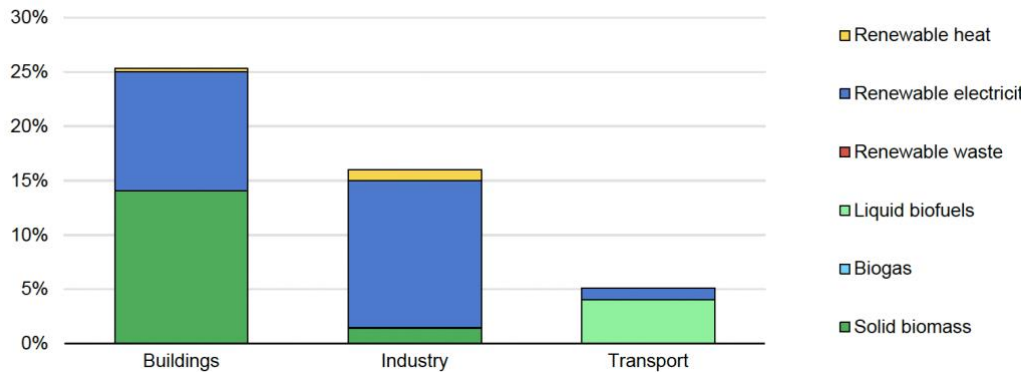
Renewable sources are predominantly employed in the building sector, meeting a quarter of its energy demand. They contribute to 16% of industrial energy consumption, as depicted in Figure 17, bioenergy is primarily utilized in the form of solid biomass for heating in buildings, with a considerably lesser application in industrial combustion. Renewables, predominantly in the form of liquid biofuels, account for approximately 5% of energy consumption in the transport sector. District heat derived from renewable sources comprises 1.0% of energy utilization in industry and 0.3% in buildings. Notably, biogas constitutes a mere 0.04% of Italy's Total Final Energy Consumption (TFEC)¹¹³.

¹¹¹ Ministero dell'Ambiente e della Sicurezza Energetica, Dipartimento Energia, Direzione Generale Infrastrutture e Sicurezza, "La Situazione Energetica Nazionale Nel 2022," July 2023

¹¹² IEA. *Italy 2023 - Energy Policy Review*, May 2023.

¹¹³ Ibidem

Figure 17. Share of renewables by end-use sector and source in Italy, 2021

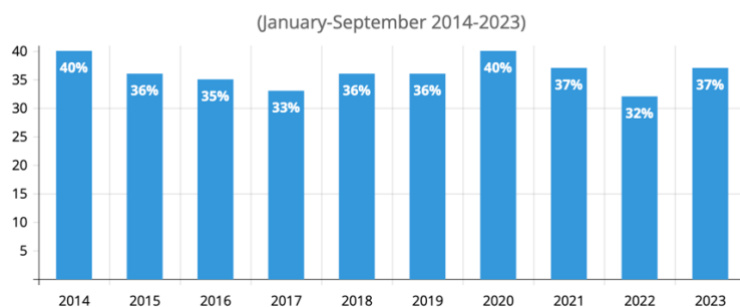


Source: IEA, 2022

Compared to 2022, in the first three quarters of 2023, renewable energy sources expanded by 10.9%, about 86 TWh, equivalent to 8.4 TWh over the previous year. An excellent contribution comes from hydropower with a production growth of 29.9%, accounting for approximately 6.3 TWh. Solar-generated energy increased by 9.6% and wind power by 3%.

As of now, 37% of the electricity demand in the three quarters of 2023 has been met by renewables, which is five percentage points higher than the same period of the previous year. Renewables accounted for 43.8% of domestic electricity production by the end of September.

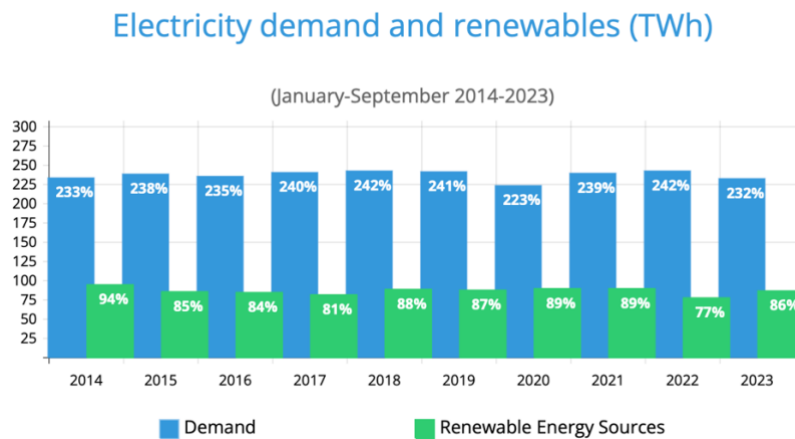
Figure 18. Share of renewables in electricity demand expressed as a percentage
Renewables % share of electricity demand



Source: Data from Terna monthly report, September 2023.

The graph below shows the electricity demand and renewable energy generation for the period from 2014-2023. The renewable energy generation decreased somewhat in comparison to previous years, partially due to a recovery in hydropower.

Figure 19. Electricity demand and renewables (TWh)



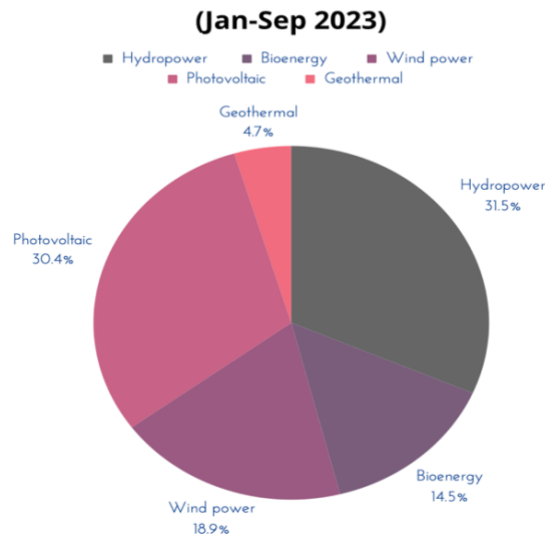
Source: Data from Terna monthly report (September 2023)

In the first nine months of 2023, photovoltaic electricity increased by 9.6 %, generating an extra 2.2 TWh compared to the January-September 2022 period (totaling 25.7 TWh by the end of September). Wind energy, on the other hand, only increased by 3.1%, adding 483 GWh.

Solar energy met 11.1 % of electricity demand so far this year (up from 9.7 % last year and 8.8 % in 2021). Wind energy contributed 6.9% (an increase from 6.4% in 2022 and 6% in 2021), while bioenergy and geothermal energy experienced a slight decrease. The chart portrays the proportion of various renewable energy sources utilized to meet the national electricity requirement during the initial nine months of the year.

Figure 20. Contribution of renewables to electricity demand expressed as a percentage

Contribution % renewables on electricity demand



Source: Data from Terna monthly report, September 2023.

According to the Terna surveys outlined in the monthly report, considering all renewable sources, the capacity increase in Italy for the first nine months of 2023 amounts to 3,911 MW. This figure represents a notable surge, surpassing the corresponding period in 2022 by approximately 1,900 MW (a 95% increase). Expanding the analysis to the last 12 months (from October 2022 to September 2023), the installed capacity has grown by 4,936 MW.

The recovery of production from renewable hydropower sources continues to progress significantly (+74.7%), along with a noteworthy expansion in photovoltaic capacity (+24.7%). There is also an increase in production from geothermal sources (+1.1%). Conversely, there is a decline in thermal power generation (-12.6%) and wind energy production (-4.4%)¹¹⁴.

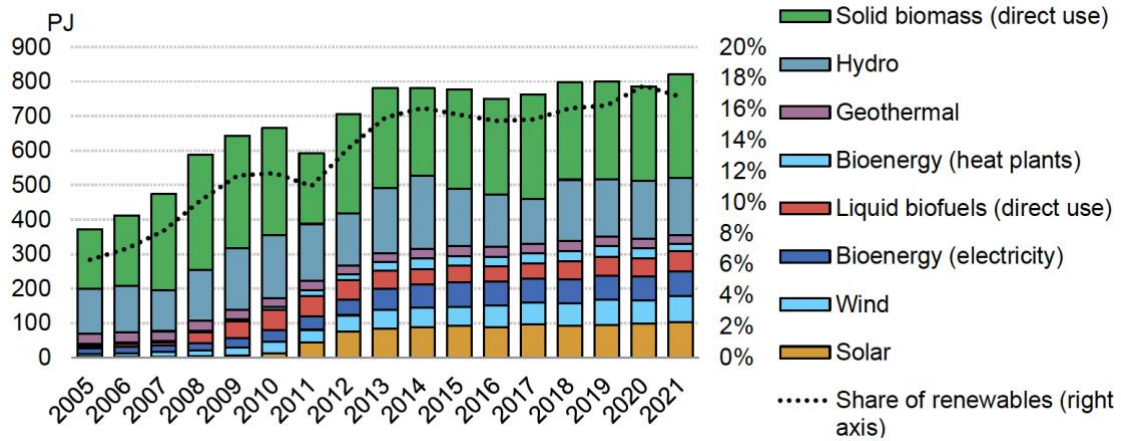
In Italy, the Total Final Energy Consumption (TFEC) was met by renewable sources more than doubled between 2005 and 2020. The proportion of renewables in TFEC rose from 7% in 2005 to 16% in 2014 and maintained a consistent level until 2021 as illustrated in the figure 21.

The growth of renewables was primarily driven by the electricity sector, experiencing particularly rapid expansion between 2010 and 2013. In 2020, the share of renewables increased to 18% of TFEC, attributed to reduced energy consumption during the COVID-

¹¹⁴ “Terna, “Terna: A Settembre Consumi Elettrici +0,5% - Terna Spa,” October 2023.

19 pandemic, while the use of renewable energy remained relatively stable compared to the previous three years. However, in 2021, the share reverted to 17%.

Figure 21. Renewable energy in total final energy consumption in Italy, 2005-2021



Source: IEA, 2022.

European Union member countries have set ambitious goals for the implementation of renewable energy facilities. They have opted for the use of wind and photovoltaic technologies to fulfill these targets in the power sector, both of which have experienced expansion in the majority of countries. Nevertheless, over the past 10 years, the majority of Member States have not maintained a consistent implementation of renewable energy technologies, resulting in intermittent use. This practice has caused several markets to perform below their potential. This is what emerges from RES Simplify, the European Commission’s final report on the development of policies for the simplification and implementation of administrative procedures concerning renewable energy installations.

The primary factor contributing to the underperformance of renewable energy sources was the presence of non-technical barriers. These included the lack of business cases, inadequate support schemes, entry barriers in the market, interferences related to administrative processes, and issues associated with the grid. Over the recent years, administrative (and grid) challenges have gained significance and urgency. Currently, administrative and grid-related concerns constitute approximately 46% of all recognized barriers, and this proportion is anticipated to increase in the future. Notably, for certain technologies like wind power and photovoltaics, there is a discernible trend where administrative hurdles surpass policy barriers linked to support schemes in terms of

importance. Business cases are becoming less reliant on support schemes due to declining technology production costs and the involvement of corporate off-takers entering the market through corporate power purchase agreements.

When market changes occur, the Commission asserts that administrative barriers, in particular, become more prominent and significant compared to other barriers.

The most significant obstacles are, as mentioned above, bureaucratic red tape, non-transparent procedures, a lack of legal coherence, and an incomplete and vague regulatory framework, which leads to different interpretations of the legislation by competent authorities and operators.

Additionally, the absence of adequate land-use planning is a particularly serious problem in some countries, such as the still unresolved issue of suitable areas in Italy. This may force developers to request changes in land use, leading to significant loss of time, resources, and major project delays. Furthermore, a separate issue arises when governing bodies employ land use plans to hinder the dissemination of particular technologies, such as wind energy¹¹⁵.

2.6.2. The impact of the Ukraine conflict on Europe's energy transition

Following the invasion of Ukraine by the Russian Federation, European governments and the European Commission swiftly underscored the necessity to increase the capacity of renewable energy. This is aimed at replacing gas imports from Russia and, more broadly, reducing dependence on fossil fuels. Although the effects of ongoing initiatives may not be immediate and are more likely to manifest in the medium to long term, the conflict in Ukraine suggests the potential for a substantial acceleration of the European Union's energy transition. This acceleration is a result of national and EU-level policy initiatives designed to promote renewable energy projects, infrastructure, and associated investments. In pursuit of this objective, European governments have allocated significant amounts of public funds¹¹⁶.

¹¹⁵ European Commission, Directorate-General for Energy, Tallat-Kelpšaitė, J., Brückmann, R., Banasiak, J. (2022). *Technical support for RES policy development and implementation : simplification of permission and administrative procedures for RES installations (RES simplify) : interim report*, Publications Office of the European Union.

¹¹⁶ PICCIARIELLO, ANGELA, OLIVIER BOIS VON KURSK, GREG MUTTITT, MOHAMED ADOW, ANDREAS GOLDTHAU, DIALA HAWILA, THIJS VAN DE GRAAF, ET AL. "The War in Ukraine and the Geopolitics of Energy Transitions." *Navigating Energy Transitions: Mapping the Road to 1.5°C*. International Institute for Sustainable Development (IISD), 2022.

The conflict in Ukraine, accompanied by subsequent sanctions and disruptions in the gas supply, poses a threat to global energy transition plans, particularly in the short term. Notably, the resurgence of interest in fossil fuel investments, following a period of low oil and gas prices, has led to their redirection to new countries to alleviate shortages resulting from sanctions and subsequent gas deficits. Concurrently, initiatives aimed at phasing out or reducing reliance on coal have been temporarily deferred to address immediate energy shortfalls. However, the long-term effects are in favor of an energy shift that is focused on renewable energy. This oil crisis, like the ones that occurred in 1973 and 1979 before it, has elevated energy security and independence to the top of the list of national objectives. In order to emphasize the necessity of sustainable and resilient energy practices, this includes placing a greater emphasis on addressing pollution, climate change, as well as water and food security.

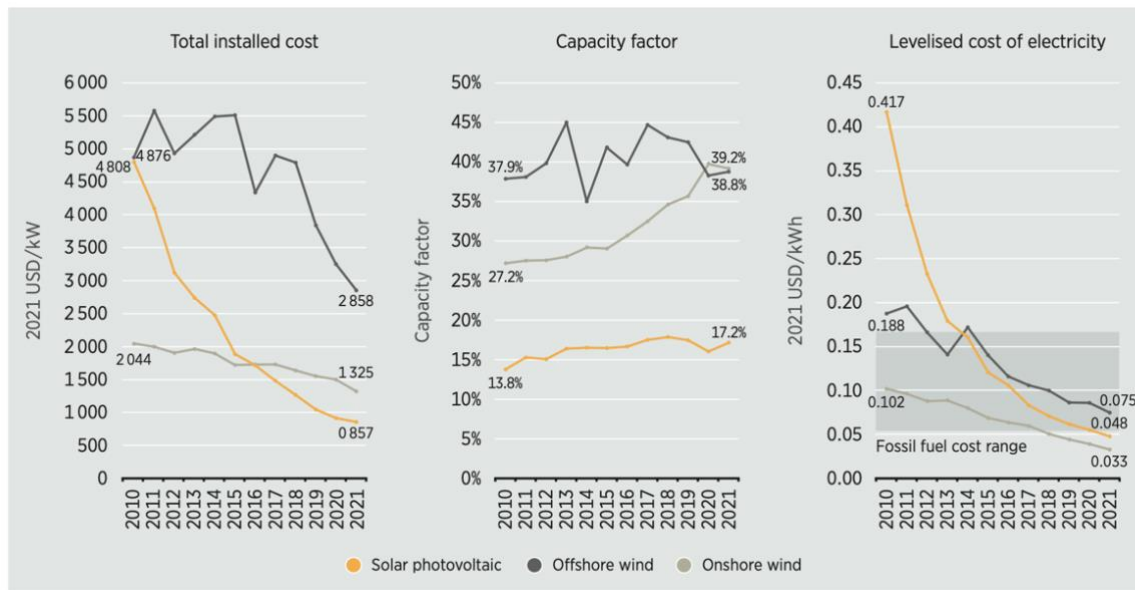
The discussion is no longer focused on whether renewable energy can meet those policy objectives, especially as renewables' cost-competitiveness has progressively increased in comparison to fossil fuels, especially with a recent price increase. Instead, as renewables' cost-competitiveness grows, the argument has switched to rising concerns that higher costs and supply chain disruptions are putting an unprecedented pressure on the industry, especially as policy tools continue to focus on price controls. With the imminent crisis, crucial structural adjustments are reemerging, particularly those concerning the design of competitive procurement mechanisms and power markets for renewables¹¹⁷.

Despite growing material and equipment costs, the global weighted average cost of newly commissioned renewable energy projects continued to fall in 2021 (Figure 22), owing to a delay in these extra expenses being passed on to total installation costs. Many of the projects that were finished in 2021 had installed costs that were predetermined by contracts signed in prior years. Because of this, the effects of rising prices and costs were more pronounced in 2022 and are predicted to be more so in the years to come. The global weighted average levelized cost of electricity (LCOE), which measures the cost of generating electricity over a power plant's lifetime, decreased by 88% for newly commissioned utility-scale solar PV projects and by 68% and 60% for onshore and offshore wind, respectively, between 2010 and 2021, as the graph below illustrates¹¹⁸.

¹¹⁷ Ibidem

¹¹⁸ Ibidem

Figure 22. Global weighted average total installed cost, capacity factor, and LCOE of newly commissioned utility-scale solar PV, onshore and offshore wind, 2010 - 2021



Source: International Renewable Energy Agency, 2022.

Simultaneously, certain parts of the world witnessed a substantial surge in wholesale prices for gas and electricity as COVID-19 lockdowns eased and demand surged. According to estimates from IRENA, the increase in gas prices in 2021 suggests that the newly added renewable capacity in the same year could potentially result in a reduction of electricity generation costs by at least USD 55 billion in 2022 (IRENA, 2022).

Following the gas shortages and sanctions, energy prices kept rising. In 2022, the price of fossil fuels increased, which had a dual effect on renewable energy sources. Firstly, being renewables a more affordable and reliable source of energy, they have become even more attractive. Secondly, there is a chance to direct additional financial resources and windfall profits from the fossil fuel industry toward renewable energy initiatives. Renewable energy and other technologies related to the energy transition have gained support due to their growing cost-competitiveness; yet there is a chance that these efforts could backfire.

Delays in obtaining permits and licenses have long been identified as one of the primary obstacles to the widespread use of renewable energy, particularly in Europe. The goal of the REPowerEU Action Plan is to remove regulatory barriers that slow down the installation of solar and wind energy. The European Commission has suggested changes

to the Renewable Energy Directive (RED) and offered suggestions on how to deal with the lengthy and complicated regulatory process for renewable energy projects¹¹⁹.

2.6.3. Renewable energy targets and policies

The 2030 benchmarks outlined in the second EU Renewable Directive (RED II of 2018) and the PNIEC are characterized by their ambitious nature. Furthermore, Italy will raise them to conform to the EU FF55 package. Also, there is a potential for further increase to be consistent with the REPowerEU of 45% of renewables in gross final energy consumption throughout the EU by 2030. The Italian government projects that the utilization of renewables should escalate to nearly 37% of gross final energy consumption by 2030 to align with the FF55 objectives. This overarching target would necessitate corresponding increases in sectoral targets. Additionally, Italy's Energy Transition Plan (ETP) aspires to generate 72% of electricity from renewable sources by 2030. Looking ahead to 2050, the country's Long-Term Strategy (LTS) envisions that renewables should constitute 85-90% of gross final energy consumption to realize the net-zero goal.

In pursuit of the 2030 objectives, the PNIEC prioritizes the expansion of wind and solar electricity generation. Additionally, it emphasizes the development of offshore multipower systems, which integrate wind, floating photovoltaics (PV), and wave motion power. The PNIEC also advocates for the promotion of energy communities and agrivoltaics, the concurrent use of land for both PV installations and agricultural activities. Furthermore, the plan seeks to encourage the production and utilization of biomethane. To facilitate the realization of the PNIEC, the National Recovery and Resilience Plan earmarks approximately EUR 6.5 billion until 2026 for various projects related to renewables. This funding is directed towards upgrading and digitizing electricity grids, given the increasing generation from renewables and the heightened demand for electricity in various end-uses. The PNRR further outlines administrative reforms designed to stimulate investment, as detailed by the Government of Italy in 2021¹²⁰.

The PNIEC anticipates that renewable electricity generation will reach 187 TWh in 2030, up from 116 TWh in 2020. However, the International Energy Agency (IEA) projects a more modest increase of approximately 7.5 TWh between 2021 and 2023 under

¹¹⁹ Ibidem

¹²⁰ IEA, *Country Review Italy 2023*. Paris, 2023

current policies. This growth rate is insufficient to meet the 2030 target or significantly reduce dependence on Russian natural gas in electricity generation. In 2020, one-fifth of the country’s electricity generation, approximately 58 TWh, relied on Russian gas imports, marking the highest share among IEA countries. Consequently, there is a pressing need to expedite the implementation of the policies and measures outlined in the PNIEC and the National Recovery and Resilience Plan.

According to the PNIEC, the combined installed capacity of solar PV and wind would need to more than double between 2020 and 2030. Specifically, an addition of 31 GW of PV capacity and 8 GW of wind capacity is deemed necessary. The installed capacity of other renewable sources is expected to remain constant. Meeting the PNIEC target entails an annual increase in renewable capacity of nearly 4 GW, on average, between 2020 and 2030. This represents more than three times the average yearly addition of 1.2 GW observed between 2015 and 2020 but aligns with the annual growth experienced in the first half of the last decade¹²¹.

Figure 23. Italy’s current renewables electricity capacity and 2030 indicative targets

Renewable electricity capacity (GW)	2022 status	2030 NECP targets	2030 FF55 target (provisional)
Variable sources	35.9	71	87
• PV	24.2	52	64
• Wind	11.7	19	23
Non-variable sources	27.4	24	27
• Hydro	22.8	19	
• Other (including biomass and geothermal)	4.6	5	
TOTAL	63.3	95	114

Source: IEA, 2023.

The government’s assessment indicates that meeting the more ambitious objectives outlined in the FF55 package will necessitate the addition of 58 GW of renewable electricity capacity by 2030. Among this, three-quarters are expected to be photovoltaic capacity. This entails an even more rapid annual average growth rate of 8 GW.

In 2021, Terna, the transmission grid operator in the country, had received requests for connections with a cumulative capacity of 168 GW for variable renewables. Half of these applications were for photovoltaic projects, 31% for onshore wind, and 19%

¹²¹ Ibidem

for offshore wind. In contrast to Terna's National Trend (NT) Italia scenario, a significant 90% of these applications pertained to plants situated in southern regions and on islands. While not all of these proposed plants will ultimately receive authorization, and there may be instances of double counting, the substantial number of applications underscores the considerable growth potential for renewable electricity.

As per the NT Italia scenario, the majority of the new PV capacity is projected to be installed in the northern part of the country. Conversely, there are no plans for wind capacity installation in the north and central-north regions due to suboptimal conditions for wind power in these areas. Wind energy is expected to continue dominating in islands and especially southern regions. Simultaneously, an additional 10 GW of electricity storage systems are anticipated to be installed by 2030, according to Terna's 2021 report. The anticipated increase in electricity generation from variable renewable sources, coupled with its uneven distribution across regions, will lead to heightened electricity flows from the southern regions and islands to the more demand-intensive northern part of the country. This, along with the projected decrease in fossil fuel-based capacity, could complicate power system balancing, emphasizing the importance of digitalization and intelligent management of the electricity system. Consequently, there is a pressing need to expand and enhance the transmission and distribution networks, in addition to investing in storage capacity¹²².

¹²² Ibidem

CHAPTER 3

THE ENERGY SECURITY IMPLICATIONS OF THE UKRAINIAN CRISIS IN ITALY

3.1. Shifts in the structure of the energy supply

The evolving geopolitical landscape and increasing apprehensions regarding energy security have prompted EU member states to thoroughly reconsider their energy portfolios. This has resulted in a swift acceleration of the transition process, focusing not only on decarbonization but also on diminishing reliance on external countries for energy. In this context, the ongoing conflict between Russia and Ukraine has already exerted and will continue to exert significant effects on the energy transition and the energy mix of member states.

Recent studies conducted by the Fondazione Eni Enrico Mattei for 2023 highlight the enduring impacts of the Russia-Ukraine war on the global energy system in the coming years. These factors include a decrease in the demand for oil and natural gas, a shift towards a more localized and environmentally friendly energy mix, and a diminished reliance on imported oil and natural gas. As a result, the energy mix is expected to become more decarbonized, with nuclear and renewable sources progressively replacing fossil fuels¹²³.

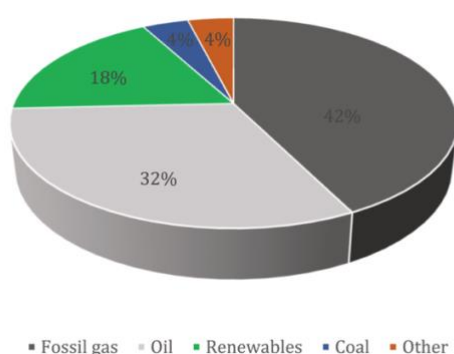
In recent years, the energy landscape of the European Union indicates that fossil fuels persist as the primary source of energy supply. Despite a roughly 8% decline in gross energy availability in 2020 compared to the previous year, the overall structure of the energy mix remained largely consistent. Oil retained its position as the primary energy source for the European economy, with natural gas following closely in second place. However, both oil and natural gas experienced reductions of approximately 12% and 2%, respectively, in 2020. In terms of renewable energy sources, their contribution showed a gradual expansion, surpassing the proportion of solid fossil fuels from 2018 onwards. Notably, solid fossil fuels experienced an 18% decrease in 2020 compared to the previous year¹²⁴.

¹²³ BP. “Bp Energy Outlook 2023 Edition,” 2023.

¹²⁴ IEA, “World Energy Outlook 2022 – Analysis - IEA,” IEA, October 2022.

Examining the supply side, Figure 24 emphasizes that Italy’s energy market continues to rely predominantly on fossil fuels. In 2021, natural gas (43%), imported oil (32%), and coal (4%) constituted the predominant sources, contributing to approximately 80% of the total energy requirements, while renewable energy made up 18% of the energy supply. Despite a declining trend in energy consumption between 2019 and 2020 due to the pandemic, Italy’s electricity demand is projected to steadily increase until 2024. Forecasts indicate that by 2024, energy consumption will exceed 307 TW-hours¹²⁵. Hence, it is imperative for the country to diminish its reliance on fossil fuels and allocate resources towards reliable and renewable energy alternatives. This is crucial in order to meet the country’s energy requirements, foster socio-economic progress, and facilitate a shift towards a more sustainable energy mix.

Figure 24. Distribution of Italy’s total primary energy supply by energy source in 2021.



Source: Enerdata, 2021.

Based on the REPowerEU plan, if all policy and legal measures are consistently put into effect, the overall energy consumption in the EU will fall by one-third by 2050. The Gross Inland Consumption¹²⁶ in 2019 amounted to 1437 million tons of oil equivalent (Mtoe). However, it is projected to decrease to 1097 Mtoe by 2030 and further decline to 1035 Mtoe by 2050. Energy efficiency initiatives, driven by increased prices, targeted policies, and consumer awareness, will further expedite this process.

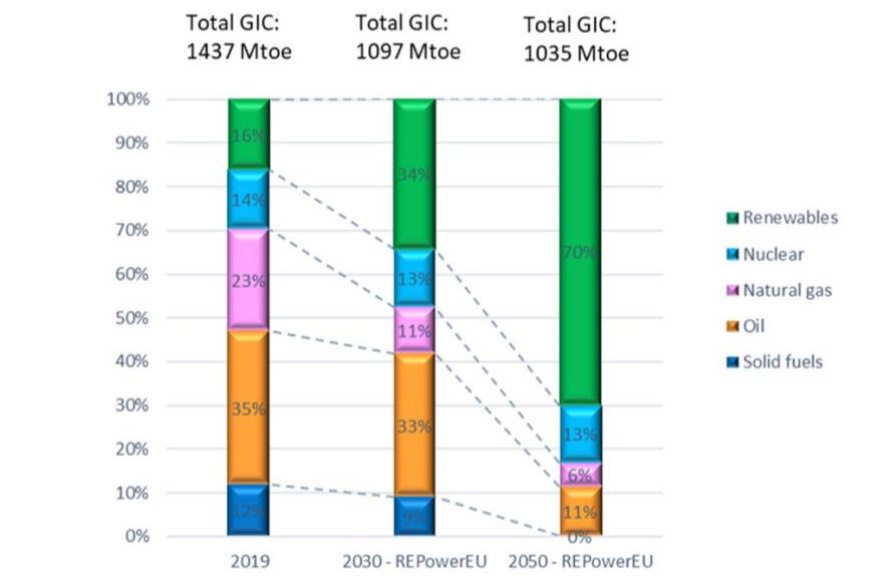
¹²⁵ Unione Energie per la Mobilità, Energy consumption in Italy from 2015 to 2021, by source (in million tons of oil equivalent), Statista (2022).

¹²⁶ Gross Inland Consumption refers to the total amount of a particular resource or product consumed within a country’s borders, without accounting for exports or subtracting imports. This measure is often used to assess the overall demand for goods or resources within a specific country.

The shift from fossil fuels to renewables in the energy mix is also foreseen to accelerate, dropping from 70% in 2019 to an estimated 53% by 2030 and further down to 17% by 2050. Projections indicate a 34% decrease in the demand for oil and a 36% decrease for coal by 2030 compared to 2020.

The increasing prominence of renewables in electricity generation is expected to gradually displace more expensive sources like coal and gas¹²⁷.

Figure 25. Energy sector: massive structural change with the green transition



Source: European Commission, 2023.

The invasion of Ukraine by Russia is expected to accelerate the decline in natural gas demand¹²⁸. It is projected that gross electricity generated from gas power plants will be 238.7 TWh lower (-67%) in 2030. Furthermore, the use of natural gas is expected to decrease significantly in residential and services sectors, with a projected 27 Mtoe reduction in gas use in buildings by 2030, equivalent to approximately 32 billion cubic meters of gas. The primary substitutes for natural gas involve the adoption of electrification, heat pumps, and the utilization of bio-methane conveyed through the existing gas infrastructure¹²⁹.

¹²⁷ MIGUEL GIL TERTRE, “Structural Changes in Energy Markets and Price Implications: Effects of the Recent Energy Crisis and Perspectives of the Green Transition” (European Central Bank , July 2023).

¹²⁸ According to the REPowerEU modeling, the full implementation of the Commission’s “Fit For 55” proposals would result in a 30% reduction in the EU’s gas consumption, equivalent to 100 billion cubic meters (bcm), by 2030.

¹²⁹ MIGUEL GIL TERTRE, “Structural Changes in Energy Markets and Price Implications: Effects of the Recent Energy Crisis and Perspectives of the Green Transition” (European Central Bank , July 2023).

However, the urgency to shift towards renewable sources is emphasized by projections indicating a substantial decrease in the demand for oil and coal by 2030. Italy, in particular, emphasizes the need to diversify its energy supply, as demonstrated by the distribution of its total primary energy sources in 2021 (see Figure 24).

The transition, however, leads to a new set of challenges. In fact, the shift towards green transition requires clean technologies that heavily rely on minerals. The majority of clean technologies demand substantial quantities of metals and minerals like copper, lithium, and cobalt, particularly in the transitional phase. According to the IEA, there will be a limitation on supply in the short and medium term due to increasing demand.

The reliance on a limited number of countries, notably China, for crucial raw materials – accounting for 98% of its rare earth supply and 93% of magnesium – raises concerns about the security and sustainability of the green transition. Europe’s heavy dependence on imports, coupled with the quasi-monopolistic control of some suppliers, intensifies the challenge, necessitating strategic measures to secure a stable and diversified supply chain¹³⁰.

3.2. Price fluctuations and market dynamics amidst the Ukrainian crisis

In recent years, the world has experienced two significant “Black Swan” events¹³¹, namely, pandemic and the conflict between Russia and Ukraine. While financial markets were still recovering from the impact of the former, Russia’s invasion of Ukraine in February 2022 marked the beginning of Europe’s largest conflict since World War II. After more than two years of dealing with the devastations caused by the pandemic, the global economic activities sharply decelerated due to Russia’s invasion of Ukraine¹³². This resulted in abnormal surges in commodity prices, heightened inflation to levels not seen in decades, worsened strain on supply chains, increased poverty, elevated policy uncertainty, reduced fiscal support in constrained financial environments, and heightened vulnerability in financial markets.¹³³ As an aftermath of the conflict, it was anticipated

¹³⁰ Ibidem

¹³¹ NASSIM TALEB, *The Black Swan: The Impact of the Highly Improbable*, New York, Random House, 2008).

¹³² RENATA KARKOWSKA AND SZCZEPAN URJASZ, “How Does the Russian-Ukrainian War Change Connectedness and Hedging Opportunities? Comparison between Dirty and Clean Energy Markets versus Global Stock Indices,” *Journal of International Financial Markets, Institutions and Money* 85 (June 2023).

¹³³ UN Environment Programme, “Global Impact of the War in Ukraine: Billions of People Face the Greatest Cost-of-Living Crisis in a Generation,” UNEP - UN Environment Programme, June 9, 2022.

that global economic growth, measured by real GDP, will decline from 5.7% in 2020-2021 to 3% in 2023-2024¹³⁴.

The conflict in Ukraine triggered a surge in price volatility across a broad spectrum of energy-related commodities, causing disruptions in global economic activities recalling those experienced during the oil shocks of the 1970s. Consequently, significant disruptions in energy trading and uncertainties regarding future supply have led to substantial increases in energy prices. The conflict's substantial impact on worldwide financial markets is primarily attributed to economic embargoes, resulting in inflationary pressures, and the difficulties of Black Sea ports, which historically served as the conduit for 90% of Ukraine's grain exports.

On February 24, 2022, global stock markets experienced notable declines. Noteworthy examples include a 5.06% decrease in the FTSE100 Index¹³⁵, a 4.84% drop in the CAC40 Index¹³⁶, a 4.96% fall in the DAX Index¹³⁷, a 5.15% decline in the FTSE MIB Index¹³⁸, and a staggering 37.61% decrease in the MOEX Index¹³⁹. Additionally, the S&P 500 index¹⁴⁰ underwent its first correction, witnessing a decline of approximately 10% from its peak on January 3. Furthermore, the Russia-Ukraine conflict had adverse effects on stock returns¹⁴¹.

It is noteworthy that natural gas holds a pivotal position as a clean energy source, being the cleanest-burning fossil fuel among its counterparts. Consequently, it uniquely contributes to accelerating structural transformations on the supply side of green and low-

¹³⁴ World Bank Group, "Global Economic Prospects," June 2023.

¹³⁵ FTSE stands for "Financial Times Stock Exchange". The FTSE 100 is a stock index of the 100 most capitalized companies listed on the London Stock Exchange.

¹³⁶ The CAC 40 is a stock index used by the Paris Stock Exchange and is the main French stock market index and one of the most important in the Euronext system.

¹³⁷ The DAX 30 was the segment of the Frankfurt Stock Exchange containing the 30 largest-capitalization stocks

¹³⁸ An acronym for Financial Times Stock Exchange Milan Index, the FTSE MIB is the benchmark stock index in Italy. It consists of a basket of 40 stocks from the Euronext Milan and Euronext MIV Milan markets, selected on the basis of capitalization, trading volume and sector. In most cases, these are securities issued by companies active in banking, insurance, and industry. The FTSE MIB index in Italy represents the strongest listed companies and concentrates most of the daily trading.

¹³⁹ The MOEX Index, also known as the Moscow Exchange Index, is an equity index representing the aggregate performance of companies listed on the Moscow Stock Exchange (Moscow Exchange). The Moscow Exchange is Russia's main stock exchange, where shares of Russian and international companies, bonds, derivatives, and other financial instruments are traded. The MOEX index is used to assess the overall performance of the Russian stock market.

¹⁴⁰ The S&P 500, or Standard & Poor's 500, is a stock market index that measures the performance of 500 of the largest publicly traded companies listed on stock exchanges in the United States. The index is widely regarded as one of the best indicators of the overall health of the U.S. stock market and, by extension, the broader U.S. economy.

¹⁴¹ SHENGMING CHEN ET AL., "The Russia-Ukraine War and Energy Market Volatility: A Novel Application of the Volatility Ratio in the Context of Natural Gas," *Resources Policy* 85 (August 1, 2023).

carbon energy. Additionally, natural gas supports environmentally friendly industrial operations; for instance, gas-run generators serve as a crucial dispatchable source of electricity, with a minimal oil footprint in electricity generation compared to the situation in the 1970s. The volatilities in financial markets have had a notable spillover effect on the ongoing expansion of the natural gas market during the contemporary era of carbon neutrality and energy transition.

While Europe's objective to reduce its reliance on natural gas in pursuit of "net zero" is a long-term endeavor, natural gas remains an essential and irreplaceable component in the short term¹⁴².

There are various ways in which the conflict is affecting the Italian economy. The sharp rise in prices of energy commodities and other goods has had and continues to have a substantial impact. Trade is significantly affected, particularly concerning the import of raw materials and semi-finished goods from the countries involved in the conflict. Additionally, there is a notable overall effect of uncertainty on the spending decisions of households and businesses. Lastly, it's important to consider the potential losses from direct investments in the three countries involved (namely Ukraine, Russia, and Belarus), as well as the risks associated with connections to the Russian financial sector¹⁴³.

The most notable consequence of the conflict is the significant increase in gas and oil prices lasting for several months. The start of the conflict has introduced substantial uncertainties in the supply chain, further amplifying financial tensions given Europe and Italy's significant reliance on Russian imports of these resources. Additionally, the surge in prices extends beyond energy commodities to include other non-energy items, particularly agricultural products. The disruption of production in Ukraine, leading to a global supply shortage, and uncertainty surrounding supplies from Russia contribute to the soaring prices of these commodities. These price hikes serve a dual purpose: i) increase the costs of production inputs for companies; ii) driving up consumer prices, particularly those related to energy, thereby diminishing households' purchasing power and, consequently, their expenditure capacity¹⁴⁴.

Following the Ukrainian crisis, Italy experienced substantial fluctuations in energy prices, marked by significant volatility and dynamic shifts in the energy market.

¹⁴² Ibidem

¹⁴³ Centro Studi Confindustria. Rapporti di previsione – *"L'economia italiana alla prova del conflitto in Ucraina - primavera 2022"*, 2022.

¹⁴⁴ Ibidem

The latter were influenced by a confluence of factors, including geopolitical risks, disruption in energy supply - offset by storage mechanisms, thus averting consequences for end consumers - and escalating global demand.

The escalation of hostilities in Ukraine had far-reaching effects on global energy markets, leading to increased volatility. Moreover, stringent sanctions imposed on key energy-producing countries heightened the market's sensitivity to geopolitical events.

The fluctuations in energy prices had broad implications across multiple sectors, impacting both businesses and individuals rather than being confined to specific commodities. To comprehend fully the energy security implications for Italy following the Ukrainian crisis, it is crucial to recognize the intricate interplay of these factors.

According to a study conducted by Centro Studi Confindustria (CSC), uncertainties regarding the imbalance between demand and supply of energy commodities have been compounded by an additional factor of criticality: the uncertainty about the duration of the energy shock, making the resolution of tensions in commodity markets more uncertain and nullifying expectations, preexisting the war, of a gradual decline in prices. Indeed, concerns about cuts or interruptions in supplies from Russia have further worsened the situation, casting a shadow - at least for Europe - of a potential supply deficit, especially for gas, leading to energy rationing¹⁴⁵.

The international economic scenario has been characterized over the past two years by an exceptional surge in commodity prices, reaching unprecedented peaks for a brief period following the outbreak of the war. The primary driver behind the spike in commodity prices has been natural gas, with its cost in Europe skyrocketing by 421% in August 2022 compared to December 2019. Within the energy commodity sector, both oil and coal prices also witnessed substantial increases, though notably more modest at +24% and +122%, respectively, in January 2022 compared to December 2019.

Energy commodity prices have surged due to several factors, including structural and conjunctural supply and demand imbalances that existed before the outbreak of the conflict in Ukraine. Among the countries that export fossil fuels, Russia is noteworthy because it supplies almost half of the gas, 44% of the coal, and about 25% of the oil that the EU imports. Consequently, the ongoing upward pressure on prices, that started in mid-

¹⁴⁵ FELICI, S., C. PUCCIONI, C. RAPACCIUOLO, E L. ROMANO. "L'impatto della corsa dei prezzi dell'energia sui costi di produzione: settori a confronto tra Italia, Francia e Germania." Nota dal CSC n. 2-2022.

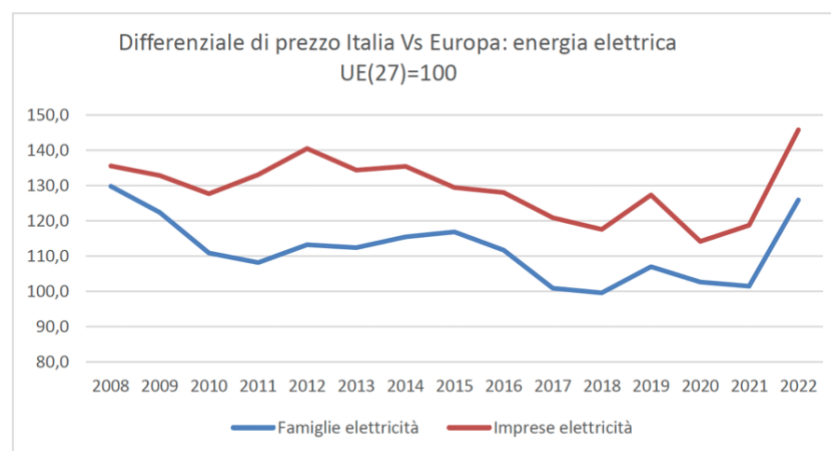
2021, has been exacerbated by the war, leading to a further spike in energy commodity prices¹⁴⁶.

In 2022, there has been a resurgence in the price of electricity in Italy and an expansion of the differential Vs. the EU average (See Figure 26), affecting both businesses and households. Therefore, there is a reversal of the trend that had shown a tendency towards a decrease in the gap starting from 2012 for businesses and from 2015 for households.

The price of electricity in Italy has been consistently higher than in the EU. The price differential is more pronounced for households than for businesses. In 2022, the electricity price for Italian households was around 140% of that of EU households, while the electricity price for Italian businesses was around 120% of that of EU businesses.

There are a number of factors that could contribute to this price differential, including the composition of the Italian energy mix, the structure of electricity markets and Italian energy policy¹⁴⁷.

Figure 26. Price differential between Italy and Europe for electricity.



* Rapporto tra i prezzi medi annui in Italia e nella UE27.

Fonte: Elaborazioni MASE su dati Eurostat.

Source: Ministero dell'Ambiente e della Sicurezza Energetica, elaboration on Eurostat data.

Figure 27 illustrates the prices observed in major European countries in 2022 for both households and businesses.

¹⁴⁶ Ibidem

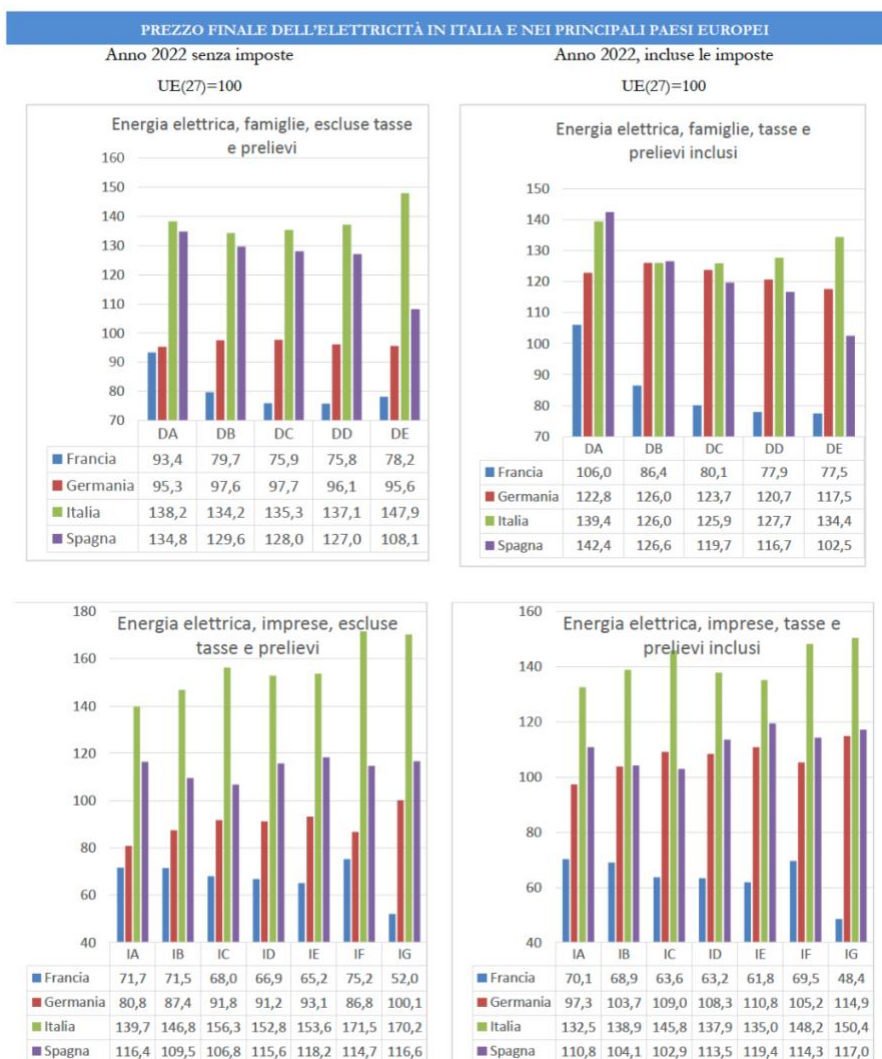
¹⁴⁷ Ministero dell'Ambiente e della Sicurezza Energetica, Dipartimento Energia, Direzione Generale Infrastrutture e Sicurezza, "La Situazione Energetica Nazionale Nel 2022," July 2023.

The upper graph shows the electricity price for households, while the lower graph shows the electricity price for businesses.

Here are some specific details to note on the graphs:

- in both the household and business graphs, Italy ranks as the most expensive country, followed by Spain, Germany, and France;
- electricity prices are generally higher for businesses than for households;
- electricity prices increased in all European countries in 2022, due to rising natural gas prices.

Figure 27. Final price of electricity in Italy and major European countries



Source: Ministero dell’Ambiente e della Sicurezza Energetica, Dipartimento Energia, Direzione Generale Infrastrutture e Sicurezza, “La Situazione Energetica Nazionale Nel 2022” July 2023.

Italian businesses and households have been severely impacted by the energy crisis that began in 2021. A more pronounced escalation of energy costs widens the competitiveness gap for Italian businesses. The data collected by the European Commission on energy markets reveals that in the third quarter of 2022, Italian small businesses paid the highest price for electricity among the 27 EU countries. The price was 44.6 % higher than the average European price, 58.0 % higher than the price paid by Spanish companies, and more than double (+105.8%) the price paid by French small businesses.

The 2022 quarterly report by ENEA, analyzing the Italian energy system, emphasizes that in the third quarter of 2022, electricity costs for non-domestic clients have continued to rise compared to the previous quarter. This suggests that on a yearly basis, there is a really substantial growth, reaching peaks of around 87% for smaller users.

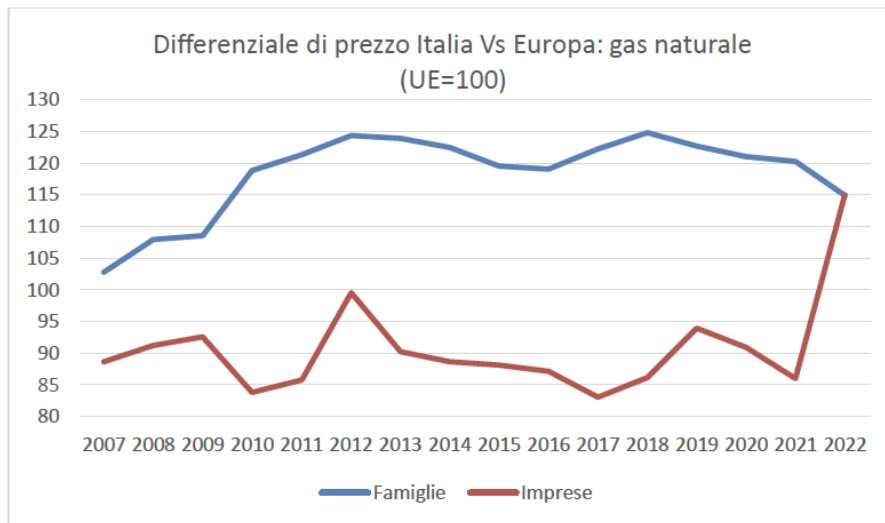
According to the analyses by Confartigianato, in 2022 the cost of electricity for micro and small businesses (MSMEs) increased by 18 billion euros compared to the previous year, while the cost of gas rose by 5.9 billion euros. Among the 27 EU countries, Italy ranks first in both energy inflation and electricity price growth rates. The latter, as of December 2022, stands at 165.4%, decelerating from +174.8% in November and +199% in October, compared to the +32.3% average for the European Union, +27.0% for Germany, and +7.3% for France¹⁴⁸.

As illustrated in Figure 28, with regard to the natural gas industry, Italian businesses had a significant rise in prices during 2022, resulting in a larger difference compared to the average costs in the 27 European countries. This gap increased from 86% points in 2021 to 115% points in 2022. For Italian households, the gap also remains high, albeit slightly decreasing from the previous year, from 120% to 115% points¹⁴⁹.

¹⁴⁸ ENRICO QUINTAVALLE, “Imprese E Famiglie Italiane Più Colpite in Europa Dalla Crisi Energetica,” ed. *Quotidiano Energia*, January 31, 2023.

¹⁴⁹ *Ibidem*

Figure 28. Price differential Italy Vs Europe: natural gas (EU=100)



* Rapporto tra i prezzi medi annui in Italia e nella UE27

Fonte: Elaborazioni MASE su dati Eurostat.

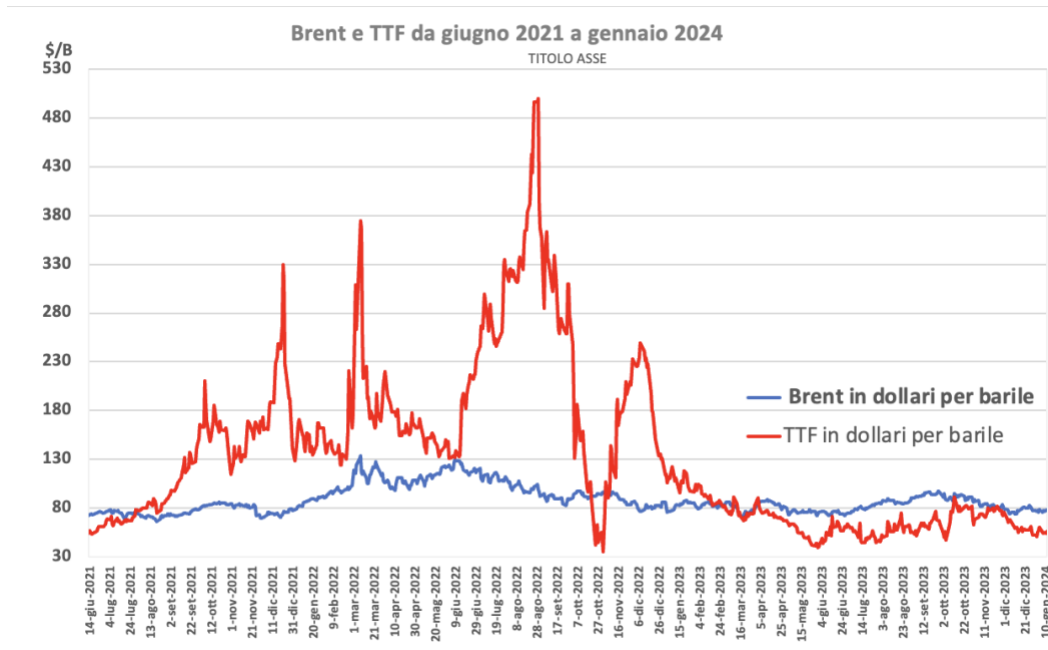
Source: Ministero dell’Ambiente e della Sicurezza Energetica, elaborations on Eurostat data.

In addition, to provide a visual context of the price fluctuations in key energy commodities - Brent oil¹⁵⁰ and TTF¹⁵¹ natural gas - during this crisis period, reference can be made to the attached graph (see Figure 29) which tracks the price development from June 2021 to 14 January 2024.

¹⁵⁰ Brent is the most traded oil in the world and taken as a benchmark by many oil majors. Brent is a mixed oil extracted from the North Sea subsoil. In the context of trading, in the markets in general, Brent is one of the benchmarks for oil, especially for the Middle East, Europe and Africa.

¹⁵¹ The TTF (Title Transfer Facility) stands as the primary virtual marketplace for gas trading in Europe, situated in Amsterdam, the Netherlands. This online platform facilitates the collaboration between natural gas producers and suppliers who buy it and resell it to end customers, citizens, and businesses, in the countries where they operate.

Figure 29. Oil (Brent) and TTF(natural gas) prices developments (June 2021 - 14 January 2024)



Sources: Brent: US EIA, Petroleum & Other Liquids; TTF: European Energy Exchange.

As shown in the graph, both prices increased significantly in 2022 due to the war in Ukraine and the subsequent energy crisis. The price of Brent reached a peak of USD 133.18 per barrel on March 8, 2022, while the price of TTF reached its highest point on August 30, 2022, hitting EUR 499.89.

The Brent Crude Oil prices experienced fluctuations during the considered time period. Starting on January 6, 2021, with a price of \$70.6 per barrel, the prices generally showed an upward trend until reaching \$89.75 on January 21, 2022. The market maintained relative stability with minor fluctuations until March 1, 2022, where a significant increase was observed, reaching \$110.93 per barrel. Subsequently, the prices displayed more volatility. On March 7, 2022, the rate surged to \$129.01 but then experienced a sharp decline to \$114.32 by March 18, 2022. The following months witnessed a series of continuous fluctuations, with prices ranging from \$71.03 on March 17, 2023, to \$86.56 on April 6, 2023. Notably, there was a period of stability from April 17, 2023, to May 10, 2023, with prices fluctuating around \$85. Overall, the Brent Crude Oil prices depicted a dynamic market influenced by various economic and geopolitical factors.

Over the observed period, an upward trajectory characterizes the natural gas market, marked by noteworthy fluctuations. Notably, there are distinct peaks and troughs, with a substantial surge in prices in the June to July 2021 period, followed by significant drops between October and December of the same year. The market displays volatility, notably in the period between August and September 2021, marked by substantial price changes.

In 2022, a prominent upward trend dominated, revealing a steady increase in natural gas prices that peaks around mid-2022. Moving into 2023, although fluctuations endure, the market maintains a relatively stable condition compared to previous peak periods. Towards the end of 2023 and the beginning of 2024, prices appear to stabilize, maintaining a relatively constant level and hinting at a potentially steady trajectory for the immediate future.

These trends in oil and natural gas prices provide further context for understanding the significant impact the energy crisis has had on the global economy, contributing to inflation, and making energy production more expensive.

3.3. Measures taken by the Italian government and industries

In response to the extraordinary increases in electricity and natural gas prices, particularly in countries heavily reliant on natural gas in their energy mix, such as Italy, national governments have implemented extraordinary measures since the second half of 2021 to alleviate the impact on consumers and businesses. Additional and broader measures were subsequently implemented in 2022, following Russia's aggression against Ukraine.

The majority of instruments adopted at the European level have favored fiscal and parafiscal levers, along with the strengthening of tools to protect the most vulnerable customers. In this regard, Italy, Spain, and France have also intervened by imposing ceilings on price hikes for a temporary period or employing mechanisms to extract extra profits from certain electricity producers with low or zero variable costs (including nuclear, hydroelectric, and renewable sources). Notably, Italy introduced a bilateral compensation mechanism designed to recapture excessive profits derived from the sale of electricity generated from renewable sources.

These measures, designed to mitigate the impact of rising energy prices on consumers and businesses have been supported by European institutions through a more flexible framework concerning state aid¹⁵².

Initially, in October 2021, the European Commission adopted the Communication “Response to rising energy prices: a package of intervention and support measures”. The document highlighted the possibility for Member States to assist those at greater risk of struggling with energy bill payments by funding related social support interventions through revenues derived from the EU Emissions Trading System (ETS). It also emphasized the option to implement targeted support measures to aid industries, in compliance with the State Aid framework, without distorting competition or interfering with the EU ETS. Essentially, the assistance interventions were required to be technologically neutral and non-discriminatory.

In early March 2022, following Russia’s aggression against Ukraine, the European Commission adopted a new communication titled “RepowerEU: Joint European action for safer, more sustainable, and affordable energy” to enhance the EU’s independence from Russian fossil fuels and address the surge in energy prices. In this context, there was an expressed intention to take full advantage of the flexibility in state aid to enable member states to support businesses and sectors severely affected by the current geopolitical developments¹⁵³.

On these grounds, at the end of March, a crisis temporary framework for state aid measures to support the economy following Russia’s aggression against Ukraine was adopted. This framework aimed to allow, until December 31, 2022, public support for liquidity to all businesses directly or indirectly affected by the crisis. This support includes the use of public guarantees on financing and public aid to high-energy-intensive businesses, enabling them to partially offset the increase in energy costs resulting from the price shock following the invasion.

The types of assistance to businesses adopted by the member states of the European Union have thus expanded, given the increased flexibility granted to them by the temporary framework. Extraordinary public guarantees have been introduced through SACE¹⁵⁴ and

¹⁵² Camera dei deputati, Servizio Studi, XVIII Legislatura, “*Le Misure Adottate Contro I Rincari Energetici*,” September 26, 2022.

¹⁵³ *Ibidem*

¹⁵⁴ SACE is an Italian state-owned company that specializes in providing export credit and financial services to support the internationalization of Italian companies. It offers insurance and financial products to help businesses manage risks and expand their global presence.

the SME¹⁵⁵ guarantee fund to address the liquidity needs of businesses associated with the rise in energy costs and raw materials. These interventions follow a model already adopted during the pandemic, utilizing the commitment limits of SACE and the resources allocated for the corresponding government guarantee that were previously earmarked and remained available¹⁵⁶.

As far as Italy is concerned, the measures were adopted – almost in their entirety—through emergency decrees. The first decrees date back to the first half of the year 2021. The legislative decrees referred to are legislative decree no. 73/2021, legislative decree no. 99/2021, and legislative decree no. 130/2021.

As for the year 2022, the measures were initially introduced through law no. 234/2021 (2022 budget law, Article 1, paragraphs 503-512) and subsequently through legislative decree no. 4/2022.

In the wake of the Russian aggression against Ukraine, the following legislative decrees were adopted: legislative decree no. 17/2022, legislative decree no. 21/2022, legislative decree no. 38/2022, legislative decree no. 50/2022, legislative decree no. 80/2022, legislative decree no. 115/2022, and, finally, legislative decree no. 144/2022.

Some of the key measures implemented include:

- allocating significant resources to temporarily reduce electricity and gas bills, mainly through initiatives that aim to compensate for the impact of general system charges on bills, which constitute a substantial portion of the total cost. In the electricity sector, this constitutes more than 20% of the annual expenditure for a typical domestic customer. In essence, these charges have been shifted from the end-user to public finances;
- strengthening tools to safeguard vulnerable customers;
- introducing installment payment options for energy bills for both domestic users and businesses located in Italy;
- implementing fiscal interventions such as tax credits for businesses based on their spending on gas and electricity;

¹⁵⁵ SME is an acronym that stands for Small and Medium-sized Enterprises. SME guarantee funds are financial mechanisms or funds that offer guarantees or assistance to small and medium-sized firms. Their purpose is to enhance access to funding and tackle specific difficulties encountered by these enterprises.

¹⁵⁶ Camera dei deputati, Servizio Studi, XVIII Legislatura, “*Le Misure Adottate Contro I Rincari Energetici*,” September 26, 2022.

- enacting fiscal measures including reducing the Value Added Tax (VAT) on gas to 5%, lowering excise duties on gasoline, diesel, and LPG, and decreasing VAT on gas for road transport. The reduction in excise rates for fuels has been in effect since March 2022 and upheld throughout the entire year 2022. This entailed a 25 cents reduction in excise taxes for gasoline and diesel, corresponding to a pre-VAT discount of 30.5 cents.

Concurrently, in 2022, the obligation to pay an extraordinary contribution has been established for energy companies engaged in the activities of electricity and gas production, resale, and imports or in the production, extraction, resale, imports, distribution, and trade of petroleum products.

It is worth mentioning that, in the aftermath of the Russian-Ukrainian war, measures to alleviate the impact of price fluctuations have been accompanied by longer-term initiatives aimed at enhancing the security of European energy supplies. These initiatives encompass additional simplifications of authorization procedures to accelerate the development of renewable sources, supported by substantial investments from the National Recovery and Resilience Plan. Moreover, efforts are focused on bolstering the national capabilities for gas supply and storage, including the optimization of domestic production¹⁵⁷.

On a domestic scale, the immediate focus of the Italian government has been to shield households and the Italian industrial system from the surging energy prices. The main energy price containment measures acted on taxes or regulated price components. Overall, the public charges aimed at reducing energy bills in Italy can be quantified, according to the Parliamentary Budget Office, at 62.8 billion euros for the biennium 2021-2022. Out of this total, 16 billion euros were specifically designated for initiatives that directly benefit people, while an extra 22.4 billion euros were devoted to measures that impact both households and companies. Businesses received the remaining 24.4 billion euros¹⁵⁸.

The reduction of the VAT on gas for both civilian and industrial purposes to 5% remained active until the end of 2022, incurring an estimated aggregate cost of 3.1 billion euros,

¹⁵⁷ Ibidem

¹⁵⁸ DAVIDE PANZERI ET AL., “*Il panorama energetico italiano dopo l’invasione russa dell’Ucraina*”, September 2023.

according to the assessment by the Parliamentary Budget Office¹⁵⁹. The compensation for system charges associated with domestic usage and low-voltage subscriptions amounted to a cumulative expenditure exceeding 11 billion euros solely until the conclusion of 2022. In conjunction with tariff interventions, measures were implemented to provide household support through various forms of monetary transfers, aiming to alleviate the impact of inflation on household budgets. The total expenditure for compensating system charges related to domestic usage and low-voltage contracts exceeded 11 billion euros until the end of 2022¹⁶⁰.

The Italian government has implemented a range of measures with a dual purpose: ensuring a substantial level of storage of natural gas in storage for the winter of 2022-2023 and swiftly diversifying the sources of imported gas. These initiatives aim to substitute approximately 30 billion m³ of Russian natural gas with around 25 billion m³ from alternative sources by 2025. Meanwhile, renewable sources and energy efficiency policies are tasked with bridging the resulting gap.

The diversification plan outlined in the “National Plan for Containment of Natural Gas Consumption” is provided below:

Figure 30. 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	

Source: Friedrich-Ebert-Stiftung, 2023.

During the second half of 2022, there was a negligible decline of 0.05 billion m³ in domestic production compared to the corresponding period in 2021. Meanwhile, imports from Algeria and Azerbaijan (TAP) increased of only 2.7 billion m³. Conversely, LNG imports experienced a notable rise of 3.3 billion m³. As a result, by combining these

¹⁵⁹ On January 3, 2024, the Regulatory Authority for Energy, Networks, and the Environment (ARERA) declared the end of the 5% VAT reduction on gas, reestablishing it to a rate ranging between 10 and 22%

¹⁶⁰ Ibidem

factors, Italy succeeded in substituting nearly 6 billion m³ of Russian gas in the second half of 2022, falling short of the planned 7.5 billion m³ substitution¹⁶¹.

In conclusion, Italy's proactive response to the challenges posed by surging energy prices, fueled by geopolitical events, reflects a comprehensive and multifaceted strategy. The prompt implementation of short-term measures, such as reducing bills and introducing fiscal interventions, demonstrated a commitment to shielding households and businesses from immediate adversities. Collaborative efforts with European institutions, utilizing flexible state aid frameworks, underscored a collective response to support industries severely affected by the energy price shock. Simultaneously, Italy's commitment to long-term energy security, evident in initiatives like the National Plan for Containment of Natural Gas Consumption, underscores a forward-looking approach to diversify energy sources and diminish reliance on Russian gas. By emphasizing both short-term alleviation and long-term resilience, this two-pronged approach places Italy on the path to a more secure and sustainable energy future.

3.4. The Mattei Plan for Africa and the Mediterranean diplomacy

Prime Minister Giorgia Meloni, in October 2022, during her inauguration speech, acknowledged the pioneering founder of the Italian oil giant Eni and articulated a contemporary vision referred to as the "Mattei Plan" for Africa. Drawing inspiration from Enrico Mattei, who in the 1950s aimed to bolster the development of natural resources in African nations, the plan aimed to assist African nations in developing their natural resources, fostering economic growth, and enhancing Italy's energy independence.

As Europe reevaluates its energy policies, seeking to reduce dependence on Russian gas, Italy is revisiting a comparable strategy through its sector companies. Prime Minister Giorgia Meloni has expressed the desire to regain a strategic role in the Mediterranean after years of setbacks.

In the 1950s, Enrico Mattei attempted to aid the development of natural resources in African countries, with the aim of helping the continent realize its full economic growth potential and contributing to Italy's energy security.

¹⁶¹ DAVIDE PANZERI ET AL., "*Il panorama energetico italiano dopo l'invasione russa dell'Ucraina*", September 2023.

Italy is now again considering a similar approach, as Europe reevaluates its energy policy and attempts to wean itself off Russian gas.

Italian industry analysts think that as Europe looks for new energy sources, Eni's deep connections to the African continent and its established business relationships with Middle Eastern countries might turn out to be a national asset. Indeed, Eni has maintained a substantial presence in Africa since 1954, operating in 14 countries.

Claudio Descalzi, the CEO of Eni, recently declared to the Financial Times that increased collaboration with African states in the field of energy has the potential to establish a new "south-north axis". This axis would establish a connection between the continent's renewable and fossil fuel resources with the energy-demanding markets of Europe.

Under Mario Draghi's former government, Eni engaged in negotiations to secure supply deals with Algeria, which has since surpassed Russia as Italy's primary gas provider. Eni announced its intention to increase investments in several countries, such as Nigeria, Angola, Mozambique, and the Republic of the Congo.

European governments have signaled their intention to invest in the existing infrastructure to increase flows from the Mediterranean area. Industry analysts in Italy emphasize the significance of key players like Eni and Snam, recognizing their crucial roles in this strategic initiative.¹⁶²

Italy has the potential to benefit from opportunities in the field of energy transition. The North African countries possess significant renewable energy capacity, which may potentially transform the region into a prominent hub for green hydrogen production. This has been a long-standing topic of discussion for Snam. Marco Alverà, the former CEO of Snam, asserts that Italy possesses several favorable attributes for developing renewable energy sources, including its strategic geographical location and its well-established infrastructure, such as international pipelines and storage capacity¹⁶³.

Italy, being the third largest economy in the Eurozone and a founding member of the G7 and NATO, has had difficulties in translating its economic strength to gain political influence.

Prime minister Meloni has taken a unique position in dealing with matters concerning the southern Mediterranean. Since taking office in October 2022, Meloni has undertaken

¹⁶² SILVIA SCIORILLI BORRELLI, "Italy Renews Its 'Mattei Plan' to Develop Energy Ties to Africa," Financial Times, January 11, 2023.

¹⁶³ Ibidem

multiple travels to North Africa, actively pursuing a diplomatic campaign with the goal of revitalizing Italian policies. In January 2023, the Prime minister Giorgia Meloni embarked on her inaugural bilateral visit overseas to Algeria, following the example set by previous Prime Minister Mario Draghi. Algeria plays a crucial role for Italy because of its extensive reserves of hydrocarbons and close geographical proximity. In 2022, Draghi set the stage for Algeria to become Italy's primary energy supplier, replacing Russia, thus facilitating a swift disengagement from Moscow amidst the ongoing conflict in Ukraine and escalating energy prices.

Meloni's approach in Algeria aims to demonstrate her willingness to extend beyond a mere collection of energy agreements and enhance Italy's foreign policy by including strategic diplomacy with a focus on achieving long-term objectives. According to Prime Minister Meloni, Algeria is Italy's "most stable, strategic, and long-standing" partner in North Africa¹⁶⁴, reassuring to the Algerian President Tebboune that Italy supports Algeria. Algeria has recently experienced a sense of isolation after Morocco's participation in the Abraham Accords¹⁶⁵, a sentiment that led Algeria to strengthen ties with Russia and China in response. Moreover, in January 2023, shortly following her visit to Algeria, Prime Minister Meloni travelled to Tripoli to hold a meeting with Libya's internationally recognized Prime Minister, Abdul Hamid Dbeibeh. As a result of the visit, a gas agreement worth 8 billion US dollars was signed between Eni and Libya's National Oil Corporation (NOC)¹⁶⁶.

In May 2023, Prime Minister Meloni met Khalifa Haftar, the leader of the Benghazi militia, in Rome to discuss the growing migration issues¹⁶⁷. She met with Dbeibeh the subsequent month to discuss energy, infrastructure, and economic issues, emphasizing the critical nature of Libyan stability in relation to Italian interests. During talks with Libyan leaders, Meloni departed from Italy and Europe's usual transactional approach towards North Africa. Instead, she advocated for a more inclusive framework that takes into consideration the region's own priorities.

¹⁶⁴ COLLEEN BARRY and ANDREA ROSA, "Algeria, Italy Look to Broaden Ties Beyond Coveted Energy", in AP News, 23 January 2023.

¹⁶⁵ The Abraham Accords are a set of agreements aimed at normalizing relations between Israel and several Arab states. These accords, all signed in the latter part of 2020, include a general declaration as well as specific bilateral agreements between Israel and the United Arab Emirates, Bahrain, and Morocco.

¹⁶⁶ GAVIN JONES, "Italy's Eni Signs \$8 Billion Libya Gas Deal as PM Meloni Visits Tripoli", in Reuters, 29 January 2023.

¹⁶⁷ "ANSA, "Meloni and Haftar Talk Migrant Flows to Italy ,", May 4, 2023.

Likewise, Meloni conducted numerous high-level meetings and established strategic relationships with Tunisia, a country currently struggling with significant economic and political difficulties. Since June 2023, Meloni has had several meetings with Tunisia's President, Kais Saied. Her last visit with President Ursula von der Leyen of the European Commission, and former Dutch Prime Minister Mark Rutte highlighted the need for long-term solutions to stabilize Tunisian finances while enhancing migration cooperation. Her initial goal was to unblock International Monetary Fund (IMF) funds to help macroeconomic stability in the country. During the meeting in Tunis, the leaders emphasized the solidarity of European countries and revealed a comprehensive aid package. This package includes 150 million euros to provide financial support to Tunisia and prevent an economic collapse.

According to Meloni, the Mattei Plan advocates for a holistic approach in dealing with African nations of significance to Italy. Its overarching goal is to transform Italy into a central energy hub connecting North Africa and Europe. By implementing the construction of new pipelines, Italy aspires to not only become an exporter of natural gas and hydrogen to countries like Germany and Austria but also serve as a crucial gateway linking North Africa to Central and Northern European countries. Recognizing the pivotal role that Europe plays in North African trade, these agreements could prove instrumental in securing enduring strategic benefits for both sides of the Mediterranean¹⁶⁸.

On January 28 and 29 of 2024, the Italy-Africa Summit took place in Rome. The plenary session began with opening remarks from Prime Minister Giorgia Meloni and Foreign Minister Antonio Tajani, as well as the President of the African Union (AU) Azali Assoumani, the AU Commission's Moussa Faki, and the Presidents of the European Commission, Council, and Parliament (Ursula von der Leyen, Charles Michel, and Roberta Metsola), along with the Deputy Secretary-General of the United Nations Amina Mohammed.

Following the opening session, five thematic sessions were held, focusing on cooperation in economic and infrastructural development, food security, energy transition, professional training, and culture, as well as migration and security.

Prime Minister Giorgia Meloni explained that Italy envisions a "collaboration on equal terms" and highlighted the revamped Mattei Plan, which now includes 5.5 billion euros in credits, grant operations, and guarantees - around 3 billion from the Italian Climate

¹⁶⁸ ALISSA PAVIA and KARIM MEZRAN, "Giorgia Meloni's Foreign Policy and the Mattei Plan for Africa," IAI Istituto Affari Internazionali, July 26, 2023

Fund and 2.5 billion and a half from the Development Cooperation Fund. Moreover, the Plan integrates with the European Global Gateway, receiving additional support of 150 billion euros from the EU.

“I am very grateful to Italy for putting cooperation with Africa at the center of its foreign policy and G7 presidency”, stated the president of the European Commission Ursula von der Leyen at the Italy-Africa Summit.

Prime Minister Giorgia Meloni pointed out that the success of the Mattei Plan relies on the comprehensive involvement of the entire national system, including development cooperation and the crucial engagement of the private sector, including major state-owned enterprises like Eni, Enel, Snam, and Leonardo. She mentioned the establishment of a new financial instrument to facilitate private sector investments in Mattei Plan projects, in collaboration with Cassa Depositi e Prestiti¹⁶⁹.

Despite the ambitious financial commitments, there are concerns about the reallocation of funds, especially from the Italian Climate Fund, initially established by the Draghi government. It seems that the government has decided to shift resources already provided by other funds to the “Mattei Plan,” without really increasing the overall financial allocations. The Italian Climate Fund was established by the Draghi government through the 2022 budget law. Its purpose was to finance initiatives aimed at achieving the goals set by international climate agreements to which Italy had committed. Initially, 840 million euros per year were allocated between 2022 and 2026, totaling 4.2 billion euros, and subsequently, 40 million euros per year starting from 2027. According to the new information presented by Meloni, the fund is expected to be reduced by over 70% of its original scope, and it is unclear whether and how it will be refinanced¹⁷⁰.

Meloni outlined some of the projects included in the Plan. She cited the creation of a large center of excellence for professional training on renewable energy in Morocco: a mission that the RES4Africa foundation, founded in 2012 and supported by large public and private companies including Enel, Terna, Intesa Sanpaolo and PwC, has been working on for years. She also mentioned a project in Côte d’Ivoire to improve access to health services, a satellite monitoring project on agriculture in Algeria, the construction of an agribusiness center in Mozambique, support for the production of wheat, corn,

¹⁶⁹ Il Sole 24 ORE. “Migranti, Vertice Italia Africa. Meloni: ‘Il Piano Mattei Parte Da 5,5 Miliardi,’” January 29, 2024.

¹⁷⁰ Il Post. “Cosa Sappiamo Di Questo ‘Piano Mattei per L’Africa,’” January 29, 2024.

soybean and sunflower in Egypt, and the construction of water purification plants in Tunisia (a program launched as early as 2020 by Eni).

Meloni also considered the infrastructural renewal of schools in Tunisia, where Eni has been active for several years with various projects focused on school renovations and renewable energy-powered nutrition. The project in Kenya, dedicated to the development of the biofuel industry, briefly outlined by Meloni, largely coincides with an Eni program. It is not surprising that many of the projects included in the “Mattei Plan” align with investments initiated by Eni, a company with significant interests in various African countries. Often, due to its considerable influence, Eni plays a supportive and guiding role in shaping Italian foreign policy in the region.

Meloni then discussed about the ELMED electricity interconnection between Italy and Tunisia, which is the construction of a 220-kilometer underwater cable being worked on by Terna, the Italian public company responsible for electricity transmission, and its Tunisian counterpart Steg. For its implementation, the World Bank recently allocated nearly \$270 million to Tunisia. Another project mentioned by Meloni is the H2 South Corridor, involving the construction of thousands of kilometers of pipelines to bring hydrogen from North Africa to Europe via Italy, with the company Snam involved in structured cooperation between Italy and Germany.

During the Summit, Prime Minister Meloni presented a number of pilot projects to African leaders as part of a development strategy to strengthen the economies of those continents and reduce the number of migrants entering Italy. Indeed, one of the ambition of the Plan is to reduce migration across the Mediterranean Sea by promoting investments on the continent. However, the specific allocation of funds for different programs has not been established, nor has the amount of funding dedicated to activities related to migration control been clarified.

Overall, the “Mattei Plan” serves as a comprehensive framework integrating projects of longstanding existence, where various major public enterprises had previously made substantial investments. Thus, it appears that the primary intent of the Plan is to strategically coordinate these initiatives, enhancing their visibility and prestige through the dedicated political commitment of the Government.

However, the realization of the Mattei Plan is confronted with numerous challenges, primarily stemming from the lack of complete information about its specifics. As very little is known about the details of the Plan, prudence arises about its actual

implementation. The absence of clear and comprehensive details about the Mattei Plan hampers a thorough assessment of its feasibility, goals, and potential implications.

CHAPTER 4

THE CASE OF ENI

4.1. Eni as a key player in the Italian diversification of supply sources

The Ente Nazionale Idrocarburi (ENI) was established on February 10, 1953, and marked a transformative milestone in Italy's energy landscape. Tasked with reconstructing the country's energy policy, Eni, under the leadership of Enrico Mattei, became the driving force behind the Italian economic boom and his presence was instrumental for its transforming Eni into a major player in the global oil and gas industry. A noteworthy aspect of Eni's history is its role in the economic development of Italy during the post-World War II period.

It was a titanic effort for Enrico Mattei to secure access to energy sources. Italy had emerged defeated from World War II, and its subordination to the United States, along with its condition of limited sovereignty, prevented it from developing its own independent system of international relations. Furthermore, Eni had clashed with the interests of colonial powers such as Britain and France, which had emerged victorious from the war. Mattei understood that, in a competitive political environment, to avoid being destroyed, one had to be powerful¹⁷¹. Mattei emphasized energy independence and pursued a strategy of diversification, which included developing strategic partnerships with oil-producing countries.

Eni, as articulated by Giuliano Amato, emerged as both the brawn and the brain of a national policy strategically oriented towards securing a vital resource, energy. Enrico Mattei, recognized as a visionary by Amato, independently organized the company's establishment, starting with drilling operations in the Po Valley. Subsequently, Mattei orchestrated an exceptional international policy. Amato lauds the founder as a courageous Italian who dared to confront the dominant so called "seven sisters" of the oil industry. Mattei's innovative creation of a symbiotic partnership between the operating company and the producing country (vested with subsoil sovereignty) provided Italy with an energy policy¹⁷². By offering producer countries

¹⁷¹ Andrea Greco and Giuseppe Oddo, *Lo Stato Parallelo* (Chiarelettere, 2016).

¹⁷² *Ibidem*

better contractual terms and greater economic returns, Mattei succeeded in obtaining numerous concessions for oil exploration and research. The success of Mattei and Eni can also be attributed to the guiding principle of Mattei's actions, which promised mutual economic benefit and shared development to local partners, rather than unilateral exploitation. Even today, Eni draws inspiration from these principles. In line with the United Nations' 2030 agenda, one of the pillars of Eni's business model, identified as the Dual Flag, aims to promote the development of local communities by facilitating access to electricity, creating employment, and transferring know-how to local partners. This has enabled the group to be present in many countries worldwide.

Eni has established a significant presence in various parts of the world, particularly in Africa, Middle East, and the Mediterranean region. The company's operations range from large-scale oil and gas projects to the development of renewable energy initiatives. Eni has been at the forefront of technological advancements in the energy sector and has consistently explored innovative solutions for sustainable and clean energy.

Eni operates in 62 countries and employs over 32,000 individuals across various sectors, including oil, natural gas, chemistry, electricity production and distribution, and renewable energy. Since its listing on the stock exchange in 1995, Eni embarked on a journey that transformed it into a globally recognized, technologically advanced energy company, a true Global Energy Tech Company. Eni is a multinational energy company involved in every aspect of the energy production process. This includes exploring, developing, and producing oil and natural gas resources, generating electricity from various sources such as cogeneration and renewable energy, traditional and biorefining, chemical production, and the advancement of circular economy practices. Eni expands its market presence by marketing gas, power, and products to local markets. Additionally, Eni offers services related to energy efficiency and sustainable mobility to both retail and business customers.

To address the energy trilemma – ensuring environmental sustainability, energy security, and affordability – while maintaining a constant commitment to value creation for shareholders, Eni employs consolidated expertise, a solid R&D program, geographical diversification of energy sources, alliances for development, and innovative business strategies as levers.

Eni is committed to become the leading company in the production and sale of decarbonized energy products, with a growing focus on customer satisfaction. The

strategy to achieve Carbon Neutrality by 2050 involves an industrial transformation that reinforces available and economically sustainable technologies¹⁷³.

Eni is a pivotal player in the energy landscape of the wider Mediterranean and stands out for its unwavering commitment to energy diversification, sustainability, and technological innovation. The company strategically aligns its mission with global imperatives, placing a strong emphasis on achieving the Net Zero target¹⁷⁴. Moreover, Eni recognizes the critical need to balance environmental responsibility with the escalating demand for energy in a world undergoing demographic and economic expansion.

Energy diversification is at the core of Eni strategic vision, positioned as the pivot for ensuring security of supply and accessibility to energy. In the company's own words, "Energy diversification is the basis of our strategy to achieve the Net Zero target while ensuring security of supply and access to energy for a world that is growing both demographically and economically"¹⁷⁵.

As Eni navigates the intricate landscape of the energy transition, it remains firm in its dedication to the twofold aim of environmental sustainability and continuous technological advancement. This commitment goes beyond traditional hydrocarbon exploration and includes a proactive approach in the development of innovative technological solutions. The awareness that achieving Net Zero goals requires pioneering advancements drives Eni's commitment to innovation, thereby supporting technological leadership, competitiveness, and the creation of lasting value for both the company and the broader energy landscape.

The Mediterranean region, renowned for its role in international relations, conflicts, and global geopolitical dynamics, represents 7% of the world's population (500 million people) and contributes 10% to the global GDP¹⁷⁶. The southern part of the Mediterranean, in constant evolution, serves as a critical crossroads connecting Middle East and Africa. This region faces several challenges like limited access to food and healthcare services, as well as political complexities such as micro-conflicts with widespread consequences. Despite grappling with poverty and socioeconomic inequality,

¹⁷³ ENI, "Eni in 2022, Summary Annual Report," 2023

¹⁷⁴ The Net Zero target is a crucial element in global efforts to address climate change, as it aims to stabilize and ultimately decrease the concentration of greenhouse gases in the atmosphere, helping mitigate the impacts of global warming.

¹⁷⁵ ENI, "Energy Sources." <https://www.eni.com/en-IT/actions/energy-sources.html>.

¹⁷⁶ ISPI, "Looking Ahead: Charting New Paths for the Mediterranean," 2017.

the Mediterranean stands out for its abundant energy resources, accessible to only a privileged few.

On the opposite side of the sea lies Italy, acting as a natural bridge between these territories and Europe. Italy has a rich history of international development and dialogue projects intervening for stabilization in the Mediterranean area and beyond. An outstanding contributor to this legacy is Enrico Mattei. Primarily focusing on the industrial sector, Mattei actively advocated inclusivity through local development projects in countries open to the expanding Eni model.

While maintaining Mattei's inclusive approach, Eni has evolved into a global player, influencing not only Italy's domestic policies, but also navigating times of increased fragmentation of national interests and lack of vision in the foreign policies of various state actors. Essential collaborations, including those with UNDP¹⁷⁷ and UNIDO¹⁷⁸, IOM,¹⁷⁹ along with a strong presence in challenging-access areas, positioning Eni as a driving force behind proactive policies for economic, social, and energy development.

As affirmed by Claudio Descalzi, Chief Executive Officer of Eni, "Eni has worked to contribute to Europe's energy security and has continued on its path of transformation towards the decarbonization of products and services, leveraging a distinctive strategy based on geographic and technological diversification of energy sources."¹⁸⁰

The company's strategic partnerships and collaborations with global entities further fortify Italy's energy security, fostering a diversified supply network that transcends geographic boundaries. Eni's involvement in securing diverse natural gas sources and its investments in renewable energy projects underscore its commitment to sustainability and align with Italy's broader goals of a sustainable and resilient energy future. As a driving force behind infrastructure development and geographic diversification, Eni plays a pivotal role in ensuring Italy's access to a diversified and secure energy mix, marking a transformative chapter in the Italian's energy history.

The challenges confronting the global energy system, both in the short term and in the upcoming years, are becoming increasingly intricate and complex with more goals and targets to work towards and more pressing actions to be taken.

¹⁷⁷ The United Nations Development Program

¹⁷⁸ The United Nations Industrial Development Organization

¹⁷⁹ The International Organization for Migration

¹⁸⁰ ENI, "ENI for 2022 - Sustainability Report".

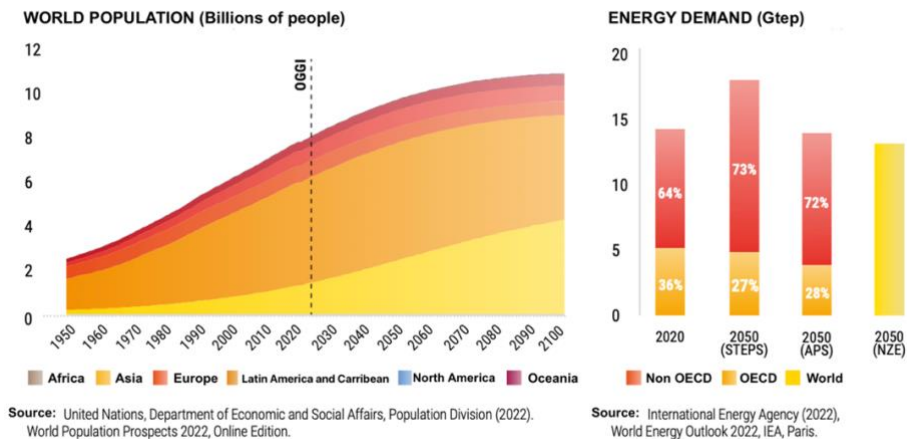
Prior to the outbreak of the war in Ukraine, the primary focus for the next few decades was fighting climate change and ensuring universal access to energy. However, the dynamics of energy systems have changed following the war in Ukraine. This has underscored weaknesses in the current energy system and revived the demand for the more polluting coal.

These events have sparked the urgency to take concrete actions to promptly implement specific measures to contain the uncertainty on consumers and the global economy. The drastic reduction in the flow of oil, gas, and coal from Russia, historically crucial for the European market, has emphasized the necessity of incorporating a crucial element into future goals: energy security. Over the next thirty years, energy demand is expected to keep rising in emerging economies, driven by the needs of emerging economies. Meanwhile, industrialized nations will likely experience a gradual decline in consumption, mainly due to increased emphasis on energy efficiency and savings measures.

As stated in the Sustainability Report drafted by Eni, fossil fuels are anticipated to maintain a noteworthy presence in the energy mix, supported by the implementation of Carbon Capture, Utilization, and Storage (CCUS) technologies, which assist in minimizing their emission impact. Nevertheless, it is projected that their proportion will decline from the current levels. This decline is mainly due to the diminishing dependence on coal, with a shift towards more environmentally sustainable alternatives like gas and renewable energy sources. Innovative technologies, including nuclear fusion, are poised to become part of the energy mix, and in conjunction with emerging sources, they will play a role in diminishing the environmental impact of the global energy system¹⁸¹.

¹⁸¹ Ibidem

Figure 31. World Population and Energy demand



Sources: United Nations Department of Economic and Social Affairs, Population Division (2022); International Energy Agency (2022), World Energy Outlook 2022.

4.2. The strategy

Eni’s strategy aims at fulfilling the three aspects of the energy trilemma, namely achieving environmental sustainability, ensuring energy security and contributing to making energy increasingly affordable and accessible. This means diversifying energy sources geographically and technologically, creating a different energy mix and maintaining a strong focus on creating value for the stakeholders.

Flexibility and adaptability are key principles of Eni’s philosophy in tackling the dynamic energy landscape. The company acknowledges the imperative to respond promptly and effectively to challenges, maintaining a keen focus on short-term objectives while concurrently advancing its long-term transformation and decarbonization goals. This dual-pronged strategy accelerates the trajectory toward a net-zero future.

Eni’s strategy is a multifaceted framework built on six pillars:

1. Energy mix diversification: Eni enhances its resilience and adaptability in response to evolving market dynamics by diversifying its energy mix, thereby mitigating risks linked to reliance on a single energy source.
2. Geographical diversification: recognizing the global nature of energy challenges, Eni strategically expands its footprint across diverse regions. Geographic diversification promotes a more inclusive and fair energy environment while also acting as a deterrent against regional instabilities.

3. Development of new technologies: innovation is pivotal in addressing the evolving energy landscape. Eni actively invests in and deploys cutting-edge technologies, positioning itself at the forefront of the industry's transformative journey.
4. Gas as a bridge energy source: Eni acknowledges the role of gas as a transitional energy source. Leveraging gas as a bridge ensures a smooth and pragmatic transition, balancing the immediate need for energy with the imperative of reducing carbon emissions.
5. New business and financial model: the company explores new models that not only sustain its operations but also contribute to the broader goals of sustainability and affordability.
6. Fast time to market: this approach allows Eni to be agile and responsive to market demands and changes, gaining a competitive advantage by being among the first to deliver innovative solutions. A commitment to fast time to market ensures that innovations and solutions are swiftly implemented, addressing immediate challenges and advancing long-term goals.

In response to the geopolitical turmoil following the Russian invasion of Ukraine, Eni, in collaboration with historical partners, formulated a series of agreements designed to diversify gas supplies to Italy and Europe. These strategic initiatives aim to replace the entirety of the approximately 30 bcm previously sourced from Russia by 2025 increasing the production in Africa and ensuring additional supplies via pipelines and LNG. This will contribute to ensuring that Italy has sufficient volumes to fill gas storage facilities to a record level, surpassing the target of 80%.

Simultaneously, Eni remained steadfast in its commitment and objectives towards carbon neutrality by 2050.

Environmental sustainability, energy security and accessibility are global issues that do not only concern Italy and Europe but have significant relevance especially in developing regions. In this perspective, in 2022 Eni strengthened its historical ties with the countries in which it operates, particularly in Africa, directing approximately 90% of the gas produced to the domestic markets. This contribution aids in providing secure access to energy for local communities.

The agreements signed, both during the government led by Draghi and under the government led by Meloni, have benefited from the continuity of some projects

previously initiated by Eni. This continuity has conferred these agreements significant political-strategic relevance, consolidating bilateral cooperation between the states involved and providing the group with greater investment solidity.

In the spring of 2022, Foreign Minister Di Maio's diplomatic missions were strategically concentrated in countries where Eni has a longstanding presence, such as the Republic of Congo (since 1968) and Angola (since 1980), or where the company has interests tied to ongoing projects. Notably, these projects include the Coral Sul FLNG floating liquefaction plant in Mozambique and collaborative efforts in the North Field East project for LNG production with Qatar Energy.

The involvement of Eni's CEO, Claudio Descalzi, proved crucial in securing Italy's increased supplies of natural gas and LNG. Both the agreement with the Algerian energy company Sonatrach and with the Republic of Congo's Minister of Hydrocarbons, Bruno Jean Richard Itoua, were signed by Descalzi, although in both cases in the presence of representatives of the two countries' governments.

In January 2023, Descalzi met with Egyptian President al-Sisi in Cairo to discuss ongoing exploration activities and to sign a Memorandum of Understanding (MoU) regarding the reduction of emissions in the country. Egypt, where Eni has been present since 1954, holds a prominent position in the portfolio of the Italian energy company. This prominence is bolstered by the successful exploitation of the Zohr basin, the most abundant deposit in the Eastern Mediterranean, discovered by Eni off the Egyptian coast in 2015. Furthermore, since 2013 Eni has held interests in seven licenses in the exclusive economic waters of Cyprus, where, in Block 6, the Calypso 1 and Chronos-1 wells were discovered in 2018 and 2022 respectively.

Since 2009, with the discovery of the Leviathan gas field off the coast of Israel, the Eastern Mediterranean region has proven to be of primary interest for the exploration of natural resources, mainly concentrated in an area of 100-150 km² at the intersection of Egyptian, Cypriot, and Israeli territorial waters.

The lack of adequate infrastructure for the extraction and transportation of these resources led the European Commission to identify, as a Project of Common Interest already in 2013, the EastMed: an underwater pipeline that would span approximately 1900 km, connecting Israel to Greece (and subsequently to Italy through the Poseidon pipeline), with the capacity to transport up to 20 bcm of gas annually. However, historical territorial and political tensions among the countries in the region, accentuated by the exclusion of Ankara and Beirut from the international organization of the East Mediterranean Gas

Forum (EMGF), have impeded progress on the project. This situation prompted the European Union, in June of last year, to opt for signing a MoU directly with Israel and Egypt, on the sidelines of a Forum meeting.

In 2022, the unfolding events in Europe, particularly in correlation with Russia's invasion of Ukraine, brought forth heightened considerations regarding energy security and the cost of energy as pivotal elements for societal well-being. This discourse, occurring concurrently with imperatives for decarbonization, underscores the contemporary trilemma confronting societies in an environment marked by profound volatility, uncertainty, and escalating imbalances. Against this backdrop, Eni strategically directed efforts toward contributing to European energy security and embarked on a trajectory of comprehensive transformation, emphasizing the decarbonization of its products and services.

4.3. Eni's presence in North Africa

Italy's primary sources of natural gas in the forthcoming years will predominantly stem from North Africa (Algeria, Egypt, and Libya) and Azerbaijan, as communicated by Eni's Head of Natural Resources to Reuters, the British press agency. The energy company will also make significant investments in Africa, mostly in new low-carbon projects and exploration.

In 2022, in response to a decrease in Russian gas supply, Eni, the primary importer of natural gas for Italy, strategically increased its imports from Africa. This was made possible by Eni's extensive presence on the continent. As a result of this geopolitical shift, Algeria has replaced Russia as Italy's primary supplier of natural gas.

Guido Brusco, the Chief Operating Officer of Eni's Natural Resources division, emphasized the necessity of making significant investments in Africa, including both conventional exploration and production activities. Brusco foresees Algeria and Egypt playing a more significant role in the coming years. Additionally, he expects Libya and many sub-Saharan countries, such as the Republic of Congo and Angola, to potentially have an increased involvement.

Eni is making multibillion-dollar investments to meet African market demands, secure exports to Italy and prepare to increase gas shipments to Europe.

Brusco recognized the worldwide transition towards more environmentally friendly energy alternatives but emphasized the continued reliance on fossil fuels, specifically in

Africa, where rapid development and growth in population require a smart strategy for managing oil reduction.

Emphasizing Eni's position as the top international gas producer in Africa, Brusco pointed out that more than 90% of the company's extracted gas in Africa in 2022 was destined for the African market. Nevertheless, he predicted a possible decline in this percentage in the future as the group's output on the continent grows, leading to an excess of gas that exceeds African needs.

In alignment with Eni's comprehensive strategy in Africa, its commitment extends beyond the reshaping of gas supplies. Notably, the company is actively involved in exploration and production initiatives across the continent, emphasizing a holistic approach to both traditional and sustainable energy sources.

Concerns regarding production issues for the Zohr field were disregarded by Brusco as the company announced plans to allocate approximately \$3.5 billion over a span of four years towards exploration and management of existing fields in Egypt, where Eni's output was approximately 346,000 barrels of oil equivalent per day in 2018. Brusco, during the interview affirmed that "the field's performance surpasses that of larger fields in Russia and is consistent with our expectations."

Eni anticipates a production growth in Algeria, reaching a level over 120,000 barrels of oil equivalent per day in 2023 compared to the previous level of 95,000 barrels of oil equivalent per day ¹⁸².

According to Brusco, the group intends to increase its export from Algeria to Italy to around 15 bcm, compared to the previous year's volume of 12 bcm, depending on demand.

In Libya, Eni achieved a production of 165,000 barrels of oil equivalent per day in 2022, and the company is preparing for a substantial \$8 billion investment. Since Eni has revoked the force majeure status¹⁸³ it declared in 2014, drilling could resume within a few years, according to Brusco.

¹⁸² Francesca Landini, "North Africa Will Be Italy's Key Gas Supplier for Years, Eni Top Executive Says," Reuters, September 12, 2023.

¹⁸³ Eni and NOC, the Libyan counterpart, have officially lifted the force majeure status on exploration areas A and B (onshore) and C (offshore). Eni, along with BP and the Libyan Investment Authority, holds a stake of 42.5%, 42.5%, and 15% respectively, in those areas.

The declaration of Force Majeure in 2014 was revoked as Eni conducted a Security Risk Assessment to evaluate the security situation in areas where the exploration program will take place. This analysis produced favorable results.

With regard to sub-Saharan, Brusco emphasised Baleine in Ivory Coast, an emblematic undertaking for Eni aimed at establishing the first gas and oil field in the entire continent to produce net zero emissions. “The production is proceeding exceptionally well” he added.

In addition to exploration and production, Eni is actively allocating resources towards energy transition initiatives. This includes investments in renewable energy projects and agricultural activities in Africa, aimed at generating agricultural feedstock for its biofuel activities. Eni is also planning the establishment of bio-refineries on the continent¹⁸⁴.

In conclusion, Eni’s strategic initiatives in Africa showcase a forward-looking approach that blends traditional energy solutions with a commitment to sustainability. The company’s investments in several projects and its pivotal role in shaping the continent’s energy landscape position it as a key player in the global energy transition. As the research shifts the focus to specific countries in North Africa, namely Algeria, Libya, Tunisia, and Egypt, the details of Eni’s engagements in these regions will come into sharper focus.

This targeted exploration aims to unveil the various roles played by Eni in shaping the Mediterranean energy landscape, while identifying the principal actors essential to the realization of the Italian diversification strategy.

4.3.1. Algeria

In the past ten years, and particularly nowadays due to the ongoing conflict in Ukraine, there has been a significant transformation in the energy landscape of the Mediterranean region. The energy plans and strategies of the countries surrounding the “mare nostrum” have been revised based on significantly altered parameters. Eni plays a significant and interconnected role in the Mediterranean countries, particularly in Libya, Egypt, Algeria, and Tunisia. The overall picture that emerges is one of Italian excellence holding a front-row seat on the global stage. A player increasingly capable of understanding major transformations and, consequently, formulating intervention strategies.

¹⁸⁴ Landini, Francesca . “North Africa Will Be Italy’s Key Gas Supplier for Years, Eni Top Executive Says.” Reuters, September 12, 2023.

With the outbreak of the war in Ukraine, reducing dependence on Russian gas has become a priority for Italian foreign policy. Turning to Algeria was a natural choice. The two countries are linked by the Transmed pipeline, connecting the Hassi R'Mel fields to Mazara del Vallo, passing through Tunisia. The pipeline has an annual export capacity of approximately 32 bcm of gas¹⁸⁵.

Algeria possesses the tenth-largest confirmed natural gas reserves worldwide, ranks as the fourth-largest exporter of gas, and holds the third-largest untapped shale gas resources internationally. Additionally, it holds the fifteenth position in terms of confirmed oil reserves and approximately 60% of its whole production is exported. All confirmed oil reserves are located on land. Algeria's national state-owned oil company, Sonatrach, reports that around 66% of the Algerian area remains underdeveloped or undiscovered, with an estimated 100 discoveries that have not been developed.

In August 2022 Sonatrach announced three significant oil and gas discoveries in three different Algerian Sahara basins. These included the largest discovery Algeria has made in the last twenty years, a gas discovery close to the massive Hassi R'Mel field. To accommodate the growing demand from Italy and the European Union, Sonatrach is accelerating these discoveries to increase Algerian gas production¹⁸⁶.

Moreover, in November 2022 Eni sold to Snam, the energy company that operates Italy's gas pipeline network, 49.9 % of its stakes in the Transmed-related pipeline companies between Italy and Algeria, TTPC¹⁸⁷ and TMPC¹⁸⁸. The outcome of the deal will lead to a new entity, with Eni holding a 50.1% majority stake and Snam holding the remaining 49.9%. The agreement, valued at 385 million euros, is focused on promoting potential development initiatives in the hydrogen value chain from North Africa¹⁸⁹.

Since 1981, Eni has operated in Algeria. The company possesses ownership stakes in 49 mineral rights, with 30 of them being actively managed by the company. Eni is the largest international company operating in the country, with an equity production of 100,000 barrels of oil equivalent per day. Eni and Sonatrach entered into a contract in December 2021 to explore and develop the Berkine South area.

¹⁸⁵ Aldo Liga, "Algeria: A Tutto Gas (per Ora)," ISPI, July 2022.

¹⁸⁶ The International Trade Administration, "Algeria - Country Commercial Guide," International Trade Administration | Trade.gov, 2023.

¹⁸⁷ Trans Tunisian Pipeline Company

¹⁸⁸ Trans Mediterranean Pipeline Company

¹⁸⁹ ENI, "Perfezionato l'Accordo Di Partnership Tra Eni E Snam Sui Gascodotti Tra Algeria E Italia," www.eni.com, October 2023,

Eni acquired BP's Algerian assets, including the In Amenas and In Salah gas concessions, in September 2022. This acquisition strengthens Eni's presence in Algeria and possesses significant strategic value. Aligned with their respective decarbonisation objectives, Eni and Sonatrach entered a MoU in 2021 that held significant strategic value and outlined collaborative efforts in the realm of energy transition (including but not limited to renewable energy, green and blue hydrogen, CO₂ capture, and bio-refining). In November 2022, Eni and Sonatrach jointly inaugurated the Solar Lab and began the construction of the second 10 MW photovoltaic plant at the Bir Rebaa North production site in the Berkine Basin, southeastern Algeria.

During an interview with *Corriere della Sera*, Eni CEO Claudio Descalzi highlighted that Eni updated annually the agreements on quantities. Algeria exported more than 3 bcm in 2022 and other 3 bcm in 2023. Descalzi emphasized that just two years ago, Algeria supplied Italy with around 21 bcm, and currently, the supply has risen to 25 bcm, with expectations to reach 28 bcm in 2023 and in 2024-25 this estimate is predicted to be exceeded again¹⁹⁰.

4.3.2. Libya

Libya's primary international gas producer is Eni, which accounted for 80% of the country's output. Since its establishment in the country in 1959, the company has maintained a substantial holding of assets engaged in exploration, production, and development.

The activity of Eni helps secure Europe's energy supplies and fortify its relations with this increasingly strategic country. Eni not only focuses on natural gas in North Africa, but also supports initiatives that follow the circular economy model. These initiatives include projects for the development of renewable energies, hydrogen, and the capture, utilization, and storage of CO₂.

In Libya, offshore regions are designated for natural gas production, whereas exploration activities involve both onshore and offshore areas. The production activities are conducted through the joint venture Mellitah Oil and Gas BV, in which Eni and Noc each own a 50% stake. The 2022 equity production amounted to 165,000 barrels of oil

¹⁹⁰ Fausta Chiesa, "Gas Russo, Descalzi (Eni): 'Grazie All'Algeria Azzeramento Dell'import Da Mosca Entro Il 2024,'" *Corriere della Sera*, January 23, 2023.

equivalent per day. Eni's primary operational center is the Mellitah complex, located approximately 70 km west of Tripoli. Inside the complex are two central facilities: the Wafa coastal plant, dedicated to processing oil and condensate from the onshore Wafa field, and the NC 41 plant, specializing in processing gas and condensate from the Sabratha offshore platform. Eni has invested 8 billion dollars to ensure production through two main platforms connected to the existing processing facilities at the Mellitah complex. Libyan gas extracted from the Wafa and Bahr Essalam fields, managed by Mellitah Oil & Gas, is transported to Italy via the Greenstream pipeline; the 520-kilometer-long pipeline connects the Mellitah compressor station on the coast of Libya to the Gela gas receiving terminal, making it the longest pipeline in the Mediterranean Sea, with some sections reaching depths of 1,127 meters. Originally established in 2003–2004 for exclusive gas transportation to Italy, the Greenstream system underwent enhancements and integration with the Libyan pipeline network, expanding its service to the domestic market in Libya since 2015. The Mellitah compressor station currently has a capacity of approximately 11.5 bcm per year. However, it is contractually committed to compressing 6 bcm per year for gas transport to Italy and 5.5 bcm per year for the Libyan market.

The annual gas production of the country reaches a substantial volume of 5.8 bcm with a total hydrocarbon production standing at 60 million barrels of oil equivalent in 2023. Additionally, the annual gas supply by Eni to the country amounts to 2.62 bcm. These numbers underscore a strong presence in the energy sector, emphasizing a substantial contribution to the country's energy resources¹⁹¹.

By launching the Structures A&E strategic project¹⁹² in 2026, Eni intends to assure gas export continuity and expand its supply to the domestic market. As part of the decarbonization strategy, the project additionally encompasses the development of a CO₂ capture and storage (CCS) facility in Mellitah, which aims to diminish the overall carbon footprint. Moreover, agreements to initiate renewable energy development initiatives are currently in progress.

Libya functions as a petrostate, with oil revenues making up 98% of public income in 2021, as reported by the Central Bank of Libya. The authorities in Tripoli have control over the National Oil Corporation (NOC) and the Central Bank, enabling them to collect

¹⁹¹ Eni, "Le Nostre Attività in Libia," www.eni.com.

¹⁹² Project Structures A&E is strategically focused on boosting gas production to meet the needs of the Libyan domestic market and to secure exports to Europe.

all proceeds from hydrocarbon production. However, Haftar's forces dominate the entire "oil Crescent"¹⁹³ in the eastern part of the country, along with five major oil ports: Es Sider, Ras Lanuf, Zueitina, Brega, and Hariga, while the other two significant oil ports, Mellitah and Zawiya, are situated in the west. Although Haftar cannot directly sell oil on international markets, he has the ability to obstruct up to 3/4 of production and exports. This strategy has been used repeatedly over the years to pressure the government in Tripoli to grant a share of the proceeds.¹⁹⁴

Libya is currently making efforts to re-engage international oil companies in the country, particularly for oil and gas exploration, especially offshore. This initiative comes after the Government of National Unity in Libya revoked the force majeure on December 4, 2022. The imposition of force majeure by the NOC was a response to the frequent closures of oil and gas exploration sites by armed groups, hindering the normal operations of employees at these sites. By declaring a state of force majeure, the NOC sought temporary relief from legal obligations tied to its contractual commitments with international oil and gas companies involved in exploration and production agreements. On August 3, 2023, Eni officially informed the NOC of the lifting of the Force Majeure status¹⁹⁵ on exploration areas A and B (onshore) and C (offshore)¹⁹⁶.

In Rome, on June 7, 2023, Eni entered into a MoU with Libya, with the aim of collaboratively exploring opportunities to diminish greenhouse gas emissions and promote sustainable energy initiatives within the country. This aligns with both Eni's strategic goals and the Libyan government's commitment to advancing decarbonization and energy transition efforts. The MoU was formalized during the visit to Italy by Prime Minister Abulhamid Dabaiba of the Government of National Unity of Libya. The agreement outlines Eni is firmly committed to reducing CO₂ emissions by addressing routine gas flaring, fugitive emissions, and venting. Furthermore, the partnership will evaluate creative solutions for developing renewable energy and initiatives aimed at

¹⁹³ The "Oil Crescent" refers to a region in Libya that is known for its significant oil reserves and production facilities. It is located along the coast of the Gulf of Sidra in the northern part of the country. The Oil Crescent includes several key oil terminals and ports, such as Ras Lanuf, Es Sider (Sidra), and Zueitina.

¹⁹⁴ Federico Manfredi Firmian, "Libia: Un Governo Bicefalo per Un Paese Diviso," ISPI, December 20, 2022.

¹⁹⁵ The Force Majeure, declared in 2014, has been revoked following the realization of a Security Risk Assessment conducted by Eni. The assessment aimed to verify the security conditions in the designated exploration areas, and the results were positive. The lifting of the force majeure is a significant indicator that security conditions have improved sufficiently to allow the resumption of drilling activities at oil and gas exploration sites.

¹⁹⁶ Carlo Marroni, "Libia, La Partita Energetica per l'Italia E Il Caos Del Paese. Eni Presente Dal 1959," Il Sole 24 ORE, January 28, 2023.

improving electricity efficiency in Libya. Lastly, Eni will focus on identifying additional gas resources from existing fields, considering their integration into a comprehensive project for the domestic market and potential export.

Italy's energy security is a top priority, evident in the recent agreement signed by Eni in January to enhance the country's long-term energy security in Libya. The agreement has a 40-year duration, involving three and a half years for extracting the already-discovered gas. Eni will recover its investment by retaining 38% of the extracted volumes for the first 15 years, followed by a reduction to a 30% share for the remaining 25 years. Excluding imported gas, the remaining portion will be utilized to power Libyan plants, establishing the Descalzi-led group as the primary gas supplier for domestic consumption in Libya. Approximately one-third of the gas retained by Eni may also be directed into the GreenStream subsea pipeline.

However, the political and territorial division between the two rival governments, the Government of National Unity and the eastern-based administration led by General Khalifa Haftar, further exacerbates the already complex Libyan situation, compromising stability and making any progress towards a lasting solution challenging.

This division, coupled with Haftar's politically driven oil and gas blockades occurred in 2022, has not only disrupted Libya's internal affairs but has also had significant repercussions on European energy supplies, particularly impacting Italy.

Haftar's oil blockades have disrupted European energy supplies, with Libya ranking as Italy's second-largest supplier in 2022 before the conflict in Ukraine, following Russia. Italy heavily relies on gas from the Mellitah complex and pipeline in Western Libya, and during Haftar's 2020 blockade, substantial losses were incurred, affecting the Mellitah complex's daily oil and gas production and resulting in a significant revenue loss.

Political fragmentation has led to chronic instability, with negative repercussions both domestically and internationally. The presence of local armed forces and regional militias, supported by external powers with divergent interests, contributes to perpetuate a deadlock and makes any attempt to build stable and democratic institutions difficult.

Ongoing tensions related to the control of vital oil resources for the Libyan economy fuel conflicts and create an environment where personal interests often take precedence over the pursuit of collective solutions. This scenario is mirrored in the complex international scenario, where different external actors support conflicting factions, further complicating the efforts for mediation and peacebuilding.

From a political and military standpoint, Libya remains in a state of deadlock. The country remains divided, poorly governed, prone to sporadic, limited-scale armed clashes, and subject to abuses of the rights of Libyan citizens and migrants. Furthermore, the Russian invasion of Ukraine has further complicated the UN mediation process in Libya¹⁹⁷. As Libya strives to re-engage international oil companies for exploration and production, recent developments such as the lifting of force majeure and Eni's MoU report positive steps towards enhancing the country's energy sector. However, the geopolitical challenges and internal divisions underscore the delicate balance between energy security, political stability, and the pursuit of sustainable energy solutions in the region.

4.3.3. Tunisia

Climate policies are intricately linked to Tunisia's energy sector, which faces a growing deficit due to declining energy production and rising demand, resulting in increased national energy dependence. Currently, the majority of Tunisian energy production relies on fossil fuels, predominantly natural gas. More than half of this gas is imported from Algeria through the Transmed pipeline, supplying energy to Italy as well. This reliance exposes the country to energy insecurity stemming from international price volatility and availability issues. Consequently, only 3% of the electricity is currently generated from renewable sources. Challenges in implementing renewable energy projects have been persistent, partly due to the political instability prevailing in the country since the 2011 revolution.

The policies shaping the renewable energy sector align with global and regional trends, primarily relying on foreign investments and the formation of public-private partnerships (PPPs). The country suffers a shortage of both financial resources and the necessary raw materials and technology for the independent production of power plants dedicated to renewable energy generation. Despite the central management of energy production and distribution by the public company STEG (Tunisian Company of Electricity and Gas), Law No. 2015-12, revised in 2019, has paved the way for private

¹⁹⁷ Federico Manfredi Firmian, "Libia: Un Governo Bicefalo per Un Paese Diviso," ISPI, December 20, 2022.

sector involvement in energy production and sales, encouraging foreign investments from companies leading in renewable energy project development.

This energy strategy is well in line with European interests regarding security and the shift towards renewable sources. Given Tunisia's strategic location and its potential in renewable energy, it could serve as a significant energy hub for Europe. Two notable contributors to the energy transition are the solar facilities located in Adam and Tataouine. In Adam, the energy produced is directly utilized on-site, leading to emissions reduction. Meanwhile, Tataouine, equipped with a solar tracking system, optimizes energy production, contributing more than 20 GWh annually to the national electricity grid.¹⁹⁸. The Adam power plant aims to reduce carbon emissions and enhance the national electricity supply. This collaborative initiative between Eni and ETAP, a state-owned company dedicated to renewable energy production, includes a twenty-year agreement for transferring the generated energy to STEG.

Eni's exploration activities in Tunisia are concentrated in the Southern desert regions and the Mediterranean offshore areas. The Trans Mediterranean Pipeline, linking Algeria to the Sicilian Channel via Tunisia, is strategically crucial as it ensures the secure supply of natural gas, to Italy¹⁹⁹.

In addition to its presence in the Tunisian market through bitumen and lubricant import and trade, Eni is actively involved in a pilot project in semi-desert areas currently unused for other crops. This initiative explores the cultivation of sustainable plant varieties intended for use as feedstock in bio-refining processes and the production of biofuels.

The focus on the energy sector in North Africa by some European countries stems from the necessity to enhance energy security, particularly in the aftermath of the Ukrainian war. While investments in transitioning to renewable energies are a crucial step in promoting local production and consumption, a genuine transition should not overlook the importance of more efficient management of local resources, addressing the population's needs, fair redistribution of investment-derived resources, and the development of local production and capacity. This holistic approach is essential for the country to achieve greater long-term independence in facing future challenges.

In conclusion, Tunisia is at a critical juncture in its energy landscape, facing challenges while making steps toward sustainability. The transition to renewable energy, exemplified by projects like the Adam's photovoltaic power plant and facilitated by

¹⁹⁸ Eni, "Adam: Il Nostro Progetto Fotovoltaico in Tunisia," www.eni.com.

¹⁹⁹ Eni, "Le Nostre Attività in Tunisia," www.eni.com

collaborations with Eni, aligns with national and global interests. Moreover, Eni's active involvement, from exploration activities to strategic projects like the crucial Trans Mediterranean Pipeline, emphasizes Tunisia's potential as a regional energy hub. Overall, ongoing collaborations, innovation, and a commitment to comprehensive development will shape a resilient energy future for Tunisia, with Eni playing a key role in this transformative journey.

4.3.4. Egypt

With a population over 100 million, Egypt now holds the title of the most populated country in the Middle East. Consequently, it faces a growing internal demand for energy driven by a rapidly expanding population and economy. The ongoing growth trend, with population and Gross Domestic Product (GDP) estimated to increase at 2% and 2.8% annually, respectively, poses significant challenges in maintaining a consistent and uniform energy supply to expanding urban centers and numerous production hubs across the country. In response to these challenges, Egypt has formulated an energy plan, considering not only the sector's importance, representing over 13% of the GDP but also its advantageous position in the Mediterranean basin. Egypt's strategic location positions it as a key hub connecting Africa, the Middle East, and Europe, with the goal of becoming a prominent macro-regional center for energy exports, particularly focusing on natural gas and electricity.

The Egyptian energy strategy is shaped by two main directions for development and implementation. This involves the exploitation and enhancement of natural gas, coupled with an ambitious energy transition program centered on the utilization of renewable resources. Both initiatives aim to achieve dual objectives: ensuring Egypt's self-sufficiency and positioning the country as a significant energy exporter in the region. This strategic move, involving the management of energy resources, secures a leading role for Cairo in the complex geopolitical landscape.

The initial directive is founded on the identification of extensive natural gas reserves off the Egyptian coastline in recent years, notably the well-known Zohr Basin discovered by Eni in the summer of 2015. Eni, with a presence in the country since 1954, has made significant strides in Egypt, achieving an annual production of 28 million barrels of oil and condensates, alongside a substantial annual gas production of 14.6 bcm. Additionally, Eni's operations contribute significantly to the production of hydrocarbons, totaling 126

million barrels of oil equivalent annually. The Zohr basin stands as the largest natural gas discovery in the Mediterranean, efficiently developed through the amalgamation of advanced technology, experienced knowledge, and the ability to establish strong agreements with the producing country and partner companies²⁰⁰. Moreover, additional discoveries have been made in the “Great Noros Area” and the North El Hammad area, located in the waters of the Egyptian Nile Delta.

Zohr, being the largest deposit discovered in the Mediterranean, has a production potential of almost 850 bcm, while Noros reserves are significantly lower, under 120 bcm.

By the end of 2018, Egypt achieved self-sufficiency in the gas sector due to these discoveries, resulting in reduced energy costs for domestic use and the cessation of costly liquefied natural gas (LNG) imports²⁰¹. The most significant benefit of the new reserves is Egypt’s ability to become a net exporter of gas.

Eni has committed to investing \$7.7 billion in Egypt over the next four years, as announced by the Egyptian presidency following a meeting between Eni’s CEO, Claudio Descalzi, and President Abdel Fattah al-Sisi on September 3, 2023. This commitment is attributed to Eni’s dedication to enhancing successful projects in Egypt. The meeting, attended by the Egyptian Minister of Petroleum and Mineral Resources, Tarek El-Molla, and senior Eni officials, emphasized the exceptional Italo-Egyptian relations and the long-standing partnership with Eni. President al-Sisi looks forward to advancing cooperation between Egypt and Eni in research, exploration, development, and production to harness Egypt’s energy resources²⁰².

The simultaneous implementation of the Suez Canal expansion and the activation of Zohr’s production, along with recent discoveries, positions Egypt as an intriguing player for political and economic strategies not only within the Mediterranean region but globally. However, challenges loom, especially in terms of internal security, crucial for economic development. Terrorist organizations persist in the Nile Delta region, the western border with Libya, and the Sinai Peninsula, even after the defeat of the Islamic State. Despite economic indicators, a 2017 Arab Barometer survey indicates that 88% of Egyptians consider the economic situation, along with corruption, as the country’s

²⁰⁰ Eni, “Zohr, the Giant Field Offshore Egypt,” www.eni.com.

²⁰¹ Federico Borsari, “Egitto: La Grande Scommessa Sull’energia,” ISPI, February 5, 2021.

²⁰² Il Fatto Quotidiano, “Descalzi Incontra Al-Sisi, Eni Investirà 7,7 Miliardi in Egitto in 4 Anni: ‘Eccezionali Relazioni Italo-Egiziane,’” September 3, 2023.

primary challenge. This economic fragility is further exacerbated by the difficulties arising from the pandemic.

In conclusion, Egypt stands at the forefront of a dynamic energy landscape, grappling with challenges while strategically harnessing its vast resources. The simultaneous expansion of the Suez Canal, the prolific Zohr discovery, and Eni's steadfast commitment to investment underscore Egypt's pivotal role in the global energy arena. As the country navigates its ambitious energy strategy, the partnership with Eni, dating back to 1954, continues to play a crucial role. Looking ahead, the collaborative efforts between Egypt and Eni are poised to further shape the nation's energy narrative, fostering sustainable development, economic growth, and resilience in the face of evolving global dynamics.

CONCLUSION

This thesis has surveyed Italy's strategic response to energy security challenges in the Mediterranean within the broader context of the post-Russian invasion of Ukraine. The geopolitical shifts triggered by the Ukrainian crisis have compelled Italy to reassess its energy policies and security measures, prompting a comprehensive examination of domestic policies and international agreements.

The thesis highlighted Italy's initiatives to diversify its energy sources, reduce reliance on traditional suppliers, and promote regional cooperation as integral components of its response strategy. It delved into the intricacies of Italy's energy security strategies and policies, providing an overview of the Italian energy sector at the beginning of the Russian invasion of Ukraine in 2022. The analysis encompassed the measures implemented by the Italian government and industries, exploring initiatives such as the Mattei Plan for Africa. Finally, the research presented a detailed case study on Eni, outlining the company's pivotal role in Italy's efforts to diversify its supply sources. The case study explored Eni's strategy and activities in Algeria, Libya, Tunisia, and Egypt, illustrating the company's significant contribution to the Italian energy landscape. Through this exploration, the thesis shed light on the broader implications of Italy's approach to energy security challenges and offered valuable insights into the role of key players like Eni in shaping the country's energy future.

The analysis extends beyond Italy's borders to assess the impact of its regional cooperation efforts on the broader Mediterranean energy security framework.

The research aimed to emphasize Italy's potential to play a pivotal role in reshaping the Mediterranean energy landscape following the Russian invasion of Ukraine. A central focus was placed on explaining how Italy could evolve into a key energy hub.

While diversifying Italy's energy sources is a major step, additional sustainable solutions are still required. Italy's proactive measures to meet climate targets and comply with the EU's "Fit For 55" package have highlighted the urgent need to increase renewable energy capacity. Undoubtedly Italy has made significant progress, but it still falls short of its goals, indicating the need for more comprehensive and ambitious policies to guarantee a resilient and sustainable energy future.

At the Italy-Africa Summit, the Italian government presented to the African leaders the political framework and the guidelines of the Mattei Plan. Following the Summit

discussions, it was emphasized that enhancing Italy-Africa relations involves committing substantial investments over the medium to long term in critical domains that reflect common priorities, including education, training, healthcare, agriculture (covering food security and safety), water resources, and energy.

Meloni mentioned various pilot initiatives under each of these pillars, specifically focusing on multiple African countries, with the ultimate objective of replicating them across the entire continent.

However, in the weeks preceding the Summit, concerns had been raised regarding the Plan's perceived deficiency in terms of effectiveness and concreteness. There is a potential risk that the Plan may consist of a collection of fragmented projects, lacking a comprehensive strategic framework to effectively manage a new cooperation between African countries, Italy, and Europe. Hereby, a trivial question emerges: what funding mechanisms will support the Mattei Plan, given that significant financial resources are required for carrying out the Plan? Meloni clarified that the currently allocated resources are evidently insufficient. Subsequently, she urged international financial institutions, multilateral development banks, the European Union, and other donor states to participate in supporting the Plan. Indeed, beyond the limited funds allocated to the Plan thus far (to draw a comparison, the African segment of the EU Global Gateway Initiative has access to 150 billion), another concern arises due to the nature of these resources – they are not new financial allocations but funds that have been reallocated to the Mattei Plan from existing resources. The lack of new financial support poses a challenge for a Plan that aspires to initiate a new phase in relations with Africa. Despite the readiness of the United Arab Emirates and Saudi Arabia to significantly support the Italian government's flagship initiative, skepticism from African countries persists, casting uncertainty on the Summit's added value and the fulfillment of its promises. Therefore, it is necessary to resolve the perceived lack of effectiveness and concreteness of the Plan.

In considering Italy's path towards a sustainable energy future and its diplomatic engagements with Africa, it is recommended that Italy prioritizes energy security through continued diversification, heightened investments in renewable energy, and the development of robust climate-aligned policies. Additionally, crucial steps involve refining the Mattei Plan with a comprehensive strategic framework, actively involving international partners, and securing a new financial support, particularly from the European Union. The success of the Mattei Plan depends significantly on obtaining this crucial financial support from the EU. Ensuring ongoing collaboration is essential to

overcome uncertainties and guarantee the success of energy initiatives in the Mediterranean region.

The success of Italy will depend on overcoming uncertainties, securing robust financial backing, honoring commitments to reshape the Mediterranean energy landscape and strengthen diplomatic ties with Africa. The energy crisis that European countries have experienced, if tackled with determination and awareness, can even become an opportunity to demonstrate Italy's resilience and leadership in navigating complex challenges. Italy, in seizing this moment, can emerge as a key player in sustainable energy solutions, leading the way to a more interconnected and prosperous future for the entire Mediterranean region. The upcoming months and years will be instrumental in determining whether our country can uphold its commitments and whether the new approach outlined by Prime Minister Giorgia Meloni will genuinely empower Africans, or if it will ultimately prove to be mere empty promises.

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