di Alberto Bindi

Liberalization of the Electricity Sector: Impacts on Consumers and Electric Utilities in Italy

This article examines the liberalization of Italy's electricity sector, assessing its effects on consumers and on former monopolist ENEL. Launched by EU Directive 96/92/EC and enacted via Legislative Decree No. 79/1999, the reforms reshaped transmission, distribution, generation, and retail segments. Regulation in natural-monopoly segments (transmission and distribution) lowered end-user costs, yet competition in generation and retail failed to drive final prices down. As a result, Italian households and businesses now pay among the highest electricity rates globally, largely due to price ties to volatile imported natural gas. Moreover, consumer protection and engagement lag behind, favouring only the most proactive users. On the utilities side, ENEL navigated these changes by completely overhauling its business model, transforming from a state monopoly into one of the world's foremost integrated electricity operators.

Today's market strucuture

italy's electricity sector has undergone a major transformation since 1999. When the country transposed EU Directive 96/92/EC via Legislative Decree 79/1999 (the so-called "Bersani Decree"), it moved from a vertically integrated public monopoly into a four-segment structure: generation, transmission, distribution and retail, each governed by distinct regulatory regimes aimed at fostering competition where feasible and preserving natural-monopoly efficiencies elsewhere.

Generation operates in a free market, converting primary sources, both non-renewable (natural gas accounting for 48.4%) and renewable (~35%), into electricity in various power plants.

Transmission, managed as a natural monopoly by Terna S.p.A., collects and transports this electricity via ultra-high and high-voltage lines; unbundling between generation and transmission prevents incumbent generators from leveraging infrastructure control to the detriment of competitors.

Distribution follows as a local natural monopoly: over 120 concessionaires step down voltage from high to low and deliver electricity to end users, with current concessions expiring at the end of 2030.

The retail segment is also liberalized, allowing consumers to choose among suppliers who procure wholesale electricity mainly on the Day-Ahead Market (MGP), run by the Italian Power Exchange (IPEx). In the MGP, transactions are auctioned in hourly blocks: bidding opens nine days prior and closes at noon on the day before delivery, yielding zonal prices across six regions and a weighted national average, the National Single Price (PUN).

PUN in this market follows a merit-order mechanism: generator offers, ranked by ascending marginal cost, intersect with the relatively inelastic demand curve to set the "system marginal price" (SMP), which equals the marginal cost of the last unit needed to meet demand. The SMP is then paid uniformly to all dispatched generators. Because renewables have virtually zero marginal costs (they don't burn any fuel), they earn significant "inframarginal rents" compared to non-renewable sources.

When renewable energy production increases (e.g., during sunny days), the supply curve shifts to the right because the "steps" at the base extend (more energy is available). As a result, the intersection point of supply and demand occurs at a lower price (merit order effect). A contraction in demand, for example at night, has the same effect: the demand curve shifts to the left and intersects the supply curve at a lower price. Conversely, when load (demand) increases, higher cost generators are dispatched and the equilibrium price increases. All these cases are represented in figure 1.

Dependence on natural gas

The SMP mechanism promotes efficiency, by ensuring that the cheapest available electricity is used first, and accelerates renewable deployment, but it also introduces a significant vulnerability: in Italy the marginal unit setting the system price is almost always a natural-gas plant. This reliance on natural gas exposes electricity prices to

Figure 1.Supply and demand in the MGP market.
Source: Risoe

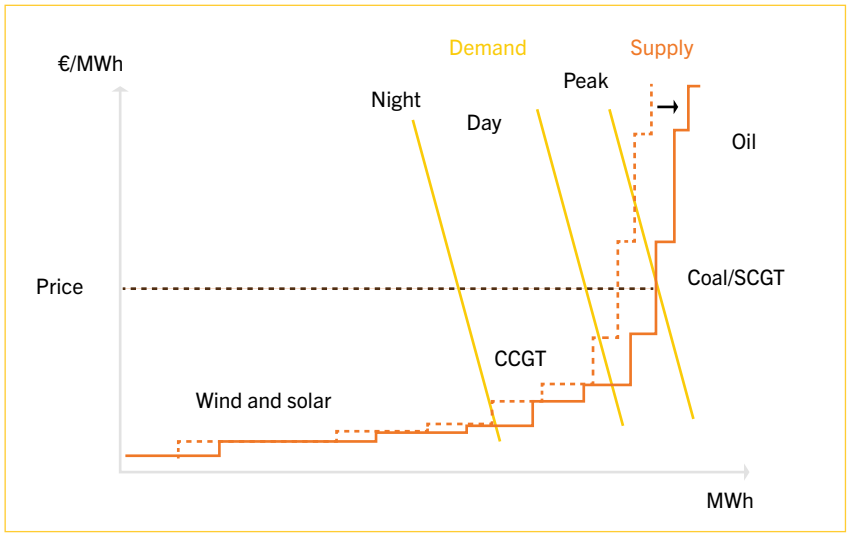
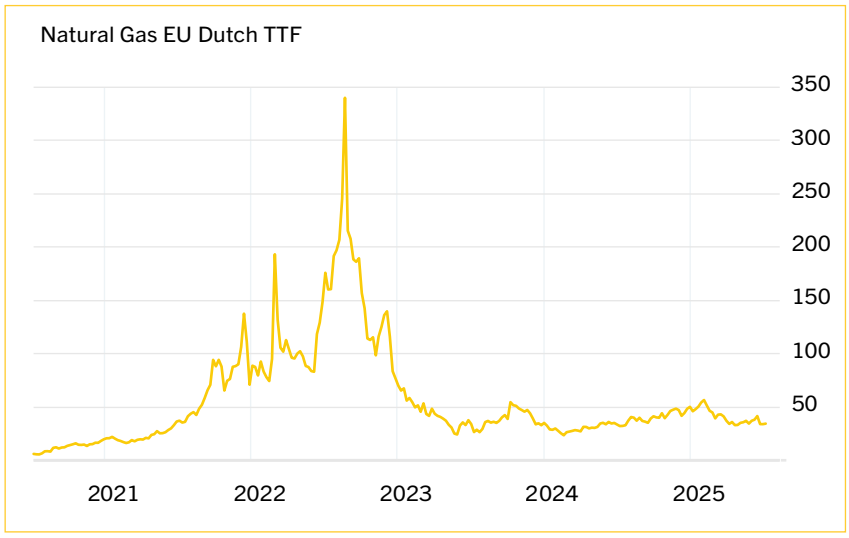


Figure 2. historical trend of Title Transfer Facility (TTF)
Source: tradingeconomics.com



the same volatility as global gas markets, volatility that has been exacerbated in recent years by geopolitical disruptions. Until 2021, Russia supplied 38% of Italy's imports; following the Ukraine conflict, Russian cut-offs drove Dutch TTF futures, the main benchmark for Natural gas price in Europe, to nearly €350/MWh in August 2022 (figure 2), shifting the supply curve upward and sending electricity prices to record highs. In response, the EU Agency for the Cooperation of Energy Regulators examined alternatives to the SMP to dampen price swings.

One such alternative was pay-as-bid pricing, in which each generator is paid its own bid price rather than a uniform market-clearing price (the SMP, set by the last accepted or first rejected offer). Although pay-as-bid can in theory limit spikes by preventing the highest-cost bids from dictating a single price, it also encourages generators to inflate bids above true marginal costs, distorts investment incentives, and reduces consumer surplus. These concerns ultimately led regulators to retain the SMP framework.

Liberalization, a process lasting 28 years

The liberalization of Italy's electricity sector is part of the broader effort to complete the EU's internal energy market, as set out in the Treaty on the Functioning of the European Union and initiated through Directive 96/92/EC. In Italy, the process formally began with the transposition of the directive into national law via the 1999 "Bersani Decree," which dismantled the vertically integrated public monopoly held by ENEL, established in 1962 through nationalization, and opened the sector to competition. The decree introduced a clear distinction between the segments open to liberalization: generation, import/export, and retail, and those not to, namely transmission (entrusted to the National Transmission Grid Operator, GRTN) and distribution (managed under a local concession regime).

Retail liberalization, however, was gradual. Until July 2024, two parallel demand-side markets have coexisted: the Free Market, where consumers choose their supplier, and the Protected Market, offering regulated tariffs for those who had not yet switched. To comply with market share limits, ENEL was forced to divest at least 15,000 MW of generation capacity by creating and selling off three new generation companies. Furthermore, ENEL was restructured into a holding with unbundled subsidiaries for production (Enel Produzione and Enel Green Power), transmission (Terna), distribution (Enel Distribuzione),

free-market supply (Enel Trade), regulated-market supply (Servizio Elettrico Nazionale), and nuclear decommissioning (Sogin).
Finally, ENEL's privatization began in 1999 and proceeded in several tranches, reducing state ownership to 23.6% as of 2023. A key shift came after the 2003 blackout, when the government reversed the separation between the ownership and operation of the transmission grid: the dispatching and development activities of GRTN were transferred to Terna (owned by ENEL), which then became a fully integrated transmission system operator. To ensure Terna's independence, a 29.85% stake was acquired by CDP Reti. As of today, Terna is a publicly traded company with a mixed ownership structure, while GRTN has been renamed GSE and now focuses on renewable energy incentives and energy efficiency promotion.

Protected market distorsions

As noted by Stagnaro (2023), the very existence of a protected market constituted a market distortion for several reasons.
First, the term "protected" is misleading for customers. It is a form of "paternalistic" protection that can induce a status quo bias, which is the tendency for people to prefer things to remain the same rather than changing. In a protected market, there is little incentive to explore competitive market options because it creates a barrier to consumer education about the benefits of switching to competitive providers.
Second, regulated prices within the protected market presented further issues: if set above market rates, they create unnecessary costs for consumers; if aligned with average prices, they serve no real purpose; and if kept artificially low, they undermine market efficiency by implying below-cost selling (which is only possible due to the involvement of a public entity, Acquirente Unico[1], that is not subject to budgetary pressures).
Moreover, the protected market's rigid framework was increasingly incompatible with the evolving energy sector. As electricity systems transition toward more flexible and renewable-based models, consumer engagement becomes essential. Market signals such as time-varying prices encourage behavioral changes, like shifting consumption to off-peak hours, which can reduce both costs and environmental impacts. In competitive markets, suppliers can offer advanced services, such as energy efficiency tools or personalized consulting, helping users manage consumption more effectively. These innovative offerings are generally absent in regulated regimes, which rely on static pricing structures and limit the potential for dynamic interaction between consumers and suppliers.

Impacts on consumers

liberalization of Italy's electricity sector has produced mixed results for consumers. While it aimed to introduce competition and lower prices, benefits have been uneven. Most cost reductions have come from regulatory improvements in the natural monopoly segments of transmission and distribution, whose share of electricity bills fell from 23% in 2004 to 14.1% in 2023. In contrast, wholesale prices have risen, mainly due to their close link with volatile natural gas markets rather than liberalization itself. As a result, many households have not experienced noticeable savings. Over 2.2 million families, 8.5% of the total, live in energy poverty, prompting public support measures including targeted bonuses, tax incentives for energy efficiency, and subsidies for low-income groups.
Although the protected market has typically offered lower prices through a variable tariff updated quarterly in line with wholesale market trends, many consumers have willingly paid more in the free market by opting for fixed-price contracts, whose higher costs served as a form of insurance against price volatility. Additionally, free market offers often include value-added services such as energy efficiency consultations, smart devices, or certified renewable energy sourcing, which some consumers are willing to pay a premium for.
Finally, a persistent issue in the liberalized market is the lack of consumer engagement, which prevents many from accessing the potential benefits of the liberalized market (offers with fixed prices and advanced services). A significant share of users remains disengaged or misinformed: many incorrectly believe that switching providers requires changing meters or may lead to service interruptions. Psychological and behavioural barriers, such as default bias and information overload, further discouraged switching. Although public authorities have introduced comparison tools and educational platforms, their usage remained limited. As a result, liberalized retail markets tend to only benefit proactive, informed consumers, while leaving passive ones at a disadvantage. In the context of the energy transition, where flexible demand and active participation are increasingly vital, closing this engagement gap is essential to ensuring that liberalization delivers inclusive and equitable benefits.

Impacts on electric utilities

In general, after a liberalization process in the power sector, incumbents must adopt distinct strategies in the B2B and B2C markets. In the free-market B2B segment, where generally competition intensifies most

(1) Acquirente Unico S.p.A. was created as a non-profit joint-stock company responsible for purchasing electricity wholesale from the Italian Power Exchange for customers of the protected market.

rapidly, utilities must cut operating expenses through sales-process automation, optimize large-client pricing with advanced analytics, maximize net margins by shedding low-profit accounts or exiting unprofitable verticals, and launch tailored industry solutions via agile product-development platforms. Conversely, in the more gradual B2C segment, priorities include slashing "cost to serve" through digital self-service and outsourcing, optimizing multichannel sales by prioritizing online acquisition and targeting door-to-door efforts with analytics, and employing retention analytics to protect high-value at-risk customers.

ENEL, Italy's sole incumbent, successfully executed this dual strategy, completely overhauling its business model. It then adopted an omnivore M&A approach, acquiring both direct and indirect competitors in the electricity sector, beginning in Eastern Europe with stakes in Slovenské Elektrárne (66% in 2006) and Electrica Muntenia Sud (64.4% in 2007) before expanding into the Americas, Africa, and Asia. ENEL also diversified into adjacent sectors, notably entering telecommunications through the acquisition of Infostrada, while dozens of new domestic and foreign utilities have been entering the power sector.

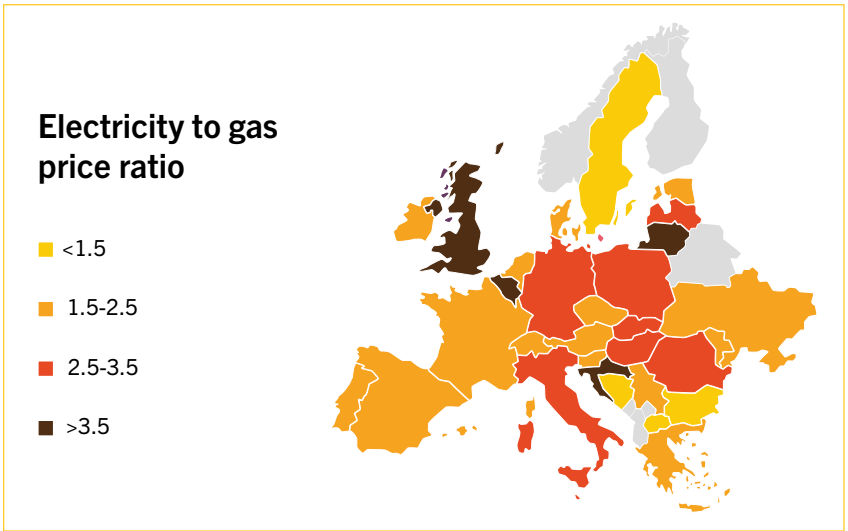
Currently, market-concentration indicators show active retailers rising from 472 in 2013 to 757 in 2022, and main suppliers (those with more than 5% market share) increasing from two to four over the same period. Yet the B2C Herfindahl-Hirschman Index remains above 2,000, the threshold signalling critical competitive dynamics, while the B2B HHI stays below 1,000, indicating a highly competitive market. In the generation segment, a 2023 four-firm concentration ratio (CR4) of 40.2% (below the 50% threshold) and an estimated HHI of around 572 also reflect strong competition. These metrics confirm that competition typically develops faster in the B2B segment.

Market outlook

As long as the marginal unit determining the system marginal price in the MGP market is a natural gas fired power plant, the price of power will remain tied to that of natural gas, with an electricity to gas price ratio fluctuating between 2.5 and 3.5 (figure 3). This gap arises because modern combined-cycle gas turbines convert fuel to electricity with a conversion efficiency slightly below 50%, whereas less efficient gas-fired steam turbines operate at 20 – 35% efficiency. Consequently, even a producer using an efficient combined-cycle turbine must sell its electricity at more than twice the price it pays for natural gas to break even, and that's before accounting for pipeline fees, fuel financing charges, variable operations and maintenance costs, taxes, and fixed expenses.

In this scenario, where the price of electricity is tied to that volatile of natural gas, the former may decrease, or at least become less volatile, thanks to a revolution occurring in recent years: the LNG (liquefied natural gas) revolution, which makes the supply of natural gas more flexible. This means that procuring feedstock for gas-fired power plants would be much more adaptable. Indeed, liquefying natural gas is a way to move natural gas long distances when pipeline transport is not feasible or convenient. In its compact liquid form, natural gas can be shipped in special tankers to terminals around the world. While pipelines can't be moved, LNG carriers can stock natural gas anywhere in the world, allowing for the storage of stranded gas too, which is natural gas extracted in remote locations where pipeline infrastructure is absent and economically unfeasible. As noted by Bresciani et al (2020), in an article published by McKinsey, a decade ago only 23 countries had access to LNG. Expensive import terminals that took years to build, coupled with rigid supply contracts, hindered the widespread adoption of LNG, despite its attractive near-term economics. Concerns about the geopolitical risks of LNG dependence also stunted demand growth from existing importers, even when few other supply options were available. Today's market is

Figure 3.The trend of the electricity-to-gas cost ratio in the European Union (EU27).
Source: ehpa. Link: https://www.ehpa.org/news-and-resources/news/in-which-countries-does-the-electricity-price-work-for-heat-pumps/



very different: by 2023, 51 countries were importing LNG, and 20 were exporting. Rising competition among suppliers and increasing liquidity in traded markets created more room to cater to individual buyer needs for contract duration, size, and flexibility. Additionally, the development of floating storage and regasification unit (FSRU) technology means LNG supply capacity can respond quickly to changes in local gas demand and supply. Indeed, FSRUs allow any country with a coastline to access LNG supply within two years.

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