G7 POWER SYSTEMS SCORECARD

COUNTRY PROFILE: ITALY[1]

May 2024

Synopsis

OVERALL COUNTRY SCORE: 164/400

The Italian power sector is to this day heavily dependent on fossil resources, as more than 50% of electricity is generated by burning fossil gas, oil or coal. While there is a phase-out date for coal, at the latest in 2028, a phase-out plan for fossil gas is still missing. It strongly depends on the policy framework and in particular the way investments in renewables will be mobilised in the near future.

The recent energy crisis sheds a new light on the need to accelerate RES deployment. In its draft National Energy and Climate Plan (NECP), Italy committed to install additional RES capacity of about 70 GW. Although the 2030 goal for renewable energy share is aligned with the EU Green Deal, it is lower than that suggested by IEA to reach at least 80% electricity generated from low-carbon sources. In 2022 and 2023 Italy manged to increase its RES installation rate, which is getting closer to what is required to achieve the 2030 goal.

When it comes to the 2035 net zero power ambition, Italy needs to define a clear delivery roadmap to be adopted in national policies. Specifically, there is a lack of a strategy and specific actions for implementing flexibility technologies and developing a smarter power system. Gas still plays a disproportionate role in the country's decarbonisation agenda – both domestically and in its diplomacy.

Headline message – Benchmarks 1–2 (Section 1: Infrastructure/Energy mix)

SCORE: 40/120

Italy ranks insufficiently in some indicators particularly around ramping up RES, due to the low RES installation rate over the last ten years. Although the government has repeatedly confirmed its commitment to speed up the renewables rollout and Italy installed 6 GW in 2023, delivery of RES targets is lagging due primarily to issues with permitting processes and delays in the

[1] To see the whole Scorecard, including the scoring methodology, visit **https://www.e3g.org/g7-power-systems-scorecard**

publication of implementing decrees that should define RES supporting schemes (e.g. FER 2, FER X, Decreto Aree Idonee).

Headline message – Benchmarks 3–5 (Section 2: Policies/Targets)

SCORE: 124/280

While Italy scores quite well on some energy efficiency indicators, it does not have a clear strategy to build up flexibility technologies, including demand side measures, short-term or long-term storage (lack of actions on seasonal storage, which is clearly an issue in terms of deep power decarbonisation), and flexible tariffs. In some cases (such as storage capacity) a target has been identified but the implementation remains unclear.

Italy is involved in some international leadership efforts / supporting the energy transition (PPCA, friend of BOGA, Mineral Security Partnership), but its energy diplomacy is still more focused on fossil fuels than clean energy.

Benchmark 1: Reducing fossil fuel reliance

TOTAL SCORE 15/60

The share of fossil fuel capacity in the power mix is 47% (corresponding to about 57 GW). Italy is strongly reliant on gas capacity, and less on coal capacity (5.7 GW). In the past it has realised the switch from coal to gas. The remaining coal capacity will phase out by 2025 in the peninsula and by 2028 on Sardinia. According to government evaluations, in a scenario of high-RES share gas capacity is considered essential for balancing the electricity grid.

1.1 New unabated coal and gas power plants in planning or construction?

SCORE: 4/15

Italy has no coal pipeline, but 4.2 GW of new gas power plant capacity in planning or construction.

1.2 Share in electricity generation: fossil fuels

SCORE: 3/15

In 2022 the share of fossil fuel generation in the power mix was 64%, which dropped to 56.2% in 2023.[2]

[2] Ember, May 2024, **Electricity Data Explorer**

According to the NECP, in 2030 fossil fuel capacity will reduce to 54–55 GW: 5.7 GW of coal capacity will be phased out and 3 GW of new gas capacity will be installed. The share will decrease to 29% by 2030.

1.3 Share in electricity generation: non-renewable low-carbon tech

SCORE: 0/15

Italy has no low-carbon technologies, such as nuclear plants.

1.4 Carbon intensity of power index

SCORE: 8/15

In 2023 Italy's carbon intensity of power generation was 330.7 gCO_2/kWh.[3]

According to the NECP, it should decrease by 50% in eight years, corresponding to 145.7 gCO_2/kWh by 2030.

Benchmark 2: Ramping up renewables

TOTAL SCORE: 25/60

Italy started to ramp up wind and solar capacity two decades ago, reaching a maximum installation rate of 10 GW/year in 2010.[4] New installations then slowed down over the last ten years. Due to the gas crisis, Italy recognised the role of RES in reducing its gas dependency and simplified the permitting process to accelerate new RES installations. In 2023 Italy installed more than 5 GW[5] of RES and aims to double this volume in 2024. 10–11 GW/year is the adequate rate for reaching 2030 targets.

2.1 Share of variable RES in electricity generation

SCORE: 5/15

In 2022 the share of variable RES (solar and wind) in electricity generation was 17%. In 2023 it increased to 21%.[6]

[3] Ember, May 2024, **Electricity Data Explorer**

[4] GSE, 2023, **Energia e clima in Italia – Rapporto periodico, primo semestre 2023**

[5] Terna, December 2023, **Rapporto mensile del 31/12/2023**

[6] From relevant Terna monthly reports: **Terna, Rapporto mensile**

2.2 Share of other RES in electricity generation

SCORE: 6/15

In 2023 the share of geothermal, bioenergy and hydro production in the power mix was 23%.[7] Hydropower is the dominant source (14.45%), followed by bioenergy (6.33%) and geothermal and other renewables (2.18%).

2.3 Variable RES pipeline capacity vs country's announced target

SCORE: 7/15

In 2023 Italy installed almost 6 GW of new RES capacity. To reach its 2030 RES target of 131 GW, it should install 10–11 GW per year. Current RES capacity is 67 GW.

As of 2023, Italy's utility-scale solar and wind project pipeline up to 2030 was ca. 45 GW, which is not sufficient to deliver the 2030 renewable target, particularly given that over half of these projects have only been announced and have not yet entered a pre-construction stage.[8]

2.4 Average permitting time for VRE

SCORE: 7/15

According to the observatory R.e.gions 2030 the permitting time is 43 months for wind and 22 months for solar.[9]

Although the government has tried to speed up the regulatory framework for authorisation of RES, the process continues to show issues. The decree aimed at defining "suitable" areas for RES installations is still not published. Furthermore, according to operators and associations the circulated draft is an additional barrier, as it burdens areas with other constraints instead of reducing as much as possible the authorisation requirements.

[7] Ember, May 2024, **Electricity Data Explorer**

[8] Global Energy Monitor, updated December 2023, **Global Solar Power Tracker**, and **Global Wind Power Tracker**

[9] R.e.gions2030, October 2023, **Rinnovabili all'italiana. La morsa degli stop and go**

Benchmark 3: Adapting the power systems to high-RES share

SCORE: 35/120

Italy has no clear strategy to build up flexibility technologies, including demand side measures, short-term or long-term storage (there is a lack of action on seasonal storage, which is clearly an issue in terms of deep power decarbonisation), and flexible tariffs. While the process for transmission grid development is transparent and efficient, issues on local grid development are unclear and not well addressed.

3.1 Policies to limit curtailment to a minimum that ensures optimal RES capacity utilisation

SCORE: 3/15

Curtailment is not a serious issue currently in the national grid: in 2022 according to Terna[10] the non-dispatched wind energy amounted to 300 GWh, over a third less than in the previous year. However, zonal bottlenecks are a reason why Terna is proposing a delay in the coal power phase-out in Sardinia, and they have long been a reason for having a large oil power plant in operation in Sicily, despite the interconnection between Sicily and Calabria having been repowered in the last two decades.

Much more unknown and most probably severe are the curtailments in the distribution networks, both in terms of delayed connection of new plants and in terms of timely response to outages. There is no detailed public data on effectiveness of distribution networks in terms of connections and reliability with respect to distributed renewables.

3.2 Active steps by the national grid operator to plan for short spells of 100% RE power

SCORE: 0/15

Italy's NECP aims to reach a RES share of 65% of power production by 2030 – a long way off 100%.[11] This is despite Italy having committed to 100% renewable electricity by 2035 within the G7. Terna, Italy's transmission system operator

[10] Terna, **Adeguatezza** (webpage, accessed May 2024)

[11] European Commission, July 2023, **Italy – Draft updated NECP 2021–2030**

(TSO) is aiming in its development plan[12] to dispatch RES energy volumes consistent with the Fit for 55 objectives, which are short of the 2035 target.

3.3 Effective policies to ramp up electricity storage

SCORE: 9/15

Italy is not taking specific actions on seasonal storage at the moment, which is clearly an issue in terms of deep power decarbonisation. However, general storage capacity procurement is addressed by a procedure (Meccanismo di Approvvigionamento di Capacità di Stoccaggio Elettrico – MACSE) which should lead by 2024 to put storage capacity consistent with the objectives of the NECP for auction.[13]

3.4 Effective policies to increase end use flexibility

SCORE: 5/15

End user flexibility in Italy has not been implemented in a satisfactory way so far, neither in terms of passive flexibility induced by dynamic pricing (most electricity users in Italy aren't even billed an hourly price), nor of active flexibility by collection of distributed resources (aggregators will be fully enabled only with the reform of the dispatching code to be enforced in 2025).

So far, flexibility is procured by Terna through the ancillary services market (MSD), from eligible interruptible industrial customers and through UVAMs,[14] which rely mainly on auxiliary power production systems installed within the premises of some industrial energy users.

Local flexibility markets (MLF) are finally about to be experimented with, but are not yet operational.[15]

3.5 Effective policies to accelerate grid development

SCORE: 6/15

While transmission grid development is transparently proposed by the TSO and approved by the government, plans in terms of local grid development are patchy and don't go through a centrally led assessment.

[12] Terna, **Piano di sviluppo della rete** (webpage, accessed May 2024)

[13] MACSE consultation documents: Terna, **Consultations** (webpage, accessed May 2024)

[14] Terna, **Progetto pilota per unità virtuali abilitate miste – UVAM** (webpage, accessed May 2024)

[15] GME, **Mercato locale flessibilita** (webpage, accessed May 2024)

Grid development in cities is slowed down by authorisation issues for the construction sites. Special rules to authorise grid construction in towns should be evaluated.

3.6 Effective policies to enable the required digitalisation of power systems

SCORE: 6/15

Despite a second generation of smart meters[16] being widely deployed already (over 30 million meters installed), little or nothing is done to foster digitalisation of energy consumption control, nor is any infrastructure to allow aggregation of distributed demand response being supported. Demand side flexibility is not even eligible for capacity payment under the capacity market scheme[17] – flexible demand is simply exempted from paying the capacity payment fee.

3.7 Effective mechanisms or frameworks to prevent preferential treatment for fossil fuel-based generation over RES on the market

SCORE: 6/15

Priority dispatching is granted to RES in Italy, which is not very significant since dispatching is based on order of economic merit under the day ahead market.

RES aren't sufficiently favoured in Italy for the following reasons:

> They have been recently requested to pay taxes on windfall profit[18] from high energy prices, while subsidies to fossil fuels in Italy are much larger than the overall amount of subsidies to environmentally favourable forms of generation.

> They get no advantage in the authorisation process based on their lower environmental impact. On the contrary, getting utility-scale RES approved in Italy is extremely hard.

> RES that join Contracts for Difference programs to reduce the unpredictability of their earnings aren't allowed to also join the capacity market scheme for the share of statistically expected capacity.

[16] ARERA, **Smart metering** (webpage, accessed May 2024)

[17] Terna, **Mercato della capacità** (webpage, accessed May 2024)

[18] Reuters, 14 December 2022, **Italy collects around 2.8 billion euros from 2022 energy windfall tax**

3.8 Electrification rate target and roadmap to support delivery

SCORE: 0/15

There is no target for electrification rate.

Benchmark 4: Governance / International leadership

SCORE: 27/80

Italy is involved in some international leadership efforts / supporting the energy transition (PPCA, friend of BOGA, Mineral Security Partnership), but its energy diplomacy is still more focused on fossil fuels than clean energy. The strategy for developing complementary technologies to renewables is biased in favour of new gas infrastructure.

4.1 2035 carbon neutral power system commitment adopted in national legislation

SCORE: 0/10

There is no legislated commitment for 2035.

Neither has the G7 commitment for a fully or predominantly decarbonised electricity sector by 2035 has been transposed into the adjusted NECP (published in July 2023). Furthermore, in the period 2024–2030 the latter plans to build new gas capacity alongside renewable deployment[19] to ensure security of supply in phasing out coal capacity. 2030 is an interim milestone for full decarbonisation of the energy sector by 2050.

4.2 Global leadership on supporting power systems decarbonisation in developing countries

SCORE: 4/10

Italy is involved in several international leadership efforts, but its energy diplomacy is still more focused on fossil fuels than clean energy.

Italy is supporting the Just Energy Transition Partnerships of Indonesia[20] and Vietnam.[21] As part of the G7 initiatives, Italy supports the G7 Partnership for

[19] Ministry of the Environment and Energy Security, June 2023, **National Energy and Climate Plan**, p.206

[20] European Commission, November 2022, **The EU and international partners launch ground-breaking Just Energy Transition Partnership with Indonesia**

[21] European Commission, December 2022, **International agreement to support Viet Nam's ambitious climate and energy goals**

Global Infrastructure and Investment,[22] with a strong focus on sustainable energy, and the G7 Clean Energy Economy Action Plan.[23] At the European level, in 2023 Italy reaffirmed its support for the EU Global Gateway,[24] Europe's external investment plan.

The Italian Climate Fund, launched in 2022 with an endowment of €840 million per year from 2022 to 2026, aims to finance climate action, including clean energy, in emerging economies.[25] About 70% of it – or €3 billion by 2026 – should go to African countries and underpin the "Mattei Plan for Africa", the Italian investment Plan for Africa.[26] A substantial amount will be dedicated to clean energy projects, including renewables, grid sand hydrogen.

As of January 2024, Italy's bilateral cooperation on sustainable development, including clean energy, has 37 active cooperation agreements and 27 agreements under renegotiation and new negotiations, for a total of 81 developing and least developed countries.[27] The Italian Development Agency AICS spent almost €5 million for energy projects in 2023.[28] At COP26 in 2021, Italy signed the Glasgow statement to end fossil fuels support internationally.[29] However, Italy's guidelines to phase out fossil fuels support through its Export Credit Agency SACE contradict the timelines agreed at COP26.[30]

4.3 International commitments on power systems decarbonisation through alliances or networks such as the PPCA, Glasgow Coal to Clean Power Initiative etc.

SCORE: 4/10

Italy is involved in several alliances and networks, but a clear commitment for unabated gas phase-out is still missing.

[22] G7 2023 Hiroshima Summit, 2023, **Factsheet on the G7 Partnership for Global Infrastructure and Investment**

[23] G7 2023 Hiroshima Summit, May 2023, **G7 Clean Energy Economy Action Plan**

[24] Decode39, 27 October 2023, **Italy backs EU's Global Gateway – and readies its own**

[25] Italian government, last updated July 2023, **The Italian Climate Fund**

[26] Italian government, 29 January 2024, **President Meloni's opening address at the Italia–Africa Summit**

[27] Italian government, last updated April 2024, **Bilateral collaboration agreements – geographical areas**

[28] Open Aid AICS, **Energy** (webpage, accessed May 2024)

[29] UN Climate Change Conference UK 2021, November 2021, **Statement on international public support for the clean energy transition**

[30] Recommon, March 2023, **National Approaches on implementation of the COP26 Statement on the Clean Energy Transition Partnership** (website, last visited May 2024).

Italy joined the Powering Past Coal Alliance in 2017, when it committed to phase out domestic coal by 2025. This target has been confirmed by the current government for the peninsula,[31] however it has been moved to 2028 for the island of Sardinia. Italy is member of the Clean Energy Ministerial and a number of initiatives to support clean power implementation.[32] In 2023, Italy joined the Minerals Security Partnership to bolster sustainable and secure supply chains.[33] At COP28 in 2023, Italy signed the COP28 declaration on tripling renewables and doubling energy efficacy.[34]

4.4 Net zero power system roadmap to drive delivery of 2035 commitment

SCORE: 0/10

In 2021, Italy committed to reach a nearly decarbonised power sector by 2035 as part of the G7. Nevertheless, a delivery roadmap has not been identified and it is still missing. To reach this target Italy needs to accelerate RES deployment and achieve a 72% share of RES in electricity generation by 2030.[35]

There is a long-term strategy for 2050 climate neutrality.

4.5 Critical role of renewables, interconnection, and demand side measures reflected in country's energy security framework

SCORE: 4/10

The strategy for developing complementary technologies to renewables, mostly planned in the NECP,[36] is biased in favour of new gas infrastructure. The capacity market scheme clearly favours new gas fired power plants over existing ones and over demand response. Central procurement of storage capacity is planned, but not performed yet, and there will probably be a lack of long-duration storage procured due to its higher cost over transacted energy.

A dynamic retail energy price has never been introduced despite the widespread deployment of electronic smart meters.

[31] Ministry of the Environment and Energy Security, June 2023, **National Energy and Climate Plan**

[32] Clean Energy Ministerial, **Italy** (webpage, accessed May 2024)

[33] U.S. Department of State, September 2023, **The Minerals Security Partnership continues to expand with Norway, Italy, and India**

[34] COP28 UAE, December 2023, **Global renewables and energy efficiency pledge**

[35] Ecco, June 2023, **Scenario of a decarbonised Italian power system by 2035**

[36] European Commission, July 2023, **Italy – Draft updated NECP 2021–2030**

There is ongoing development of interconnection capacity, and the first interconnection with northern Africa has been included in the TSO's development plan.[37]

4.6 Unabated coal phase-out date and roadmap to support delivery

SCORE: 10/10

In the 2019 NECP, Italy committed to phase out coal capacity by 2025. Nevertheless, in the 2023 NECP draft Italy postponed this date to 2028 for the island of Sardinia on the grounds of changing conditions in the energy system and security of supply due to the geopolitical crisis. The new trajectory is:

> 1,480 MW to be phased out by April 2024.

> 1,655 MW to be phased out (445 MW in Sardinia) by April 2025.

> 1,845 MW to be phased out by January 2026.

> 480 MW to be phased out in Sardinia by January 2028.

> 265 MW to be phased out in Sardinia by January 2029.

4.7 Unabated gas phase-out date and roadmap to support delivery

SCORE: 0/10

There is no gas phase-out date in the power sector.

4.8 2030 target for share of total RES in electricity generation

SCORE: 5/10

According to the NECP, in 2030 the share of total RES in the power mix will increase to 65%. There is no roadmap in place to support delivery.

[37] Terna, **Piano di sviluppo della rete** (webpage, accessed May 2024)

Benchmark 5: Reducing energy waste

SCORE: 62/80

Italy has invested a lot in buildings efficiency (Superbonus 110%) but more efforts are needed, especially in reducing buildings' emissions. A clear commitment for the electrification of heating consumption is lacking.

5.1 Efficient policies to retrofit / renovate buildings

SCORE: 15/20

Incentive schemes for improving energy efficiency in buildings have been in place since 2007, but the pace and scale of rollout needs to be improved. A greater focus on implementation is needed, particularly for buildings with very low energy efficiency (e.g. F/G rated) and for deep renovation (an upgrade of at least 2–3 energy labels should be required). Fossil-based technologies (such as gas condensing boilers) should no longer be subsidised. Furthermore, the gas and electricity tariff framework encourages gas consumption and represents a barrier to end user electrification.

The status of EPBD transposition into national law is unclear. There are a range of different funding schemes available for building requalification: including Bonus Casa, Superbonus, Ecobonus, Conto Termico, Bonus for home appliances, National Energy Efficiency Fund, and The Programme for the Energy Requalification of Central Public Administration Buildings (PREPAC).

The government is planning to reform these incentive schemes. The most discussed is the one concerning the residential sector: the timeframe should be at least ten years and it should primarily target low energy efficient buildings, provide deduction rates aligned with the energy performance achieved, and be accompanied by supporting financial instruments, such as low-interest financing and loan origination, with favourable conditions for people in energy poverty.

5.2 National energy/power savings target

SCORE: 15/20

In line with European legislation and climate goals, and specifically the EU Energy Efficiency Directive, Italy has targets for reducing final energy consumption in buildings, transport, and industry.[38] There is no target for reducing transition and distribution losses.

[38] European Commission, July 2023, **Italy – Draft updated NECP 2021–2030**

5.3 Sufficient spending on energy efficiency programmes

SCORE: 16/20

In 2022 total investments in energy efficiency interventions in buildings were about €68 billion, of which about 80–90% was public spending.[39]

5.4 High-quality appliance and equipment standards and labelling

SCORE: 16/20

Minimum energy performance standards for buildings are in discussion and there are energy labels for a wide range of products.

Energy labels were introduced in 1998. The legislation has been changed over the years, and today it implements the EU legislation corresponding to:

> The Ecodesign omnibus is Regulation (EU) 2021/341 amending Regulations (EU) 2019/424, (EU) 2019/1781, (EU) 2019/2019, (EU) 2019/2020, (EU) 2019/2021, (EU) 2019/2022, (EU) 2019/2023 and (EU) 2019/2024 with regard to Ecodesign requirements for servers and data storage products, electric motors and variable speed drives, refrigerating appliances, light sources and separate control gears, electronic displays, household dishwashers, household washing machines and household washer-dryers and refrigerating appliances with a direct sales function.

> The Energy Labelling omnibus is Regulation (EU) 2021/340 amending Delegated Regulations (EU) 2019/2013, (EU) 2019/2014, (EU) 2019/2015, (EU) 2019/2016, (EU) 2019/2017 and (EU) 2019/2018 with regard to energy labelling requirements for electronic displays, household washing machines and household washer-dryers, light sources, refrigerating appliances, household dishwashers, and refrigerating appliances with a direct sales function.

[39] ENEA, December 2023, **Rapporto Annuale sull'Efficienza Energetica 2023**

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