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Heat pumps for Italy: Aligning energy policy to support the transition to clean heating

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1. Introduction

Heat pumps are a central technology for decarbonising residential heating and increasing energy security in Italy, where fossil gas still provides more than half of residential space heating and hot water demand[1] and domestic gas production has been declining for decades.[2,3] Heat pumps can provide space heating, cooling and domestic hot water, making them well suited to Italy's diverse climate conditions. While northern Italy experiences a substantial heating season, southern Italy faces growing cooling demand, and many off-grid households continue to rely on costly liquid petroleum gas (LPG). Across all regions, domestic hot water needs remain high year-round.

Italy has several favourable conditions for heat pump deployment: a mild climate well suited to air-source technologies, strong solar resources for pairing with photovoltaics, and an urgent need to reduce dependence on imported gas. Italy also hosts a strong heat pump manufacturing base, including several leading European brands, creating industrial opportunities. At the same time, the current heating landscape remains deeply shaped by gas infrastructure, uneven building energy performance, and an electricity–gas price imbalance that tilts running costs against electrification.

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[1] Eurostat. (2025). *Share of fuels in the final energy consumption.* https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Energy_consumption_in_households#Data_sources

[2] IEA. (n.d.). *Evolution of domestic gas production, Italy.* https://www.iea.org/countries/italy/natural-gas#where-does-italy-get-its-natural-gas

[3] The authors would like to thank Steffen Verheyen (Agora Energiewende), Francesca Andreolli (ECCO Climate) and Davide Sabbadin (European Environmental Bureau) for their helpful comments on earlier drafts of this paper. They also thank Marion Santini (Regulatory Assistance Project) for her valuable comments and guidance throughout the development of the paper, and Steena Williams (Regulatory Assistance Project) for her editorial support and copyediting.

Heat pump sales have grown over the past decade, but deployment has been volatile and heavily influenced by policy cycles. In 2020, Italy introduced the temporary Superbonus scheme as part of its post-pandemic recovery strategy, covering up to 110% of eligible installation costs and triggering record heat pump installations.[4] Yet the subsequent tightening of fiscal rules produced a sharp contraction in 2023 and 2024. This stop-start pattern highlights both the transformative potential of heat pumps and the limitations of relying on short-lived incentive schemes without a stable long-term strategy.

This paper assesses Italy's current position and explores the policies needed to accelerate heat pump deployment at a pace consistent with national decarbonisation goals and the EU Energy Performance of Buildings Directive. Drawing on RAP's Heat Pump Policy Toolkit,[5] this paper examines the economics of heating, the enabling conditions for clean heat uptake, the regulatory and financial framework, and the governance structures shaping Italy's heat transition.

Italy does not lack policy intervention or technical options for clean heating, but the country's policy framework remains insufficiently aligned with the conditions required to scale heat pumps and electrified heating in a durable and equitable way. Distorted price signals, broad and volatile support schemes, and fragmented system planning continue to slow the transition, despite favourable climatic conditions, strong solar potential, and periods of rapid market growth.

Key recommendations

- **Establish clear long-term regulatory signals.** Set a fossil boiler phase-out pathway, national heat-planning requirements and a heat pump deployment trajectory.
- **Rebalance energy prices to support clean heating.** Shift policy costs away from electricity, protect vulnerable households and enable flexible electric heating through suitable retail tariffs.
- **Strengthen and stabilise financial support.** Prioritise accessible point-of-sale grants, predictable funding and complementary financing for fully electric heating.
- **Integrate electricity and gas network planning.** Align investment decisions with increasing electrification and declining gas demand to minimise stranded assets and unnecessary costs.
- **Strengthen support for households and installers.** Expand installer training, trusted advice and integrated electrification solutions across all regions.
- **Embed equity throughout clean heat policy.** Target assistance and ETS2 revenues towards low-income and energy-poor households.

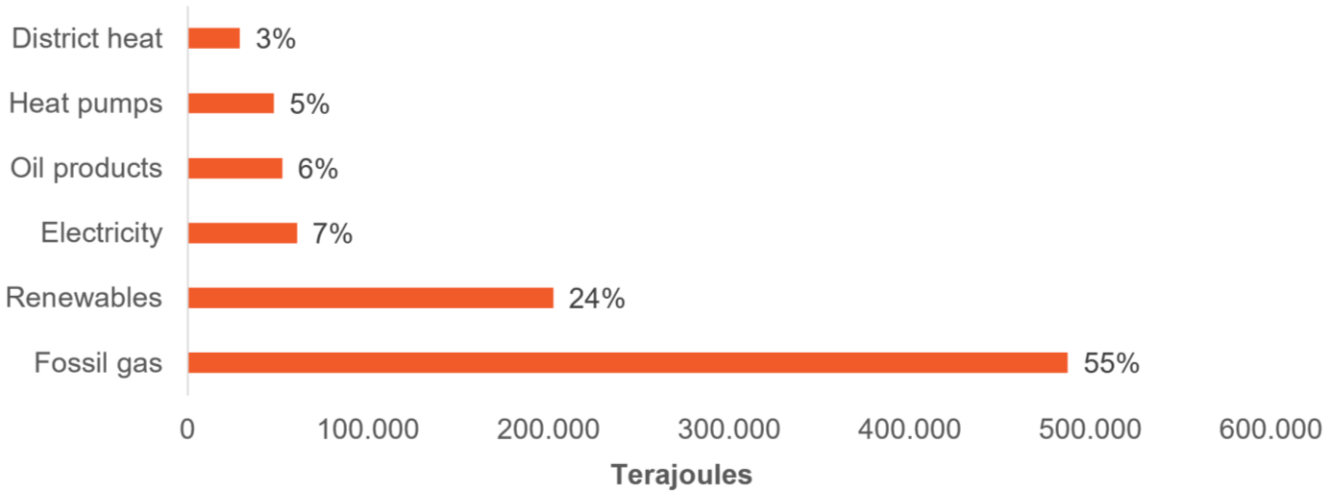
[4] Ministero dell'Economia e delle Finanze. (n.d.). *Superbonus 110%.* Agenzia delle Entrate. https://www.agenziaentrate.gov.it/portale/superbonus-110-

[5] Lowes, R., Gibb, D., Rosenow, J., Sunderland, L., Thomas, S., Graf, A., Verheyen, S., Kelpsaite, L., Malinowski, M., Ross, A., Graham, P., Kabare, R. & Njendu, M. (2024, November). *A policy toolkit for global mass heat pump deployment — Version 2.0.* Regulatory Assistance Project, Agora Energiewende, CLASP, Global Buildings Performance Network. https://www.raponline.org/toolkit/heat-pump-toolkit/

2. The Italian heat mix

Italy relies heavily on fossil fuels to meet its heating needs. As shown in Figure 1,[6] in 2024 around 55% of residential space-heating and hot-water demand was provided by fossil gas while fuel oil supplied 6%. Bioenergy and solar heating accounted for 24% of demand, with heat pumps supplying 5%.

Figure 1. Energy used for space heating and hot water in homes in Italy, 2024



Data source: Eurostat. (2026). *Disaggregated final energy consumption in households*

Note: 'Renewables' include bioenergy and solar thermal. See the Annex for a full list of data sources and methodology.

Italy's dependence on gas creates energy security risks. Domestic fossil gas production has declined steadily over the past three decades, falling from around 20 bcm per year in the early 1990s to less than 4 bcm in 2024.[7] Today it accounts for only a marginal share. As a result, import dependence has risen sharply, reaching around 99% of total gas supply in 2022 and remaining above 96% in 2023.[8]

This high reliance on imports exposes Italy to geopolitical, economic and infrastructure risks. Gas supply is concentrated across a limited number of external routes – including pipelines from Algeria, Libya, Azerbaijan and Northern Europe, as well as LNG imports – making Italy sensitive to disruptions in international markets and diplomatic relations. While diversification since 2022 has reduced dependence on Russian gas, it has not eliminated exposure to global LNG price volatility or to political developments in key supplier countries.[9] Recent tensions in

[6] Eurostat. (2026). *Disaggregated final energy consumption in households* [Data set]. https://ec.europa.eu/eurostat/databrowser/view/nrg_d_hhq/default/table?lang=en

[7] Enerdata. (2026). *Domestic natural gas production — Benchmark countries (1990–2025)*. https://yearbook.enerdata.net/natural-gas/world-natural-gas-production-statistics.html

[8] ARERA. (2023a). *I numeri dei servizi pubblici* [The numbers of the public services]. https://www.arera.it/comunicati-stampa/dettaglio/it/com-stampa/23/230711cs

[9] ARERA, 2023a.

the Middle East have demonstrated that Italy remains vulnerable to geopolitical shocks affecting global gas markets.[10]

The 2022 energy crisis exposed this vulnerability, with the sharp increase in gas prices pushing household bills to record levels despite extensive state support. Residential gas consumption fell by 13.5% in 2022, reflecting emergency conservation and price effects rather than a structural shift away from gas-based heating.[11] In 2023, residential gas tariffs remained slightly below the 11.9 eurocent per kilowatt-hour average price in the Eurozone,[12] largely due to temporary VAT reductions and fiscal measures.[13]

Italy's residential heating landscape varies considerably across regions. Centralised heating systems are concentrated in northern Italy, while households in southern Italy and the islands rely much more heavily on individual heating appliances. According to the latest data from the Italian National Institute of Statistics (ISTAT), 69.6% of households use autonomous heating systems as their primary heating system, 22.4% use centralised systems (predominantly in northern Italy), and 8.0% rely primarily on individual heating appliances such as stoves, fireplaces and split air-to-air heat pumps.[14] These national averages conceal substantial regional variation. In the North-West, centralised heating remains the primary system for almost 30% of households, compared with less than 3% in southern Italy and the islands. Conversely, individual heating appliances are the primary system for almost one quarter of households in southern Italy and 45.3% in the islands. Sardinia is particularly distinctive, with 54.7% of households relying primarily on individual heating appliances, reflecting the island's historically limited development of the gas network and distinctive heating infrastructure.

These regional differences translate into different energy vulnerabilities and therefore different pathways to decarbonisation. Northern households tend to face higher heating demand and greater reliance on gas-based centralised and autonomous heating systems, while households in southern Italy and the islands rely more heavily on individual heating appliances, many of which are fuelled by LPG or biomass. Temporary bill support measures cushioned the immediate impact of the recent energy crisis but also masked the underlying electricity–gas price imbalance, reducing incentives to switch to clean heating. Although electricity prices remain partly linked to gas prices in wholesale markets, electrified heating offers much greater scope to reduce long-term energy costs through higher efficiency, demand-side flexibility and integration with rooftop photovoltaics. By contrast, fossil fuel heating leaves households directly exposed to fuel price volatility, with limited opportunities to reduce costs beyond reducing consumption. Without sustained electrification policies, Italian

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[10] Andreolli, F. & Signorelli, G. (2026, 12 March). *Crisi nello stretto di Hormuz: gas, prezzi dell'energia e autonomia strategica europea* [Crisis in the Strait of Hormuz: gas, energy prices and European strategic autonomy]. ECCO Climate. https://eccoclimate.org/crisi-nello-stretto-di-hormuz-gas-prezzi-dellenergia-e-autonomia-strategica-europea/

[11] ARERA, 2023a.

[12] Eurostat. (2023). *Electricity and gas prices stabilise in 2023.* https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20231026-1

[13] ARERA. (2024). *I numeri dei servizi pubblici* [The numbers of the public services]. https://www.arera.it/comunicati-stampa/dettaglio/arera-i-numeri-dei-servizi-pubblici

[14] ISTAT. (2025). *Dotazioni energetiche delle famiglie* [Household energy equipment]. https://www.istat.it/comunicato-stampa/dotazioni-energetiche-delle-famiglie-anno-2024/

households will remain exposed to volatile energy prices, high heating costs and persistent air pollution associated with residential combustion, particularly in the Po Valley, where domestic heating is a major contributor to winter smog.[15]

3. The path to clean energy

Italy's National Energy and Climate Plan (NECP) identifies building decarbonisation as one of the key pillars of its strategy to meet its 2030 climate and energy targets.[16] The plan signals a broad shift towards renewable heat and reduced reliance on fossil gas, pointing to a gradual reconfiguration of Italy's residential heat mix over the coming decade.

While the overall direction is clear, the scale and pace of the transition remains uncertain. The NECP does not establish a dedicated heat-pump deployment trajectory or a clear pathway for replacing gas-based heating systems, limiting the visibility needed for a rapid transition.

Italy's favourable solar resource further strengthens the case for electrification. When combined with rooftop photovoltaics, heat pumps can reduce household exposure to retail electricity prices and improve system efficiency. However, this integrated approach is not yet fully reflected in national policy design.

3.1 A rapidly evolving but uneven transition

Italy's pathway towards clean heating has evolved rapidly but unevenly. Between 2014 and 2020, heat pump installations grew steadily, but the market expanded rapidly after the launch of the Superbonus 110% tax credit in 2020, which covered more than the full cost of energy efficiency upgrades (Figure 2).[17] The scheme triggered a surge in sales: in 2022, over half a million units were sold.[18] The subsequent tightening of fiscal rules[19] led to a sharp contraction: sales dropped 26% in 2023[20] and a further 3–5% in 2024.[21] However, even after this correction, annual installations remain significantly above pre-2020 levels, suggesting that

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[15] Gualtieri, G., Carotenuto, F., Finardi, S., Tartaglia, M., Toscano, P. & Gioli, B. (2018). Forecasting PM10 hourly concentrations in northern Italy: Insights on models performance and PM10 drivers through self-organizing maps. *Atmospheric Pollution Research, 9*(6), 1204–1213. https://www.sciencedirect.com/science/article/abs/pii/S1309104218301053

[16] Ministero dell'Ambiente e della Sicurezza Energetica (MASE). (2024). *Piano Nazionale Integrato per l'Energia e il Clima (PNIEC)* [Integrated National Energy and Climate Plan]. https://www.mase.gov.it/portale/energia-e-clima-2030

[17] Uguen, G., EHPA (personal communication, 16 June 2026)

[18] EHPA. (2023, May). *Annual report.* https://ehpa.org/news-and-resources/publications/ehpas-annual-report-2022/

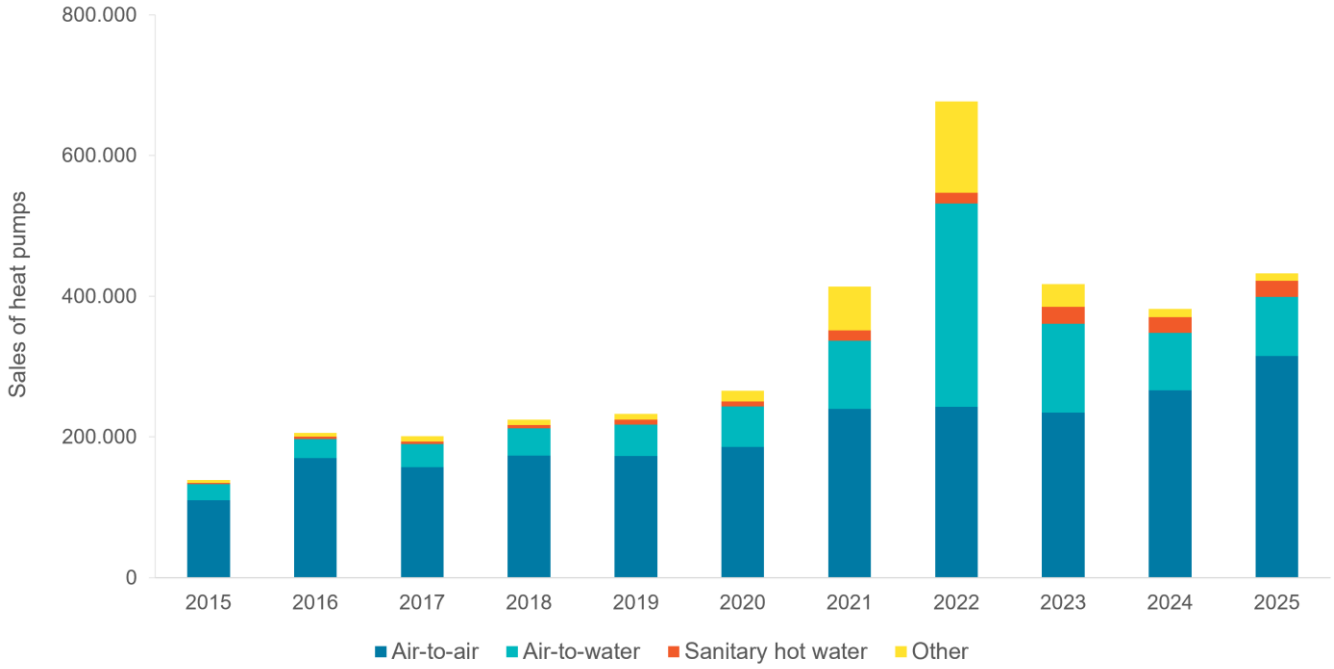
[19] Romano, F. (2023, February). *L'Italie revient sur son système de « superbonus » pour la rénovation des logements* [Italy rolls back its 'superbonus' scheme for housing renovation]. Euractiv. https://www.euractiv.fr/section/economie/news/litalie-revient-sur-son-systeme-de-superbonus-pour-la-renovation-des-logements/

[20] EHPA. (2024, April). *Pump it down: Why heat pump sales dropped in 2023.* https://ehpa.org/news-and-resources/publications/pump-it-down-why-heat-pump-sales-dropped-in-2023/

[21] EHPA. (2025, March). *Pump it down: Why heat pump sales dropped in 2024.* https://ehpa.org/news-and-resources/news/why-did-heat-pump-sales-drop-in-2024/

part of the Superbonus-driven expansion reflects structural market growth rather than purely temporary demand.

Figure 2. Annual sales of heat pumps in Italy, 2015–2025



Source: Uguen, G., EHPA (personal communication, 16 June 2026)

However, the Superbonus also illustrates a broader structural paradox. Despite mobilising €123 billion in investment and supporting hundreds of thousands of building interventions, the scheme affected only a small share of the national building stock and delivered uneven outcomes across households.[22] Evidence suggests that benefits were disproportionately captured by higher-income groups and by building segments with greater administrative and financial capacity to access the scheme.[23] At the same time, the absence of spending caps and cost controls contributed to rising construction prices and opportunistic behaviour, reducing overall cost-effectiveness.[24] As a result, the policy combined very high fiscal cost with limited structural transformation of the heating system.

This stop-start pattern reflects the absence of a stable, medium-term policy framework. With the fiscal space exhausted, the government is now prioritising budget-controlled instruments such as Conto Termico and white certificate schemes over new tax incentives. While fiscally

[22] ENEA — Italian National Agency for New Technologies, Energy and Sustainable Economic Development. (2026, 28 February). *Monthly report on Superbonus data.* https://www.efficienzaenergetica.enea.it/images/Report_28_02_2026.pdf

[23] Tonin, S. (2025). Revitalizing Italy's housing stock: Policies and economic strategies for energy efficiency and social equity. *Land, 14*(6), 1151. https://doi.org/10.3390/land14061151

[24] Andreolli, F. (2022). A critical assessment of the Italian Superbonus. In Sunderland, L. & Segura Cueto, L., *Energy poverty handbook*, pp. 32–35. The Greens/EFA in the European Parliament. https://www.greens-efa.eu/en/article/study/energy-poverty-handbook

prudent, there is a risk this shift will cause a steep decline in renovation rates and in consumer confidence. In the construction sector, companies that scaled up during the Superbonus years are already reporting falling activity and employment.

Box 1. Italy's stock of reversible air-to-air heat pumps

Italy's heat-pump market differs from many northern European countries because a large share of the installed stock consists of reversible heat pump systems capable of providing both heating and cooling, though they are primarily installed and used for cooling. According to ISTAT, heat pumps were present in 40.4% of Italian households in 2024, with particularly high penetration in the islands (58.5%) and the Northeast (46.9%).[25] Space-cooling equipment is especially widespread in warmer regions, suggesting that cooling demand has already driven substantial electrification of household energy use.

The installed stock is overwhelmingly composed of air-to-air systems, which account for around 89% of residential heat-pump units. Many of these systems are reversible air conditioners that can provide both heating and cooling, but are not necessarily used as the primary source of space heating. Over the last 15 years, more than 22 million residential air-conditioning and heat-pump units have been installed in Italy.[26]

At the same time, incentive-supported heat-pump deployment has been concentrated in colder parts of the country, where a large share of supported thermal capacity has been installed. This highlights the continued importance of hydronic heat pumps in renovation projects and primary-heating applications.[27]

These patterns suggest that different electrification pathways are emerging across Italy. In warmer regions, existing reversible systems may provide an entry point to greater use of electric heating, while in colder regions heat-pump deployment is more closely linked to building renovation and the replacement of conventional heating systems.

3.2 Structural challenges to scaling electrification

Italy has a relatively high electricity-to-gas price ratio compared with many European countries, weakening the economic case for households to switch from fossil gas boilers to heat pumps despite their higher efficiency.[28] ECCO Climate argues that although the introduction of the new EU Emissions Trading System (ETS2) will modestly narrow the gap, carbon pricing alone will not make heat pumps cheaper to operate without broader tariff

[25] ISTAT. (2026). *Household energy equipment — Year 2024*. https://www.istat.it/en/press-release/household-energy-equipment-year-2024/

[26] Politecnico di Milano. (2025). *State of the art of the Italian heat pump market* [presentation]. Energy & Strategy Group. https://www.ingenio-web.it/articoli/pompe-di-calore-in-italia-cosa-aspettarsi-al-2030-secondo-il-report-del-politecnico/

[27] Assoclima. (2023). *Libro bianco sulle pompe di calore* [White book on heat pumps]. https://www.assoclima.it/downloads/2256/73/Libro_Bianco_sulle_pdc_quarta_edizione__versione_web.pdf

[28] European Commission. (2025). *2025 country report — Italy*. https://economy-finance.ec.europa.eu/economic-surveillance-eu-member-states/country-pages-including-country-reports/country-report-italy_en

reform and better alignment of network cost recovery with decarbonisation goals.[29] RAP's pan-European study likewise finds that shifting policy costs away from electricity is one of the fastest and most effective ways to support clean heating while protecting vulnerable consumers.[30]

To partially address this challenge, Italy has significant untapped potential to improve the cost-effectiveness of heat pump adoption through integrated technologies. The rapid expansion of rooftop photovoltaics during the Superbonus period was accompanied by strong growth in residential battery storage, creating one of Europe's largest fleets of behind-the-meter storage assets. Combined with heat pumps and smart controls, these technologies can reduce running costs and provide flexibility to the wider electricity system. Where suitable time-varying retail tariffs are available, households can benefit from this flexibility by shifting some heat pump operation to lower-price periods without compromising comfort. However, current policy and regulatory frameworks do not yet systematically promote integrated electrification or enable households to benefit from the flexibility these technologies can provide.

At the same time, Italy's climatic conditions and building diversity create differentiated pathways for electrification. In southern regions, where heating demand is moderate and cooling demand is increasing, reversible air-to-air heat pumps — already widely deployed for cooling — could play a larger role in providing space heating.[31] Recent analysis suggests that electrification may be particularly cost-effective in warmer regions, where lower heating requirements and favourable climatic conditions reduce the overall cost of switching to heat pumps.

In parallel, gas-sector actors continue to influence Italy's energy transition narrative, promoting fossil gas as an indispensable transition fuel for energy security and competitiveness. This narrative emphasises supply diversification, existing gas infrastructure, and the role of gas in maintaining energy system flexibility and security of supply.[32] It also highlights the potential of hydrogen and biomethane blending to decarbonise existing gas infrastructure, and calls for a 'pragmatic' pace of transition that maintains gas system reliability during electrification.[33] Echoed in recent media statements and policy discussions,

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[29] Leonardi, M., Andreolli, F., Bienati, M., Mambro, C., Panzeri, D. & Stani, A. (2025). *ETS2 and energy costs: What are the benefits for consumers?* ECCO Climate. https://eccoclimate.org/en/ets2-and-energy-costs-what-are-the-benefits-for-consumers/

[30] Sunderland, L., Gibb, D. & Thomas, S. (2025). *Making electricity cheaper: Redistributing policy costs for affordable household heat electrification.* Regulatory Assistance Project. https://www.raponline.org/knowledge-center/making-electricity-cheaper-affordable-household-heat-electrification/

[31] Andreolli, F., Colafrancesco, G. & Marinelli, L. (2026, April). *Integrare la transizione economica, sociale e climatica in Sicilia* [Integrating the economic, social and climate transition in Sicily]. ECCO Climate. https://eccoclimate.org/it/integrare-la-transizione-economica-sociale-e-climatica-in-sicilia/

[32] Proxigas. (2026). *L'Europa accelera sull'elettrificazione, ma il gas resterà indispensabile* [Europe is accelerating electrification, but gas will remain indispensable]. https://proxigas.it/leuropa-accelera-sullelettrificazione-ma-il-gas-restera-indispensabile/

[33] Proxigas. (2025, 7 November). *«Il gas sarà cruciale per il futuro del sistema energetico». L'intervista al presidente Dell'Orco de Il Sole 24 Ore* ['Gas will be crucial for the future of the energy system'. Interview with chair Dell'Orco in Il Sole 24 Ore]. http://proxigas.it/gas-dellorco-proxigas/

this framing has reinforced Italy's traditional gas-centric energy model and contributed to a slower and more contested shift towards full electrification.[34]

ECCO Climate's analysis indicates that a large share of gas imports could be substituted in the short term through a combination of renewables, efficiency and electrification measures, highlighting the extent to which demand reduction — rather than supply diversification — can underpin energy security.[35]

3.3 Coordination challenges in planning and governance

Institutionally, coordination between gas and electricity network planning in Italy remains incomplete. Recent regulatory reforms have strengthened cooperation between SNAM (the gas transmission system operator) and Terna (the electricity transmission system operator), including requirements for joint scenario development. However, planning and investment decisions remain largely sector-specific, with full alignment of gas and electricity network planning required only from 2027.[36] ECCO Climate notes that SNAM's latest network-development projects plan continued capex growth under assumptions of stable or rising gas demand,[37] echoing the Institute for Energy Economics and Financial Analysis (IEEFA)'s findings that SNAM's planning remains locked into high-demand scenarios despite a forecast of falling consumption.[38] This misalignment between infrastructure planning and projected demand increases the risk of over-investment in gas assets and under-preparation for electrification, with implications for both system costs and long-term decarbonisation pathways.

3.4 The road ahead

To align with NECP targets and EU measures such as the Energy Performance of Buildings Directive and ETS2, Italy will need to stabilise policy support for electrification, accelerate reforms to rebalance the relative costs of electricity and fossil gas, and strengthen coordination across energy networks. A clear long-term framework for clean-heat investments – combining predictable incentives, fair pricing and protection for vulnerable consumers – will be essential to turn short-term volatility into sustained progress.

At the same time, the diversity of Italy's climate and buildings suggests that multiple electrification pathways will need to coexist. In colder northern regions, renovation combined

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[34] Celio, C. (2025, 3 November). *Il futuro del gas tra decarbonizzazione e sicurezza energetica* [The future of gas between decarbonisation and energy security]. Il Sole 24 Ore. https://stream24.ilsole24ore.com/video/radiocor/il-futuro-gas-decarbonizzazione-e-sicurezza-energetica/AHKiecWD

[35] Andreolli, F. & Signorelli, G. (2026). *Energy security: Reducing Italy's dependence on Qatari LNG.* ECCO Climate. https://eccoclimate.org/en/pub/energy-security-reducing-italys-dependence-on-qatari-lng/

[36] ARERA. (2023b). *Documento per la consultazione 173/2023/R/EEL — Orientamenti dell'Autorità per la predisposizione dei piani di sviluppo delle reti di distribuzione post 2023* [Consultation document 173/2023/R/EEL — The Authority's guidance on preparing post-2023 distribution network development plans]. https://www.arera.it/atti-e-provvedimenti?anno=2023&numero=173

[37] Andreolli, F. & Cassetti, G. (2024). *The state of Italian gas: What infrastructure does Italy require?* ECCO Climate. https://eccoclimate.org/en/the-state-of-gas-what-infrastructure-does-italy-require/

[38] IEEFA. (2025). *Italy's incentive scheme for gas investment must confront falling demand.* https://ieefa.org/articles/italys-incentive-scheme-gas-investment-must-confront-falling-demand

with air-to-water heat pumps is likely to dominate. In warmer southern regions reversible air-to-air systems, often paired with rooftop photovoltaics and storage batteries, could offer a faster and more cost-effective route to partial electrification. Dedicated heat pump water heaters may also provide an accessible entry point for electrification, particularly in regions where domestic hot water represents a significant share of household energy demand and where households are not yet ready to replace their primary space heating system. Harnessing these differentiated pathways within a coherent national strategy will be critical to scaling deployment while maintaining affordability and system efficiency.

4. Italy's heat pump policy and market landscape

Italy's policies, institutions and market conditions shape a complex and often fragmented landscape for clean heating. This section describes the current framework governing heat pump deployment – including strategic signals, enabling conditions, energy price structures and existing support instruments – to provide a background for the diagnostic assessment in Section 5. Recent policy developments also highlight a broader pattern in Italy's approach to clean heating: rather than a lack of intervention, the policy landscape is characterised by a combination of short-term affordability measures, broad technology-neutral incentives, and limited structural reform of energy pricing and infrastructure planning.

4.1 Targets

Italy's updated NECP outlines a broad shift toward renewable heat by 2030.[39] The plan targets a 35.9% share of renewables in the thermal sector, up from around 20% in 2020–2021, driven mainly by increased use of ambient heat (heat pumps) and bioenergy.[40] While the NECP does not establish an explicit gas consumption reduction target, its modelling shows a decline in the role of fossil gas in the primary energy mix from 38.6% in 2022 to 33% in 2030, together with a 20% reduction in net imports between 2025 and 2030.[41]

These trends are consistent with lower projected gas demand in buildings and power generation, rather than increased domestic production. Taken together, these projections point to a gradual reconfiguration of Italy's residential heat mix over the coming decade. However, the scale and pace of this shift remains uncertain, as the NECP does not specify a detailed trajectory for final energy demand in the building sector or a clear pathway for replacing gas-based heating systems, limiting the visibility needed for a rapid transition.

[39] Italian government. (2024). *Italy — Final updated NECP 2021–2030 (submitted in 2024)*. European Commission. https://commission.europa.eu/publications/italy-final-updated-necp-2021-2030-submitted-2024_en

[40] Eurostat. (updated 14 July, 2026). *Main indicators - share of renewable energy*. https://ec.europa.eu/eurostat/databrowser/view/nrg_ind_ren__custom_19670602/default/table

[41] MASE, 2024.

4.2 Enabling conditions

Planning and energy-system coordination

Recent regulatory reforms have strengthened coordination between SNAM and Terna, but electricity and gas network planning will not be fully aligned until 2027. Closing this gap is important to avoid delaying electrification and increasing system costs.

Installer capacity

Italy experienced a significant, yet temporary, expansion of the installer workforce during the Superbonus period. However, capacity remains uneven across regions: northern regions retain denser and more experienced installer networks, consistent with their history of renovation activity and heating-system upgrades. In contrast, many areas in the south continue to face shortages, driven by weaker renovation markets, less developed gas infrastructure, greater reliance on individual heating appliances, and more limited access to training and certified installers.[42]

Building stock and renovation readiness

Italy has one of Europe's oldest and least-efficient residential building stocks,[43] characterised by a high share of multi-family buildings and widespread thermal inefficiency.[44] While heat pumps can operate efficiently even in less energy-efficient homes – and can achieve strong seasonal performance where space heating constitutes a large share of demand – many dwellings will nevertheless require building-fabric improvements and/or upgrades to heat-distribution systems to ensure appropriate system sizing, acceptable operating costs, and thermal comfort. While modern high-temperature heat pumps can often operate with existing radiator systems, building improvements remain important for reducing energy demand and improving overall system performance. In the absence of a stable, long-term renovation and buildings strategy, these enabling works occur piecemeal and at insufficient scale.

4.3 Market design

The structure of retail energy prices remains a major barrier to heat-pump adoption in Italy. Households pay around 2.6 times more per kilowatt-hour for electricity than for gas. Much of this differential reflects the structure of retail energy prices rather than underlying energy costs. In the first half of 2024, taxes and levies accounted for roughly 26% of household electricity bills, compared with around 11% for gas.[45] Although Italy does not have the highest electricity-to-gas price ratio in Europe, the current differential remains large enough to

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[42] ENEA. (2026). *Rapporto annuale sull'efficienza energetica 2025* [Annual report on energy efficiency 2025]. https://www.efficienzaenergetica.enea.it/pubblicazioni/raee-rapporto-annuale-sull-efficienza-energetica/rapporto-annuale-sull-efficienza-energetica-2025.html

[43] EU Building Stock Observatory. (n.d.). *Database*. https://building-stock-observatory.energy.ec.europa.eu/database/

[44] ENEA. (n.d.). *Portale Nazionale sulla Prestazione Energetica degli Edifici* [National portal on the energy performance of buildings]. https://pnpe2.enea.it/statistiche

[45] EUROSTAT. (2025). *Electricity price statistics*. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Electricity_price_statistics

weaken the business case for heat-pump adoption. Rebalancing these structural price distortions, while protecting vulnerable consumers, is among the most effective ways to accelerate electrification.[46]

Recent policy interventions have sought to mitigate these price differences through short-term affordability measures. The 2026 Energy Bills Decree (*Decreto Bollette*) introduces targeted bill support for households and non-domestic users, including an expansion of the energy bill discount (*bonus sociale*) for vulnerable consumers and additional support mechanisms financed through public resources and voluntary contributions from suppliers. While these measures provide immediate relief, they remain constrained by fixed budget allocations and do not alter the underlying structure of electricity price formation.[47]

Italy currently does not apply a carbon price on heating fuels, but the expected implementation of the EU Emissions Trading System for buildings and road transport (ETS2) in 2028 will begin to raise the relative cost of fossil heating. However, given today's large electricity–gas price differential, ETS2 alone will not rebalance the economics of heat pumps in the near term.

Price effects are compounded by the cost-recovery structure of the gas network. Italy's gas transmission and distribution networks face declining throughput owing to building sector electrification, efficiency gains and renewable deployment reducing gas demand. Nevertheless, planned investment levels remain high. Analysis by ECCO Climate argues that, unless investment planning and asset depreciation schedules are aligned with expected demand reductions, consumers may face unnecessary costs and an increased risk of stranded assets.[48] As demand falls, fixed network costs are recovered from a shrinking customer base, driving rising gas transport tariffs and increasing the risk of stranded assets. Similar dynamics have already been observed in other European countries, where declining gas consumption has contributed to upward pressure on network tariffs, reinforcing concerns about the distributional impacts of the transition.[49] This dynamic places disproportionate financial pressure on households that electrify later — including many lower-income consumers — and risks creating a gas-network lock-in.

In parallel, the 2026 Energy Bills Decree includes measures to reduce electricity costs by temporarily lowering specific tariff components, including the A_SOS component, which covers support for renewable energy and cogeneration. However, these approaches primarily shift cost recovery over time rather than reducing total system costs. By advancing bill

[46] Sunderland et al., 2025.

[47] *Decreto-Legge 20 febbraio 2026, n. 21* [Decree-Law of 20 February 2026, No. 21].

[48] Andreolli, F. & Leonardi, M. (2025). *Il gas tra calo della domanda e infrastrutture in eccesso. Rischi per la competitività italiana* [Gas between falling demand and excess infrastructure. Risks for Italian competitiveness]. ECCO Climate. https://eccoclimate.org/it/il-gas-tra-calo-della-domanda-e-infrastrutture-in-eccesso/

[49] Connaissance des Énergies. (2026, 3 February). *La consommation de gaz toujours en baisse: un risque de hausse des tarifs?* [Gas consumption still falling: a risk of rising tariffs?]. https://www.connaissancedesenergies.org/la-consommation-de-gaz-toujours-en-baisse-un-risque-de-hausse-des-tarifs

reductions in the short term while deferring recovery to future periods, such mechanisms risk increasing long-term electricity prices and weakening the economic case for electrification.[50]

At the same time, some measures included in the Decree risk reinforcing existing dependencies on gas. The Decree provides for reimbursing certain gas transport costs incurred by gas-fired generators. It also provides for reimbursing some ETS compliance costs for efficient gas-fired generation, subject to prior approval by the European Commission under EU state aid rules.[51] Although intended to reduce wholesale electricity prices in the short term, these measures could weaken carbon-price signals and incentives for electrification and renewable deployment, creating tension between short-term price stabilisation and long-term decarbonisation objectives.

As long as electricity remains structurally more expensive than gas and gas-network cost recovery is not aligned with realistic demand trajectories, heat pumps will continue to face a structural cost disadvantage in Italy. Under these conditions, financial support can mitigate upfront costs but struggles to deliver sustained uptake, as underlying price signals and infrastructure incentives continue to favour gas. Recent policy interventions, while addressing short-term affordability concerns, do not yet resolve these structural misalignments.

4.4 Policies and support

Regulation and obligations

Italy has introduced several regulatory measures supporting renewable heating. Following Italy's implementation of the updated Renewable Energy Directive (RED III), new buildings must now ensure that renewable energy covers 60% of domestic hot water demand and 60% of the combined demand for domestic hot water, heating and cooling.[52] Similar, though lower, requirements apply to major renovations and heating-system refurbishments. These obligations help anchor heat pumps and other renewable heating technologies in new construction and renovation projects.

In parallel, Italy operates the White Certificate (*Titoli di Efficienza Energetica*, TEE) scheme, which places energy-efficiency obligations on electricity and gas distributors above a defined size threshold. Distributors must demonstrate annual energy savings, typically by purchasing certificates generated by eligible market actors such as certified energy service companies (ESCOs).

In practice, the scheme has played a limited role in supporting residential heat pump deployment. The requirement to quantify savings using metered data strongly favours large-

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[50] Governatori, M. (2026, March). *Il decreto energia non abbassa le bollette e rischia di rallentare gli investimenti nelle rinnovabili. Quali sono le alternative* [The energy decree does not lower bills and risks slowing renewable investment. What the alternatives are]. ECCO Climate. https://eccoclimate.org/it/il-decreto-energia-non-abbassa-le-bollette-e-rischia-di-rallentare-gli-investimenti-nelle-rinnovabili/

[51] Gazzetta Ufficiale della Repubblica Italiana. (2026, 18 April). *Testo coordinato del decreto-legge 20 febbraio 2026, n. 21, coordinato con la legge di conversione 10 aprile 2026, n. 49* [Consolidated text of Decree-Law No. 21 of 20 February 2026, as amended by conversion Law No. 49 of 10 April 2026], Article 6. Gazzetta Ufficiale, Serie Generale No. 90. https://www.gazzettaufficiale.it/atto/serie_generale/caricaDettaglioAtto/originario?atto.codiceRedazionale=26A01940&atto.dataPubblicazioneGazzetta=2026-04-18&elenco30giorni=false

[52] *Decreto Legislativo 16 gennaio 2026, n. 5* [Legislative Decree of 16 January 2026, No. 5], Allegato III, Sezione B, punto 1(a). *Gazzetta Ufficiale*, n. 15, 20 January 2026. https://www.gazzettaufficiale.it/eli/id/2026/01/20/26G00018/sg

scale, bespoke energy-efficiency projects over standardised residential heat pump installations.[53] As a result, while White Certificates remain an important efficiency instrument in Italy's broader policy mix, they do little to address barriers to clean heating in the residential sector.

Tax deductions

The Ecobonus is Italy's long-standing tax deduction scheme for energy-efficiency measures in existing buildings, introduced in 2007 and periodically updated through successive Budget Laws. Historically, it offered deductions ranging from 50% to 65% (and up to 75% for some apartment-block interventions), creating a stronger incentive for energy-efficiency upgrades than for general renovation works.[54] Eligible measures include window replacement, insulation, solar thermal systems, heat pumps, hybrid heat pumps, micro-cogenerators and building automation systems. In 2019, the National Agency for Energy and the Environment (ENEA) published updated technical guidelines for accessing the Ecobonus, consolidating eligibility rules and deduction rates for different technologies.[55]

A structural limitation of tax-deduction schemes is that they generally favour households with sufficient taxable income and liquidity to pre-finance investments. Because benefits are realised over multiple years through income tax liabilities, lower-income households, pensioners with limited tax exposure and consumers facing credit constraints may be less able to access support. This has long raised concerns about the distributional impact of tax-based renovation incentives in Italy.

In 2020, the government introduced an enhanced version of the Ecobonus, known as the Superbonus 110% (or SuperEcobonus). Conceived as both a COVID-era economic stimulus and an energy-efficiency measure, the scheme offered a 110% tax deduction for renovation works that achieved at least a two-class improvement in building energy performance, including insulation, building-fabric upgrades and heat pump installations. A defining feature of the scheme was the use of credit transfers (*cessione del credito*) and invoice discounting (*sconto in fattura*), which allowed households with low or zero income tax liability to benefit from the incentive and partially overcame a longstanding limitation of traditional tax-deduction schemes.[56] According to ENEA, by August 2024 the Superbonus had supported €123 billion in investments, completed 96% of planned works, and delivered annual energy savings estimated at 20–25 TWh.[57]

The Superbonus demonstrated the transformative potential of large-scale public support for building renovation and clean heating. By reducing both tax-liability and liquidity barriers, it

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[53] De Chicchis, L. & Di Santo, D. (2026). M&V in the Italian white certificates scheme. In *Resources for an effective implementation of the EED energy savings obligation* (ENSMOVplus report), pp. 134–140. https://energysavingpolicies.eu/materials/ensmov-plus-catalogue-of-resources-26-examples-for-an-effective-implementation-of-the-eed-energy-savings-obligation/

[54] Pieve, M., Trinchieri, R., Dall'Ombra, M. & Musazzi, F. (2024). Italy: Heat pump market report. *Heat Pump Technologies, 42*(3). https://heatpumpingtechnologies.org/articles/heat-pumping-technologies-magazine-vol-42-no-3-2024/national-market-report-italy/

[55] ENEA. (2019). *Ecobonus vademecum.* https://www.efficienzaenergetica.enea.it/detrazioni-fiscali/ecobonus/vademecum.html

[56] ENEA. (2020). *SuperEcobonus 110%.* https://www.efficienzaenergetica.enea.it/detrazioni-fiscali/superbonus.html

[57] ENEA. (2025). *Dati di utilizzo del Superbonus 110%* [Superbonus 110% usage data]. https://www.efficienzaenergetica.enea.it/detrazioni-fiscali/superbonus/risultati-superbonus.html

enabled a much broader range of households and condominium associations to undertake energy efficiency investments, while accelerating heat pump deployment and renovation activity across the country. The scheme therefore provided important lessons on how policy design can expand participation in the clean heating transition. However, its benefits remained unevenly distributed, as households and condominium associations with greater financial resources, access to technical expertise and capacity to navigate complex administrative procedures were generally better positioned to take advantage of the scheme.

Despite these achievements, the scheme also generated significant fiscal challenges. Rapid growth in demand contributed to rising construction costs, while the absence of a spending cap and the broad use of credit-transfer mechanisms put pressure on public finances and exposed the scheme to fraud risks.[58] These concerns prompted successive rounds of tightening between 2022 and 2024, culminating in a gradual reduction of the deduction rate – from 110% to 90% in 2023,[59] 70% in 2024 and 65% in 2025[60] – effectively bringing the scheme back towards ordinary Ecobonus levels. Evidence suggests that heat pump activity contracted sharply following the reduction of support rates, highlighting the sector's continued dependence on public incentives.

Beyond fiscal sustainability concerns, the Superbonus highlighted broader questions about incentive design. By covering more than 100% of eligible costs, the scheme weakened incentives for cost control and efficient allocation of public resources. At the same time, the absence of strong targeting mechanisms limited its effectiveness in directing support towards households most exposed to affordability challenges and energy poverty. These experiences underline the importance of designing future support schemes that balance deployment objectives with cost-effectiveness, equity and long-term market development.

Recent Budget Laws have further reshaped the tax-incentive landscape. For expenditures incurred from 2025 onwards, support levels under the Ecobonus were reduced, with heat pump installations generally eligible for deductions of 50% for primary residences and 36% for secondary residences. These changes also largely aligned Ecobonus rates with those available under Bonus Casa, Italy's general building renovation tax incentive, thereby reducing the additional financial incentive to undertake energy-efficiency improvements rather than standard renovation works.

Grant-based support

Unlike tax-deduction schemes such as the Ecobonus, which provide support through future reductions in tax liabilities, Conto Termico – introduced in 2013 and substantially reformed in 2016 – is a scheme that supports renewable heating technologies and small-scale energy-efficiency measures through direct payments, reducing some of the liquidity barriers associated with tax-based incentives.[61] It applies to both primary and secondary homes and

[58] Lo Schiavo, L., Ranci, P., Regalini, E., Ruggieri, G. & Zangheri, P. (2024). Efficienza e sostenibilità negli usi dell'energia [Efficiency and sustainability in energy use]. In Ranci, P. (Ed.), *Economia dell'energia. Transizione ecologica e sostenibilità*, pp. 280–281. Il Mulino. https://www.mulino.it/isbn/9788815389961

[59] *Legge 197/2022* [Law 197/2022]. (It.)

[60] *Decreto-Legge 176/2022* [Decree-Law 176/2022], converted with amendments by *Legge 6/2023* [Law 6/2023]. (It.)

[61] GSE. (2026). *Conto Termico 3.0, come funziona e principali novità* [Conto Termico 3.0: How it works and key developments]. https://www.gse.it/servizi-per-te/efficienza-energetica/conto-termico-3-0

historically has supported a broad portfolio of technologies, including electric heat pumps, solar thermal systems, biomass boilers, hybrid systems and gas-absorption heat pumps. Typical grants for residential heat pump installations can reach up to €5,000. The Ecobonus and Conto Termico operate as alternative support mechanisms rather than cumulative incentives: households must choose between the two schemes for a given intervention.

The latest reform, Conto Termico 3.0, entered into force in late 2025 and represents Italy's attempt to establish a more stable grant-based alternative to the stop-start pattern associated with tax deductions. With an annual budget of €900 million – of which €400 million is reserved for public administrations – the scheme expands both the scope and accessibility of support. Incentive rates can cover up to 65% of eligible costs for households and up to 100% for certain public sector interventions, particularly in smaller municipalities. Payments are made directly to beneficiaries, with one-off disbursements for contributions up to €15,000 and simplified procedures for larger projects.[62] The reformed scheme continues to apply no income thresholds and makes no distinction between primary and secondary homes.

The updated scheme supports a wide range of interventions, including electric heat pumps, hybrid systems, heat-pump water heaters, solar thermal technologies, biomass systems, and building efficiency measures such as insulation and window replacement. It also broadens the range of eligible renovation measures and seeks to simplify access compared with previous versions of the scheme.

The reform addresses several shortcomings of earlier support instruments. Compared with tax deductions, direct grants improve liquidity and reduce the time households must wait before receiving support. The scheme also provides greater policy stability than temporary tax incentives and offers a clearer long-term framework for investment decisions.

Important limitations remain, however. Even with direct grants, households must still finance a substantial share of project costs upfront. Without complementary financing instruments such as public-backed low-interest loans or guarantee mechanisms, households with limited savings or restricted access to credit may still struggle to undertake the investment.

The scheme also remains relatively technology-inclusive rather than strategically targeted. A particularly important design choice is the continued eligibility of hybrid heat pump systems, which warrants closer examination (see Box 2). While broad technology eligibility may increase political acceptability, it risks diluting support for fully electrified heating pathways and slowing the transition away from fossil fuels.

Early drafts of Conto Termico 3.0 attracted criticism because they retained support for certain gas-related technologies, raising concerns about consistency with Article 17(15) of the recast Energy Performance of Buildings Directive, which requires Member States to phase out financial incentives for stand-alone fossil fuel boilers. Following consultation and stakeholder pressure, support for stand-alone fossil fuel boilers was removed from the final scheme. The

[62] UNILAB. (2025). *Updates, incentives, and the role of heat pumps.* https://www.unilab.eu/articles/updates-incentives-and-the-role-of-heat-pumps/; Latour, G. (2025). *Conto Termico 3.0: New rules and benefits of the Christmas home bonus.* Il Sole 24 Ore. https://en.ilsole24ore.com/art/thermal-account-30-new-contribution-start-christmas-AHkSWftC

debate nevertheless illustrates the broader tension between technology-neutral support approaches and policies aimed at accelerating full electrification of heating.

Box 2. The limits of hybrid heat pumps for clean heating

Hybrid heat pump systems combine an electric heat pump with a newly installed fossil-fuel boiler – typically gas – operating together within a single heating system. They are sometimes presented as a pragmatic 'bridge' towards electrification. Evidence reviewed by RAP[63] shows that while hybrids may offer some short-term advantages in specific contexts, they offer limited strategic value for affordable decarbonisation in warmer climates. The evidence points to several reasons:

They reduce emissions only partially and temporarily. The heat pump component can cut gas use in the short term, but the boiler continues to run during colder periods or at higher temperature requirements. In some configurations, the boiler also continues to provide domestic hot water throughout the year, leading to ongoing gas consumption even when most space-heating demand is met by the heat pump. In modern European power systems, where electricity is rapidly decarbonising, standalone heat pumps already outperform hybrids on emissions down to very low outdoor temperatures (below –20°C). Hybrid systems therefore extend reliance on combustion when all fossil heating must be phased out well before 2040.

They risk locking households into the gas network. Hybrid systems preserve gas demand for space or water heating, prolonging the lifetime of gas infrastructure. As the number of gas customers declines, maintaining the network imposes rising per-household tariffs, leading to higher costs for those who electrify later. Hybrids therefore increase the risk of stranded infrastructure and push costs onto consumers.

They may increase costs for households. Hybrid systems often increase household costs both in the short and long term. In the near term, households face higher upfront investment, dual maintenance requirements and ongoing servicing costs for two heating appliances. Operating costs can also be higher, as households continue to pay gas standing charges alongside electricity bills. In the longer term, most hybrid systems do not support a straightforward upgrade to full electrification: households typically need to install a second, standalone heat pump later. This 'two-step' pathway can result in duplicated investment, higher lifetime costs, and delayed decarbonisation.

They provide limited system benefits. Claims that hybrids alleviate electricity-system stress are overstated. Similar or greater benefits can be achieved through better building efficiency, smart controls and appropriately sized heat pumps.

Implications for Italy. Given Italy's mild climate, rapidly decarbonising power sector, and need to reduce gas infrastructure costs over time, the long-term value of hybrids is structurally limited. Continuing to subsidise hybrid systems risks locking in fossil fuel use, delaying renovation and undermining Italy's heating-sector decarbonisation commitments.

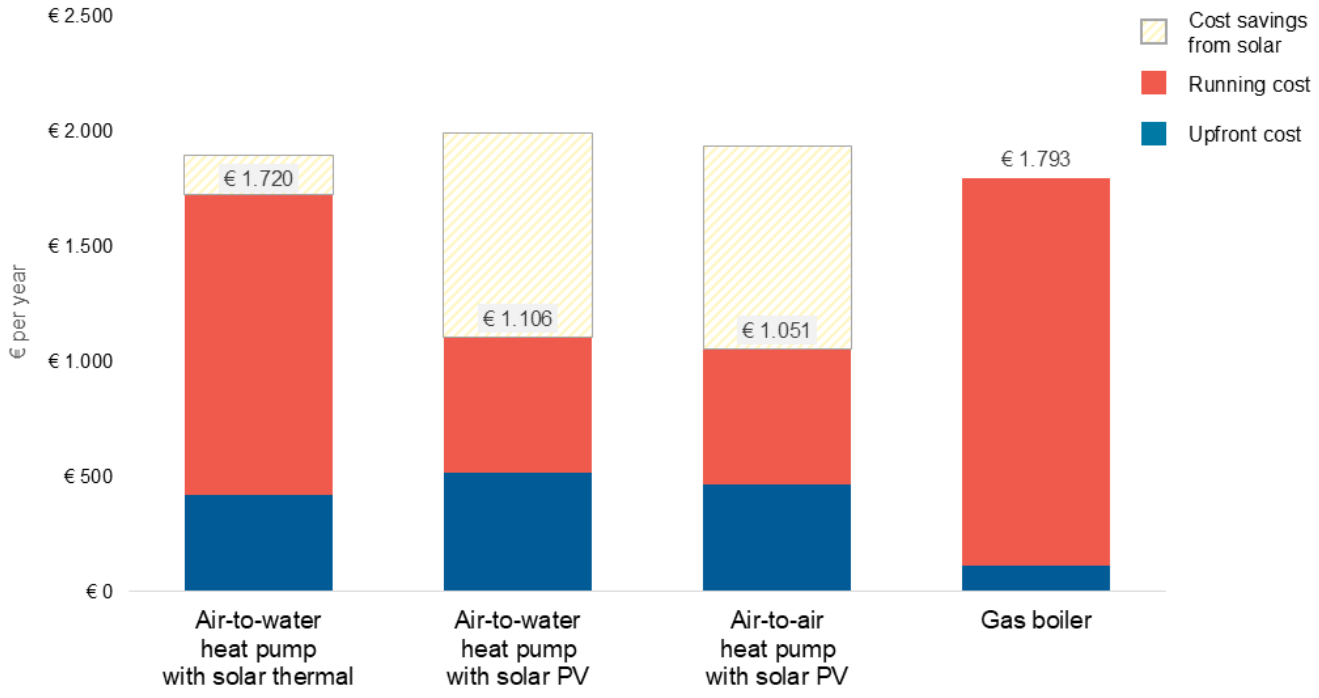
[63] Gibb, D. & Lowes, R. (2024). *One foot in the past: The role of hybrid heat pumps in Europe.* Regulatory Assistance Project. https://www.raponline.org/knowledge-center/one-foot-in-past-role-hybrid-heat-pumps-europe/

Affordability and total cost considerations

The upfront cost of heat pumps remains a barrier. Even with public support covering up to 65% of eligible installation costs, many households face significant capital expenditure, and heat pumps can still face a lifetime cost disadvantage under current energy prices – this is primarily due to the electricity–gas price imbalance rather than to the cost of the technology (Figure 3).

However, when heat pumps are paired with solar energy, especially solar photovoltaics, significant cost savings emerge. Under current energy prices solar PV can save an estimated €880 per year on running costs, virtually cutting the total cost of ownership of a heat pump in half over its 18-year lifetime. With these cost savings, the solar PV system (assumed at €5,775 upfront, see Annex) will be paid off after seven years. Compared to a gas boiler, with solar PV an air-to-water or air-to-air heat pump (with the added benefit of cooling) is 60–70% cheaper per year.

Figure 3. Annualised total cost of ownership of an air-to-water heat pump with solar thermal and with solar PV, an air-to-air heat pump with solar PV, and a gas boiler



Source: RAP analysis

Note: The air-to-air heat pump includes a heat pump water heater and also provides cooling, a significant value which is not represented here. See the Annex for a full list of data sources and methodology.

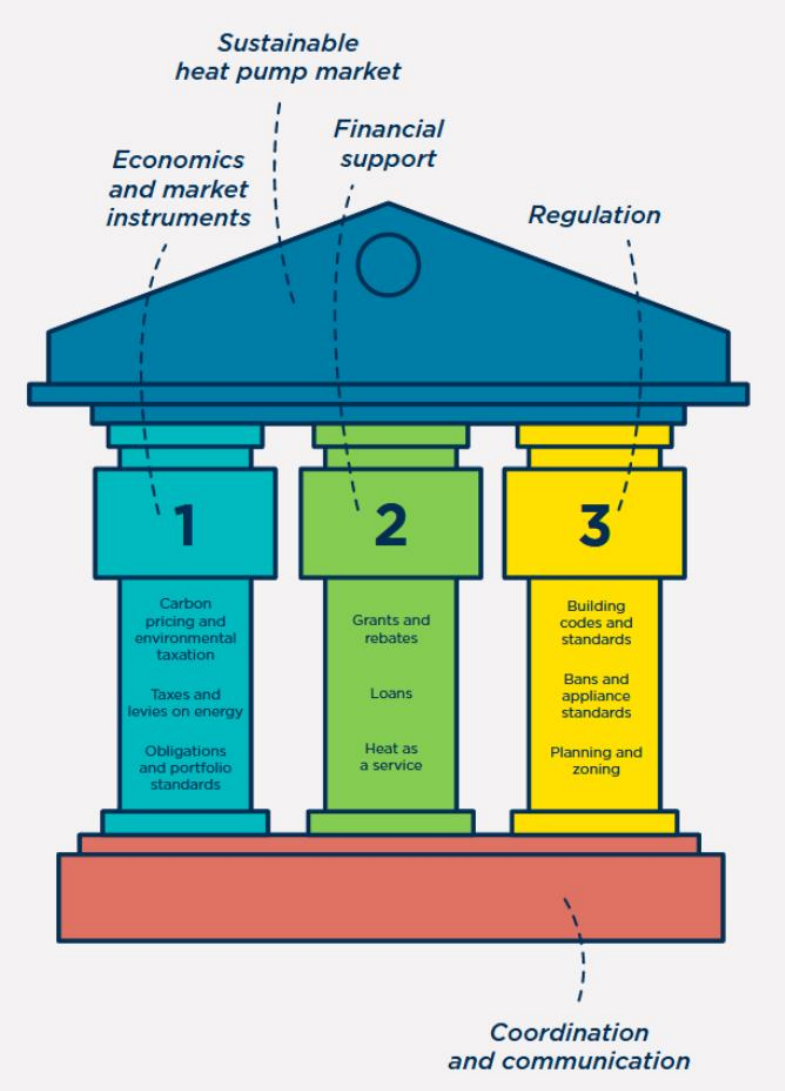
Italy's clean heat policy framework has delivered periods of rapid deployment, particularly during the Superbonus era, but remains characterised by volatility, fragmentation and uneven targeting. At the same time, the results above suggest that integrated electrification solutions combining heat pumps and rooftop solar can already deliver substantial cost savings for households under current market conditions. Stable incentives, tariff reform and a consistent

renovation strategy will be essential to accelerate heat-pump adoption and ensure a fair transition.

5. Applying the Heat Pump Policy Toolkit to Italy

Italy's current policy framework contains many of the elements required for a successful heat pump transition, yet these elements do not operate as a coherent package. Applying RAP's Heat Pump Policy Toolkit[64] (Figure 4) highlights a central challenge: Italy has the tools for clean heating, but policy is not yet aligned to deliver it at scale. Rather than a lack of intervention, the current policy mix is characterised by short-term affordability measures, broad and often technology-neutral incentives, and limited structural reform of the market conditions that shape household heating choices. Building on the evidence set out in Sections 3 and 4, this section assesses how these elements interact, and identifies areas where misalignments continue to constrain the development of a durable heat pump market.

Figure 4. The Heat Pump Policy Toolkit's Greek temple



Source: RAP. (2024). *A policy toolkit for global mass heat pump deployment — Version 2.0*

[64] Lowes et al., 2024.

A central barrier lies in the **economics of heating**. Italy maintains a relatively large electricity-to-gas price gap, driven by the disproportionate share of taxes and system charges placed on electricity. Recent policy interventions have sought to mitigate this imbalance through short-term affordability measures – including targeted bill support and temporary tariff adjustments – but these do not alter the underlying cost structure of the energy system. As a result, even highly efficient heat pumps struggle to compete with gas boilers on running costs under current market conditions. The introduction of ETS2 will only modestly narrow this gap. Without structural reform – including rebalancing policy costs and aligning gas network cost recovery with declining demand – heat pumps will remain at a structural cost disadvantage regardless of subsidy levels.

Italy's **financial support** architecture illustrates both ambition and inconsistency. The Superbonus demonstrated that generous incentives can rapidly scale deployment, but also exposed fiscal and administrative vulnerabilities when support was withdrawn. The Ecobonus provides continuity but remains poorly suited to lower-income households due to its reliance on tax capacity and upfront financing. The updated Conto Termico improves stability, liquidity and accessibility – including through direct payments and support for integrated solutions combining heat pumps with renewable generation – yet continues to spread resources across a broad range of technologies, including hybrid and gas-linked systems. This technology-neutral approach dilutes the focus on full electrification and may prolong fossil fuel use. More broadly, Italy still lacks a comprehensive suite of financing instruments tailored to different household circumstances. In particular, public-backed low-interest loans, on-bill financing mechanisms and other solutions that reduce or eliminate upfront costs remain underdeveloped compared with several other European markets.

On the **regulatory side**, obligations for renewable heating in new buildings have helped normalise heat pumps in construction. However, Italy has not yet defined a clear fossil boiler phase-out pathway, a dedicated heat pump deployment trajectory, or a comprehensive national heat-planning framework. These gaps weaken long-term investment certainty for manufacturers, installers and households. At the same time, planning fragmentation persists: despite evolving coordination requirements, electricity and gas network operators continue to develop largely separate demand scenarios and investment plans, increasing the risk of over-investment in gas infrastructure and under-preparation for electrification.

Finally, the Toolkit highlights the importance of **coordination, communication and system readiness**. Italy expanded installer capacity during the Superbonus period, but this growth has been uneven: shortages remain particularly acute in southern regions, where clean heating could deliver significant social benefits. Public awareness of heat pumps remains uneven, and local advisory services are limited. More broadly, coordination between national ministries, regulators, municipalities, network operators and industry actors remains fragmented, and Italy lacks a dedicated governance structure to steer the heat transition.

Taken together, these findings suggest that Italy does not lack ambition, intervention or technical potential for clean heating. What it lacks is **policy alignment**. Recent developments show a continued reliance on short-term affordability measures and broad support schemes that address immediate pressures but do not resolve the structural barriers to electrification.

While the overall direction of travel remains compatible with EU decarbonisation goals, the current framework still weakens the operating case for heat pumps, spreads support too broadly, and leaves planning and governance insufficiently aligned with long-term system change. Accelerating progress will require moving from fragmented interventions to a coherent strategy that connects fair pricing, targeted support and coordinated planning.

6. Policy recommendations

Italy's challenge is no longer whether to support clean heating, but how to align pricing, incentives, regulation and infrastructure planning behind a coherent electrification strategy.

To unlock sustained and equitable growth in heat pump deployment, Italy will need to move beyond episodic incentives and short-term price interventions toward a stable long-term strategy that aligns pricing, support, regulation and system planning. The recommendations below are mutually reinforcing: no single measure will be sufficient on its own, but together they can establish the conditions for a durable clean heat transition.

1. **Establish clear regulatory signals for the long term.** Long-term investment requires a predictable regulatory framework that gives households, installers and manufacturers confidence to electrify. The government should set a fossil boiler phase-out pathway consistent with the revised EPBD, with clear intermediate milestones and sector-specific guidance. The Ministry of the Environment and Energy Security (MASE) should introduce national heat planning requirements to help municipalities identify the most cost-effective local heating solutions, while also setting a national heat pump deployment trajectory to provide long-term visibility for manufacturers, installers and supply chains.
2. **Rebalance energy prices to support clean heating.** Current energy price signals continue to favour fossil gas over electricity, weakening the economic case for heat pump adoption. The government should replace temporary bill reductions and ad hoc tariff adjustments with structural reforms that progressively shift policy costs and levies away from electricity, funding them through general taxation or reallocating them to fossil fuel consumption, with ETS2 revenues used to support electrification and targeted affordability measures. The Italian Regulatory Authority for Energy, Networks and the Environment (ARERA) should complement these reforms by completing electricity tariff reforms that reward flexible and efficient electric heating, including dynamic and time-of-use tariffs and targeted exemptions or reductions in levies for electricity used for space and water heating.
3. **Strengthen and stabilise financial support.** Financial support should make clean heating affordable both to install and to operate, while providing stable and predictable investment conditions for households, installers and manufacturers. The government should progressively shift support from income tax deductions towards well-designed point-of-sale grants that reduce upfront costs and improve accessibility. These grants should operate within predictable multi-year programme budgets and include maximum eligible costs, transparent pricing benchmarks, robust oversight and stronger targeting.[65] MASE should reform Conto Termico 3.0 to prioritise fully electric heating solutions and strengthen support for vulnerable households, while progressively phasing out subsidies for hybrid heat pumps and other gas-linked technologies. Complementary financing instruments –

[65] Gibb, D., Santini, M., Sapochetti, L., Thomas, S. & Verheyen, S. (forthcoming). *Money for something: Designing effective heat pump support schemes in Europe*. Regulatory Assistance Project.

including public-backed low-interest loans, loan guarantees and enabling frameworks for market-based models such as heat-as-a-service – should reduce remaining upfront investment barriers.

4. **Integrate planning across electricity and gas networks.** Network planning should be based on consistent long-term assumptions about growing electrification and falling gas demand. ARERA should implement its guidance on aligned scenario development and require coordinated investment planning between SNAM and Terna by 2027. Independent validation of long-term gas demand forecasts should also be introduced to reduce the risk of stranded assets, avoid unnecessary infrastructure investment, and ensure that network planning supports – rather than delays – the transition to clean heating.
5. **Strengthen the enabling environment for households and installers.** Financial incentives alone will not deliver widespread heat pump deployment without trusted advice, skilled installers and greater consumer confidence. National and regional authorities should expand installer training, particularly in southern Italy and for technicians transitioning from fossil boiler installation. ENEA, together with MASE, should strengthen technical guidance and public communication to address persistent misconceptions about heat pump performance in older and multi-family buildings. Municipalities should be supported in providing independent local energy advice through one-stop shops. Policy should also promote integrated electrification solutions that combine heat pumps with rooftop photovoltaics, smart controls and renewable energy communities, particularly where individual rooftop generation is not feasible.
6. **Prioritise equity in clean heat policy design.** The government should ensure that equity is embedded across all clean heat policies rather than addressed through standalone support measures. Financial assistance should be targeted towards low-income households and those experiencing energy poverty through tailored grants, social tariffs and dedicated loan guarantees. ETS2 revenues should be used to support targeted affordability measures and electricity tariff reform, ensuring that carbon pricing reinforces – rather than undermines – the transition to clean heating.

Annex

Figure 1 methodology

Estimates of the energy mix in 2024 for space and water heating in residential buildings in Italy are presented in this paper. The values presented are largely based on Eurostat, *Disaggregated final energy consumption in households*.[66] RAP calculations create a 'Renewables' category that includes solid biomass, biofuels and solar thermal energy.

The category 'heat pumps' is based on the category 'Ambient heat (heat pumps)' from Eurostat with an 'electricity needed to power heat pumps' reallocation. This is calculated by dividing the ambient heat by a heat pump seasonal coefficient of performance, assumed to be 3.1. This value, 'electricity used for heat pumps', is added to the 'Ambient heat' category and subtracted from the 'Electricity' category to avoid duplication.

[66] Eurostat, 2026.

Figure 3 methodology

Estimates of the total cost of ownership in Italy for an air-to-air heat pump, an air-to-water heat pump and a gas boiler are presented in this paper. The model used by RAP calculates the total cost of ownership per year for each technology in 2025. Parameters used in the model are discussed in the following paragraphs.

Residential space and water heating demand in 2024 was taken from the Eurostat database *Household final energy consumption disaggregated*.[67] The average space heating demand per country was divided by the number of households to reach an average space and water heating demand per household.[68]

Average seasonal conversion efficiencies are assumed for an air-to-water heat pump with a seasonal coefficient of performance (SCOP) of 3.1 and a condensing gas boiler with an efficiency of 95%. The efficiency of the electric water heater included with the air-to-air heat pump is 100%. These efficiencies are largely accepted as industry standards and may even downplay the performance of heat pumps in Italy where average external air temperatures are higher. For example, the Sustainable Energy Authority of Ireland reported a median SCOP of 3.95 in 2020, and Denmark and the Netherlands have seen SCOPs reach above 4.[69] These countries are all significantly colder than Italy.

The efficiency value used in this study may also be generous towards gas boilers, considering it corresponds to the minimum as defined by Appendix X in the European Commission's Energy Efficiency Directive guidance note.[70] The existing fleet of boilers in Italy is not comprised exclusively of the most energy-efficient options, and would therefore likely operate at a fleet efficiency much lower than 95%.

For each technology, the calculation consists of a capital cost component and an operating cost component. For upfront costs, these values were assumed via desk research. To illustrate the economics of heat pumps under favourable support conditions currently available in Italy, the analysis assumes support covering 65% of eligible installation costs for the air-to-water heat pump scenario. Actual support levels vary according to the programme, technology type, system size, efficiency and climate zone and are often lower in practice. A lifetime of 18 years for each technology was used. The upfront costs used in the model are as follows:

- Air-to-water heat pump: €10,100 (€3,535 after 65% subsidy).
- Air-to-air heat pump: €2,500 (dual-split, 18,000 BTU).
- Gas boiler: €2,000.

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[67] Eurostat, 2026.

[68] Eurostat. (updated 3 July 2026). *Private households by household composition, number of children and age of youngest child* [Data set]. https://ec.europa.eu/eurostat/databrowser/view/LFST_HHNHTYCH/default/table?lang=en

[69] International Renewable Energy Agency (IRENA). (2022). *Renewable solutions in end-uses: Heat pump costs and markets.* https://www.irena.org/Publications/2022/Nov/Renewable-solutions-in-end-uses-Heat-pump-costs-and-markets

[70] European Commission. (2019). *Annex to Commission Recommendation (EU) 2019/1658 of 25 September 2019 on transposing the energy savings obligations under the Energy Efficiency Directive.* https://eur-lex.europa.eu/eli/reco/2019/1658

An upfront cost of €1,500 for an electric water heater is included for the air-to-air heat pump. We estimate that the upfront costs of a solar thermal system and solar PV system (3 kilowatts peak) are €4,000 and €5,775 respectively.[71]

In terms of operating costs, current electricity and fossil gas prices were taken from Eurostat.[72] These prices are shown in Table 1.

Table 1. Gas and electricity retail prices used for analysis

Fuel	Fuel price (ct/kWh)
Electricity after taxes and levies, second half of 2025	32.91
Fossil gas	12.40

Source: Eurostat. (n.d.). *Electricity prices for household consumers* [Data set nrg_pc_204] *and gas prices for household consumers* [Data set nrg_pc_202].

Maintenance costs were assumed for the heat pump at €180/year and gas boiler at €190/year. Standing charges for electricity and gas networks are assumed to be €90/year and €115/year respectively.

[71] Estimates for solar power prices are €1,750/kWp, with 10% VAT applied, and are from SolarPower Europe. (2023). *Solar powers heat 2023.* https://api.solarpowereurope.org/uploads/0523_SPE_Solar_Heating_report_09_mr_98b11ef7ab.pdf Estimates for solar thermal costs are from market research.

[72] Eurostat. (updated 12 August 2026). *Electricity prices for household consumers* [Data set nrg_pc_204]. https://ec.europa.eu/eurostat/databrowser/view/nrg_pc_204/default/table?lang=en; Eurostat. (updated 11 August 2026). *Gas prices for household consumers* [Data set nrg_pc_202]. https://ec.europa.eu/eurostat/databrowser/view/nrg_pc_202/default/table?lang=en

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