

CONNECTING REALITY WITH CLIMATE GOALS: CASE STUDIES OF GAS DISTRIBUTION SYSTEM PLANNING AND REGULATION

Country Report Italy

Malte Bei der Wieden (Öko-Institut)

Veit Bürger (Öko-Institut)

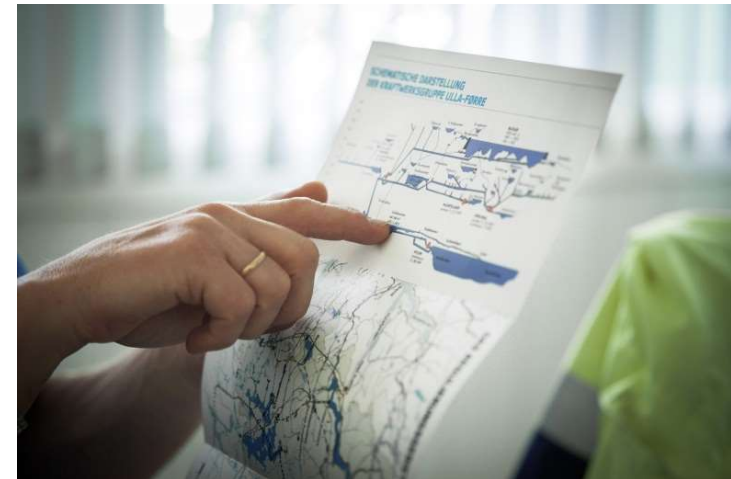
Carmen Loschke (Öko-Institut)

Jan Rosenow (RAP)

Sibylle Braungardt (Öko-Institut)

Tilman Hesse (Öko-Institut)

Marc Stobbe (Öko-Institut)



Background and objectives

- Fossil gas consumption in the EU must decline rapidly to meet energy and climate targets, as well as in the context of energy security concerns, and gas price volatility.
- Declining gas demand will lead to higher grid fees for remaining customers as fewer people use the gas infrastructure, with potential high increases of grid fees.
- Proposals to replace fossil gas with hydrogen face technical and economic challenges, with hydrogen being less efficient and more expensive for heating compared to electrification and district heating.
- Continued investment in gas infrastructure without a decommissioning plan risks stranded assets, as the long lifespans of gas grids do not align with decreasing gas usage and climate targets.
- Regulations are beginning to address these issues, with some countries taking steps towards orderly gas grid decommissioning to manage costs and transition to alternative energy sources efficiently.
- In view of these challenges ahead, the objectives of this country sheet are to
 - provide an overview the status quo of gas consumption and gas distribution networks
 - Outline how regulations related to the gas grid embrace this challenge and identify gaps
 - Highlight opportunities for stakeholders to interact in the process

Summary of the country report for Italy

- There are no regulatory efforts to prepare the phase out of gas infrastructure in Italy yet.
- The consumption of gas plays a vital role in Italy. No decline of gas consumption is on the horizon.
- Due to its LNG regasification capacity and pipelines to Algeria (and in future to Greece), Italy has a role as European “Gas Hub” and further invests in its transmission grid.
- The Transmission Network Development Plan is based on scenarios with a continuously high fossil gas demand, which is not aligned to climate neutrality scenarios. The projections for the future use of biomethane and hydrogen are very ambitious to meet.
- Vulnerable Households automatically receive a lump-sum reduction on their gas bill.
- Italy has a White Certificate Scheme, which incentivises grid operators to conduct energy efficiency measures on behalf of their costumers.

Content and structure of the country report

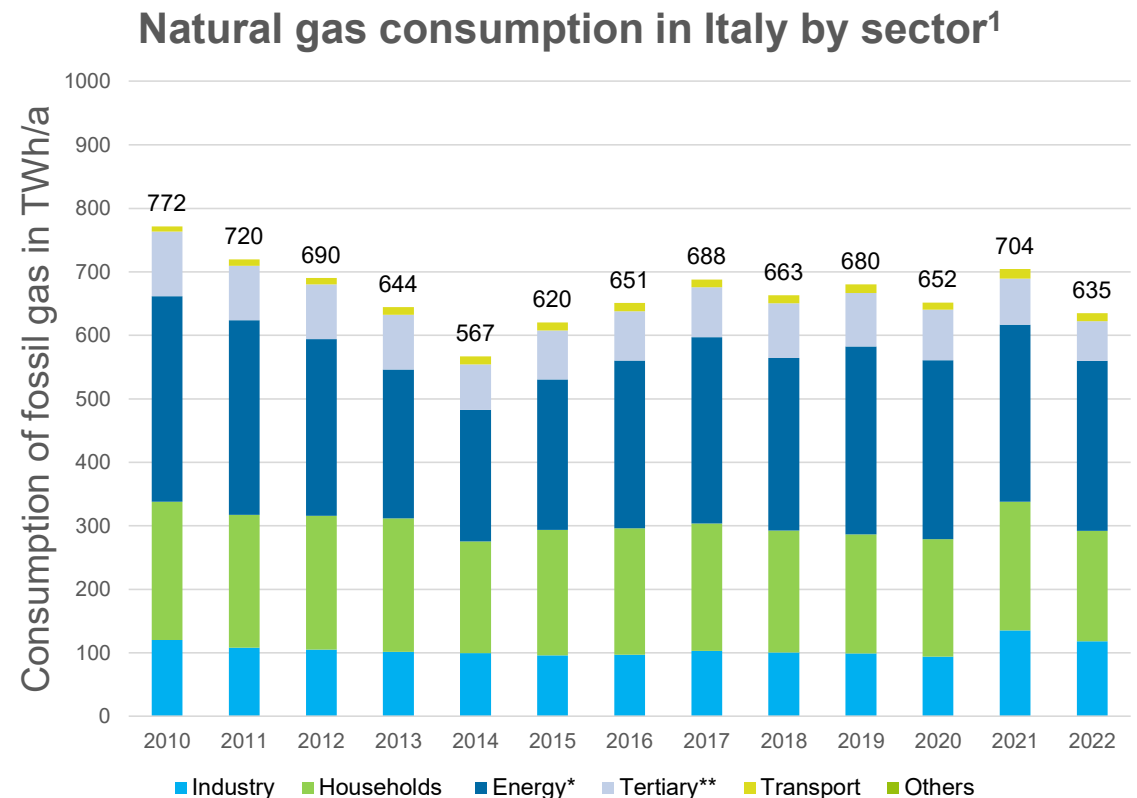
1. **Development of Fossil Gas Consumption + Heating Market/Systems:** This chapter provides an overview of historical trends and current statistics regarding fossil gas usage and the evolution of heating systems.
2. **Distribution Network - Development and Current State:** This section discusses the infrastructure that supports the distribution of gas, including an assessment of its development over time and its condition today.
3. **Network Regulation, Costs vulnerable and low-income Energy Users:** Here, we analyze the regulatory framework governing the distribution network and detail the associated costs of maintaining and expanding this infrastructure.
4. **Current and Anticipated Role of Alternative Gases:** This chapter evaluates the expected role of alternative gases like biogas and hydrogen in transitioning away from fossil fuels, including current applications and future projections.
5. **Alignment with Climate Scenarios:** We explore how gas grid planning is aligned with national climate goals, examining scenarios that aim to reduce greenhouse gas emissions.
6. **Transparency of Information and Stakeholder Input:** The final section discusses transparency and highlights opportunities for stakeholder engagement.

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Development of fossil gas consumption

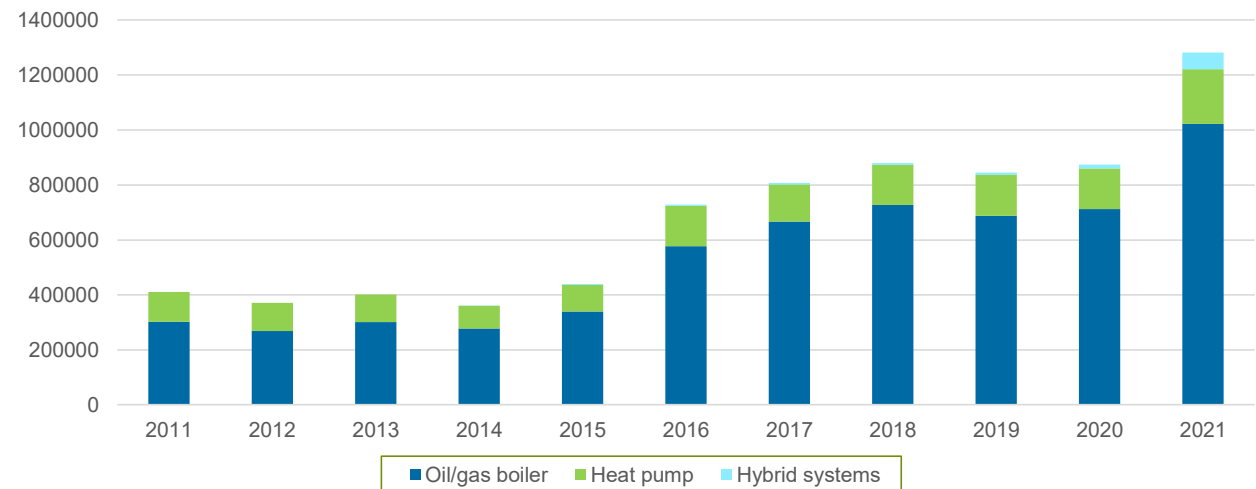
- The total consumption of fossil gas in Italy has remained consistently high over the past decade. Following a brief decline, consumption increased once more in 2021, reaching over 700 TWh per year. However, due to the ongoing conflict in Ukraine and the subsequent gas crisis, yearly consumption declined in 2022 to approximately 635 TWh.
- Gas accounted for 42% of final energy consumption in 2021 and for 39.5% in 2022.²



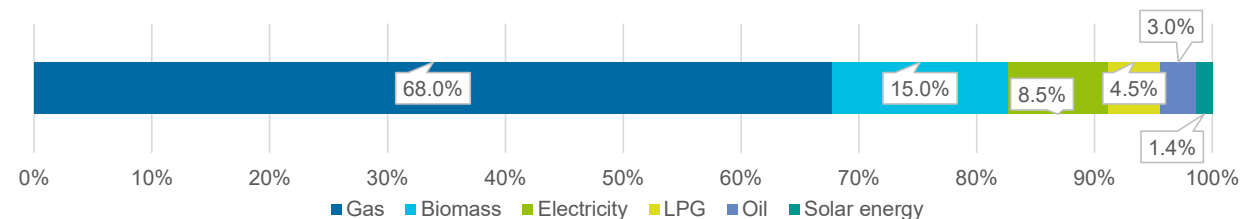
Development of heating systems

- Fossil boilers have been the dominant heating system in the market for the past decade, accounting for 70-80% of the market share. Despite climate policies, the sales of fossil boilers has continued to rise steadily from 2015 to 2021.¹
- In 2021, over 19 million installed gas boilers made up more than two-thirds of the existing stock of heating systems. Given a lifespan of 20 to 30 years, it is reasonable to conclude that gas will continue to play a significant role in space heating.^{2,3}
- In 2021, the share of hybrid systems has increased, mainly heat-pump combined with gas boiler.¹ A continuation of this trend is opposing the decommissioning of the gas grid.

Development of sales of heat generators by technology¹



Shares of the existing heating systems by technology (2021)²



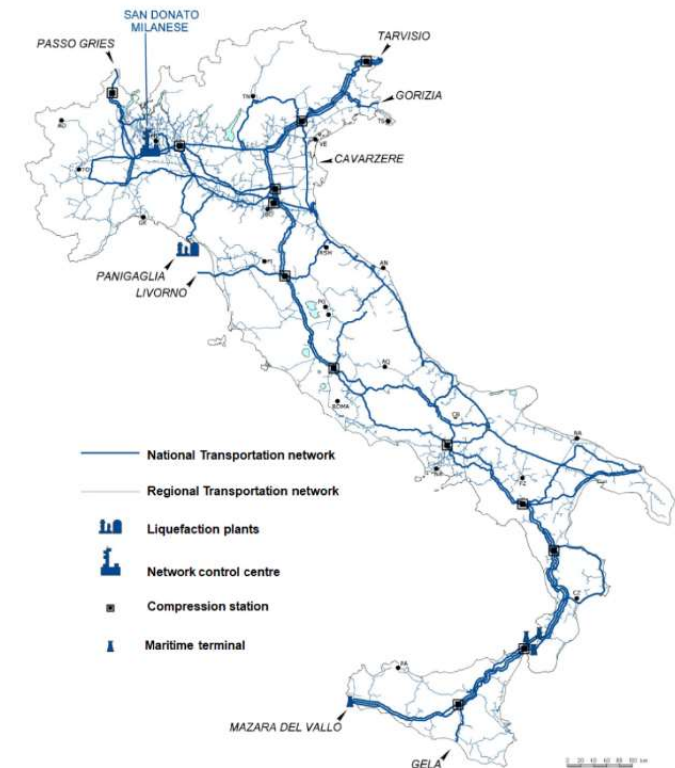
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Map of the Italian gas transmission network (Status 2018)

- “Natural gas imports to Italy arrive through six pipeline interconnection points, and three (liquefied natural gas) LNG terminals. The vast majority of imports (over 90% in January 2022) come by pipeline.”¹
- In Italy, the national (10,286 km) and regional (24,817 km) gas transmission network is operated by nine transmission companies.¹ The national network is connecting north and south.
- 70% of the Italian natural gas consumption takes place in the North of Italy.³
- The primary transmission system operator (TSO) is Snam Rete Gas. The Snam Group holds a majority stake in the networks, amounting to 92.8%.¹
- In 2023, Snam invested EUR 1,1 billion in its transport segment mainly including its transportation grid.⁴
- In order to decrease gas dependency, an expansion of import capacity by LNG terminals and transnational pipelines is planned.⁵
- Italy has a gas storage capacity of 17.75 Gm³ in depleted gas fields. It is operated by five companies among which Stogit holds 10 out of 15 concession.¹
- With its capacity of regasification of LNG, pipeline connections to Algeria (and in the future Greece) and a high gas transmission capacity, Italy is considered to be a “Gas Hub”.⁵

National and regional gas transmission network³



Italian gas distribution network

- In 2022, the Italian gas distribution network encompassed a total length of 269,249 kilometers and serves approximately 22 million consumers.¹
- A total of 194 distribution system operators (DSOs) are currently active in the Italian gas network. Of these, six are classified as very large, with over 500,000 customers; 41 are medium-sized, with between 50,000 and 500,000 customers; and 147 are small, with less than 5,000 customers. Significant regional disparities exist in the distribution system.^{1,3}
- The natural gas distribution sector is operated on the basis of licenses awarded by the relevant local authorities. In each concession area, a single network operator is granted the requisite authorisation to distribute natural gas. The most significant distribution company is Italgas, which is owned by the Snam Group and owns 28% of the distribution network. Other significant distribution network operators include 2i Rete Gas (19% of the network) and A2A (9% of the network). In addition to these three largest operators, the Italian gas distribution sector is characterised by a high level of fragmentation.^{1,3}
- From 2018 to 2021 there was no decline of redelivery/consumption points.¹

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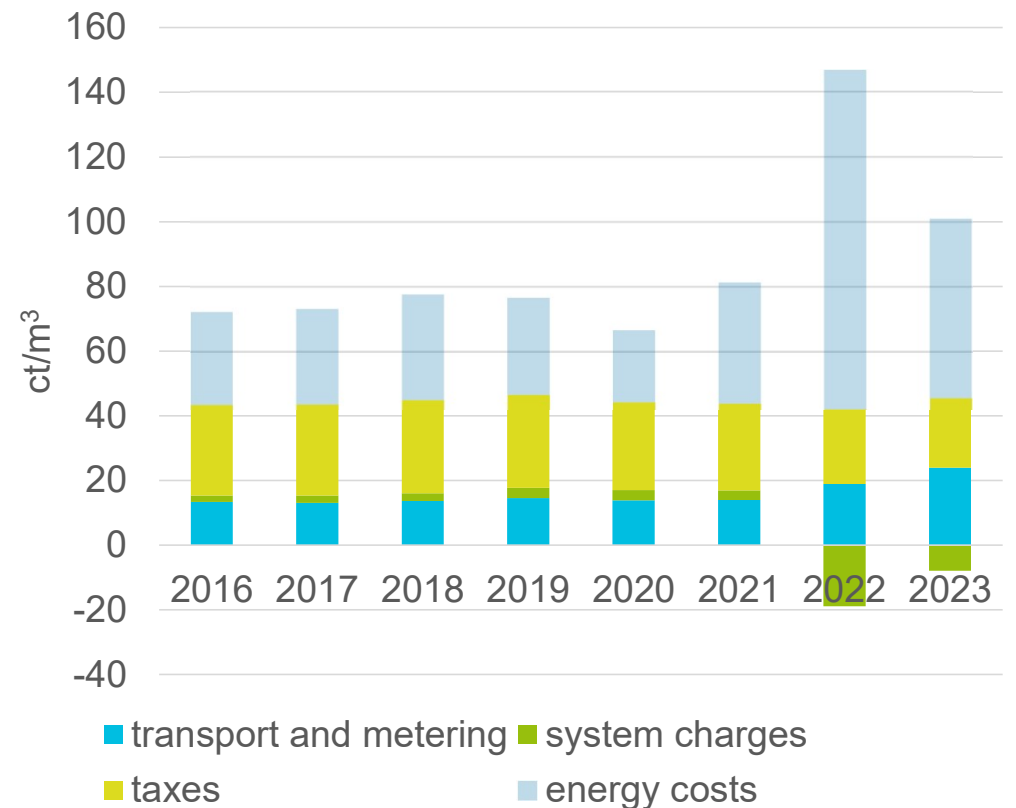
Gas grid regulation

- The Italian Gas Distribution and Metering Services Tariff Regulation (regolazione tariffaria dei servizi di distribuzione e misura del gas; RTDG, 570/2019/R/gas and 736/2022/R/gas) sets the applicable gas grid charges for regulation periods of six years. This contains the following key aspects: 1. a regulatory asset base considering operational and capital expenditure of grid operators, 2. a revenue cap model with defined interest rates, 3. incentives to increase the efficiency. Furthermore, there is a standardized process on behalf of tendering for gas distribution concessions in 175 defined geographical areas.^{1,2,3}
- Following the related regulation (468/2018/R/gas), Snam, which operates the vast majority of the Italian gas transmission grid, elaborates the national Gas Transmission Network Development Plan (current period 2023-2032). The future gas demands are projected in different scenarios.^{4,5}
- Grid operators are obliged to connect new costumers to their grid if technically and economically feasible (Art. 8, 164/2000).⁶
- Depreciation periods of 50 years are applicable for investments of grid operators in gas infrastructure (Art. 11 par. 2a, 203/2005).¹¹
- Italy has a White-Certificate Scheme (also known as Energy Efficiency Obligation Scheme) which obligates grid operators with more than 50,000 consumers to meet efficiency targets via technical measures. Their costs are passed on to the grid charges via a cost recovery mechanism.^{7,8}
- Energy planning law is force in Italy since 1991: Regional energy plans (Piani regionali) are mandatory for the 22 regions and local energy plans (Piano Energetico Ambientale Comunale; PEAC) for communities with more than 50,000 inhabitants (Art. 5, 10/1991). Areas for decommissioning the gas grid are not mandatorily designated in this process.¹⁰
- No ban of gas boilers is in force or planned. The government still provides subsidies for new gas condensing boilers.¹¹

Gas grid charges

- Grid charges for transport and metering were stable during the last years and have begun to rise slowly with the gas crisis.
- Grid charges for the system are low compared to the energy costs and stable. During the gas crisis the system charges were used as a mechanism to subsidise the sharply risen energy prices
- Another relief mechanism during the crisis was the reduction of energy taxes and the Value Added Tax which accounted for a substantial part of the Italian gas price for end consumers before the crisis.

Gas price for consumers¹



Addressing vulnerable energy consumers and broader social justice concerns

- Social bonus for gas supplies (Bonus Energia): Households receive a lump-sum reduction on their gas bill if they fall under a threshold in terms of an economic condition index (ISEE). The relief mechanism is passed on automatically. During the gas crisis, the group of eligible consumers was increased by the government. In 2022, 2.4 million households were supported this way.²
- Information initiatives: on gas bills, it is obligatory to print the advice to compare offers for gas prices. There is an official comparison tool for energy prices.²
- Help-desk and conciliation service for complaints with more one million calls in 2021.²
- There are two different gas markets: for the so-called protected market (Maggoir Tutela) the network agency ARERA calculates energy prices based on gas prices from the wholesale market. This protects costumers from rip-offs but there is no further protection. Around 38% of Italian gas consumers receive a protected gas price determined by the Regulatory Authority (AREREA).³ In January 2024, this scheme is terminated and gas consumers have to choose a gas-tariff at the open market. There is a transitional phase and certain vulnerable groups can also keep the regulated tariff.⁴
- The White Certificate Scheme does not focus on savings in vulnerable households.

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Hydrogen and biomethane

Hydrogen

- Currently, hydrogen is merely used. But Italy has a National Hydrogen Strategy which envisions that, Italy can produce enough low-carbon hydrogen to cover 2% of its primary energy demand by 2030. Nevertheless, a detailed plan with measures to reach this target is still needed.²
- As part of the National Recovery and Resilience Plan (PNRR), Italy promotes the production of hydrogen in particular areas primarily at disused industrial sites and the build up of hydrogen supply chains in so-called “hydrogen valleys”.³

Biomethane

- Currently, there are over 2,000 biogas plants and around 85 biomethane production plants, particularly located in northern Italy. They produce around 600 million m³ biomethane per year. To encourage biomethane development, Italy has initiated funding under the National Recovery and Resilience Plan, allocating EUR 1.92 billion. The government plans to increase the production to up to 10 billion m³ until 2030, whereas the potential for 2030 is determined to be half of this.⁴

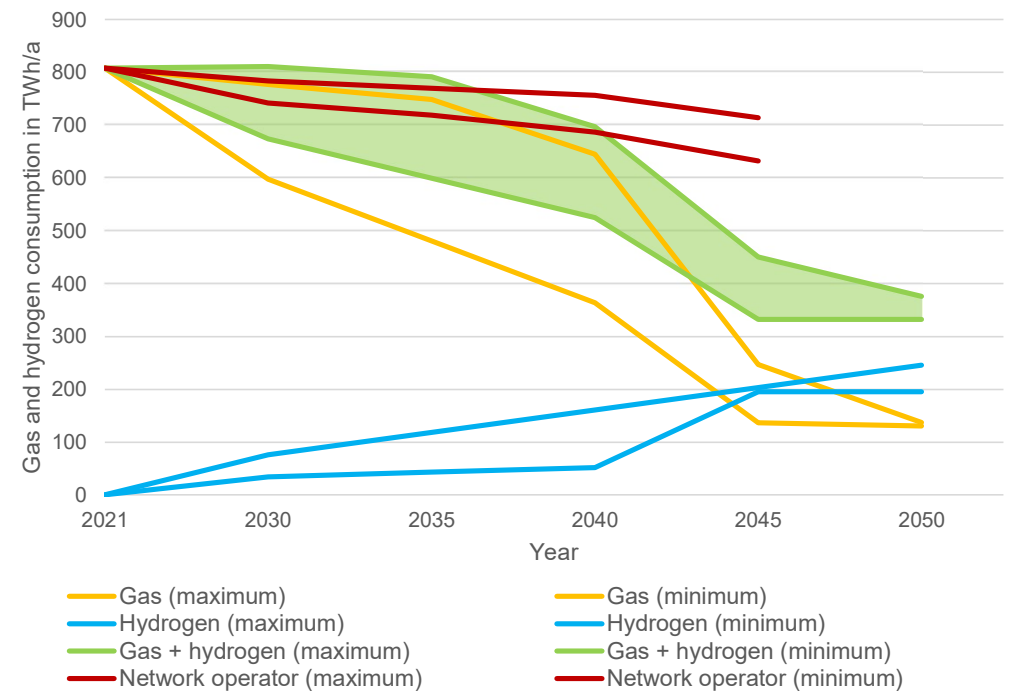
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Scenarios

- The Gas Transmission Network Development Plan is based on different scenarios: DE-IT+, GA-IT+ are aligned with the ENTSOG-scenario by European Network of Transmission System Operators. The Reference and Policy-scenarios of the National Energy and Climate Plan (NECP) show a similar reduction of gas demand – which is low.¹
- In contrast, scenarios which show pathways to a decarbonization show a sharp reduction of natural gas demand which is not equalized by an increased demand for green gases.
- The reduction of gas demand until 2040 in the scenarios which the Network Development Plan is based on, is not linked to climate target scenarios.
- In the LTS-scenario hydrogen is primarily used in the transport sector and merely for buildings.^{2 (p.69)}
- Eccoclimate (2024) compares the gas demand of the NECP with climate target scenarios and comes to the same result: The gas demand in the Gas Transmission Network Development Plan is not aligned to climate goals.⁴

Climate Scenarios and gas demand – Italy^{1, 2, 3}



Future gas and hydrogen demand in Germany one the one hand based on different scenarios that aim to achieve the climate targets of the country and on the other hand showing the projected developments of the gas network operators. The values in the green corridor do not correspond solely to the sum of the maximum values for gas and hydrogen. Instead, the green corridor represents the range of the total sum of hydrogen and gas within the same scenario for different scenarios. Included scenarios: I4C and LTS*^{2, 3} and for the network operators F55+, policy, Reference, GA-IT+, DE-IT+¹

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Public information and stakeholder involvement

Public information

- The regulatory authority ARERA annually publishes a monitoring report with information on the gas grid.⁶
- A regional gas distribution register provides public information.⁴
- There is an official comparison tool for energy prices. Every gas bill includes the advice to use it.⁵

Stakeholder involvement

- In June 2024, ARERA started a stakeholder process for defining the scenarios for the new transmission network development plan.⁷
- The creation of regional and local energy plans includes the involvement of stakeholders.^{2, 3}

Opportunities for stakeholder involvement

- In Italy regulatory changes should address the following points:
 1. **Allow Refusal of New Connections and Disconnections:** Implement policies that permit gas network operators to refuse new connections and disconnect existing customers where appropriate.
 2. **Shorten Depreciation Periods:** Reduce depreciation periods for both past and future infrastructure investments. This will help avoid stranded assets and distribute decommissioning costs over a shorter timeframe, ensuring full repayment by the time the network is decommissioned.
 3. **Cover Decommissioning Costs:** Finance foreseeable decommissioning costs through network tariffs or funding mechanisms. Establish a reserve for future decommissioning to spread financial burdens and protect consumers from excessive costs.
 4. **Integrate Infrastructure and Municipal Heat Planning:** Ensure that gas infrastructure planning is closely coordinated with municipal heat planning for better alignment and efficiency.
 5. **Incorporate Climate Scenarios in Planning:** Use climate scenarios in infrastructure planning to avoid unnecessary costs and investments, ensuring that plans are sustainable and aligned with climate goals.

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Contacts

Sibylle Braungardt, Marc Stobbe

Öko-Institut e.V. – Institute for Applied Ecology
Postfach 17 71
D-79017 Freiburg
Germany

Mails:

s.braungardt@oeko.de
m.stobbe@oeko.de

Jan Rosenow

Regulatory Assistance Project (RAP)
Anna-Louisa-Karsch-Straße 2
D – 10178 Berlin
Germany

Mail:

jrosenow@raponline.org