

Enel's roadmap to decarbonization and electrification

TCFD: Metrics & Targets

In 2022, Enel carried out a **full update of its decarbonization roadmap**. The process was validated by the Science-Based Targets initiative according to the criteria and recommendations related to short-term objectives and according to the SBTi Corporate Net Zero standard. This review included updating existing medium-term (2030) and long-term (2040) objectives, as well as setting new targets, all aligned to a 1.5 °C pathway, as defined by the SBTi, according to IPCC scenarios and other international benchmarks.

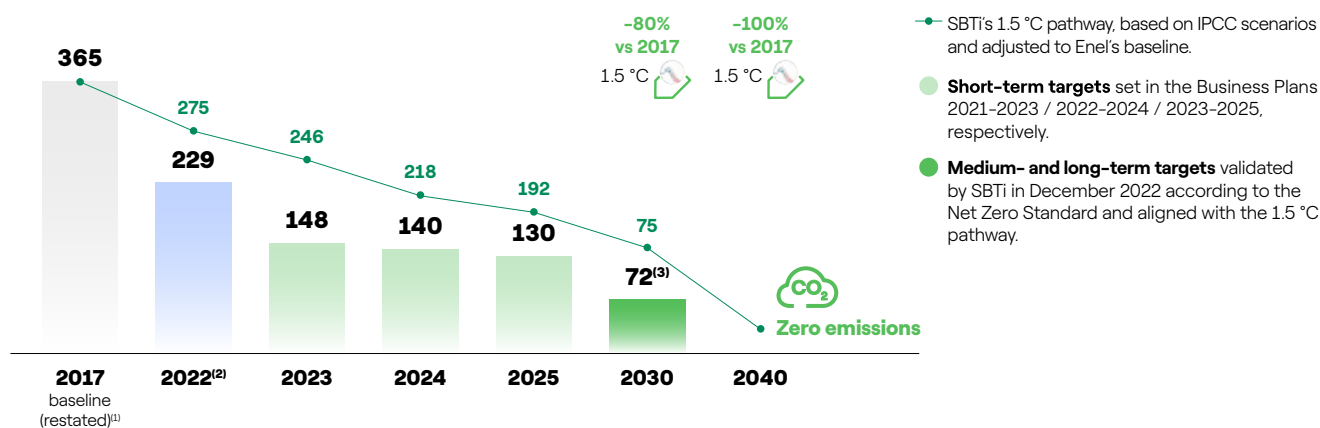
The main updates are:

- 2017 baseline was restated for all targets to exclude those direct and indirect GHG emissions from assets disposed in 2017-2022 period, including thermoelec-

tric and renewable plants and energy distribution assets that were disposed or are no longer consolidated within Enel's financial perimeter, in accordance with the GHG Protocol and SBTi guidelines;

- target ambition on **Scope 1 GHG emissions intensity relating to power generation** has been improved, from 82 gCO_{2eq}/kWh to 72 gCO_{2eq}/kWh by 2030. This target covers all greenhouse gas emissions (including CO₂, CH₄ and N₂O) deriving from the power generation process with respect to total electricity and heat generated by the Group (excluding pumped storage generation to avoid possible double counting in the Scope 2 emissions calculation).

Scope 1 GHG emissions intensity relating to power generation (gCO_{2eq}/kWh)

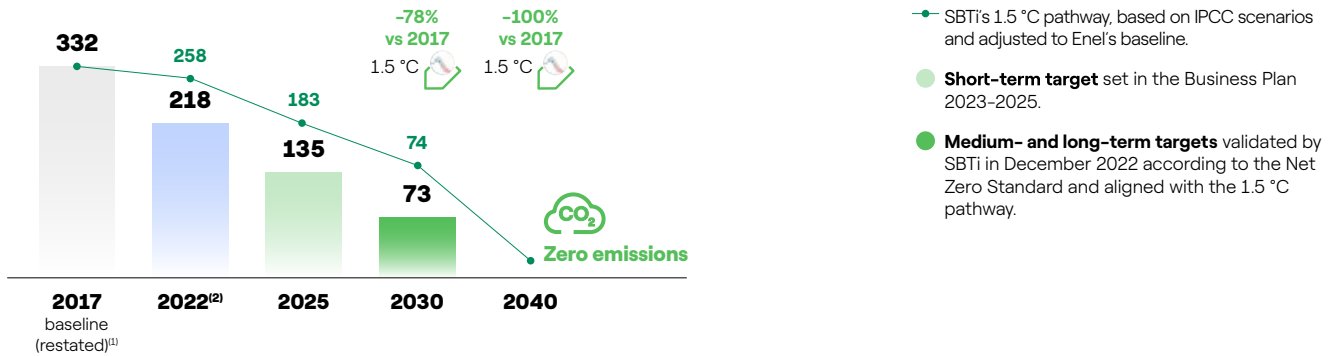


(1) The 2017 baseline has been restated from 416 gCO_{2eq}/kWh to 365 gCO_{2eq}/kWh to exclude GHG emissions from assets disposed in 2017-2022 period, in accordance with SBTi.
 (2) 2022 value has not been restated and includes the GHG emissions of assets in operation during 2022 and disposed before the end of the year, according to the consolidation guidelines of the Sustainability Report. The figure, excluding GHG emissions from these assets, is 217 gCO_{2eq}/kWh, down 40% compared to the restated baseline.
 (3) Target previously validated by SBTi in 2020 (1.5 °C pathway) of 82 gCO_{2eq}/kWh.

- target ambition on **Scope 1 and 3 GHG emissions intensity relating to Integrated Power** has been improved, from 83 gCO_{2eq}/kWh to 73 gCO_{2eq}/kWh by 2030. This target is calculated as the combination of direct Group GHG emissions (Scope 1 – including CO₂, CH₄ and N₂O) from electricity and heat generation and Group indi-

rect GHG emissions (Scope 3) from power generation electricity purchased and sold to end customers (an element of the 3-Fuel and Energy Related Activities subcategory of the GHG protocol Scope 3 standard), divided by power generation (including heat and excluding pumped power storage) and purchase of electricity;

Scope 1 and 3 GHG emissions intensity relating to Integrated Power (gCO_{2eq}/kWh)

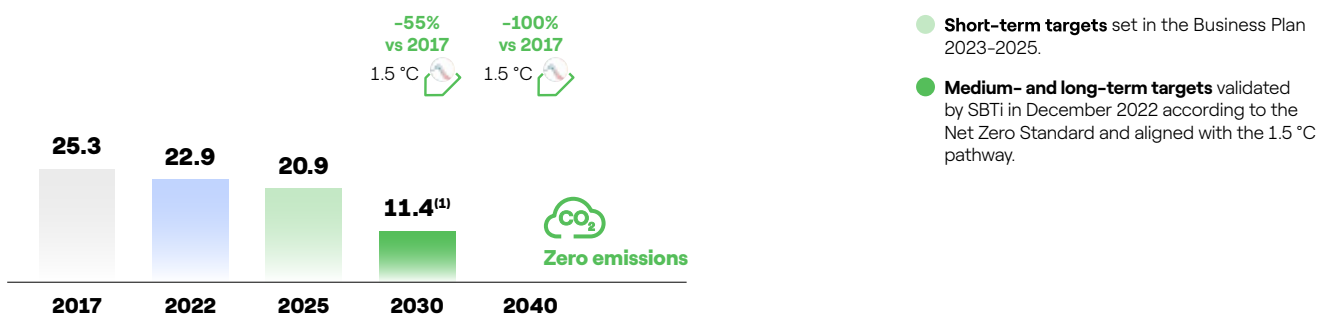


- The 2017 baseline has been restated from 373 gCO_{2eq}/kWh to 332 gCO_{2eq}/kWh to exclude GHG emissions from assets disposed in 2017-2022 period, in accordance with SBTi.
- The 2022 value has not been restated and includes the GHG emissions from assets in operation during 2022 and disposed before the end of the year, according to the consolidation guidelines of the Sustainability Report. The figure, excluding GHG emissions by these assets, is 210 gCO_{2eq}/kWh, down 36% compared to the restated baseline.

- target ambition on **absolute Scope 3 GHG emissions relating to Gas Retail** has been significantly improved from 21.2 MtCO_{2eq} to 11.4 MtCO_{2eq} by 2030, to increase the

level of alignment with temperature scenarios of the Paris Agreement, from a previous 2 °C pathway to one of 1.5 °C, to which the target is now aligned;

Absolute Scope 3 GHG emissions relating to Gas Retail (MtCO_{2eq})

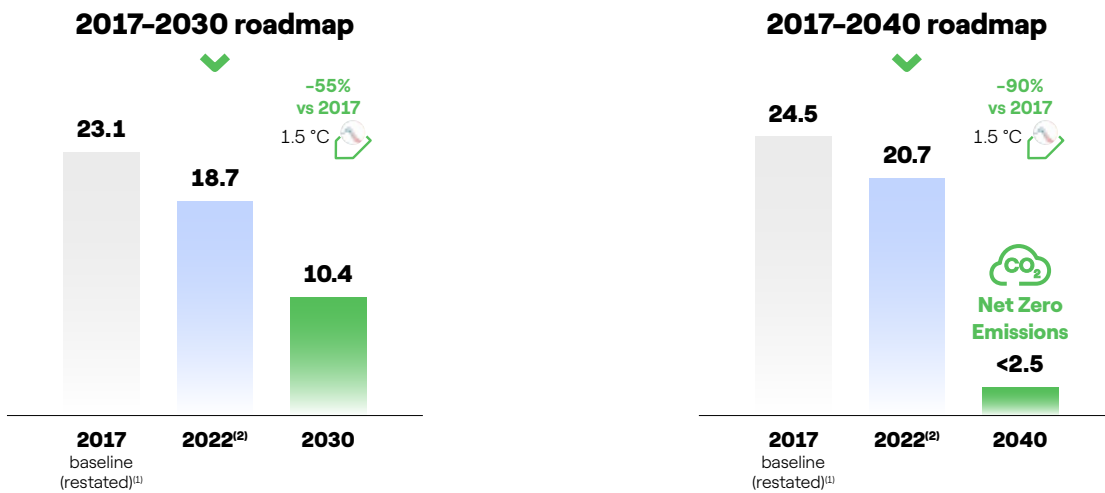


- Target previously validated by SBTi in 2019 (WB2C scenario) of 21.2 MtCO_{2eq}

- new target has been defined for **additional absolute Scope 1, 2 and 3 emissions**. The target covers i) Scope 1 GHG emissions from vehicles fleet and buildings, and losses of SF₆ in distribution assets; ii) all Scope 2 emissions; iii) Scope 3 emissions from the supply chain and all other activities related to fuel purchase and transportation. This objective provides for different levels of coverage of GHG emissions deriving from the supply chain for the 2030 and 2040 targets, allowed by SBTi method-

- ology, which translate into two decarbonization curves:
- 2017-2030 roadmap covers specific supply chain categories that accounted for 40% of supplier emissions in 2017;
 - 2017-2040 roadmap covers all supply categories included in the 2017-2030 roadmap and additional ones, which account for 54% of supplier emissions in 2017.

Additional Scope 1-2-3 emissions (MtCO_{2eq})



● **Medium- and long-term targets** validated by SBTi in December 2022 according to the Net Zero Standard and aligned with the 1.5 °C pathway.

- 2017 baseline has been restated from 25.0 MtCO_{2eq} to 23.1 MtCO_{2eq} for 2017-2030 roadmap and from 26.5 MtCO_{2eq} to 24.5 MtCO_{2eq} for 2017-2040 roadmap to exclude GHG emissions from assets disposed in 2017-2022 period in accordance with SBTi.
- 2022 figure has not been restated and includes the GHG emissions of assets in operation during 2022 and disposed before the end of the year, following the consolidation guidelines of the Sustainability Report. The figure, excluding GHG emissions by these assets, is 17.5 MtCO_{2eq} for the 2017-2030 roadmap, down 24% compared to the restated baseline and 19.5 MtCO_{2eq} for the 2017-2040 roadmap, down 20% from the restated baseline.

- 2017-2030 roadmap covers specific supply chain categories that accounted for 40% of supplier's emissions in 2017.
- 2017-2040 roadmap covers all supply chain categories included in the 2017-2030 roadmap and additional ones, which accounted for 54% of supplier's emissions in 2017.

The first three targets envisage a 100% reduction in emissions generated by 2040, as the Group will produce and sell 100% of energy from renewable sources by then and will no longer maintain a presence in the retail gas market. The fourth objective currently envisages a 90% reduction by 2040 from 2017, with a residual volume of less than 2.5 MtCO_{2eq} which will be neutralized through carbon removal in the event that the current external factors (linked to the supply chain, the market and the regulatory frameworks) that prevent Enel from mitigating them will also be present after 2040.

The four targets cover the 93.3% of the total direct and indirect GHG emissions reported by Enel in 2022. Specifically:

- 98.6% of Scope 1 GHG emissions.** Minor sources of GHG

emissions were excluded as they were not directly related to the combustion process for electricity generation or the power distribution activity (such as GHG emissions from ancillary services in renewable power plants and distribution sites, CH₄ leakage in gas-fired plants, and SF₆ leakage in thermal and renewable plants) or of biogenic origin (such as CH₄ emissions from hydroelectric reservoirs);

- 100% of Scope 2 emissions**, including all indirect emissions from electricity consumption and technical grid losses;
- 87% of Scope 3 emissions** for the target set for 2030, compared to 90% for the target set for 2040. Specific categories of the supply chain have been excluded from the scope of the targets.

GHG targets	Core business activity	GHG sources covered (GHG Protocol) ⁽¹⁾	Timing	GHG targets	Climatic scenario	Main drivers and actions
Intensity of GHG Scope 1 emissions relating to power generation	Electricity generation	98.2% of Scope 1 GHG emissions⁽²⁾	●○○○	130 gCO _{2eq} /kWh	1.5 °C ⁽³⁾	<ul style="list-style-type: none"> Gradual phase-out of coal-fired capacity over the period 2023–2025 (percentage weight of coal-fired capacity in consolidated capacity from about 7% in 2022 to less than 0.5% in 2025). Invest 15 billion euros to accelerate the development of renewable energy by installing 17 GW of new renewable capacity (including about 13 GW at consolidated level) and 4 GW of BESS in the period 2023–2025, reaching 75 GW of renewable capacity (including 4 GW of BESS) by 2025.
			●●○○	72 gCO _{2eq} /kWh (-80% compared to baseline year 2017)	1.5 °C (SBTi certified)	<ul style="list-style-type: none"> Continue the process of decarbonization of electricity generation, thanks to a Group-wide investment plan that will be confirmed at the annual levels of the 2023–2025 plan, reaching a managed capacity of more than 130 GW by 2030, thus bringing the Group's generation facilities to consist of about 85% renewable plants. Exit the coal-fired generation business on a global scale by 2027.
			●●●○	0 gCO _{2eq} /kWh (-100% compared to baseline year 2017) Zero emissions	1.5 °C (SBTi certified)	<ul style="list-style-type: none"> Exit the thermal electricity generation business, achieving a 100% renewable energy mix. No use of carbon removal technologies
Intensity of GHG Scope 1 and 3 emissions relating to Integrated Power	Sale of electricity	<ul style="list-style-type: none"> • 98.2% of Scope 1 GHG emissions • 73.4% of Scope 3 GHG emissions - category 3 (fuel and energy related activities) 	●○○○	135 gCO _{2eq} /kWh	1.5 °C ⁽³⁾	<ul style="list-style-type: none"> Increase the share of renewable energy sold to customers by increasing the Group's renewable generation. Increase from about 70% in 2022 to about 90% in 2025 the share of fixed-price power sales covered by carbon-free sources in core countries, while simultaneously increasing the volumes of electricity sold at fixed prices from about 185 TWh in 2022 to about 200 TWh in 2025.
			●●○○	73 gCO _{2eq} /kWh (-78% compared to baseline year 2017)	1.5 °C (SBTi certified)	<ul style="list-style-type: none"> Increase the share of renewable energy sold to customers by increasing the Group's renewable energy generation, reaching a managed capacity of more than 130 GW by 2030, thus bringing the Group's generation facilities to consist of about 85% renewable plants. Continue the strategy of balancing supply and demand and increasing the share of electricity sold at fixed price covered by carbon-free power generation.
			●●●○	0 gCO _{2eq} /kWh (-100% compared to baseline year 2017) Zero emissions	1.5 °C (SBTi certified)	<ul style="list-style-type: none"> Achieve 100% of energy sales from renewable sources by 2040. No use of carbon removal technologies

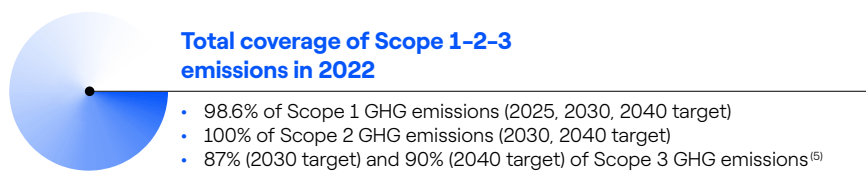
Timing: ●○○○ Short term (2025) ●●○○ Medium-term (2030) ●●●○ Long-term (2040)

Zero emissions ambition

GHG targets	Core business activity	GHG sources covered (GHG Protocol) ⁽⁴⁾	Timing	GHG targets	Climatic scenario	Main drivers and actions
Absolute Scope 3 GHG emissions relating to gas sales in the end market.	Gas sales to the end customer	100% of Scope 3 GHG emissions – category 11 (use of sold products)	●○○>	20.9 MtCO _{2eq}	n.a. ⁽⁴⁾	<ul style="list-style-type: none"> Promote the switch of customers from gas to electricity (especially residential customers) by pushing more efficient electrical technologies (e.g. heat pumps for home heating or induction hobs in kitchens), increasing the electrification rate of our customers in Italy and Spain from 17% in 2022 to over 20% in 2025. Promote electrification-enabling services to end customers: increasing behind-the-meter storage capacity from about 75 MW in 2022 to about 352 MW in 2025, increasing the capacity of photovoltaic panels installed by end customers from about 100 MW in 2022 to about 300 MW in 2025, and increasing demand response capacity from about 8.5 GW in 2022 to about 12.4 GW in 2025. Reduce the volumes of gas sold to end customers from about 10.2 bcm in 2022 to about 4.3 bcm in 2025. Optimize the gas portfolio of customers (especially industrial customers) by reducing the number of customers in the retail gas business from about 6.5 million in 2022 to about 4.4 million in 2025.
			●●●>	11.4 MtCO _{2eq} (-55% compared to baseline year 2017)	1.5 °C (SBTi certified)	<ul style="list-style-type: none"> Promote the switch of customers from gas to electricity (especially residential customers) through the promotion of more efficient electrical technologies (e.g. heat pumps for home heating or induction hobs in kitchens), increasing the electrification rate of our customers in Italy and Spain from 17% in 2022 to over 30% in 2030. Continue the strategic actions envisaged for the short term, by continuing to promote services to end customers that enable the electrification of consumption and achieving a demand response capacity by 2030 of more than 20 GW. Optimize the gas portfolio of customers (especially industrial customers) by continuing to reduce the volume of gas sold to about 3 bcm in 2030.
			●●●>	0 MtCO _{2eq} (-100% compared to baseline year 2017) Zero emissions	1.5 °C (SBTi certified)	<ul style="list-style-type: none"> Achieve 100% sales of energy covered by renewable sources by 2040. Exit from the business of gas sales to retail by 2040. No use of carbon removal technologies.

Timing: ●○○> Short term (2025) ●●●> Medium-term (2030) ●●●> Long-term (2040)

GHG targets	Core business activity	GHG sources covered (GHG Protocol) ⁽¹⁾	Timing	GHG targets	Climatic scenario	Main drivers and actions
Additional absolute Scope 1-2-3 emissions	<ul style="list-style-type: none"> Electricity distribution (Scopes 1 and 2) Fleet management of vehicles, buildings and other assets (Scopes 1 and 2) Supply chain management (Scope 3) Purchase of fuels (Scope 3) 	<ul style="list-style-type: none"> 0.4% of Scope 1 GHG emissions ●●●○ 100% of Scope 2 GHG emissions 28.6% of Scope 3 GHG emissions - category 1 (purchase of goods and services) for the 2030 target and 43.0% for the 2040 target⁽⁵⁾ 	<ul style="list-style-type: none"> 10.4 MtCO_{2eq} (-55% compared to the baseline year 2017) 	1.5 °C (SBTi certified)	<ul style="list-style-type: none"> Invest a total of 15 billion euros in distribution networks over the period 2023-2025, of which 11% to increase digitalization and 47% to improve the resilience and quality of networks, thus helping to reduce network losses and related emissions. Replace existing components of the distribution network infrastructure with SF₆-free solutions. Electrify the fleet and buildings by 2030. Implement a circular procurement approach and increase the number of contracts that include the measurement of the carbon footprint of products and services purchased by Enel by incentivizing their reduction in a decarbonization pathway shared with our suppliers. Strengthen the dialogue with manufacturers or raw materials and other utilities to define effective and long-term common decarbonization strategies. Phase out coal-fired generation by 2027, mitigating all GHG emissions related to coal supply. 	
		<ul style="list-style-type: none"> 26.6% of Scope 3 GHG emissions - category 3 (fuel and energy related activities) ●●●○ 	<ul style="list-style-type: none"> <2.5 MtCO_{2eq} (-90% compared to the baseline year 2017) 	1.5 °C (SBTi certified)	<ul style="list-style-type: none"> Promote the digitalization of the distribution network and replace existing network infrastructure components with SF₆-free solutions. Implement a circular procurement approach and increase the number of contracts that include the measurement of the carbon footprint of products and services purchased by Enel by incentivizing their reduction in a decarbonization pathway shared with our suppliers. Strengthen the dialogue with manufacturers or raw materials and other utilities to define effective and long-term common decarbonization strategies. Zero emissions from gas extraction activities by exiting the business of both electricity generation from gas and gas sales to end customers. 	



(1) Percentages based on total GHG emissions in 2022.
(2) Marginal Scope 1 GHG emissions not directly related to the combustion process of fossil fuels for power generation in thermal power plants were excluded, representing 1.4% of total Scope 1 emissions in 2022. In any case, the GHG emissions covered by all of the above targets together represent 98.7% of total Scope 1 and 2 emissions in 2022 and are therefore above the 95% threshold required by SBTi.
(3) The target meets the 1.5 °C path set by SBTi for the electricity service sector (sectoral decarbonization approach, SDA), although it could not be officially validated because SBTi does not certify targets with a timeframe of less than five years from the date of submission.
(4) The target could not be officially validated because SBTi does not certify targets with a timeframe of less than five years from the date of submission. Furthermore, SBTi has not defined a sectoral decarbonization approach for these types of emissions, so the level of ambition cannot be verified.
(5) Two different percentage limits to the supply chain GHG Scope 3 target have been defined, as allowed by the SBTi methodology, which requires at least 67% of Scope 3 emissions to be covered for the 2030 target, and at least 90% for the 2040 target.

Timing: ●○○○ Short term (2025) ●●○○ Medium-term (2030) ●●●○ Long-term (2040)