Acciaierie Venete Decarbonisation Plan

Executive Summary

Monitoring and updating of the Decarbonisation Plan drawn up in 2023

Version	Date	Created	Version history
0	15/11/2025	Energy Management Office	First issue

Index

Figures

Tables

1 Introduction

Acciaierie Venete's decarbonisation plan is divided into several phases, the three key ones being measurement, planning and monitoring.

The first phase involved measuring Acciaierie Venete's greenhouse gas (GHG) emissions for the year 2022, taking into account all direct and indirect sources (Scope 1, Scope 2 and Scope 3). The calculation of the inventory provided a snapshot of emissions (reference baseline) and enabled the identification of the main emission hotspots, which are useful for defining reduction measures in the areas where they will be most effective.

The second phase, carried out in 2023, focused on planning emission reduction objectives, with the setting of short-term targets, namely by 2030, relating to Scope 1 and Scope 2 emissions, taking into account the emission reduction trajectories indicated by the SBTi (Science Based Targets Initiative) and the broader objective of achieving net-zero by 2050. During this phase, a strategy has been developed and a roadmap drawn up for the selected initiatives.

Acciaierie Venete is currently in the third phase, dedicated to monitoring, which consists of the annual calculation of GHG emissions and the results achieved against the set targets. During this phase, the strategy is continuously monitored, with any corrective actions based on the data collected. This phase is essential for assessing the progress of the plan and updating, if necessary, the strategy initially established.

1.1 Reference period

The reference year, defined as the base year from which the GHG emissions reduction pathway begins, is 2022. The targets initially set in 2023 are short-term (2030) and form part of the broader objective of achieving net zero by 2050. This update, carried out in the second half of 2025, represents the first review of the decarbonisation plan.

1.2 Scope of reference

For the purposes of defining the decarbonisation plan, in line with the work carried out in 2023, only categories 1 and 2 of ISO 14064-1 were considered. Therefore, from Chapter 2 onwards, the analysis will consider only the impacts of Scope 1 and Scope 2 Market Based.

1.3 Relevant regulations

The decarbonisation plan drawn up in 2023 does not refer to any specific legislation. Among the voluntary regulatory references currently available, ISO 14068-1:2023 provides general principles and a methodological approach for achieving carbon neutrality, without, however, defining minimum emission reduction thresholds. In the process of setting targets, the plan has therefore taken into account the emission reduction trajectories indicated by the SBTi initiative, consistent with limiting the global temperature rise to 1.5 °C, in line with the principles of the Paris Agreement.

1.4 Strategic and geopolitical context

From 2022, the reference year, to the present day, the geopolitical landscape has changed profoundly. The European steel market has rebounded following the post-Covid recovery, with some strategic European supply chains facing significant difficulties. This situation has been exacerbated by the ongoing energy crisis, developments in US economic policy, and aggressive policies in non-EU steel markets, and has been further burdened by excessive bureaucracy following the Green Deal, creating a climate of uncertainty that does not favour long-term planning by companies.
Within this changed context, the concept is gaining ground that environmental sustainability cannot be separated from the economic sustainability of initiatives, as well as their social sustainability. The revision of the decarbonisation plan was therefore based on this principle. Where possible, the payback periods (PB) and internal rates of return (IRR) for the various measures were compared, selecting those that were most profitable from both an economic and environmental perspective.

Furthermore, there is currently considerable uncertainty at European level regarding the adoption of the Green Steel accreditation methodology. The European steel industry comprises two distinct production processes: the primary process, which relies on coal and involves a blast furnace and basic oxygen furnace (BF-BOF), and the recycling process, which uses an electric arc furnace (EAF). The latter accounts for 45% of EU steel production, comprising both carbon and stainless steels, and is already electrified, circular and low in CO_2 emissions. The latter should therefore be recognised, promoted and preserved as a key element of the European strategy on climate, industry and resilience. Instead, the main voluntary accreditation schemes for *Green Steel*, currently under review by the Commission, provide for a “sliding scale” approach, including the German *LESS*, *Responsible Steel* and the IEA mechanism. This approach does not favour electric furnace producers, as it rewards the percentage reduction in emissions rather than the actual carbon footprint (as is the case with the GSCC).
As a result of this uncertainty, Acciaierie Venete has not yet adopted a verification and certification scheme for its decarbonisation efforts, pending the European Commission’s definition of a uniform mechanism at EU level.

1.5 Starting baseline

The emission reduction targets were defined based on the calculation of the inventory for 2022, the year taken as the baseline, calculated in accordance with ISO 14064-1, and covering all emission categories.
Acciaierie Venete’s emissions, broken down into the three categories, are shown in the tables below. In particular, two different calculation methodologies are applied for Scope 2 emissions: the location-based approach, used to obtain the results in Table 1, and the market-based approach, reported in Table 2. The first

utilises the emission factor of the national electricity generation fleet, the reduction of which is therefore linked to the decarbonisation of that sector; the second, however, includes the possibility of utilising market-based instruments, such as the purchase of guarantees of origin; the residual portion, however, to avoid double counting, is considered as being produced by a thermoelectric power fleet.

Table 1 GHG inventory for the year 2022 – location-based approach

Type of emissions	$tonCO_2e$	$tonCO_2e/ton\_lam$	%
Scope 1	264,107	0.21	16%
Scope 2 - location based	313,505	0.25	19%
Scope 3	1,114,508	0.88	66%

Table 2 GHG inventory for the year 2022 – market-based approach

Type of emissions	$tonCO_2e$	$tonCO_2e/ton\_lam$	%
Scope 1	264,107	0.21	14%
Scope 2 - market based	497,084	0.39	27%
Scope 3	1,114,508	0.88	59%

2 Inventory monitoring of GHG

2.1 Analysis of GHG inventory trends

Starting from the baseline, an analysis was carried out of emissions trends for the three-year period 2022–2024, covering only categories 1 and 2 of ISO 14064-1.
During the period under review, there was a downward trend in the organisation's total emissions, with significant differences between the various categories. These variations depend both on the nature of the category (Scope 1 and Scope 2) and on the approach adopted for reporting Scope 2 emissions (*location-based and market-based*):

- Scope 1 emissions show a slight reduction, linked to energy efficiency measures implemented on heating systems (burners, heat recovery and automation).
- Scope 2 emissions, using a *market-based* approach, show a significant decrease, attributable to the increase in the share of renewable energy consumed.
- Scope 2 emissions, using a *location-based* approach, show a slower reduction, attributable to the gradual decarbonisation of the national electricity grid's energy mix.

Figure 1 Trends in Scope 1 and Scope 2 GHG emissions, market-based approach and location

3 Update on reduction strategy

Following the annual monitoring of GHG emissions and the analysis of their trends, an assessment was carried out of the progress of the planned measures, which led to the update of the reduction strategy.
The analysis was structured around five main categories of measures, as shown in Figure2: energy efficiency, certificates and market-based instruments for energy from renewable sources, direct production from renewable sources, replacement of high-carbon materials, and special projects and innovative solutions.

Figure2 Main categories of interventions

1. Energy efficiency: the primary driver for decarbonisation, enabling the reduction of direct and indirect emissions. It generally involves a significant investment, which pays for itself within a limited time frame (depending on the process). The absolute impact in terms of emissions reduction is generally limited.

2. Certificates and market-based instruments: currently applicable only to indirect Scope 2 emissions, they are also evolving rapidly in the use of certificates for renewable fuels; therefore, with an impact on Scope 1. They do not involve investment costs, but rather operational costs. They enable a significant percentage of reduction in emissions. Their use is heavily influenced by regulatory changes.

3. Special projects and innovative solutions: these are projects that would be carried out in any case for the purposes of technological renewal, system upgrades or to improve product quality. These involve significant investments, which are not always matched by a commensurate impact on emissions reduction.

4. Direct production from renewable sources: These are investments aimed at production from renewable sources (photovoltaic), in the case of Acciaierie Venete on-site. In this case, the investment is significant, at the expense of limited O&M costs, for a small percentage reduction in Scope 2 emissions.

5. Replacement of materials with high carbon content: In this case as well, the cost is mainly operational, net of investments in the systems used in the melting furnace. The reduction in process emissions, however, is limited both in terms of applicability and the extent of the emissions reduction.

3.1 Scenario assumptions

The analyses set out in the following paragraphs are based on specific scenario assumptions, relating both to the expected evolution of commodity prices and to rolled steel production in future years, as determined at the time of the plan's analysis.

3.2 2030 Emissions trend scenario

Following a review of the plan, which involved not only verifying the degree of completion of the measures already planned but also identifying further emission reduction actions, the 2030 emissions scenario was developed.
This scenario assumes the implementation of all measures defined during the update process, representing a total of approximately €150M in capital expenditure, in accordance with the planned timetable, and enables an estimate of the evolution of GHG emissions over the plan's time horizon.

For Scope 1 emissions, a significant reduction is observed from 2026 onwards, attributable mainly to the use of certificates and market-based instruments, in conjunction with the implementation of the first phase of measures aimed at technological renewal, such as the new EAF furnace at the Padua steelworks. In the period 2026–2030, the reduction continues at a more gradual pace, as a result of the implementation of further energy efficiency measures and special projects spread out over the time horizon.

Scope 2 emissions calculated using a market-based approach show a progressive reduction to zero by 2030, driven by the increase in the share of electricity covered through the purchase of Guarantees of Origin, as well as the effect of the PPAs signed in 2024.

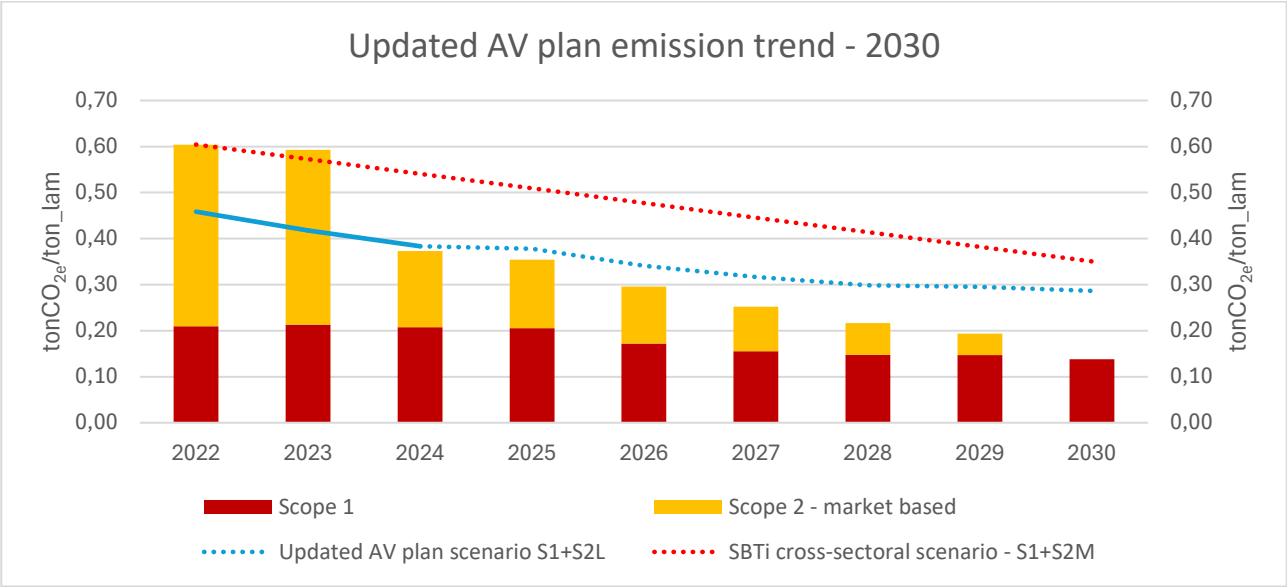

Figure 3 Updated emission trends to 2030

The analysis shows that the Scope 1 and Scope 2 emissions reduction requirements (market-based approach) for 2030 are met: compared to the 42% reduction indicated by the SBTi as a benchmark, the updated version of the plan enables an overall reduction of 77% to be achieved. The analysis also highlights that, were the location-based approach to be used, the emissions trend would be closely linked to the future scenario for the national electricity grid's energy mix by 2030, assumed in the analysis on the basis of the PNIEC scenario for 2030 and consequently beyond the organisation's control.
It should be noted that the reduction trajectories indicated by SBTi have been used solely as a reference. From a methodological perspective, the SBTi initiative also involves setting targets for Scope 3 emissions, i.e. the organisation's indirect emissions, which are not currently included in the plan.

4 Conclusions

The analysis carried out clearly shows that the most effective means of achieving the objective on time lies in market-based instruments. These, in addition to being economically viable, have no particular implications in terms of HSE, quality and process. However, they are subject to significant regulatory exposure, particularly regarding the use of guarantees of origin for electricity and biomethane in the accounting schemes used for emissions verification. Furthermore, a strategy based solely on this instrument could be labelled as "*Green washing,*" and must therefore be supported by concrete actions.
Process energy efficiency is certainly an important lever, as it enables resource savings and a short payback period; however, its impact on the system is limited. It is clear that attempting to replace gas entirely across all services, at the expense of electrification, leads to an excessive economic burden when compared to the impact in terms of emissions: as a result, as the most profitable measures are exhausted, the cost of decarbonisation increases considerably.
Direct production from renewable sources has a minimal impact in terms of indirect emissions avoided, despite the high economic cost, and is therefore considered a lower priority.
The use of innovative materials in the melting furnace, however, presents significant process limitations, as well as environmental implications. For this reason, these emissions will be the most difficult to decarbonise, likely after 2030.
As regards special projects, it is considered that, at present, decarbonisation cannot be regarded as the primary driver for their implementation, given the disproportionate economic impact compared to the positive environmental externalities. Furthermore, such projects require significant incentives and are therefore affected by changes in both the regulatory framework and the external environment (steel market, raw material and commodity costs, etc.).

In conclusion, it is considered that the strategy adopted to date is well structured to achieve the targets set for 2030, but that it requires periodic monitoring, approximately every two years, given the rapid changes in factors external to the organisation.

In the natural evolution of the Decarbonisation Plan, finding a certification scheme is ultimately a priority; however, this cannot be separated from an assessment of the expansion of the scope to include part of Scope 3 and from developments in European legislation.