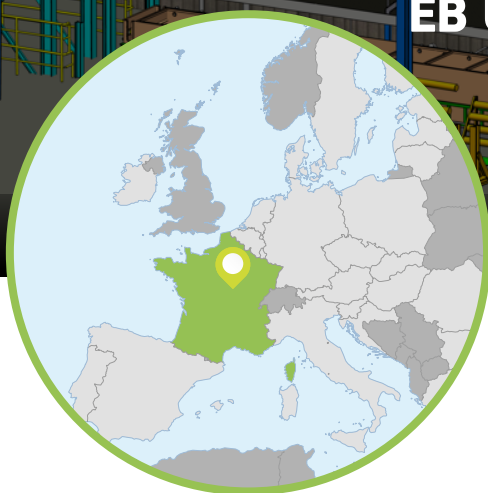


INNOVATION FUND

Driving clean innovative technologies towards the market

EB UV: Electron Beam and Ultra-Violet curing of paint on steel substrates without gas

The Innovation Fund is 100% funded by the EU Emissions Trading System



Project summary

The aim of the Electron Beam and Ultra Violet (EB UV) project is to deploy a first-of-a-kind full-scale process for curing paint on steel substrates (to avoid presence of moisture) without the use of natural gas. The innovative project will have multiple environmental benefits: it will reduce the energy and carbon intensity of the process by using electron radiation instead of incineration (saving up to 31% in greenhouse gas (GHG) emissions compared to a conventional technology) and will also reduce Volatile Organic Compounds (VOCs) emissions by using solvent-free solid paint.

COORDINATOR

Arcelor Mittal Construction

LOCATION

Contrisson, France

SECTOR

Iron & steel

AMOUNT OF INNOVATION FUND GRANT

EUR 2 400 000

RELEVANT COSTS

EUR 4 000 000

STARTING DATE

01 December 2021

PLANNED DATE OF ENTRY INTO OPERATION

Q4 2022

An innovative process resulting of 13 years of R&D

The “UV/EB” technology is based on three innovations: (1) the use of Electron-Beam (EB) curing of solvent-free paint; (2) the use of Ultra-Violet (UV) technology combined with electron-beam curing to adjust the gloss of the paint; and, (3) a flexible process control system based on an automated heating management of the paint with an infrared heating system.

At present, the paint film is cured after each coating stage in convection gas ovens (see ‘Painting section’ in figure below) and recovered solvents are oxidized in a gas incinerator. This process, developed by Arcelor Mittal together with Liège Research Centre for over 13 years, is unique because it offers an alternative to curing ovens by allowing a low-carbon application and curing of solvent-free paint topcoat, and ensuring adjustment of the gloss by the process instead of via solid paint differentiation.

Two major environmental benefits, at the same price for its customers

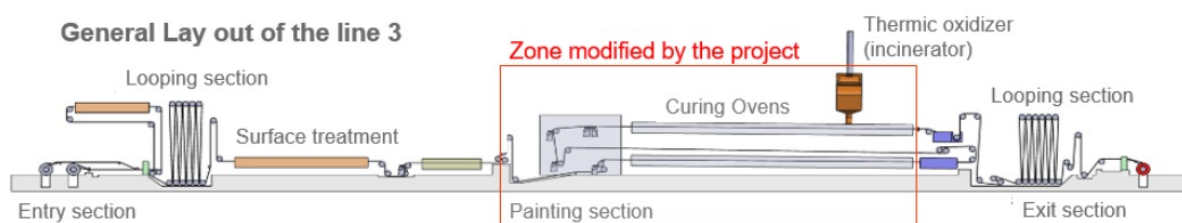
The new process will save up to 31% in GHG emissions compared to the reference scenario, without affecting the quality of the product or the capacity of the site that currently produces 100 000 tons of pre-painted Zinc-Magnesium galvanized steel coils per year. Whilst the ordinary curing of paint is done in ovens at about 400°C, the new curing process will be done at room temperature. This avoids the need to incinerate solvents and leads to a significant

reduction in gas consumption. The net absolute avoided emissions during the first ten years of operation are estimated to more than 35 000 tCO₂e.

The substitution of conventional polyester paint technologies gives another huge environmental advantage: no VOCs are emitted during the paint curing and cross-linking stage. Thanks to technical progress made over the past ten years by the European paint industry, the new process is now economically viable and will enable the company to offer the product at market price.

Scale up potential

The project is still in demonstration stage (as it builds on the results obtained with the pilot line installed at the Liège Research Centre). However, if successful, it will be extended to the two other coil coating lines at the site; and, later on, to other coil coating lines of Arcelor Mittal in Europe.



Overview of line 3 at the Contrisson site