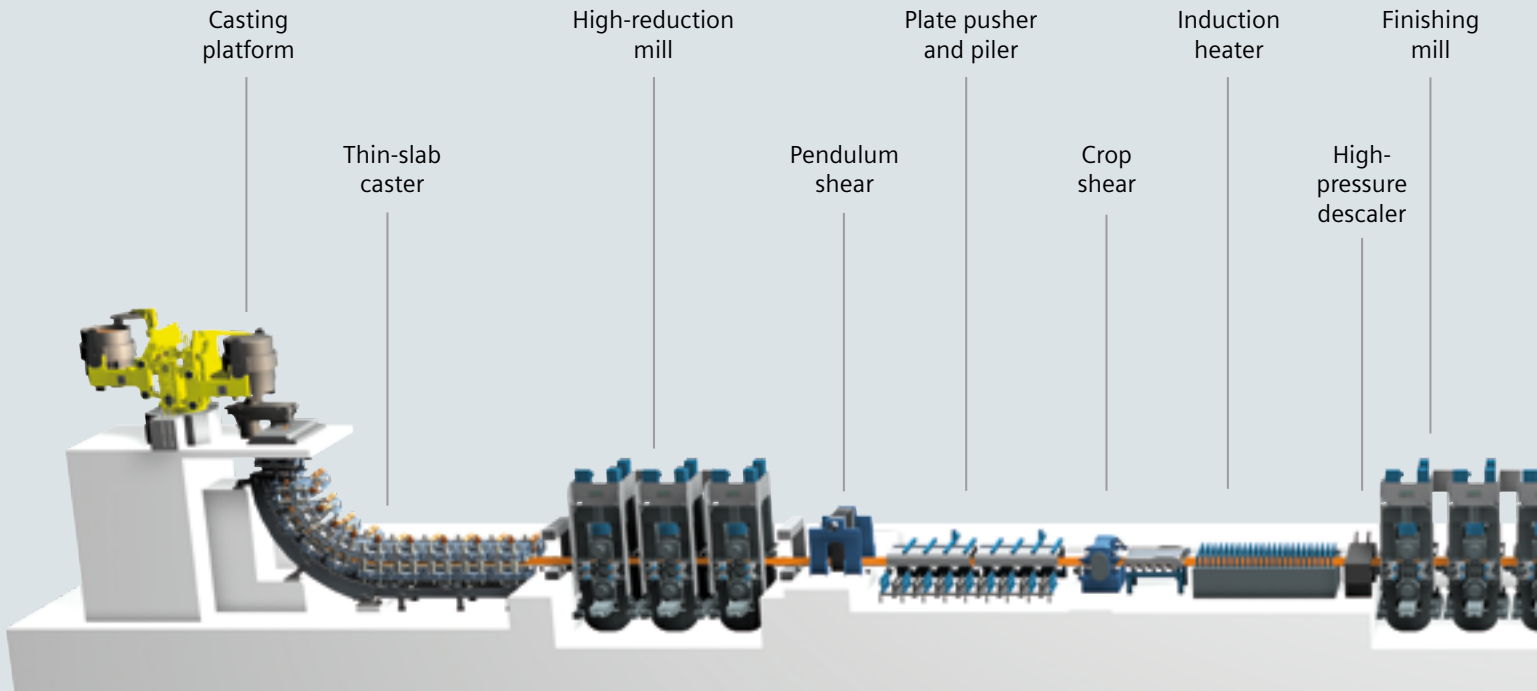


Arvedi ESP – Endless Strip Production

The next generation of thin-slab casting and rolling technology for the market is under construction at the Arvedi works in Cremona

Metals Technologies

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General layout of an Arvedi ESP thin-slab casting / Endless rolling line

Good reasons for Arvedi ESP:

- Economical production of hot-rolled thin strip, substituting cold-rolled strip for many applications
- Significant cost savings due to the short ESP line length (190 m) and direct linkage of casting and rolling
- Production of high-quality coils with uniform mechanical properties
- Fully integrated production facility incorporating advanced technological packages for overall plant reliability, superior products and a high line output
- Environmentally friendly due to lower energy consumption and fewer emissions
- The most compact process respecting the metallurgical transformation principle based on the cast-rolling concept

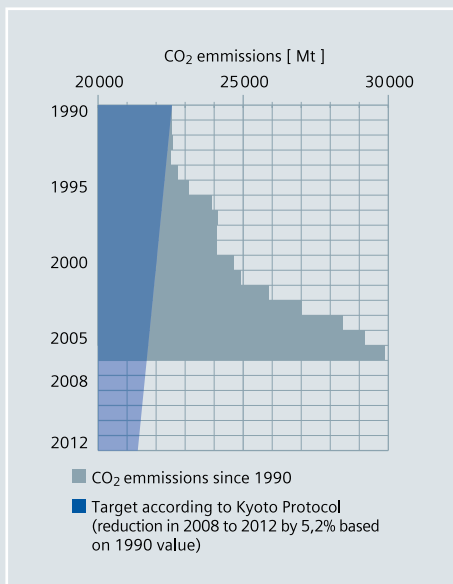
Arvedi ESP – Endless Strip Production

The first choice for profitable strip production

The challenge:

A new generation of casting/rolling plants able to satisfy current and future market demands is on its way, offering a wide range of high-quality and ultra-thin steel grades from an endless cast-rolling process.

Worldwide demand for steel is set to grow 25% by the year 2015 according to current forecasts. Improved plant performances not only need to satisfy steel requirements but also conform to environmental laws and the targets of the Kyoto Protocol. Arvedi ESP meets these requirements by operating with lower power requirements and producing fewer emissions than comparable plants.



The development of CO₂ emissions since 1991 in relation to the targets of the Kyoto Protocol

Source: BMWA, BP – Calculated based on primary energy consumption (BP Statistical Review of World Energy)

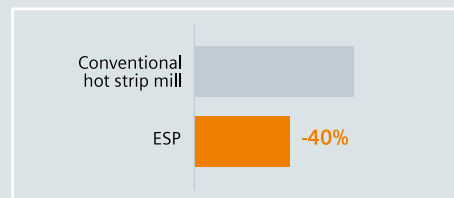
Our solution:

Based on the proven ISP (In-line Strip Production) technology, Acciaieria Arvedi S.p.A. (Arvedi) has developed a new thin-slab casting/continuous rolling technology for the production of hot-rolled coils under the brand name Arvedi ESP.

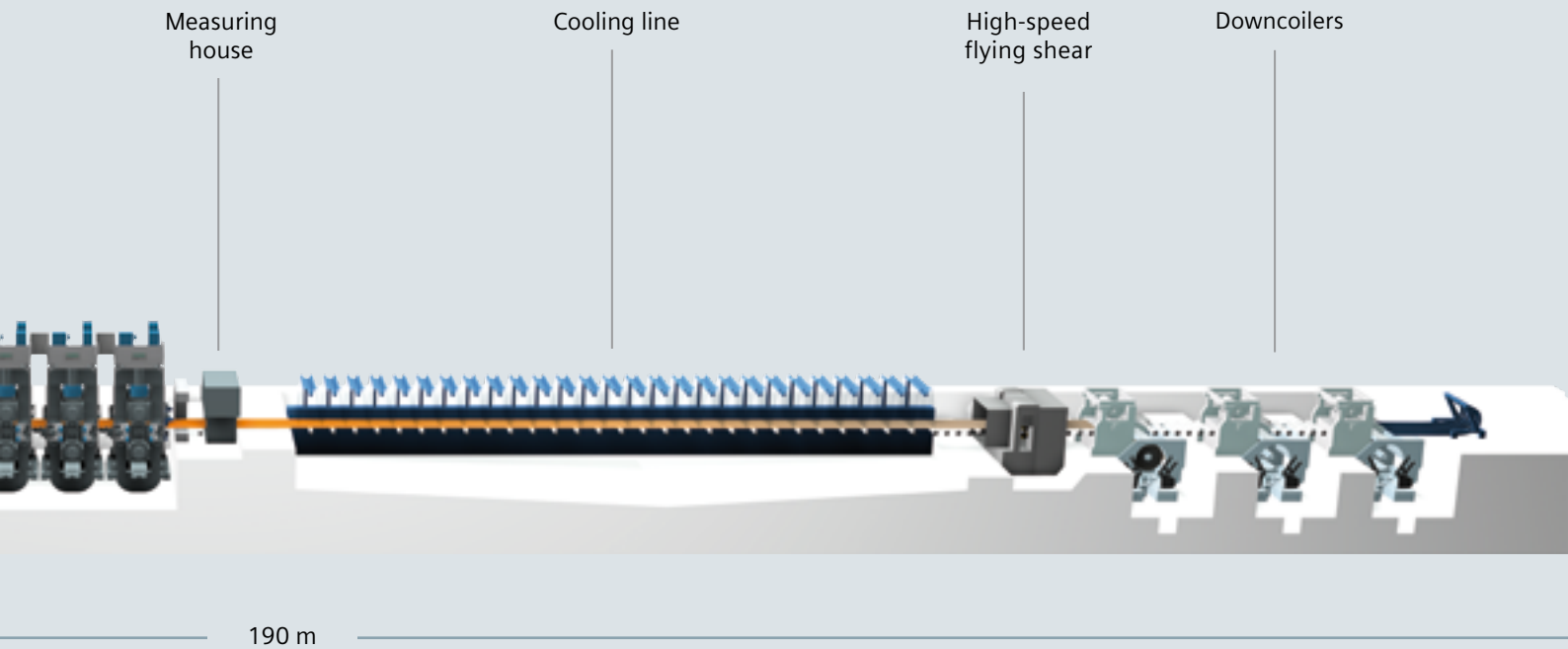
With this state-of-the-art technology, a strip less than 0.8 mm thick can be produced without strip threading problems. Depending on the steel grade and rolled strip thickness, the production capacity of this single strand line will be more than 2 million tons per year.

Arvedi has decided to install a new ESP line at its Cremona works, Italy, incorporating additional plant and process improvements offered by the industrial plant builder Siemens VAI.

The project will be implemented by Cremona Engineering, a newly formed joint venture engineering company owned 50% by Arvedi and 50% by Siemens VAI. The start-up of the new ESP line is scheduled for 2008.



Direct processing costs are characterized by lower energy consumption (about 40% less compared with conventional hot strip mills).



Project scope:

- Integration with steel works
- Thin-slab caster
- High-reduction mill (3-stand/4-high)
- Shears
- Induction heater
- 5-stand/4-high finishing mill
- Cooling line
- Coilersection
- Electrics and automation
- Auxiliary facilities



Continuous caster with integrated 3-stand high-reduction mill (Existing ISP plant)

Introducing Arvedi ESP

From liquid steel to hot rolled coil in seven minutes

Optimized production with ESP

The new generation of ESP thin-slab casting/ endless rolling lines is composed of four main plant sections in addition to infrastructural and auxiliary facilities.

The **first section** consists of a thin-slab caster featuring liquid core reduction followed by rolling in a linked 3-stand, 4-high mill positioned at the exit of the continuous caster.

In the **second section**, the temperature of the intermediate strip is heated in an induction heater in order to meet finishing rolling requirements.

The **third section**, composed of a 5-stand, 4-high finishing mill and cooling line, is designed to allow the strip to be rolled to thicknesses between 0.6 mm and 12.0 mm at strip widths up to a maximum of 1,570 mm.

The **fourth section** consists of a high-speed flying shear and three downcoilers. The maximum coil weight will be 32 tons. The integration of advanced automation systems and technological packages ensures that all production and product quality parameters are satisfied.

Decisive advantages

The unique design and plant configuration of an ESP facility, particularly the high casting speeds that are possible, will allow continuous, endless rolling of high-quality strip. Due to the highly compact ESP line arrangement with a total length of 190 m and the direct linkage of casting and rolling, lower investment and operating costs are incurred compared with conventional thin-slab casters and direct-rolling plants.

Profitable strip production

With the line capable of producing hot-rolled thin strip, subsequent cold-rolling will not be necessary for many strip applications, thus resulting in significant operational cost savings. Thanks to its precision characteristics, the ESP thin strip can also be used in a compact tandem cold-rolling mill with a reduced number of rolling stands, resulting in lower investment and conversion costs.

Due to endless rolling operations, the production of strip with uniform and repeatable mechanical properties will be possible along the entire strip width and length. This fully integrated production facility incorporating advanced technological packages is the basis for overall plant reliability, superior products and a high line output.



5-Stand finishing mill (Existing ISP plant)



Completely integrated automation (Existing ISP plant)

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