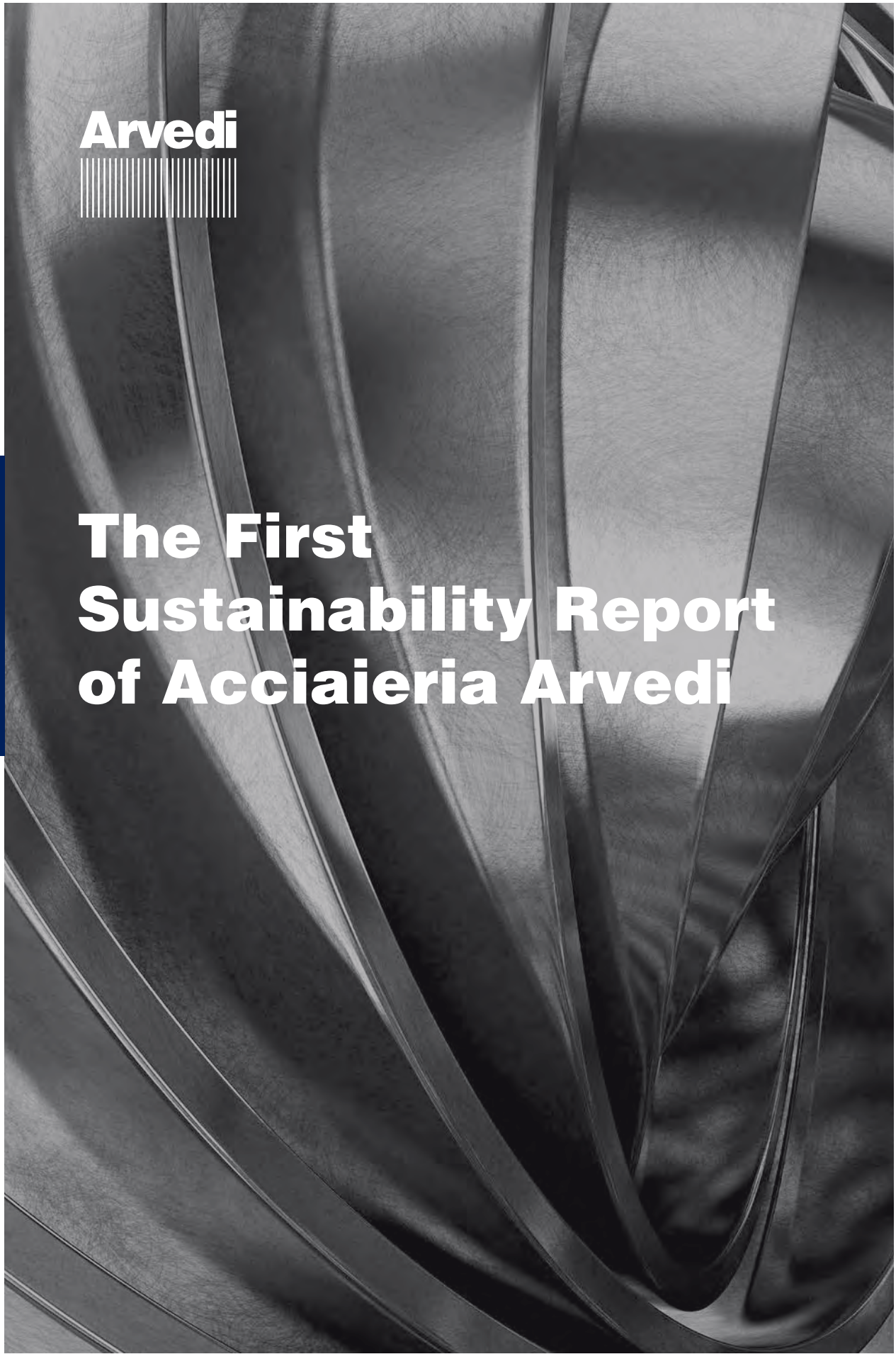
Arvedi

The First Sustainability Report of Acciaieria Arvedi



The First Sustainability Report of Acciaieria Arvedi

Arvedi

THE TECHNOLOGY, THE PEOPLE, THE CHALLENGES

ACCIAIERIA ARVEDI TELLS ITS STORY

Dear readers,

I am pleased to present to you the first Sustainability Report of Acciaieria Arvedi, a first step toward the communication of our social and environmental performance in compliance with the most highly accredited, at an international level, reporting standards.

The story of the Arvedi Group dates back to 50 years ago and to a social context that witnessed an agricultural economy that was shedding its workforce, and the province of Cremona without the necessary industrial culture and traditional basis that could promote a manufacturing transformation capable of absorbing the surplus labour.

My first industrial activity started in 1963 with the production of welded tubes in a location known as an urban waste land, which was revitalised through a business that has progressively employed more than 600 people. The story of Acciaieria Arvedi starts about 25 years later, i.e. with the launch of manufacturing at the plant of Cremona, a leading industrial facility capable of processing high quality thin materials, with competitive costs and with a reduced environmental impact. Thanks to the vision and determination of our people, and to a patented innovative technology, defined as Arvedi Steel Technology, we have succeeded in reaching a level of greenhouse gas emissions per ton of steel among the lowest in the world.

In 2014, thanks to the same innovative and driving spirit, we decided to take up another major challenge by purchasing Ferriera di Servola in Trieste and starting an integral process of environmental restoration. This initiative represents even now one of the most important and most ambitious environmental restoration operations in the history of the Italian steel sector.

For us, the concept of challenge is combined with the concept of opportunities and our ambition, with this acquisition, is to provide to the city of Trieste and to the national steel industry a site that is highly strategic for both its employment impact and its production capacity.

I am firmly convinced – also because of the Christian values that guide me – that respect for human dignity is expressed through work governed by a set of principles and values tied to the promotion of social and civil rights, as well as through corporate actions aimed at mitigating the environmental impact because of a profound respect for nature, ourselves and God.

We strongly believe that the growth of our know-how and our production development go hand in hand with the health and safety of our people. In particular, the transition toward the new ISO 45001 will allow us to review our processes, strengthen our control systems in terms of occupational safety and, at the same time, improve our performance.

All the objectives that we have reached so far, as well as those that we are planning to achieve in the future, derive directly from the commitment and passion of the many people who have worked and are working with us. This document tells the story of the long way we have come together and lays the basis for the many challenges ahead of us. It is therefore with pride and conviction that I wish to thank those who have contributed to the contents of these pages and I welcome our stakeholders to the world of Acciaieria Arvedi.

Enjoy the reading.
Giovanni Arvedi
Group Founder

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This document has been developed with the support of the EY Sustainability team.

1. ARVEDI GROUP AND ACCIAIERIA ARVEDI

1.1 HISTORY DATING BACK TO 1963

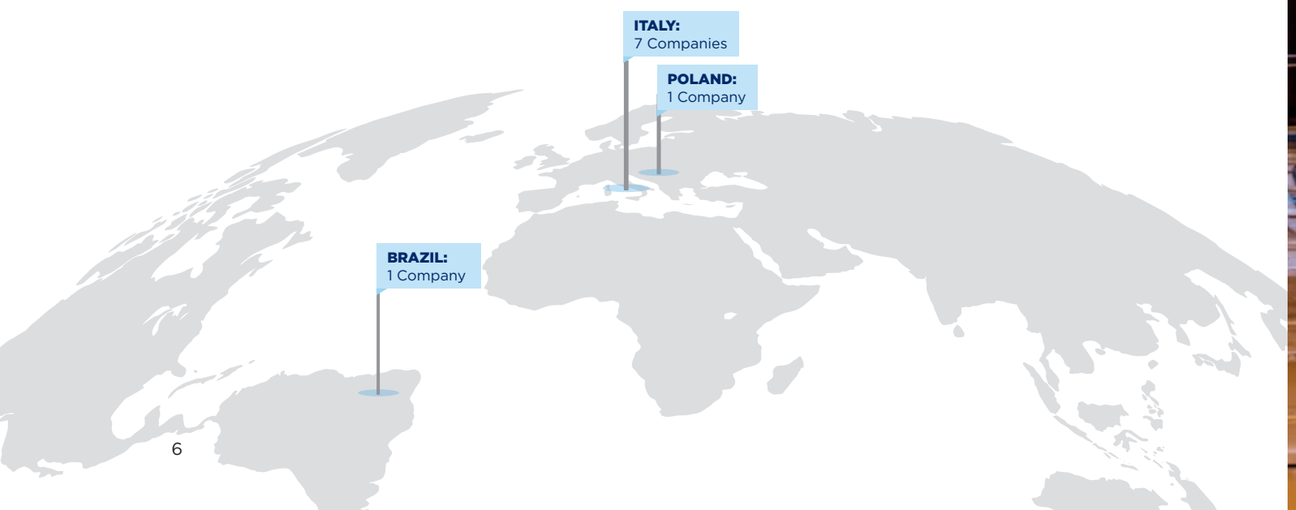
The Arvedi Group is a steel company founded by “Cavaliere del lavoro” Giovanni Arvedi which has worked in the steel processing and treatment industry for over 50 years. The Group began as a transformer of primary steel products and later adopted an integrated and verticalised strategy, fully entering the steelmaking industry with Acciaieria Arvedi.

The Group plays a leading role in the Italian and European steel industries, with 4 million tonnes of products destined for markets all over the world.

The Arvedi Group has a total **of 460 registered patents** globally.

460
registered patents

Today, the Arvedi Group’s production hub consists of seven Italian companies located primarily in northern Italy, at the centre of a high steel consumption market, alongside a small production capability abroad, in Poland and Brazil.



→ 1.2 WHICH HAS ITS HEART IN CREMONA AND TRIESTE

turnover of euro 2.1 billion

Acciaieria Arvedi is the Group's main company with a turnover of euro 2.1 billion, which handles the production and distribution of flat carbon steel products at two sites in Italy.

Opened in the early 1990s, the **Cremona** site is a modern industrial facility and the first European example of a compact factory in the steel sheet metal sector. With annual production of more than three million tonnes of steel strips, which can be increased up to four million, it is the manufacturing and industrial heart of Acciaieria Arvedi.

In 2014 Acciaieria Arvedi acquired the Trieste site which was subject to a significant environmental recovery process lasting 60 months, one of the most important and ambitious projects carried out in the history of the Italian steel industry. The Trieste steelworks, formerly known as the Ferriera di Servola, which has been operative since 1896, is one of Italy's oldest steelmaking plants. The works is located in the Servola industrial area which in 2003 was included within the Trieste "Site of National Interest". As part of a Planning Agreement signed with the competent authorities pursuant to art. 252 bis of Italian Legislative Decree 152/06, Acciaieria Arvedi undertook to carry out a number of environmental safety, industrial reconversion and economic/manufacturing development interventions in the area of the Trieste steelworks site, with an investment of more than **Euro 180 million**.

» The synergy between Trieste and Cremona is one element underlying Acciaieria Arvedi's growth strategy. The raw material produced in Trieste provides an important contribution to manufacturing in Cremona. .

Pig iron is manufactured at the Trieste site and then sent to the Cremona site as a high-quality raw material for the manufacture of steel. Thanks to the new cold rolling plants that have come online, the steel strips made in Cremona can then be returned to Trieste to be transformed into thinner steel and for further processing.

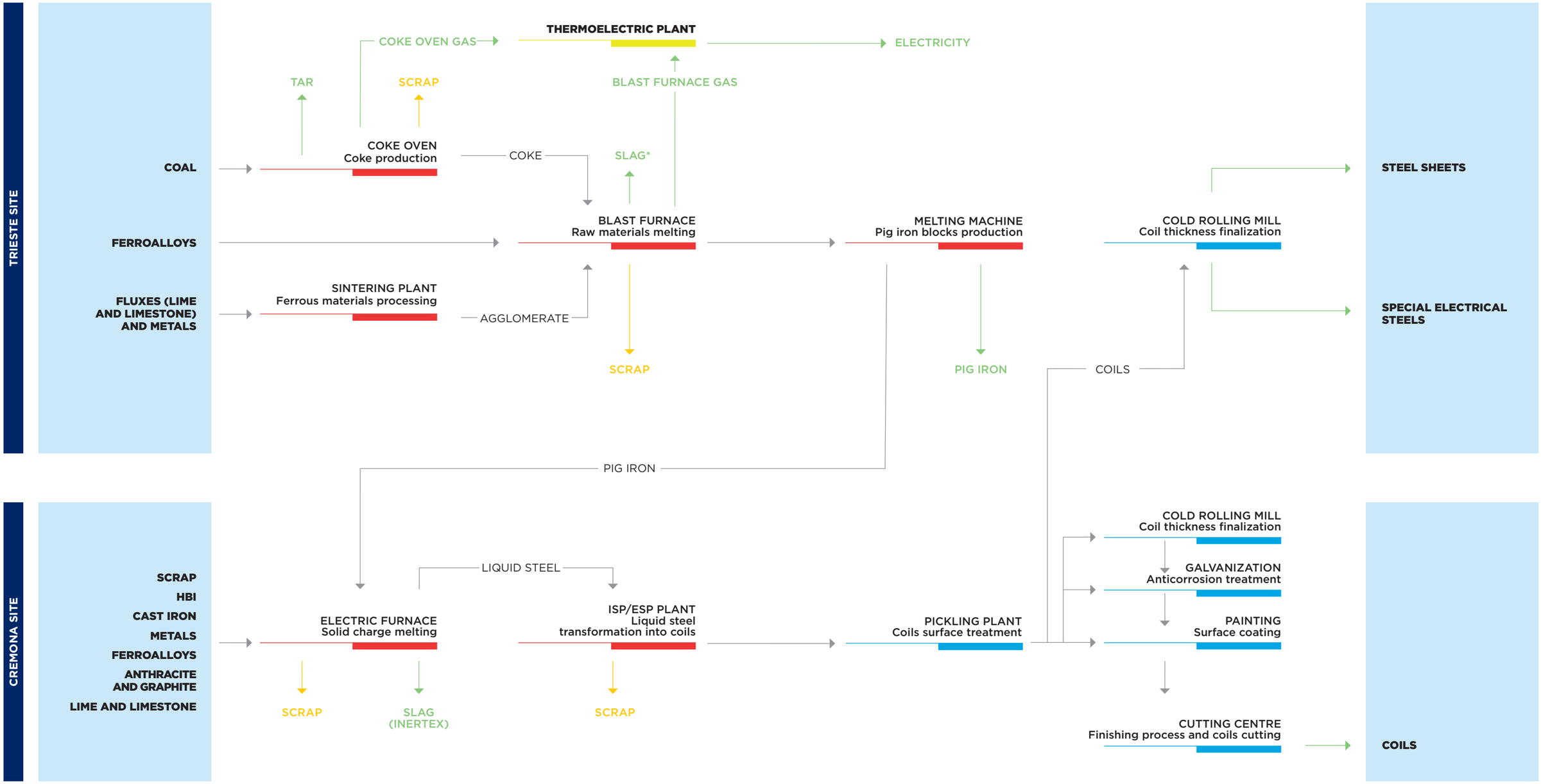
Today, the Trieste site produces 400,000 tonnes of pig iron every year, while the new cold rolling cycle - which began operating in September 2016 – has been fully operational since May 2017 producing 400,000 tonnes of quality steel strips, and is expected to increase to roughly 800,000 tonnes.

Acciaieria Arvedi has a broad, diversified product range that can be employed in nearly every industrial sector requiring steel for special applications. Almost 30% of the products marketed are for the automotive sector (16% direct sales and 12% indirect sales), while nearly 20% of applications sold are used in civil and industrial construction. A significant portion of the finished product, around 35%, is sold to traders and other distributors.

» Italy is the heart of the Company's steel manufacturing and sales. Acciaieria Arvedi manufactures in Italy what our domestic factories would be forced to acquire abroad.

The majority of Acciaieria Arvedi's products are sold in Italy (73%), followed by the European market, especially Germany (38.5% of the European total), Poland (9.5%) and Belgium (7.7%).

Acciaieria Arvedi is a member of the leading international industrial associations (World Steel Association and Eurofer) and national ones (Federacciai [representative entity of all iron and steel companies in Italy], Associazione Italiana di Metallurgia [Italian Association for Metallurgy] and Confindustria [the main association representing manufacturing and service companies in Italy]) which are committed to steel market innovation and development.



** By-product of the cast iron production process that is cooled and granulated to be then sold to cement plants.*

2. ACCIAIERIA ARVEDI, ITALY'S FLAGSHIP FOR INNOVATION

→ 2.1 THE PRIDE OF ITALIAN INDUSTRY IN THE WORLD FOR PROCESS AND PRODUCT INNOVATION

Acciaieria Arvedi's strategic development is characterised by constantly seeking out innovative solutions to ensure high levels of competitiveness and increasingly high-quality products.

Finished product quality has risen over the years through the increasingly careful selection of raw materials, continuous research on materials and on the stability of the intermediate production process parameters, functional to ensuring the consistent mechanical characteristics of the products. We are dealing with "technological steelmaking" based on a set of stringent technical procedures which no longer rely solely on the experience of the "steelmaking of times past".

» Excellent know-how and business skills are two distinctive elements of Acciaieria Arvedi. Today recognised by the market as a company capable of offering multiple products with high quality performance.

Manufacturing processes are continuously improving, relying on internal resources as well as external consultancies. To this end, Acciaieria Arvedi has intellectual exchange agreements with a number of very high-profile entities including the Politecnico University of Milan, Centro Sviluppo Materiali in Rome, the Universities of Aachen and Freiburg in Germany, the BFI materials analysis centre in Düsseldorf and Interflow in Canada.

→ 2.2 CAPABLE OF GENERATING A TECHNOLOGICAL REVOLUTION WITH THE EXCELLENCE OF ITS KNOW-HOW

Arvedi Steel Technology is the most advanced compact steel manufacturing technology. Developed on the intuition of Giovanni Arvedi, Arvedi Steel Technology makes it possible to transition from liquid steel to the finished product extremely rapidly and in very limited spaces.

The revolution consisted of being able to make what others were unable to produce or produced at uncompetitive costs. In just one extremely compact cycle, liquid steel is transformed into high quantities of high quality, ultra-thin and wide steel strips.

Arvedi Steel Technology captures the excellence of Italian know-how via hundreds of patents created over time and based on practical transformation of the ideas and intuition of the people within the Arvedi Group.

ISP since 1992

The starting point for all subsequent innovations was I**SP (In-Line Strip Production)** technology, started up in 1992: in 15 minutes and 180 metres, liquid steel is transformed into strips with a final thickness of between 1 and 10 millimetres.

With **ESP (Endless Strip Production)**, in 2009 Acciaieria Arvedi Arvedi started up the process that makes it possible to produce 0.8-mm thick steel strips in just five minutes, comparable, for example, to 8 sheets of extra-strong paper, one on top of the other.

AR-Cold technology maximises all of the advantages of the previous innovations. Since 2011, at the Cremona site it has been possible to manufacture - using compact plants - ultra-thin and extremely wide strips starting with the hot rolled strip coming from the ESP line.

The end product obtained - with thicknesses ranging from 0.2 to 2 mm and widths of up to 1,560 mm - guarantees uniform quality and extraordinary precision, with vast applications in the automotive, electrical appliance and construction industries.

"Those who pursue innovation know that it requires a lot of work and a lot of sacrifice, and that it often results in many disappointments and a lot of loneliness. The effort has been enormous, but creating a highly innovative process with respect for the environment which reduces human effort has been our greatest satisfaction"

Giovanni Arvedi, Group Founder

Another distinctive aspect of Arvedi Steel Technology is its capacity to reduce the environmental impact of manufacturing processes, achieving the objective that many define as "environmentally friendly steelmaking". With ESP, the processing of achieving strips to the desired thickness is made possible through an integrated rolling process which - by eliminating the traditional phases of cold rolling and heat treatment - makes it possible to obtain energy savings of up to 60% and water savings of up to 50% compared to conventional steelmaking processes.

To calculate the benefits obtained, Acciaieria Arvedi has obtained Product Carbon Footprint (PCF) certification, internationally recognised to quantify, manage and reduce greenhouse gas emissions of a product throughout its lifecycle. With this certification it is possible to evaluate and certify the quantity of CO_2 emissions for each tonne of steel produced with a "cradle-to-gate" approach, i.e. taking into account all direct and indirect consumption,

including that linked to the logistical handling of incoming and outgoing materials. The analysis, carried out by TÜV, showed that the PCF for the production of one tonne of hot-rolled steel is equal to 1,220 kg of CO2, where the main indirect emission contribution is represented by ferrous scrap (about 63%). Likewise, the certification states that energy consumption from the casting tower to the downcoiler - for the production of 1 tonne of hot rolled steel with a thickness of 2 mm, produced using the ESP technology in the Cremona plant, is equal to 131.6 kWh.

Moreover, a comparison of ESP and conventional technologies, for the casting and rolling phases, shows a 47% energy saving: the ESP consumption is 24.3 kilograms of oil equivalent (KOE) while the best European producers stand at an average value of 46.3 KOE (for the production of hot rolled steel with a thickness of 3 mm). The overall energy saving exceeds 60% when considering the manufacturing of a 1 mm product using the ARVEDI cycle (hot-rolled) and conventional cycle (hot-rolling + cold-rolling).

This data confirms the significant advantages derived from the ESP technology in terms of energy consumption and consequently low environmental impact.

An extremely ambitious objective which, we can say, we have reached.

"Our genuine added value does not lie only in ultra-thin thicknesses, but in the fact that we obtain these results in less time, less space and with lower costs and consumption, while our competitors need to take many additional steps."

Giovanni Arvedi, Group Founder

3. ACCIAIERIA ARVEDI, A PLACE OF PEOPLE

In light of the increasing complexity of the markets and stringent sector regulations, the steel industry requires increasingly sophisticated and updated skills. The intuition at the basis of Acciaieria Arvedi's innovative process would never have been put into practice without the skills, determination and will of those who strove to pursue it.

Today Acciaieria Arvedi employs 2,152 people. Thanks to their dedication and skills, the Company is currently recognised as an example of Italian entrepreneurship par excellence, capable of driving the steel sector at a European level.

2,014
employees

In detail, at the end of 2017 Acciaieria Arvedi had 2,014 employees, plus 138 temporary staff, which for Acciaieria Arvedi represent the first step towards permanent employment in the Company. In fact, after being hired on a staff-leasing contract, during which time new resources follow specific training courses for orientation within the various manufacturing lines, blue-collar workers are offered a temporary contract and later on a permanent contract in line with relevant legislation. In 2017, 211 people joined the Acciaieria Arvedi workforce full time. In terms of contract type, at the end of 2017 more than 87% of the employees had a permanent contract, while the remaining 13% were on temporary contracts.

As is typical in the steel sector, employees are largely male, while women (50, roughly 3% of the total) are an important presence in control functions outside the production process.

EMPLOYEES AND OTHER WORKERS		2015	2016	2017
Permanent employees		**1,368**	**1,350**	**1,746**
Of which women		25	31	40
	Cremona	25	31	33
	Trieste	-	-	7
Of which men		1,343	1,319	1,706
	Cremona	1,343	1,319	1,320
	Trieste	-	-	386
Temporary employees		**59**	**96**	**268**
Of which women		11	9	10
	Cremona	11	9	10
	Trieste	-	-	-
Of which men		48	87	258
	Cremona	48	87	205
	Trieste	-	-	53
TOTAL EMPLOYEES (not including personnel with staff leasing contracts)		**1,427**	**1,446**	**2,014**
Personnel with staff leasing contracts		**179**	**223**	**138**
Of which women		1	-	-
	Cremona	1	-	-
	Trieste	-	-	-
Of which men		178	223	138
	Cremona	178	223	108
	Trieste	-	-	30
TOTAL EMPLOYEES AND OTHER WORKERS		**1,606**	**1,669**	**2,152**

RECRUITMENTS, DEPARTURES AND TURNOVER RATES		2015	2016	2017
Recruitments		**52**	**89**	**211**
Women		5	7	7
< 30 years		-	5	3
Between 30 and 50 years		5	2	4
> 50 years		-	-	-
	Cremona	5	7	7
	Trieste	-	-	-
Men		47	82	204
< 30 years		13	38	122
Between 30 and 50 years		28	34	77
> 50 years		6	10	5
	Cremona	47	82	184
	Trieste	-	-	20
Departures		**59**	**70**	**89**
Women		2	4	3
< 30 years		1	-	2
Between 30 and 50 years		-	4	1
> 50 years		1	-	-
	Cremona	2	4	3
	Trieste	-	-	-
Men		57	66	86
< 30 years		14	9	25
Between 30 and 50 years		25	29	32
> 50 years		18	28	29
	Cremona	57	66	66
	Trieste	-	-	20
Employees		**1,427**	**1,446**	**2,014**
Incoming turnover		**4%**	**6%**	**10%**
Outgoing turnover		**4%**	**5%**	**4%**

Note: the data relating to recruitments, departures and the number of employees and other workers for the years 2015 and 2016 refer only to the Cremona site.

→ 3.1 STARTING WITH HEALTH AND SAFETY

Occupational health and safety represent a daily challenge for Acciaieria Arvedi. Specific control mechanisms combined with training, the dissemination of required conduct and awareness raising programs amongst all employees are the elements underlying the approach of Acciaieria Arvedi to prevent the typical risks within this industrial sector.

The workplace safety commission made up of the current worker safety representatives (RLS) and company representatives, with the participation of the Company physician if required, has the duty of examining the accidents that occurred in the previous months, constructively proposing improvement actions, reporting and analysing the critical issues and/or risks that could contribute to the occurrence of accidents. In both sites, periodic meetings are held with the Prevention and Protection Service Managers and supervisors - both department managers and shift managers - to analyse accidents and identify as well as implement preventive and corrective actions aimed at avoiding or minimising the recurrence of such accidents.

For safety risk management and injury prevention purposes, Acciaieria Arvedi codifies the most relevant work phases with operating procedures containing rules and precautions to be observed to which workers' awareness is strengthened at periodic meetings or during safety training sessions. The main part of this training consists of compulsory training for new employees and personnel already working in the company on a periodic basis.

To guarantee a systematic approach to occupational health and safety, the Cremona steel plant has also adopted a specific OHSAS 18001 certified management system and policy. The safety status and updating on the progress of improvement actions are shared during periodic meetings with the Employer and the Chairman's office. As part of this assessment, an improvement action plan to 2020 has been approved.

In the 2015-2017 period there was a slight overall decline in injuries, attributable primarily to slipping, stumbling and knocks from equipment and objects being handled.

Taking into consideration both sites, in 2017 the injury frequency index stood at 31.81 while the injury severity rate was 0.46.

→ 3.2 AND ENDING WITH THE GROWTH AND DEVELOPMENT OF SKILLS

Today the steel industry is a sector with advanced specialised automation. Worker skills are fundamental to ensure that the production process operates smoothly and the desired final product is attained.

To maintain and develop new skills, the employee training path is of crucial importance. A significant amount of training takes place on-the-job, based on the skills and knowledge required for the production line. Particular attention is placed on training new employees with specific instructional and coaching activities lasting 6 months.

In addition to on-the-job training and occupational and safety training, in 2017 Acciaieria Arvedi undertook a set of specific training activities at the Cremona site for a total number of training hours exceeding 8,200. The technical/specialist training plans, for example, included targeted

courses on fluid dynamics, metallurgy and statistical process control, which are fundamental to ensure that people gain the skills required for the management of company processes and operations at the sites.

In addition, within the context of continuous growth at Acciaieria Arvedi, it is increasingly important for managers to have the best skills to manage their teams. Therefore, in 2017 management training programmes were continued for office and production managers on topics such as work management, effective interpersonal communication and team building. The next steps will be an expansion of the training package by adding courses linked to the sense of belonging to the company, team building and maintaining healthy lifestyles. These activities will involve the entire company with 24-hour modules.

Lastly, since it operates in an international context, Acciaieria Arvedi has also provided training courses for foreign languages, at various levels and focusing on literacy as well as technical business language.

For the sales functions, the courses organised concentrate on strengthening selling and negotiation techniques and improving influential techniques, so as to boost awareness regarding relationship skills and goal oriented sales results.

As well as professional training and growth, Acciaieria Arvedi has also entered into supplementary agreements for all employees that improve upon those of the national collective labour agreement for metalworkers. At the Cremona site, there is also a specific **company welfare** programme that provides goods and services to employees and their families, such as financial support for the education of employees' children, services linked to health and social support for the scholastic education of employees' children, services linked to health and social support for the elderly and the disabled, pension contribution additions, payment of additional contributions and services regarding free time - travel, well-being and language courses.

Since 2017, these benefits can be accessed through a dedicated welfare web portal, where individual employees can autonomously create their own package of goods and services and obtain a voucher or a refund, based on a pre-determined expense budget. The choices made by employees for 2017 show that a significant portion of spending - equal to 43% - was attributed to services correlated with the pension fund, 28% went to education, 19% was dedicated to health and the remaining 14% went to recreational goods and services.

In accordance with the national collective labour agreement, a second platform was also activated for the provision of welfare services to workers on staff leasing contracts. With this instrument, even temporary employees are able to obtain a series of benefits including support for education, maternity, healthcare, adoption and foster care, personal loans, workers' accident compensation and mobility support.

4. ACCIAIERIA ARVEDI, A KEY ELEMENT OF THE CIRCULAR ECONOMY

The steelmaking cycle already constitutes a virtuous example of the successful application of the “circular economy”: steel is by far the most recycled material in the world, and all steel products already have very high recycling rates.

Federacciai, 2017 Sustainability Report

In recent decades, we have seen extraordinary technological progress supported - including financially - by entrepreneurs that have helped to make production processes, plants and technologies increasingly sustainable, and in line with the circular economy.

Apart from an overall reduction in production process consumption, beginning with the selection of raw materials, the steelmaking process can represent a virtuous example of the recovery and efficient re-use of resources, as in the case of using ferrous scrap metal for the production of new steel.

In addition, at the end of the production process the recovery of metal waste and dust reduces the exploitation of natural resources and the correlated environmental impacts regarding raw material extraction and disposal activities. In parallel, the use of steelworks gas, as a process sub-product, can provide electricity for internal use.

4.1 WITH FOCUS THAT BEGINS WITH THE SELECTION OF RESOURCES

Careful selection of raw materials and the rigorous application of techniques enable Acciaieria Arvedi to develop a high quality final product that meets specific customer requirements. Raw materials are checked on arrival at the loading docks by third-party companies with a view to evaluating the compatibility and quality of incoming materials; specifically with regard to scrap metal, Acciaieria Arvedi's selection and transformation process guarantees uniformity in the melting process. In fact, the quality of the finished product is closely correlated to the quality of the scrap metal used.

With its Cremona site, Acciaieria Arvedi is the most important Italian user of scrap metal. In 2017, over 1.8 million tonnes of ferrous scrap, mostly from Italy and from Europe, were used along with other raw materials, for the production of 3.4 million tonnes of steel.

Aside from the geographical vicinity of the scrap metal used, the production of steel from scrap metal has significant advantages in terms of reducing environmental impact. Indeed, considering the entire lifecycle of steel and excluding the contribution of scrap metal, production from scrap metal generates just 20% of the CO2 emissions - around 450 kg - compared with manufacturing from virgin raw materials. Also, taking into consideration the emissions linked to the disposal and use of steel scrap that cannot be otherwise reused, the emission value reaches 1,220.

The other raw materials used at the Cremona site are pig iron - supplied in part by the Trieste works and in part purchased - HBI (Hot Briquetted Iron), anthracite, graphite and metals (such as aluminium and zinc) and iron alloys, in variable quantities depending on the required chemical and physical characteristics of the finished product.

The main raw materials used at the Trieste site for the production of pig iron are iron ore and coal, along with other raw and auxiliary materials - such as lime and limestone.

RAW MATERIALS [TONNES] - 2017

Ferrous scrap	**1,810,226**
Purchased pig iron	**747,221**
Pig iron provided by Trieste	**378,674**
HB (Hot Briquetted Iron)	**562,131**
Ferroalloys	**39,671**
Metals	**40,000**

Care in selecting the best scrap metal

Depending on the origin of the incoming scrap metal and the requirements of the production process, Acciaieria Arvedi conducts a number of entry acceptance controls which define which preliminary treatments are necessary to obtain the required chemical and physical characteristics.

In particular, the initial assessment is conducted by the procurement office during the supplier selection phase. During this phase all authorisation documents are evaluated to verify the full conformity of scrap metal suppliers. Once the suppliers are qualified and the materials are received on site, any non-ferrous materials and other unwanted elements are removed from the scrap metal through a series of treatments. Then, the material is made uniform in size to guarantee uniformity in the melting process. These activities make it possible not only to optimise the steelmaking process but also to reduce energy consumption, atmospheric emissions and noise emissions.

→ 4.2 AND A COMMITMENT THAT CONTINUES FOR THE RECOVERY OF WASTE AND BY-PRODUCTS

47%
of waste sent for recovery

With a view to the circular economy, the minimisation and recovery of waste and scrap provides environmental as well as financial benefits for the company and for the system as a whole.

Overall, in 2017 Acciaieria Arvedi generated 243,040 tonnes of waste, of which more than 47% was sent for recovery.

Acciaieria Arvedi's investments and research are oriented in particular towards seeking out ways to recover hydrochloric acid and refractory linings, which find a new life in the production processes at the Cremona site, as well as white slag, for which a recovery process is currently being developed.

Hydrochloric acid recovery

Hydrochloric acid - used for the preparation of steel surfaces before protective anti-corrosive coatings are applied - is recovered by Acciaieria Arvedi through a specific plant with a capacity of roughly 25 thousand tonnes per year.

This treatment allows the removal of iron oxide from the acid after use, so it can be re-injected into the pickling plant through a closed circuit. Thus, new hydrochloric acid does not need to be purchased, with indirect benefits in terms of atmospheric emissions of carbon dioxide and dust, as well as the reduction of the risks associated with such a corrosive substance.

The recovery of refractory materials

Refractory materials are used as a lining in combustion chambers and other plant parts exposed to high temperatures. Acciaieria Arvedi carefully ensures that heating plants run optimally with a view to conserving the materials for a longer period of time, reducing their replacement rate and thus producing as little waste as possible.

In managing the inevitable amount that needs to be replaced, the steelworks selects refractory materials based on type (magnesite, dolomite, ramming mix) and defines methods for reuse: to repair the linings of protective walls or within the steelworks' processing cycle (after crushing) to replace other process substances.

Hazardous waste, which amounted to 22% of the total waste produced in 2017, is almost all recovered. The disposed waste includes dust deriving from the treatment of the melt shop fumes, rendered inert by an internal plant authorised to chemically/physically treat this type of waste.

WASTE PRODUCED [TONNES]		2015	2016	2017
Total hazardous waste produced		**51,939**	**51,216**	**52,336**
Of which sent for recovery		51,319	50,727	50,667
	Cremona	51,088	50,246	50,652
	Trieste	231	481	15
Of which sent for disposal - Cremona		620	489	1.669
Of which temporarily stored on site - Trieste		233	5,626	619
Total non-hazardous waste produced		**198,894**	**205,926**	**190,704**
Of which sent for recovery		84,338	87,563	64,254
	Cremona	59,291	62,604	63,469
	Trieste	25,047	24,959	785
Of which sent for disposal - Cremona		114,556	118,363	126,450
Of which temporarily stored on site - Trieste		5,626	4,801	68
TOTAL WASTE PRODUCED		**250,833**	**257,142**	**243,040**

Note: with reference to the Trieste site, the data relating to 2015 and 2016 should not be considered linked to normal production activities but rather to the disposal of waste from clean-up activities and the relative safe handling in case of emergency, as set forth in the Planning Agreement. After the completion of environmental recovery activities, the data from 2017 instead relate only to production activities.

Aside from the waste recovery, Acciaieria Arvedi carries out a set of activities to make the best use of by-products.

Thanks to a research project that began in 2006, Acciaieria Arvedi has acted on production parameters so as to be able to generate black dross with specific useful functional characteristics. Thus, black slag, derived from the production of liquid steel, no longer represents waste, but rather a by-product of the processing cycles, and generates Inertex, a product that has been particularly successful in the market. Sold from 2013, today Inertex is widely used for civil engineering works and as a base for road surfaces.

Inertex, repurposing black dross

Believing strongly in the project for repurposing black dross, Acciaieria Arvedi has developed a production process so that the black dross can be considered as a by-product. In particular, the Company has followed all development phases and defined a processing cycle that guarantees the necessary controls and specifications for the production of the material to be repurposed.

The manufacturing cycle includes a period where the dross is stored in dedicated warehouses near the Cremona site. The assessment of safety - through ecotoxicity testing - and compliance with REACH rules on chemical substances and CLP rules for labelling have demonstrated the product's utmost compatibility with the environment and its intended use.

Acciaieria Arvedi has carried out a series of activities at the Trieste site as well, to make use of by-products such as tar and coking plant off-gases. The tar is sold, while the off-gases - after being treated to eliminate some specific substances - are an excellent fuel for the facility's thermoelectric plant and the coking plant battery.

5. ACCIAIERIA ARVEDI, LOCATED IN THE COMMUNITIES OF CREMONA AND TRIESTE

The steel production cycle has a potential impact on many environmental aspects.

Current technologies and plant configurations at the individual production plants make it possible to mitigate environmental impact, for example reducing polluting emissions and the consumption of energy resources; promoting a culture focused on protecting the environment in production chain management is another significant element for reducing the environmental impact of a steelworks.

5.1 THROUGH ADEQUATE ENVIRONMENTAL MANAGEMENT

For a systematic management of ALL environmental aspects, in 2004 the Cremona production site obtained ISO 14001 certification for its environmental management systems - supplemented with the quality and workplace safety certifications - whereby Acciaieria Arvedi conducts continuous monitoring of environmental performance from a Life Cycle Perspective (LCP), aiming to progressively reduce the environmental impact of production processes as well as the final product.

In 2012 the Cremona site also obtained Product Carbon Footprint (PCF) certification, internationally recognised certification to quantify, manage and reduce the greenhouse gas emissions of a product throughout its lifecycle. This certification was able to attest a reduced energy consumption

for the production of a functional unit using ESP technology at the Cremona plant, compared to conventional manufacturing methods (see par. 1.2).

The Trieste site is subject to a complex and integrated environmental compliance process. When the Planning Agreement was signed in 2014, Acciaieria Arvedi confirmed its commitment to launching, in synergy with public institutions, the environmental recovery and industrial redevelopment of the steelworks areas. The Planning Agreement calls for the implementation of several prevention, operational safety and environmental monitoring activities - described in paragraphs 4 and 6 - and a set of plant optimisation actions - described in paragraph 7 - for an in-depth technological restyling in accordance with Best Available Technologies for the purpose of renewing the Integrated Environmental Authorisation (AIA).

Acciaieria Arvedi has invested in the optimisation of the production process, improvement of the environmental performance of its plants and management of environmental aspects, with a view to mitigating possible impact on the environment.

The economic development of the site to relaunch production and boost its competitiveness in the market has been achieved through a series of activities involving revamping existing plants and introducing new production processes. Some of the most significant actions included introducing a cold rolling mill, thanks to which the plant is capable of boosting final product quality by exploiting synergies with the Cremona plant. The production site reindustrialisation activities also include significant development of the Trieste site area, in the short-medium term, in terms of manufacturing, as a service centre and for the processing of raw materials, semi-finished and finished products, in order to increase the Group's industrial activities.

Acciaieria Arvedi closely works with public bodies responsible for implementing the project to ensure the protection of the natural underground aquifer, consisting in the creation of a physical barrier on the state-owned area and the purification plant for the treatment of pumped water.

A summary is provided below of the operations managed by Acciaieria Arvedi and provided in the Planning Agreement and the Integrated Environmental Authorisation, with an indication of the implementation status - concluded activities are in green and those under way in yellow.

PREVENTION, OPERATIONAL SAFETY AND MONITORING INTERVENTIONS (arts. 4 and 6 Planning Agreement)

Historical waste accumulation[1] (paragraph 2)

The historical accumulation of waste within the site prior to the acquisition was all disposed of by November 2016, in compliance with all institutional requests.
The areas containing this waste have now been completely recovered.

Hot spots[1] (paragraph 2)

The removal and disposal of the most contaminated parts of the land, in particular hot spot S143, was completed by May 2017.
The interventions planned in the "PZ2" area required a considerable commitment by the Company and were completed in September 2017. Several technical analyses and monitoring activities are ongoing in the area in order to pursue the best continuous protection of the environment.

[1] The removal of accumulated waste and Hot Spots PZ2 and S143 are in the Regional inspection phase (source: November - February 2018 quarterly report).

PREVENTION, OPERATIONAL SAFETY AND MONITORING INTERVENTIONS (arts. 4 and 6 Planning Agreement)

Pumping of underground water from existing piezometers (paragraph 3)

As part of recovery activities, the system for pumping underground water from the wells and piezometers present on site was activated with 2 Water Soil Remediation modules; the "well PZ2 and PZ3" pumping activities will continue throughout 2019.

New surfacing (paragraph 4)

In 2018, activities were completed for the new surfacing within the steelworks areas. In this context, the activity also included the recovery and improvement of existing surfaces.

Rainwater (paragraph 4)

The installation of a rainwater collection and management network, which began in 2015, is currently under way and expected to be completed in early 2019.

Volatile compounds (paragraph 4)

The safety interventions are subject to continuous monitoring and improvement through the preparation of the risk analysis, first conducted in 2015, and the monitoring of volatile compounds.

Water barrier system[2] (paragraph 5)

Within the site, the supplementary interventions on the piezometer network are under way for the study and optimisation of the existing underground water barrier system.

Underground water collection network (paragraph 5)

As part of reclamation activities, a network has been completed and is currently in use for the collection of underground water pumped from the active "PZ2, PZ3 and PZA" piezometers. This activity is subject to continuous supervision and improvement.

Management, treatment, monitoring and disposal of underground water (paragraph 5)

For the entire underground water control network, monitoring campaigns to be conducted in conjunction with the control bodies are planned on a quarterly and monthly basis. The activities are under way.

[2] To be kept functioning until the implementation of the public project for physical containment pursuant to Axis I, Action II of the Planning Agreement of 30/01/2014.

INTERVENTIONS REQUIRED TO RENEW THE INTEGRATED ENVIRONMENTAL AUTHORISATION (art. 7 Planning Agreement)

Coking plant

The interventions called for the full revamping of the coking plant, the partial filling-in of the foundations of the quench tower and its height adjustment, the automation of furnace loading operations, the localised dust collection at the coke transfer points and the full collection of diffuse emissions and a dedicated treatment system.
All activities were successfully completed in 2016, followed by the adoption of a maintenance schedule.

Blast furnace

The interventions called for the complete updating of the blast furnace, replacing the refractory lining with a view to reducing heat loss and the installation of gas recovery systems to channel diffuse emissions and reduce energy consumption.
All activities were successfully completed in 2015 and implemented through further actions carried out in 2016-2017.

Agglomeration plant

In order to channel diffuse emissions and reduce energy consumption, the extraction system was reinforced near the lump breaker, and the installation of a smoke evacuation and cooling system is planned to serve the blast furnace heat recovery plant.

Logistics areas

The surfaced areas behind the docks, as well as the internal roads of the site, were restored and cleaned. For dust containment purposes, confinement systems were also adopted during the ship unloading phases and a watering system was activated to moisten storage areas.

Iron ore and coal yards

The technical and economic feasibility of covering the iron ore and coal yards is currently being evaluated. The yards are equipped with an automatic watering system and film cover system in order to prevent dust loss in particular weather conditions.

Along with the interventions laid out in the Planning Agreement, Acciaieria Arvedi has also decided to carry out a set of additional interventions, including the new coking plant fumes evacuation system, based on an Arvedi patent. This solution has allowed a reduction in emissions and dust and benzene emission levels to be lower than those set forth not only in the Planning Agreement, but also in the BREF (BAT REFerence Documents), the European Union documents describing the best available techniques (BAT), also in terms of environmental standards. The fumes evacuation system will thus become the new BAT standard.

FOCUS - ENERGY CONSUMPTION MANAGEMENT

Steel manufacturing is an industrial process requiring significant energy consumption. Acciaieria Arvedi has an Energy Office dedicated to monitoring the efficiency of energy consumption, managing the Emissions Trading System (ETS), handling energy procurement and technical aspects relating to boosting the efficiency of production plants.

The energy consumption of the various production processes is primarily linked to the procurement of electricity and the consumption of natural gas.

Natural gas is used particularly at the Cremona site for the boilers on the galvanising lines; at the Trieste site, as an auxiliary fuel to coke oven gas to fuel the power plant that covers the facility's energy consumption, with any surplus energy transferred to the national grid.

The Cremona site procures its energy from the national grid, while the Trieste site has a thermoelectric power plant capable of covering the facility's energy requirements, thanks to the recovery of heat from the off-gases from the steelmaking cycle. Taking into account only the Cremona plant, thanks to the implementation of an effective energy consumption monitoring plan, the three-year reporting period shows a 7% reduction in energy intensity.

ENERGY INTENSITY OF THE CREMONA PLANT	2015	2016	2017
ENERGY INTENSITY kWh / tonne of steel produced	**929**	**862**	**867**

Natural gas consumption rose between 2016 and 2017 at the Trieste site in correlation with the operational start-up of the rolling mill and the overall increase in production capacity, in accordance with the Planning Agreement. In parallel, the increased production entailed an increase in coking plant off-gases, a by-product used to fuel the power plant present on site, thus reducing the consumption of electric energy from the national grid. During 2017, the plant produced roughly 400 TJ of electric energy, of which 43% was transferred to the national grid.

ENERGY CONSUMPTION WITHIN THE ORGANISATION BY SOURCE [TJ]		2015	2016	2017
Natural gas		2,348	2,584	2,759
	Cremona	2,327	2,462	2,403
	Trieste	22	122	356
Electric energy acquired from the national grid		7,781	7,718	8,168
	Cremona	7,707	7,683	8,117
	Trieste	75	35	51
Self-produced electric energy – Trieste		341	611	399
	of which consumed	321	500	229
	of which transferred to the grid	20	111	170
TOTAL ENERGY CONSUMED WITHIN THE ORGANISATION		**10,451**	**10,801**	**11,156**

In researching and developing solutions to **boost the efficiency level** of its production plants, Acciaieria Arvedi has taken action on various fronts.

Aside from the patented ISP and ESP technologies for the development of increasingly compact, rapid and high efficiency processing lines, Acciaieria Arvedi is committed to efficiently managing the running and fuelling of the furnaces, in order to reach and constantly maintain the proper operating temperature. In addition, the policy of continuously modernising, revamping or replacing smelting plants has enabled Acciaieria Arvedi to rely on furnaces that are always high performing. While Acciaieria Arvedi inherited the historical blast furnace at the Trieste site, the average age of the furnaces used at the Cremona site is less than 10 years, the shortest in the entire national steel sector.

Lastly, research on heat optimisation and recovery systems within the same plant or in other production phases helps to ensure that energy resources are used more efficiently.

The new furnace with heat recovery

heat from the fumes generated by the combustion process thanks to the integration of a water cooling system within the abatement system used on the hot fumes coming out of the furnace. This system totally eliminates the consumption of the pickling plant boiler rooms, which were previously fuelled by natural gas.

The technology of the new electric furnace also requires a single loading phase compared to the two/three using traditional technology, resulting in less dispersion of heat - as well as dust and noise. Thus, this solution - compared to the reference electric furnaces for this market sector - allows a reduction in energy consumption - both electricity and fuel - of approximately 300,000 GJ per year.

With regard to the existing Consteel furnace, the heat recovered from the furnace fumes is sent to the ORC (Organic Rankine Cycle) turbine used to generate electricity. The new recovery system, called “iRecovery”, contributes to covering part of the energy requirements of the Cremona facility, thus allowing a reduction in energy consumption exceeding 110,000 GJ.

Heat recovery from the Trieste sinter plant cooling air

In 2018 a heat recovery plant was installed at the Trieste site for recuperating hot air exiting the fans during the cooling process of the product leaving the agglomeration furnace. The recovered heat will be used to produce industrial hot water (95°C) which will then be utilised in the pickling plant in the cold rolling area to heat tanks of acid. The total savings that can be obtained correspond to nearly 93,000 GJ of natural gas, with an annual reduction in CO_2 emissions of 5,262 tonnes.

Heat recovery from the Trieste coking plant fumes

The heat recovery system for the fumes exiting the coal distillation process (coking plant) allows the production of pressurised steam to be introduced into the facility's current distribution system, and industrial hot water (90 °C). The total savings that can be obtained correspond to more than 230,000 GJ of natural gas, with an annual reduction in CO_2 of 10,700 tonnes.

FOCUS - EMISSIONS MANAGEMENT

Acciaieria Arvedi, both in Cremona and Trieste, participates in the European Union Emissions Trading Scheme (EU ETS), the instrument adopted by the European Union to reach carbon dioxide emission reduction targets. In accordance with this system, Acciaieria Arvedi monitors its greenhouse gas emissions and reports them every year to the Ministry for Environment, Land and Sea Protection.

At the Cremona plant, the newly introduced important technological innovations have also allowed greenhouse gas (GHG) emission levels per tonne of steel produced – i.e. carbon intensity – to be among the lowest in the world.

CARBON INTENSITY OF THE CREMONA PLANT	2015	2016	2017
Tonnes of CO_{2eq} / Tonnes of steel produced	**0.31**	**0.40**	**0.39**

GREENHOUSE GAS EMISSIONS [TONNES CO_{2EQ}]		**2015**	**2016**	**2017**
Direct emissions from processes and combustion, directly monitored by the Organisation (Scope 1)		**771,660**	**1,323,541**	**1,258,673**
	Cremona	343,698	375,923	380,658
	Trieste	427,962	947,618	878,016
Indirect emissions from the electricity purchased from the grid (Scope 2)		**775,982**	**769,633**	**850,880**
	Cremona	768,510	766,170	845,515
	Trieste	7,472	3,463	5,364

With reference to atmospheric emissions, Acciaieria Arvedi has implemented a set of abatement and capture systems equipped with the most modern technologies currently available and classified as Best Available Techniques (BAT) at international level.

Once the abatement of fumes is ensured, a complex control and monitoring system both within and outside the facility (managed in part by the company and in part by the competent public bodies) makes it possible to constantly verify emissions quality. The methods and timing for these activities are established by the local authorities in accordance with legislation in force and in line with the best available techniques.
The measurements taken show continuous compliance within the legal limits in the values of the tracers typical of steelmaking processes present in the atmosphere.

Some of the main parameters continuously monitored through the measurement systems installed at the mouth of the chimneys are PM10, nitrogen oxide (NOx), sulphur oxide (SOx) (see Atmospheric Emissions table). Full emissions monitoring is also carried out every six months.
Some of the parameters monitored include dioxins, pollutants not associated with steelmaking processes but which could be detected if not removed from the incoming raw materials.

As regards the Trieste site, the quantity of dust captured is the most objective piece of information for an initial assessment of the effectiveness of the interventions undertaken for the air quality of Acciaieria Arvedi.
The results obtained are the fruit of the application of the best emissions capture and abatement techniques as well as the development of new ad hoc solutions - such as the extraction system at the coking plant - for the Trieste site to obtain emissions values below those deemed physiological for this type of manufacturing by international standards. Approximately one year after the initial safety activities were carried out in line with the Planning Agreement, and the start-up of the supplementary interventions implemented by Acciaieria Arvedi to further reduce emissions, the data collected confirm an overall improvement in emission levels and their alignment below legal limits.

The two monitoring stations dealing with these substances are managed by ARPA Friuli Venezia-Giulia. The data are made available daily on the ARPA website.

ATMOSPHERIC EMISSIONS [TONNES]		2015	2016	2017
PM10		148	134	124
	Cremona	36	28	26
	Trieste	112	106	98
NOx		329	799	271
	Cremona	196	206	148
	Trieste	133	593	123
SOx		365	115	71
	Cremona	-	-	-
	Trieste	365	115	71

For the Cremona facility, in addition to Acciaieria Arvedi's systems, there is a monitoring station for detecting pollutants that fall to the ground, located in the town of Spinadesco and managed directly by Arpa Lombardia, supplementing the network of public monitoring stations in the province of Cremona consisting of another four measurement stations.

Since 2008, traditional monitoring of atmospheric emissions has also worked alongside voluntary monitoring of pollutants that fall to the ground through bio-monitoring of the flora and fauna surrounding the facility area. All analyses conducted made it possible to indirectly confirm the data gathered by the monitoring instruments, excluding a significant amount of metallic pollutants falling to the ground from Acciaieria Arvedi's industrial activities and with no possibility of distinguishing the industrial contribution from the background level.

Analysis of flora and fauna in the Cremona area

From 2008 to 2015 Acciaieria Arvedi carried out a plan to check falling pollutants, starting with an analysis of local flora and fauna samples to verify any presence of pollutants that may be associated with the site's industrial activities. The sampling was conducted within a maximum range of 20 km from the steelworks.

The search for traces of lead, cadmium, chromium, nickel and zinc in samples collected from farm animals and wild animals did not show different accumulation values in the animal populations within the area under examination. In the same way, regarding flora, the lichen biodiversity indices showed a certain stability which indirectly confirms the absence of appreciable amounts of falling pollutants.

Lastly, the soil biological quality index - determined on the basis of morphological modifications in organisms present in the soil for adaptive purposes and conducted in three distinct sampling areas around the steelworks - did not bring to light a significant impact of the industrial activities on the biological quality of the soil.

White smoke at the Trieste site

One of the most eye-catching aspects of steelmaking activity at the Trieste site are the clouds of white smoke rising from the coking plant. The clouds

consist of water vapour and are the natural effect of the water cooling of incandescent coke coming out of the coking plant.

Immediately after Acciaieria Arvedi acquired the facility, it raised the height of the quench tower by 3 metres to bring it into line with the best available techniques - which call for a height of at least 30 metres. This made the steam channelling and abatement path longer and more effective, thus reducing emissions in the areas around the site.

FOCUS - WATER MANAGEMENT

Water is a key resource in steel processing, used mainly for cooling purposes in product finishing.

To ensure water recovery and savings, at Acciaieria Arvedi's Cremona site closed circuit cooling cycles have been developed which make it possible to limit replenishment of the evaporation components. This has permitted a 50% water consumption reduction compared to conventional steel plants.

To reduce water consumption, the site also has a network that collects rainwater which is channelled into tanks, purified and then used in the various manufacturing phases.

At the Trieste site, most of the water consumed comes from the sea. This water is used for indirect plant cooling and then returned to the sea. With the activation of the water barrier, the water pumped and treated in special plants is reused within the production site.

During the three-year period shown below, Acciaieria Arvedi's water consumption was stable and did not show any significant change.

WATER CONSUMPTION [m³]	**2015**	**2016**	**2017**
from the sea - Trieste (in circulation)	13,276,000	13,664,000	13,428,000
from the municipal aqueduct, of which:	3,312,511	3,296,106	3,644,209
Cremona	78,011	48,406	52,709
Trieste	3,234,500	3,247,700	3,591,500
from underground water - Cremona	2,600,110	2,515,000	2,673,090

Acciaieria Arvedi's plants are also equipped with an environmental monitoring system that controls its waste water quality. Waste water quality controls are conducted half-yearly or quarterly and even on a continuous basis for the more significant ones. The first rain water collected by the recovery system is also subject to periodic quality analyses.

WASTEWATER QUALITY - CREMONA Measured average values	**Unit of measurement**	**Legal limits**	**2015**	**2016**	**2017**
pH	pH units	5.5-9.5	8.10	8.02	8.15
Conductivity at 20°C	micro S/cm		2,050.00	2,170.00	2,034.00
Total COD	mg/l	160	15.00	12.00	16.00
Ammonium ions	mg/l	15	0.40	0.27	0.38
Chlorides	mg/l	1,200	364.00	358.00	321.00
Cyanides	mg/l	0.5	<0.001	<0.001	<0.001
Total phosphorus	mg/l	10	1.50	1.70	1.40
Cadmium	mg/l	0.02	<0.001	<0.001	<0.001
Total chromium	mg/l	2	0.004	0.004	0.003
Iron	mg/l	2	0.90	0.99	0.79
Nickel	mg/l	2	<0.002	<0.002	<0.002
Lead	mg/l	0.2	0.003	0.001	0.001
Copper	mg/l	0.1	0.02	0.02	0.02
Manganese	mg/l	2	0.16	0.52	0.21
Zinc	mg/l	0.5	0.05	0.03	0.06
Arsenic	mg/l	0.5	0.01	0.01	0.01
Mercury	mg/l	0.005	<0.001	<0.001	<0.001
Total hydrocarbons	mg/l	5	0.90	0.80	0.80
Polycyclic aromatic hydrocarbons (PAH)	mg/l	-	<0.01	<0.01	<0.01
Suspended solids	mg/l	80	6.0	8.10	7.90

Source - self-monitoring chemical analysis validated by Arpa

WASTEWATER QUALITY - CREMONA Measured average values	**Unit of measurement**	**Legal limits**	**2015**	**2016**	**2017**
pH	unità pH	5.5-9.5	7.20	7.10	7.50
Conductivity at 20°C	micro S/cm		41,500.00	51,600.00	47,800.00
Total COD	mg/l	160	148.00	152.00	142.00
Ammonium ions	mg/l	15	12.00	9.00	11.00
Chlorides	mg/l	-	11,450.00	15,120.00	12,130.00
Cyanides	mg/l	0.5	0.40	0.30	0.20
Total phosphorus	mg/l	10	0.50	0.50	0.50
Cadmium	mg/l	0.02	<0.001	<0.001	<0.001
Total chromium	mg/l	2	<0.001	<0.001	<0.001
Iron	mg/l	2	0.05	0.10	0.10
Nickel	mg/l	2	<0.002	<0.002	<0.002
Lead	mg/l	0.2	0.003	0.001	0.001
Copper	mg/l	0.1	0.02	0.02	0.02
Manganese	mg/l	2	0.16	0.52	0.21
Zinc	mg/l	0.5	0.08	0.05	0.05
Arsenic	mg/l	0.5	0.01	0.01	0.01
Mercury	mg/l	0.005	<0.001	<0.001	<0.001
Total hydrocarbons	mg/l	5	<2	<2	<2
Polycyclic aromatic hydrocarbons (PAH)	mg/l	-	<0.001	<0.001	<0.001
Suspended solids	mg/l	80	18.00	54.00	28.00

Source - self-monitoring chemical analysis validated by Arpa

FOCUS - LOGISTICS MANAGEMENT

Due to the quantity and volumes of raw materials coming in and finished products exiting the facilities, logistics represents one of the greatest challenges in the steel industry. Acciaieria Arvedi moves incoming and outgoing materials by road, ship and train.

At the Cremona site 42% of incoming and outgoing goods are moved by means of the railway network, which has enabled the site to increase its production since 2009 without increasing transport by road. At the Trieste site, however, a good deal of the incoming goods arrive from the ports of Marghera and Trieste. Indeed, the Trieste site has a logistics terminal, a dock under concession from the Trieste Port Authority and an internal railway connected to the Italian Railway Network (RFI).

Acciaieria Arvedi has worked over the years to **strengthen railway transport**, with a view to reducing pressure on the road and motorway network in the area surrounding the Cremona facility and minimising total emissions of greenhouse gas and micropollutants - such as particulates, nitrogen oxide and sulphur oxide. In particular, the introduction of a Multimodal Container system developed by Acciaieria Arvedi in 2017 makes it possible to receive both types of steel products handled and thus always travel with a full load (see Focus - Strengthening lower impact logistics solutions).

The strengthening of the Cremona intermodal hub will also help to further reduce the impact of Acciaieria Arvedi's road transport, incentivising the activity of the port of Cremona, which is in a privileged position along southern Europe's most important water transport route and has an advanced logistics platform.

Strengthening lower impact logistics solutions

The "Multimodal Container" system introduced by Acciaieria Arvedi moves beyond the traditional system for transporting steel products by rail based on the use of two types of equipment, which is different for trains and for lorries. In the traditional system, steel strips are transported on lorries using coil racks and by train using "Shimmns" containers, while pig iron and scrap are transported with tanks on lorries and in "Eanos" containers on trains. With this approach, it is impossible to use the same equipment to receive and deliver the goods, thus generating a breakdown in the logistics chain due to trips that need to be taken with no goods aboard.

With this in mind, Acciaieria Arvedi introduced **the first multimodal containers** to ensure a standard intermodal system which can be used for both materials on both types of transport, thus making it possible to cut the number of trips in half, along with the relative environmental impact and the risk of possible accidents correlated with the number of trips taken.

More precisely, a study conducted with the EcoTransIT World system - developed by the independent institute for energy and environmental research of Heidelberg and Rail Management Consultants GmbH (RMCon) - showed that the movement of 1,152 trains per year along the Cremona-Trieste and the Marghera-Trieste corridors, making return trips, made it possible to eliminate 165,888 lorries on the road, with a resulting reduction in energy consumption, polluting emissions and road traffic. Indeed, this logistics solution made it possible to achieve annual energy savings of 326% and an annual reduction in CO2 emissions of 425%, compared to the equivalent movement of goods by road.

FOCUS - ACOUSTIC IMPACT

In Italy, noise legislation is governed by individual local institutions through "noise zoning" which classifies the various parts of a district based on their prevalent use or significant interest and assigns resulting limits to be respected.

At the Cremona site, the vicinity, within just a few kilometres, of two different municipalities may lead to the situation, paradoxical but true, in which a plant under the authority of two or more local institutions may be subject to different limits within its own perimeter. This situation requires rebalancing and harmonisation, taking into account the predominantly industrial nature of the area where the production plants are located.

Outside the Acciaieria, near the town of Spinadesco, a continuous monitoring system has been installed for detecting noise as well as analogous systems within the perimeter of the facility.

Feedback from the control authorities and the continuous measurements taken by the fixed monitoring stations installed at the plant and in the municipality of Spinadesco have revealed an improvement in the acoustic impact of scrap metal handling activities, demonstrating the effectiveness of the operational measures taken. Based on these measures, when Acciaieria Arvedi **reaches a pre-threshold**, it changes its operating activities on the site with a view to decreasing their acoustic impact in order to remain below the noise threshold approved by ARPA.

The measurements in the table refer to the period of night-time measurements conducted in August 2016 and the most sensitive measurement points (based on classification and due to human presence at these points), so as to monitor the most stringent scenario. .

Noise zoning classes of the area surrounding Cremona's industrial area

NOISE EMISSIONS IN CREMONA	13th night		14th night	
Monitoring points	B	C	B	C
Class	IV	IV	IV	IV
Nocturnal environmental noise level dB(A)	49.5	44.5	49.5	44.5
Nocturnal residual noise level dB(A)	48.3	46.6	47.6	45.8
Plant contribution dB	43.5	-	45	-
Legal limits dB	50	50	50	50
Compliance with the law	YES	YES	YES	YES

Note: August 2016 measurements. The nocturnal residual environmental noise was measured during the extraordinary maintenance shut-down period for the sole purpose of precisely evaluating the noise level in the effective absence of Acciaieria Arvedi's activities.

At all production plants operating on a continuous cycle model, the reference best available techniques (BAT) have been adopted as well as rules and procedures that govern worker behaviour so as to reduce noise levels and the propagation of soundwaves outside the facility.

More specifically, all plants that generate vibrations or significant noise due to the type of activity carried out are placed inside closed structures with appropriately shielded walls and automatic entrance closures, so as to reduce outgoing noise emissions, thus contributing to the reduction of overall noise impact on the surrounding area.

A number of operations have been implemented aimed at the overall reduction of noise such as, for example, the application of noise barriers in the coking plant and blast furnace areas. Further interventions are currently under way and will continue up to December 2018. All this is in addition to the rules of conduct based on Acciaieria Arvedi's preventive approach: limitations on certain activities based on time of day, finding the optimal plant operating conditions and controlled access to certain areas.

At the Trieste site, the municipal administration has not yet approved the noise zoning plan.

However, in July 2016, Acciaieria Arvedi, in compliance with the provisions of the Integrated Environmental Authorisation issued by the Friuli-Venezia Giulia Region, submitted a Noise Clean-up plan for the steelworks including 11 projects for 11 "points" on the site (i.e. on 11 macro-noise sources, some of which are the combination of sources located close to each other) in areas near the coking plant, the blast furnace and the agglomeration plant. The plan also estimates the acoustic benefits that may be obtained at the sources, which can be verified only after the interventions are completed.

The interventions are based on the fundamental principles relating to acoustic improvements, i.e.:

- "Active" interventions directly on the sources, which involve plant-related decisions from the technical and functional perspective;
- "Passive" interventions on the sources (encapsulations), understood as the interception and containment of the soundwave;
- Passive interventions on the environment (cladding/shielding), understood as the interception and containment of the soundwaves.

In September 2016, along with the details of the 11 interventions set forth in the plan, a basic implementation schedule was submitted to the competent institutions, which will be further detailed once the executive planning phase and the assessment of soundproofing product supply needs are concluded.

The actions set forth in the plan and further additional interventions were concluded by the end of 2018.

FOCUS - ODOUR EMISSIONS

In order to limit odour emissions associated with the steelmaking process, Acciaieria Arvedi relies on the support of well-established laboratories for studies on the atmospheric dispersion and impact on the ground of the odour emissions from its production activities.

At the Cremona site, it took action to implement specific technical measures, such as the installation of a cooler and active carbon filters at the exit from the combustion chamber, as well as the installation of a lime abatement system before the filters.

Although monitoring has shown these measures to be effective (values lower than the lower assessment threshold), Acciaieria Arvedi has provided a further technical intervention, collecting the fumes from the preheating furnaces with the fumes treatment system at the exit of one of the electric furnaces, equipped with a more advanced abatement system.

At the Trieste site, odour emissions are contained by a new Arvedi-patented fumes evacuation system installed in early 2016 for the abatement of dust with the aim of reducing the impact of coking plant emissions.

→ 5.2 WITH A STRONG SOCIAL COMMITMENT

Business activities must be conducted in light of the social and territorial context in which they take place. The economic and social instability characterising Italy in recent decades has redefined the role of non-profit organisations in community life and development. In this scenario, private individuals and companies play an increasingly significant role to respond to new social needs and create successful channels for dialogue with the general public.

Along with the other Group companies and the Arvedi family, Acciaieria Arvedi supports the activities promoted by the Giovanni Arvedi e Luciana Buschini Foundation, founded with a view to contributing to the civic, cultural and economic development of the communities in which it operates.

» Since 1990 the Foundation has promoted educational, training and social assistance initiatives, as well as the promotion of artistic and cultural heritage, with a particular focus on Cremona, the town in which the Group was founded.

Indeed, Arvedi's first philanthropic activities date back to the 1980s when, as a personal initiative by the founder of the Arvedi Group, he worked to open a department of the Politecnico di Milano university in Cremona, in order

to support the local development of extremely high-level skills. Today, with annual funding, the Foundation supports the **Entrepreneurial Development Research Centre** - created in collaboration with Università Cattolica del Sacro Cuore - to develop the competitiveness of companies in the Cremona area through entrepreneurial research and training activities, and the **Cremona University Studies Association** - created in collaboration with the Politecnico di Milano university, the Municipality, the Province and Trade Associations - to aid access by the local student population to university education, providing students with technical and scientific support tools.

In terms of the promotion of arts and culture, in 2013 the Arvedi Buschini Foundation was responsible for the creation of the **Violin Museum**, located in the historic Palazzo dell'Arte building, the interior and exterior restoration, installations and furnishings of which it followed and sponsored. "Cremona is the town of Stradivari" and for five centuries has been the capital of violinmaking; it now has an important structure able to act as an auditorium and a museum, a research laboratory and study centre, with a pavilion for temporary exhibitions.

Along with the creation of the Violin Museum, and on the initiative of the Foundation, the new museum hub also has an innovation and research component, as it is home to two laboratories equipped with cutting edge technological instruments and a staff of researchers, in collaboration with the University of Pavia and the Politecnico di Milano university. This collaboration has given rise to the **Arvedi Non-Invasive Diagnostics Laboratory**, a highly specialised scientific research and diagnostics centre for the preservation of antique musical instruments. In parallel, the Politecnico di Milano **Musical Acoustics Research Laboratory** was also created, dedicated to scientific research for the development of advanced technologies to improve violinmaking tradition by using the most advanced techniques.
In addition, the Arvedi Buschini Foundation provides annual funding to the Cathedral of Cremona's Organ and Choir School for ordinary activities in the Cathedral throughout the liturgical year and concerts in Italy, as well as the Ponchielli Theatre Foundation, which manages Cremona's historical theatre.

With a view to supporting the community's sports activities, in 2011 the Foundation also created the Giovanni Arvedi Sports Centre, a tangible sign of the desire to look ahead, in particular helping the development of young athletes and the promotion of football as an opportunity for personal and athletic growth for young people.

The Centre, located within a large urban park, provides the Cremona community with five football pitches and the associated services and infrastructure, on a surface of 65,000 square metres. Designed primarily for the roughly 250 young people in the training academy of US Cremonese, the town's football team, the Centre is accessible to the public and today represents a place for meeting, training and socialising, a project strongly supported by Mr Arvedi in agreement with the Municipality of Cremona.

In 2017, the Foundation's activities supported another important project for the recovery and redevelopment of **Cremona's "Colonie Padane"** riverside park, giving local residents the opportunity to once again use a space that had previously been abandoned. In particular, the Foundation's support made it possible to create social value, for the benefit of families, young people and the elderly, who have a large, well-equipped area available free-of-charge where they can spend their free time, play, practise hobbies and view the architecture, with the recovery of a significant building, an integral part of the urban fabric.

6. METHODOLOGY NOTE

→ 6.1 HOW WE CONSTRUCTED THE REPORT

The Acciaieria Arvedi Sustainability Report was prepared in order to provide reporting on the Company's sustainability performance.

The methodology reference for preparation of the Report was the latest available version of the "Global Reporting Initiative (GRI) - Sustainability Reporting Standards", adopting the "In Accordance - Core" option.

The GRI Standards particularly envisage that the Sustainability Report contains information on "materiality" aspects, i.e. those reflecting significant impact on the organisation in economic, environmental and social terms, and which are capable of substantially influencing the assessments and decisions of stakeholders.

In order to define the 2017 Sustainability Report contents, Acciaieria Arvedi activated a structured process for gathering sustainability pressures - internal and external - which were later validated by the Company's key managers. Specifically, this procedure was conducted through analysis of the main reporting guidelines and sector-related documents of the main associations, Federacciai, World Steel Association and Eurofer, as well as media analysis and benchmark analysis of Italian and international companies operating in the steel industry. For the identification and definition of the materiality issues, input from the main stakeholders of Acciaieria Arvedi was also taken into consideration, starting from the listening channels and tools already used by the Arvedi Group.

Of particular importance among the main stakeholders of Acciaieria Arvedi are the customers, capital providers, direct employees and staff on leasing contracts, the local communities, regulators, suppliers, trade associations, the media and competitors.

The following table indicates the **eight materiality issues** reported on in this document. The relative impacts of the materiality issues reported are all attributable to Acciaieria Arvedi activities.

Workplace safety

The implementation and constant maintenance of health and safety conditions in the workplace are an absolute priority for steelmaking companies. Knowing how to correctly manage safety, integrating it into the business management of all the processes, contributes to improving work quality, which also triggers increased efficiency and productivity of the company. The issues currently associated with health and safety in the workplace for the steel industry are mostly concentrated on reducing the risks linked to mechanical handling, access to confined spaces and working at height.

Personnel training and skills

The steel industry is committed to training and promoting increasingly qualified professional profiles, also with considerable investments in training to reach ever higher standards of quality and innovation. In the steel industry, the integration of theory training and practical experience is indispensable to producing the best professionalism for the industry.

Energy efficiency

Optimisation of the use of energy resources has always been a key element in the development strategies of steelmaking companies. The industry is characterised, in fact, by a significant incidence of energy procurement, therefore representing a factor of fundamental importance in maintaining competitiveness.

Circular economy

The steelmaking cycle constitutes a virtuous example of the successful application of the “circular economy”: steel is the most recycled material in the world, and all steel products - from those with a short lifecycle to more durable ones – have already achieved very high recycling rates. The circular economy allows the valorisation of production residuals, such as scrap, refractory materials, slag and steelmaking off-gases, consequently reducing the waste generated.

Atmospheric emissions

The role of steel in the fight against climate change is primarily linked to reducing the emissions generated during the manufacturing stage. Within the scope of the actions taken for emission abatement, the adoption of Best Available Technologies plays a significant role.

Water consumption

Water resources are of enormous value to the steel production cycle due to their use in cooling the machinery and the cooling/conditioning of raw materials, process production and waste materials. The use of the most suitable water sources and the search for the best solutions for reducing waste form the basis of water resource management.

Relations with the local communities in Cremona and Trieste

As industrial complexes are located close to residential areas, steelmaking companies are aware of their responsibility towards the communities in which their facilities are located. In particular, steelworks are subject to strong media pressure, mostly associated with their impact on the local environmental. In parallel, the companies are involved in the development of constructive dialogue with all the main stakeholders.

Process innovation

There is a constant commitment to research into innovative solutions both in terms of product design and in end-of-life recycling technology, with the aim of minimising environmental impact. It is only by implementing innovative solutions in all the stages of the steel lifecycle that competitive results can be achieved in terms of quality and environmental performance.

→ 6.2 THE ASSUMPTIONS AND CALCULATION METHODS ADOPTED

This report is the first edition of the Acciaieria Arvedi Sustainability Report and contains a description of initiatives and activities referring to 2017 and the performance trends for the three-year period 2015-2017, where available. All the data and information contained in the text refer to Acciaieria Arvedi S.p.A. Specific information is also provided of cases in which the Trieste facility was taken into consideration for the entire three-year period and where its performance is not included in the data.

To ensure the reliability of information contained in the report, directly measurable quantities were included, as much as possible limiting recourse to estimates which, where necessary, were founded on the methods described below. The data and information were collected and consolidated by the various functions in charge, using data extracted from the corporate IT systems, primary sources and internal and external reporting.

A number of assumptions relating to the calculation methods used to determine the indicator figures are provided below, broken down by chapter.

Chapter 2 - Acciaieria Arvedi, Italy's flagship for innovation

The data relating to energy savings from ESP technology were calculated by considering a product mix, typical of such technology, with 45% fine gauges (from 1.0 to 1.5 mm) and comparing the results with those of traditional plants.

Chapter 3 – Acciaieria Arvedi, a place of people

The frequency rate was calculated as the ratio of the total number of hours lost due to injury and the total number of hours worked, multiplied by 1,000,000.

The severity rate was calculated as the ratio of the number of days lost multiplied by 1,000 to the worked hours. For both rates, injuries causing an absence exceeding 3 days are considered and the injury cases still on-going are excluded.

The total number of white-collar workers (as a contractual category) includes personnel operating both in the offices and at the facilities.

The data relating to the breakdown of employees by classification, gender and age for the years 2015 and 2016 - indicated in the table below and in other tables included in the report - refer only to the Cremona site. The Trieste facility was however reincluded in the 2017 data, following its acquisition by Acciaieria Arvedi.

BREAKDOWN OF EMPLOYEES BY CLASSIFICATION, GENDER AND AGE			2015	2016	2017
Directors					
Women	< 30 years	no.	-	-	-
	Between 30 and 50 years	no.	1	-	-
	> 50 years	no.	1	2	2
TOTAL FEMALE DIRECTORS		**no.**	**2**	**2**	**2**
		%	**13**	**13**	**12**
Men	< 30 anni	no.	-	-	-
	Between 30 and 50 years	no.	4	3	4
	> 50 anni	no.	10	11	11
TOTAL MALE DIRECTORS		**no.**	**14**	**14**	**15**
		%	**88**	**88**	**88**
TOTAL DIRECTORS		**no.**	**16**	**16**	**17**
		%	**1**	**1**	**1**

BREAKDOWN OF EMPLOYEES BY CLASSIFICATION, GENDER AND AGE			2015	2016	2017
White-collar workers					
Women	< 30 years	no.	3	6	5
	Between 30 and 50 years	no.	24	24	29
	> 50 years	no.	7	8	14
TOTAL FEMALE WHITE-COLLAR WORKERS		**no.**	**34**	**38**	**48**
		%	**10**	**11**	**11**
Men	< 30 years	no.	15	18	22
	Between 30 and 50 years	no.	214	214	270
	> 50 years	no.	62	68	109
TOTAL MALE WHITE-COLLAR WORKERS		**no.**	**291**	**300**	**401**
		%	**90**	**89**	**89**
TOTAL WHITE-COLLAR WORKERS		**no.**	**325**	**338**	**449**
		%	**23**	**23**	**22**
Blue-collar workers					
TOTAL FEMALE BLUE-COLLAR WORKERS		**no.**	**-**	**-**	**-**
		%	**-**	**-**	**-**
Men	< 30 years	no.	195	187	280
	Between 30 and 50 years	no.	687	678	933
	> 50 years	no.	204	227	335
TOTAL MALE BLUE-COLLAR WORKERS		**no.**	**1,086**	**1,092**	**1,548**
		%	**100**	**100**	**100**
TOTAL BLUE-COLLAR WORKERS		**no.**	**1,086**	**1,092**	**1,548**
		%	**76**	**76**	**77**

BREAKDOWN OF EMPLOYEES BY CLASSIFICATION, GENDER AND AGE			2015	2016	2017
Total					
Women	< 30 years	no.	3	6	5
		%	1	3	2
	Between 30 and 50 years	no.	25	24	29
		%	3	3	2
	> 50 years	no.	8	10	16
		%	3	3	3
TOTAL WOMEN		**no.**	**36**	**40**	**50**
		%	**3**	**3**	**2**
Men	< 30 years	no.	210	205	302
		%	99	97	98
	Between 30 and 50 years	no.	905	895	1,207
		%	97	97	98
	< 50 years	no.	276	306	455
		%	97	97	97
TOTAL MEN		**no.**	**1,391**	**1,406**	**1,964**
		%	**97**	**97**	**98**
TOTAL EMPLOYEES		**no.**	**1,427**	**1,446**	**2,014**
	of which <30 years	**%**	**15**	**15**	**15**
	of which between 30 and 50 years	**%**	**65**	**64**	**61**
	of which > 50 years	**%**	**20**	**22**	**23**

With regard to the governing bodies, however, for 2015 and 2016 the 4 members of the Board of Directors of Acciaieria Arvedi were male, in the over 50 age range. In 2017, this number increased by two members, of the same gender and age range as their predecessors.

Chapter 4 – Acciaieria Arvedi, a key element of the circular economy

The **energy intensity** values for the Cremona facility were calculated on the basis of total energy consumption, both electricity and methane gas, for all the production processes and all production lines, divided by the quantity of steel strips produced. As regards the Trieste facility, however, this information is of little significance - and therefore not reported - as most of the energy used during the process derives from raw materials combustion.

The **carbon intensity** was calculated as the ratio between direct and indirect emissions produced by the Cremona facility and the annual steel strips production.

To calculate the **greenhouse gas emissions**, the values reported by the Cremona and Trieste facilities on the ETS system were taken into consideration. In addition to these emissions, to calculate those not considered from the ETS data, the emission factors used were taken from DEFRA (UK Government GHG Conversion Factors for Company Reporting 2015, 2016, 2017) on greenhouse gas emissions - Scope 1, and emission factors taken from Terna's International Comparison (2014 and 2015 data) on greenhouse gas emissions - Scope 2.

The reduction of **carbon dioxide emissions** associated with scrap production was calculated through Life Cycle Assessment, as the functional unit using 1 tonne of low-carbon, low-alloy steel plate with a thickness of 2 mm and width of 1,500 mm. The energy consumption calculated by this method was subject to verification and certification (PAS 2050 - Green Certification) by an accredited third-party company.

For further details and requests about this report: marketing@arvedi.it

→ 6.3 GRI CONTENT INDEX

GRI Standard	Disclosure	Description	Page number/Section	Omission/ Note
GRI 102 - GENERAL DISCLOSURES 2016				
Organizational profile				
	102-1	Name of the organization	1	
	102-2	Activities, brands, products, and services	1	
	102-3	Location of headquarters	The headquarter of the Company is located in Enrico Forlanini Street, 23 20134 Milano (Italy)	
	102-4	Location of operations	1.2	
	102-5	Ownership and legal form	1	
	102-6	Market served	1.2	
	102-7	Scale of the organization	1.1	
	102-8	Information on employees and other workers	6	
	102-9	Supply chain	4	
	102-10	Significant changes to the organization and its supply chain	4	
	102-11	Precautionary Principle or approach	6	
	102-12	External initiatives	5.1	
	102-13	Membership of associations	1.2	
Strategy				
	102-14	Statement from senior decision-maker	Letter to stakeholder	
Ethics and integrity				
	102-16	Values, principles, standards, and norms of behavior	1	
Governance				
	102-18	Governance structure	1, 3.1, 5.1, 6.2	
Stakeholder engagement				
	102-40	List of stakeholder groups	6.1	
	102-41	Collective bargaining agreements	Il 100% of employees are covered by collective bargaining agreements	
	102-42	Identifying and selecting stakeholders	6.1	
	102-43	Approach to stakeholder engagement	6.1	
	102-44	Key topics and concerns raised	6.1	
Reporting practice				
	102-45	Entities included in the consolidated financial statements	6.1	
	102-46	Defining report content and topic Boundaries	6.1	
	102-47	List of material topics	6.1	
	102-48	Restatements of information	Non applicable since the present document is the first Sustainability Report	
	102-49	Changes in reporting	Non applicable since the present document is the first Sustainability Report	
	102-50	Reporting period	6.1	
	102-51	Date of most recent report	Non applicable since the present document is the first Sustainability Report	
	102-52	Reporting cycle	6.1	
	102-53	Contact point for questions regarding the report	6.2	
	102-54	Claims of reporting in accordance with the GRI Standards	6.1	
	102-55	GRI Content Index	6.3	
	102-56	External assurance	The Report has not been audited from an external assurance company	

GRI Standard	Disclosure	Description	Page number/Section	Omission/ Note
ENVIRONMENTAL MATERIAL ASPECTS (GRI 300)				
	MATERIALS			
GRI 103: Management Approach 2016				
	103-1	Explanation of the material topic and its Boundary	4.1	
	103-2	The management approach and its components	4.1	
	103-3	Evaluation of the management approach	4.1	
GRI 301: Materials 2016				
	301-1	Materials used by weight or volume	4.1	
	ENERGY			
GRI 103: Management Approach 2016				
	103-1	Explanation of the material topic and its Boundary	5.1.1	
	103-2	The management approach and its components	5.1.1	
	103-3	Evaluation of the management approach	5.1.1	
GRI 302: Energy 2016				
	302-1	Energy consumption within the organization	5.1.1	
	302-3	Energy intensity	5.1.1	
	302-4	Reduction of energy consumption	5.1.1	
	WATER AND EFFLUENTS			
GRI 103: Management Approach 2016				
	103-1	Explanation of the material topic and its Boundary	5.1.3	
	103-2	The management approach and its components	5.1.3	
	103-3	Evaluation of the management approach	5.1.3	

GRI Standard	Disclosure	Description	Page number/Section	Omission/ Note
GRI 303: Water and Effluents - Management Approach 2018				
	303-1	Interactions with water as a shared resource	5.1.3	
	303-2	Management of water discharge-related impacts	5.1.3	
GRI 303: Water and Effluents Topic-specific 2018				
	303-3	Water withdrawal	5.1.3	
	EMISSIONS			
GRI 103: Management Approach 2016				
	103-1	Explanation of the material topic and its Boundary	5.1.2	
	103-2	The management approach and its components	5.1.2	
	103-3	Evaluation of the management approach	5.1.2	
GRI 305: Emissions 2016				
	305-1	Direct (Scope 1) GHG emissions	5.1.2	
	305-2	Energy indirect (Scope 2) GHG emissions	5.1.2	Scope 2 emissions have been calculated according to the location-based method
	305-4	GHG emissions intensity	5.1.2	
	305-7	Nitrogen oxides (NOX), sulfur oxides (SOX), and other significant air emissions	5.1.2	
	EFFLUENTS AND WASTE			
GRI 103: Management Approach 2016				
	103-1	Explanation of the material topic and its Boundary	4.2	
	103-2	The management approach and its components	4.2	
	103-3	Evaluation of the management approach	4.2	
GRI 306: Effluents and waste 2016				
	306-2	Waste by type and disposal method	4.2	

GRI Standard	Disclosure	Description	Page number/Section	Omission/ Note
SOCIAL MATERIAL ASPECTS (GRI 400)				
	EMPLOYMENT			
GRI 103: Management Approach 2016				
	103-1	Explanation of the material topic and its Boundary	3	
	103-2	The management approach and its components	3	
	103-3	Evaluation of the management approach	3	
GRI 401: Employment 2016				
	401-1	New employee hires and employee turnover	3, 6.2	
	401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	3.2	
	OCCUPATIONAL HEALTH AND SAFETY			
Management Approach 2016				
	103-1	Explanation of the material topic and its Boundary	3.1	
	103-2	The management approach and its components	3.1	
	103-3	Evaluation of the management approach	3.1	
GRI 403: Occupational health and safety				
	403-1	Occupational health and safety management system	3.1	
	403-2	Hazard identification, risk assessment, and incident investigation		
	403-3	Occupational health services	3.1	
	403-4	Worker participation, consultation, and communication on occupational health and safety	3.1	
	403-5	Worker training on occupational health and safety	3.1	
	403-6	Promotion of worker health	3.1	
	403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	3.1	
Topic-specific disclosures 2018				
	403-8	Workers covered by an occupational health and safety management system	3.1	
	403-9	Work-related injuries	3.1	Work related injuries are related only to 2017
	TRAINING AND EDUCATION			
GRI 103: Management Approach 2016				
	103-1	Explanation of the material topic and its Boundary	3.2	
	103-2	The management approach and its components	3.2	
	103-3	Evaluation of the management approach	3.2	
GRI 404: Training and Education 2016				
	404-1	Average hours of training per year per employee	3.2	Hours of training are related to technical-specialist training, without distinction by gender and professional category
	DIVERSITY AND EQUAL OPPORTUNITY			
GRI 103: Management Approach 2016				
	103-1	Explanation of the material topic and its Boundary	3	
	103-2	The management approach and its components	3	
	103-3	Evaluation of the management approach	3	

GRI Standard	Disclosure	Description	Page number/Section	Omission/ Note
GRI 405: Diversity and Equal Opportunity 2016				
	405-1	Diversity of governance bodies and employees	3, 6.2	
	LOCAL COMMUNITIES			
GRI 103: Management Approach 2016				
	103-1	Explanation of the material topic and its Boundary	5.2	
	103-2	The management approach and its components	5.2	
	103-3	Evaluation of the management approach	5.2	
GRI 413: Local Communities 2016				
	413-1	Operations with local community engagement, impact assessments, and development programs	5.2	

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