


Outokumpu's business and business units

Outokumpu's product range includes standard and special grades of stainless steel and stainless steel products. The Group's main production facilities are efficient integrated mills located in Tornio, Finland and Avesta, Sweden. There is also a production route from the Sheffield melt shop in the UK to several long-product and plate-production units in Sweden, the UK and the US.



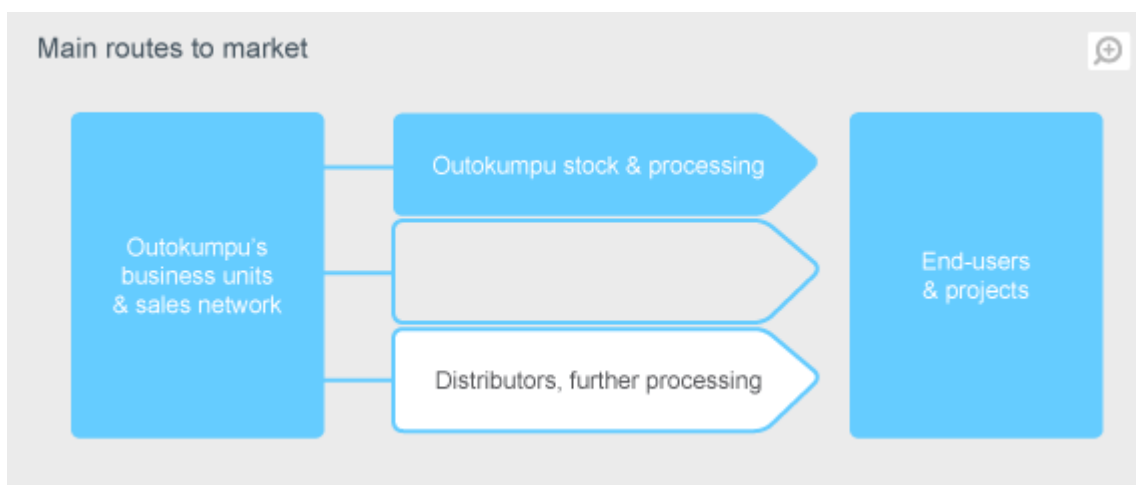
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From chromite ore to finished products

Stainless steel is produced in a variety of grades, and chromium is an essential component in all of them. Production at the Tornio Works in Finland – Outokumpu's largest production site – consists of a unique integrated process which starts with the mining of chromite ore and finishes with cold rolled stainless steel products ready for further processing. Have a look at how stainless steel is made.

Outokumpu's organisation serves customers in an optimal manner. Group Sales and Marketing, a cross-organisational function, consists of customer industry-based groups and its responsibilities include the Group's commercial targets. Outokumpu's production operations are organised into two profit-responsible divisions based on product type: General Stainless and Specialty Stainless. The Group-wide Supply Chain Management function is responsible for end-to-end delivery performance.

Outokumpu also has a comprehensive network of sales companies, service centres and sales agents in some 70 countries. Group strategy is aimed at achieving higher levels of customer satisfaction and a more stable and profitable business model.



A significant proportion of Outokumpu's sales are made to distributors, re-rollers and tubemakers. While these segments continue to be an essential part of the Group's total business, Outokumpu is looking for growth in value-adding end-user segments such as a range of industrial uses, construction, and catering and appliances. As a supplier for project applications, market segments such as the pulp and paper industry, desalination, and oil and gas exploration and production are central to the Group's development.

Stainless steel deliveries

1 000 tonnes	2010	2009	2008
Cold rolled	698	545	739
White hot strip	312	263	330
Quarto plate	83	67	120
Tubular products	51	53	70
Long products	58	40	55
Semi-finished products	114	63	109
Total deliveries	1 315	1 030	1 423

Three main types of stainless steel

Stainless steel is made by adding chromium and other metals to iron. All grades of stainless steel contain a minimum of 10.5% chromium, which gives the material its corrosion resistance.

The main grades of stainless steel are:

Austenitic (typically 18% chromium and 8% nickel)

Ferritic (chromium up to 24%, no nickel)

Ferritic-austenitic (chromium content >20%, 1.5–5% nickel)

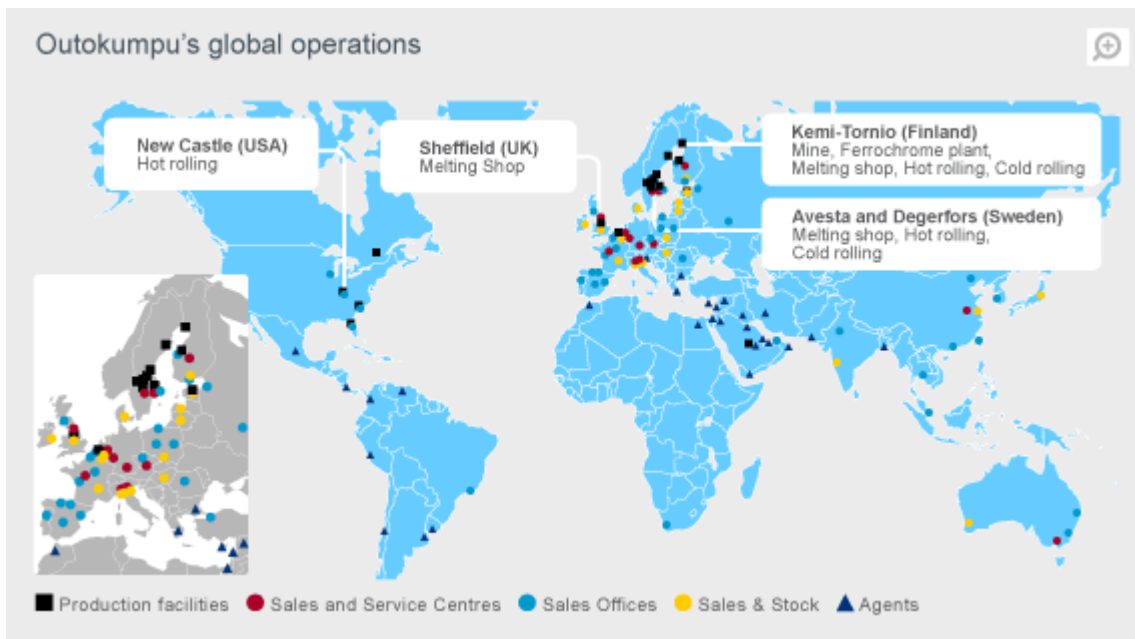
Duplex steel grades are ferritic-austenitic, contain only small amounts of nickel, and are very strong and corrosion resistant.

International presence

Outokumpu's main production facilities are located in Finland, Sweden, the UK, the US and The Netherlands.

Outokumpu's annual melting capacity totals 2.55 million tonnes and the Group has annual finished products capacity of 1.6 million tonnes for cold-rolled material and white-hot strip. Outokumpu also has annual production capacity totalling 0.3 million tonnes for long products and plate.

The Tornio Works in Finland (Outokumpu's largest site) is one of the world's most cost-efficient and highly-integrated single-site stainless steel production facilities. Production at Tornio consists in the main of high-volume standard grades of stainless steel. At the Group's integrated site at Avesta in Sweden, the focus is on special grades and products tailored to customers' specific requirements.



Market position

In recent decades, consumption of stainless steel has been growing more rapidly than that of any other metal. Outokumpu, one of the world's largest producers of stainless steel, is widely recognised as a global leader in both research and development and technical support.

Outokumpu's current strategy includes an increase in the proportion of special grades and special products in the Group's product mix.

The global stainless steel market totals approximately 30 million tonnes and has a value of approximately EUR 80 billion. During the last twenty years, consumption has grown at an annual rate of 4–5%. In western Europe, the Group's main market area, sales in 2010 totalled 3.4 million tonnes. In historical terms, consumption in Europe has grown at an annual rate of some 2%, but declined sharply in 2009 before increasing by 20% in 2010. In recent years, the largest growth in global terms has been taking place in China, where average annual growth rates have exceeded 10%.

Outokumpu had a 18% share of the stainless steel coil market in Europe and a 5% share of the global market for this product in 2010. The main markets for Outokumpu products are Europe (75% of sales in 2010), Asia (11%) and North and South America (11%).

Major stainless steel producers

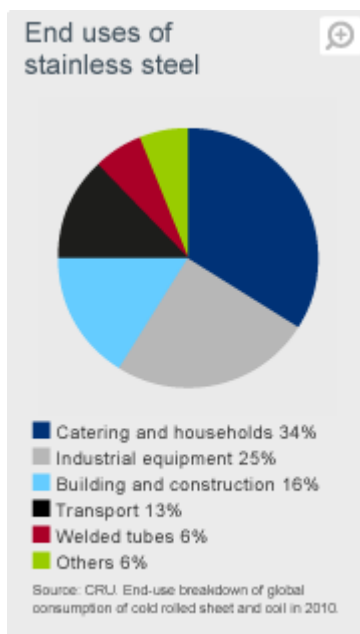
Estimated slab capacity

million tonnes	2010	2013
Acerinox, Spain	3.28	3.28
Aperam, Luxembourg	3.00	3.00
ThyssenKrupp, Germany	2.90	3.90
Posco, South Korea	2.80	2.80
Tisco, China	2.60	2.60
Outokumpu, Finland	2.55	2.55
Yusco, Taiwan	1.98	1.98

Market review

Global demand for stainless steel increased significantly in 2010 as the world embarked on a recovery from the financial crisis. The recovery was particularly strong during the first half of the year, creating good demand and leading to a 44% increase in stainless steel production compared to the first half of 2009. While the recovery continued in the second half of the year, levels of growth were more moderate. Overall, stainless steel production increased by 25% in 2010, following a decline of 5% in 2009 (ISSF).

Global end-use consumption of stainless steel increased by 13% in 2010 following a 3% decline in 2009. Growth in end-use consumption was positive in all regions and highest in China, where end-use consumption grew by 16% in 2010, up from 15% in 2009. Elsewhere in Asia, consumption grew by 15% after declining 6% in 2009. In the Americas, consumption increased by 9% following the 24% decline in 2009. In Europe, end-use consumption grew at the rate of 7%, after a 16% decline in 2009.



Demand in consumer-led industries in 2010 was higher than in more industry-focused stainless steel consuming segments which continued to be impacted by restrictions on the availability of finance for investment projects. In 2010, consumption in all end-use clusters was higher than in 2009, with the largest growth occurring in the transportation, process & resources and catering & appliances clusters. The lowest growth figure was recorded in the architecture, building & construction cluster.

In the transportation cluster, end-use consumption of stainless steel grew by 19% in 2010, following a decline of 10% in 2009. Automotive companies sought to rebuild inventories of parts and work in progress after the severe reductions in stock levels that took place in 2009. Sales of finished automotive vehicles were also good, particularly in emerging economies.

Global stainless steel consumption in the architecture, building & construction cluster increased by 7%, following a 3% decline in 2009. Although activity in this cluster in developed economies remained modest, demand was strong in developing economies, particularly China and India where the urbanisation process continues.

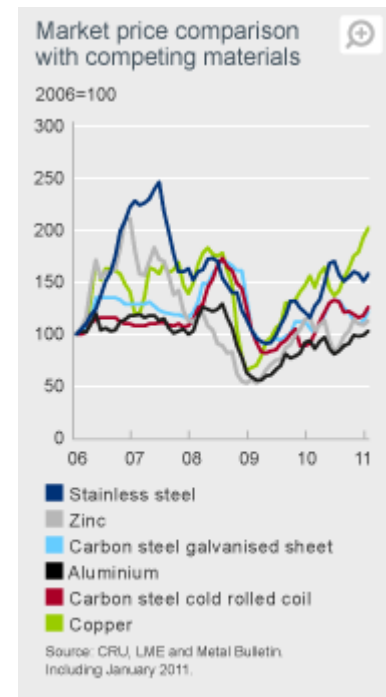
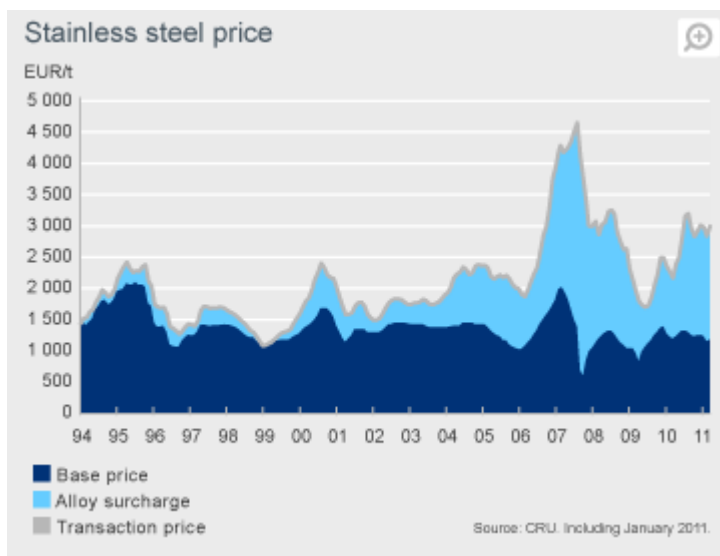
Catering & appliances was the only end-use cluster in which stainless steel consumption increased in 2009 and consumption in this cluster grew by a further 14% in global terms in 2010. Growth was strongest in emerging markets, for example the quantity of stainless steel consumed in producing white goods rose by more than 30% in China. In India, the

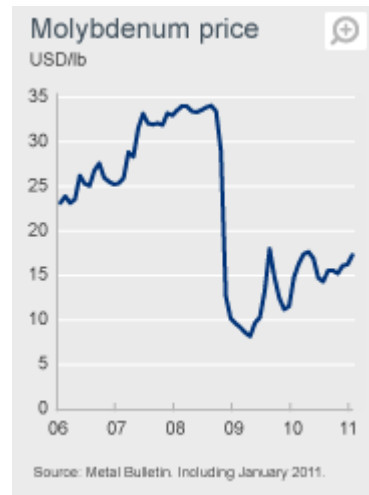
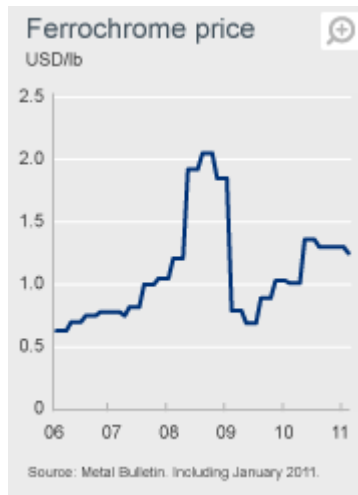
amount of stainless steel consumed in the catering & appliances cluster grew by more than 15%. Consumers in developed markets also felt positive enough to continue purchasing consumer goods.

After declining by 6% in 2009, stainless steel consumption within the process & resources cluster increased by 16% in 2010. Growth in stainless steel consumption in the chemical, petrochemical and energy cluster increased by 12% in 2010 following the 11% decline in 2009. Consumption in these two clusters was adversely affected by the continuing tight conditions in financial markets which hampered approvals for project investments.

Long-term prospects for stainless steel demand remain robust. Key global megatrends in urbanisation, modernisation and increased mobility, combined with growing global demand for energy, food and water will ensure the continuing growth of stainless steel consumption in the future. SMR estimates indicate that the average annual growth in world-wide stainless steel consumption over the 2009–2020 period will be 5.8% (CAGR). As a leading producer of stainless steel, Outokumpu is well positioned to capitalise on the world's growing need for this material.

Sources: ISSF, SMR and Outokumpu





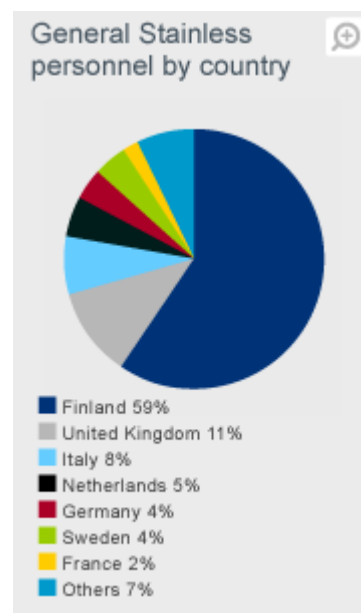
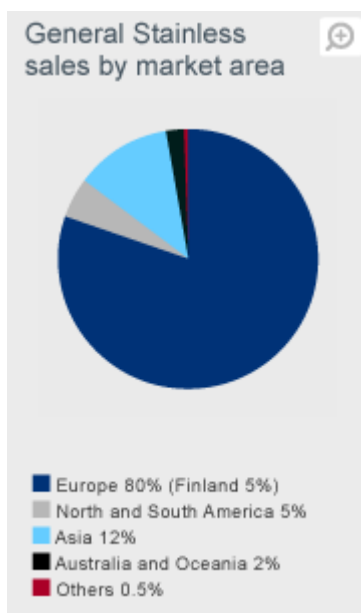
General Stainless – high-quality standard stainless steel

Outokumpu's General Stainless division produces high-quality standard stainless steel in the form of coil, sheet and long products. Europe is the main market for these products. In this standard high-volume market segment, cost efficiency, high quality and delivery reliability are key competitive advantages.

Outokumpu aims to maintain its cost leadership in standard stainless steel grades by exploiting the advantages offered by the Group's integrated stainless steel facility in Tornio, Finland.

The main applications for General Stainless products are in industrial segments such as chemicals and petrochemicals, construction and energy-related industries, pulp and paper, catering and households.

Customers are primarily distributors and processors who stock and process stainless steel to serve end-customers. General Stainless consists of the Tornio Works, the Sheffield Melt Shop and Long Products. The majority of the Group's stock and processing units and its sales companies are also reported under General Stainless. As of 1 March 2011, the Kloster plant in Sweden, previously part of Thin Strip/Specialty Stainless is also reported under General Stainless.



General Stainless key figures

€ million	2010	2009	2008
Sales	3 503	2 065	4 147
of which Tornio Works	2 334	1 292	2 701
Operating profit	14	-259	-6

of which Tornio Works	29	-183	66
Non-recurring items in operating profit	-	-	-
Operating capital on 31 Dec	2 763	2 421	2 663
Return on operating capital, %	0.6	-10.2	-0.2
Capital expenditure	73	129	332
Depreciation	148	141	135
Personnel on 31 Dec	4 029	3 753	3 938
1 000 tonnes			
Deliveries of main products			
Cold rolled	615	486	628
White hot strip	299	248	297
Semi-finished products	268	196	340
Total deliveries of the division	1 181	929	1 265

An efficient, integrated single-site operation

Located in northern Finland, Tornio Works is one of the largest stainless steel mills in the world and also the world's most integrated single-site operation. It is the only stainless steel production facility in the world that is fully backwards-integrated into the essential raw material, chrome, giving stainless its corrosion resistance. Tornio Works' main products are cold rolled and hot rolled 300-series austenitic stainless steel coils and sheets; ferritic grades are also part of the product portfolio.

The integrated production process begins at the nearby Kemi chromite mine, continues in the Tornio ferrochrome smelter and proceeds through two stainless-steel melt shops, a hot-rolling mill and cold-rolling mills. The majority of finishing operations, like slitting and cut-to-length, are carried out both directly at the cold rolling mill in Tornio or in Terneuzen in The Netherlands.

Annual production capacities at Tornio Works are:

- 1.65 million tonnes of melted products
- 1.60 million tonnes of hot rolled products
- 1.20 million tonnes of finished products from the cold rolling mills

The majority of the stainless steel produced at Tornio is standard austenitic stainless containing nickel in addition to chrome and iron (300-series). Another important 300-series grade produced is the acid resistant austenitic stainless steel containing molybdenum. Outokumpu also produces 400-series ferritic stainless steel in Tornio. As ferritic grades do not contain nickel, prices for these products have traditionally been less volatile than those of the Group's main product, 300-series austenitic stainless steel. Outokumpu's production capacity in ferritic grades totals approximately 140 000 tonnes with current product portfolio. In 2010, Outokumpu introduced a new surface finish for a ferritic grade – 2BB. Some white-hot strip (annealed and pickled but not cold rolled) and black-hot band (hot rolled) material from Tornio is also delivered to both internal and external customers.

Read more about [new products introduced to the market](#).

Research and development activities carried out at the Tornio Research Centre focus on process, product and application development.

Read more about [R&D](#).

Tornio Works' competitive edge

Tornio Works is Outokumpu's largest production unit and one of the world's most cost-efficient stainless steel operations. Production at Tornio Works accounts for approximately two thirds of the Group's total stainless steel production.

Integration with ferrochrome production

Chromium is an essential component in the production of stainless steel, as it gives the steel its corrosion resistance. It reacts with oxygen in the air to form a passive film of chromium oxide, preventing surface corrosion and blocking the spread of corrosion into the metal's internal structure.

Outokumpu's unique reverse integration into ferrochrome production offers the Group significant competitive advantages. Having an in-house chromium supply offers significant cost advantages and is also a way of mitigating risk. Chromite ore is mined at the underground mine in Kemi and then converted into ferrochrome in the Tornio Works ferrochrome smelters.

For Outokumpu, the primary benefit is the ability to source chromium at cost while selling it at prevailing market prices in the stainless steel products. As the Group's ferrochrome smelter is located on the same site as its integrated stainless steel mill, ferrochrome can be transferred to the stainless steel melt shop in liquid form, an exceptional advantage in terms of both energy usage and logistics costs.

RAP line

Tornio Works' integrated rolling, annealing and pickling (RAP) using the most modern and unique technology has a total steel strip length up to four kilometres. This provides additional production flexibility as production quantities can be shifted between semi-cold rolled and cold rolled products in accordance with market demand. As well as yielding a clear cost advantage, the Tornio Works RAP line requires less working capital than traditional cold rolling processes in which annealing and pickling operations are carried out on separate lines.

Efficient logistics

Tornio Works is located on the coast and has its own harbour. Transportation of finished products to Europe for further distribution and the shipping of raw materials to Tornio are therefore carried out in a highly efficient manner.

Ferrochrome

The chromium that provides stainless steel with its corrosion resistance is obtained from ferrochrome. Approximately 90% of the chromite ore mined around the world is converted into different grades of ferrochrome for use by the metals industry. The stainless steel industry consumes about 90% of the global production of ferrochrome (primarily high-carbon and charge grades). In 2010, global ferrochrome production totalled 8.3 million tonnes (2009: 5.6 million tonnes).

The major producers of ferrochrome are South Africa (42%), China (23%), Kazakhstan (13%), India (10%) and Finland (3%). Outokumpu's unique situation – having an in-house chromite mine with its own ferrochrome production located on the same site as the Tornio Works stainless steel plant – provides the Group with a clear competitive edge.

The main benefits of this integrated production chain are:

- The sourcing of raw material at cost while pricing the chromium contained in stainless steel products at prevailing market prices,
- The transfer of ferrochrome to the Tornio Works stainless steel melt shop in liquid form (savings in energy, transportation and logistics costs), and
- The use of carbon monoxide gas produced in the ferrochrome process as fuel in the Tornio Works stainless steel mill (reducing the need for external energy supplies).

Outokumpu is currently 60–65% self-sufficient in ferrochrome and able to satisfy the Tornio Works' needs from internal resources even when production of stainless steel is at full capacity. While the Group always attempts to optimise use of the recycled stainless steel which provides most of the balance, some primary ferrochrome is also purchased on the global market.

According to a seismic research report produced by the Geological Survey of Finland in 2009, mineral resources at the Kemi Mine could turn out to be significantly greater than indicated by earlier estimates. The intrusion which contains

chromium ore was found to extend to a depth of 2–3 kilometres and possibly to four kilometres, while the chromitite layer possibly extends to a depth of 2–2.5 kilometres or more.

Proven ore reserves at the Kemi Mine total approximately 37 million tonnes while the quantity of mineral resources totals some 87 million tonnes (estimated to a depth of one kilometre). Information in the new seismic research report indicates the existence of resources sufficient to allow several hundreds of years of mining activity even with doubled annual production volumes (the previous estimate was 70–80 years of mining activity). Outokumpu's mineral resources were not updated on the basis of these findings.

Investment to double ferrochrome production capacity

In June 2010, Outokumpu decided to restart the project to increase the Group's ferrochrome production capacity in Finland which had earlier been postponed. Including interest payments, this investment will total EUR 440 million. Annual ferrochrome production at Tornio will be doubled to 530 000 tonnes, enabling Outokumpu to cover all of the Group's internal needs and also supply global markets with approximately 200 000 tonnes of ferrochrome on an annual basis. The expanded production capacity is expected to be operational during the first half of 2013 with capacity being ramped up in 2015. At current prices and exchange rates and at full capacity, the planned expansion will yield additional annual operating profits totalling some EUR 150 million.

The ferrochrome market is very attractive because of high growth expectations and rising demand, especially from China. Demand for ferrochrome is primarily driven by the consumption of stainless steel. As ferrochrome production is a very energy-intensive process, the long-term price of ferrochrome is driven by problems with the availability of electrical power in South Africa, which supplies approximately 40% of the global market. Related constraints are expected to continue for several years, and electricity prices in South Africa are forecast to double over the next few years compared to prices in 2009.

Kemi mine and Tornio ferrochrome smelter

Production	2010	2009	2008
Ore excavated, million tonnes	1.3	0.5	1.3
Chromite concentrates, 1 000 tonnes	598	247	614
Ferrochrome	238	123	234

Ore reserves and mineral resources			
31 Dec 2010		million tonnes	grade
Ore reserves			
Proven	36		26% Cr ₂ O ₃
Mineral resources			
Indicated	13		30% Cr ₂ O ₃
Inferred	74		29% Cr ₂ O ₃

A mineral resource is a concentration or occurrence of material of intrinsic economic interest in or on the Earth's crust in such form, quality and quantity that there are reasonable prospects for eventual economic extraction. An ore reserve is the economically mineable part of the measured and/or indicated mineral resource. Ore reserves are not included in the mineral resources.

Cr_2O_3 = chromium oxide

Long Products

Sheffield

The Sheffield Melt Shop in the UK has an annual operational production capacity of approximately 400 000 tonnes. At current manning levels, production capacity is some 300 000 tonnes. The melt shop produces slabs for flat stainless steel production and billets, blooms and ingots for the production of long products.

The wire rod and reinforcing bar operations at Sheffield have an annual production capacity of 30 000–35 000 tonnes of rod in coil and reinforcing bar. Finalised in 2010, an investment of EUR 10 million in Long Products' finishing facilities in Sheffield enabled an integrated manufacturing route for small bar and reinforcing bar that complements Sheffield's existing melt shop and wire-rod mill.

Degerfors

The hot rolling mill in Degerfors, Sweden produces long products in the form of rolled billets and heavy bars from blooms cast in Sheffield. Annual operational rolling capacity at Degerfors is approximately 50 000 tonnes.

Richburg

Outokumpu's bar production in Richburg, SC in the US has an annual delivery capacity of some 60 000 tonnes of long products.

Other

Outokumpu has a 50% stake in Fagersta Stainless, a company located in Sweden that manufactures and sells stainless steel wire rod and wire products.

Specialty Stainless – special grades and products

Outokumpu's Specialty Stainless division supplies both flat and tubular products for tailored solutions and demanding customer applications. Project orders form an important part of the business, supported by a strong R&D function and extensive, long-term experience in delivering tailored solutions.

End-users

Specialty Stainless serves customers who set very high requirements on steel grade, shape, thickness and surface finish in the oil and gas, chemical and petrochemical and pulp and paper industries as well as for applications in nuclear power and desalination plants.

Products, production and R&D

The main products produced by Specialty Stainless are hot and cold rolled coil, strip and plate, heavy plate (quarto plate), tubes and a variety of fittings, and precision strip. Most of the stainless steel slabs supplied to Specialty Stainless units come from Outokumpu's melt shops in Avesta, Sweden and Sheffield in the UK.

In terms of finished products, Specialty Stainless units have production capacity totalling:

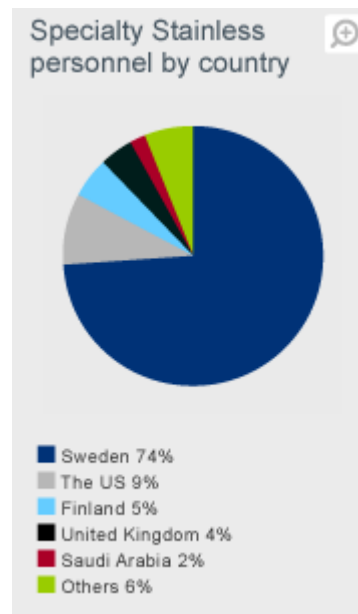
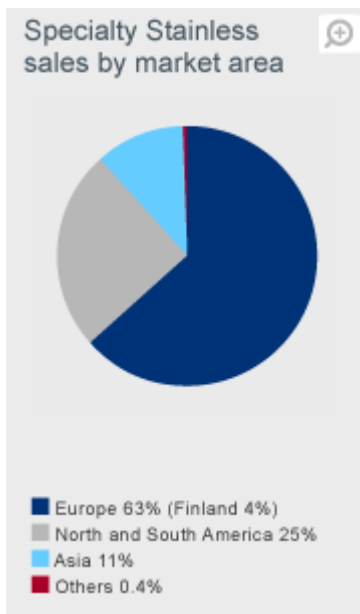
- 450 000 tonnes of cold rolled, white hot strip, plate and thin strip
- 170 000 tonnes of quarto plate
- 100 000 tonnes of tubular products

The focus of operations in Specialty Stainless is on differentiation and further specialisation in special grades and products, with specific customer needs being met through the offer of development opportunities. Duplex grades, for example, are an excellent substitute for standard austenitic (nickel-containing) grades of stainless steel. Outokumpu is a market leader in duplex grades with a global market share of some 50%.

Read more about [duplex](#).

At the Group's Avesta Research Centre in Sweden, the focus of R&D is on developing new grades of stainless steel, new applications and identifying the best solutions for each Outokumpu customer.

Read more about [R&D](#).



Specialty Stainless key figures

€ million	2010	2009	2008
Sales	1 710	1 239	2 705
Operating profit	-76	-149	-101
Non-recurring items in operating profit	-17	-20	-83
Operating capital on 31 Dec	1 277	1 035	1 174
Return on operating capital, %	-6.6	-13.5	-7.5
Capital expenditure	69	93	170
Depreciation	73	62	63
Personnel on 31 Dec	3 388	3 361	4 006
1 000 tonnes			
Deliveries of main products			
Cold rolled	133	86	154
White hot strip	124	92	142
Quarto plate	87	71	126

Tubular products	43	47	66
Long products	55	38	52
Total deliveries of the division	443	335	541

As of 1 March 2011, the organisation of Specialty Stainless changes. The former business units Special Coil & Plate and Thin Strip are replaced by the business units Special Coil and Special Plate. Special Coil comprises the flat products' production unit in Avesta, Sweden and the former Thin Strip unit in Nyby, Sweden. Special Plate comprises the quarto plate production units in Degerfors, Sweden, and New Castle, USA, the Nordic plate service centre in Degerfors as well as the unit in Willich, Germany. At the Group's Avesta Research Centre in Sweden, the focus of R&D is on developing new grades of stainless steel, new applications and identifying the best solutions for each Outokumpu customer.

Special Coil and Plate

Special Coil and Plate offers a wide range of special grades and products in a variety of dimensions.

Production facilities

Special Coil and Plate consists of the integrated Avesta production facility (coil and continuously-produced plate) and Hot Rolled Plate (quarto plate) production in Degerfors in Sweden and New Castle in the US.

As of 1 March 2011, Special Coil and Plate as well as Thin Strip are reorganised into Special Coil and Special Plate. Special Coil comprises the flat products' production unit in Avesta, Sweden and the former Thin Strip unit in Nyby, Sweden. Special Plate comprises the quarto plate production units in Degerfors, Sweden, and New Castle, USA, the Nordic plate service centre in Degerfors as well as the unit in Willich, Germany.

Products and production

Avesta is a world-class supplier to the process industry of thick, two-metre-wide cold rolled and white hot rolled products as well as continuously-produced plate. The integrated Avesta production facility covers the entire production chain from melt shop through hot rolling to cold rolling. Approximate annual operational production capacities at Avesta total:

- 500 000 tonnes for melting with the current mix
- 450 000 tonnes hot rolling (at current manned capacity)
- 250 000 tonnes of finished products

Avesta supplies the Nyby and Kloster cold rolling mills with black hot band and white hot strip material. Slabs and hot rolled plate are supplied to heavy plate operations (quarto plate). Outokumpu is the market leader in heavy plate with a more than 30% market share in Europe and a 10% market share in North America. Thick, wide, and individually rolled quarto plates are used in demanding applications in the pulp and paper, oil and gas, power plant and desalination segments, as well as in chemical tankers. Outokumpu produces quarto plates at Degerfors, Sweden and in New Castle, in the US. Annual production capacity in quarto plates is currently 110 000 tonnes at Degerfors and 70 000 tonnes at New Castle. The Group's plate service centres in Europe complement these facilities. To expand Outokumpu's ability to broaden its product mix and produce more special grades, a decision to invest EUR 104 million at Degerfors in Sweden was made in 2010. By 2014, production capacity at this site will have increased by 40 000 tonnes to an annual level of 150 000 tonnes and the Group's annual quarto plate production capacity will have correspondingly expanded to a total of 220 000 tonnes.

In accordance with Outokumpu strategy, the product mix at Avesta and quarto plate production at both Degerfors and New Castle are being shifted from standard grades towards the increased production of value-added, customised special grades – especially duplex grades – to ensure that end-user and project customers can be offered the Group's entire product range.

Thin Strip

Outokumpu's Thin Strip operations consist of cold rolling mills at Nyby and Kloster in Sweden. These mills have a combined annual delivery capacity of approximately 145 000 tonnes (Nyby some 100 000 tonnes and Kloster some 45 000 tonnes). Thin strip products are commonly used in plate heat exchangers, domestic heaters and heating elements, flexible tubes and automotive head gaskets. Annual production capacity in special grades at Nyby totals some 70 000 tonnes.

As of 1 March 2011, Special Coil and Plate as well as Thin Strip are reorganised into Special Coil and Special Plate. Special Coil comprises the flat products' production unit in Avesta, Sweden and the former Thin Strip unit in Nyby. The Kloster plant reports under [General Stainless](#).

Outokumpu Stainless Tubular Products (OSTP)

OSTP manufactures and markets welded stainless steel tubes and pipes as well as butt-welded and threaded fittings. With a market share of almost 20% in the process-pipe segment, Outokumpu is one of Europe's largest producers of stainless steel tubes. Tubular products are manufactured in Canada, Estonia, Finland, Sweden and the US. The Group's main products – process pipes and fittings, heavy-wall pipes and heat-exchanger pipes – are used in most segments of the process industries in the pulp and paper, oil and gas, chemical and petrochemical, automotive, and construction sectors. Annual delivery capacity at OSTP totals some 100 000 tonnes.

As part of the restructuring of OSTP, the operation producing structural hollow sections in Jakobstad in Finland was sold to Stal tube Oy in 2009. The OSTP site in Veteli in Finland was closed in the first quarter of 2010 and production was moved to Jakobstad in Finland and Örnsköldsvik in Sweden.

In Saudi Arabia, the OSTP joint venture with Armetal, a tube manufacturer, is creating the largest local producer of process pipe. Investments made during 2010 expanded the product range substantially.

Duplex grades

Demand for ferritic-austenitic duplex grades is growing significantly faster than demand for standard stainless grades. In addition to its low nickel content, duplex stainless steel is characterised by good corrosion resistance and high strength, allowing thinner gauges to be used in a variety of applications such as tanks, pressure vessels, piping, transportation, building and construction, and desalination plants. Considerable reductions in material costs can be achieved. Outokumpu is the clear market leader in duplex grade stainless steel with a global market share of some 50%. The Group's Avesta Works has a long and successful track record in the very demanding process of duplex production.

Outokumpu LDX 2101[®], a lean duplex grade developed and patented by Outokumpu, has a nickel content of only 1.5%, making its price less dependent on the volatile price of nickel. In terms of corrosion resistance, LDX performance is similar to that of standard austenitic 304 grade (8% nickel), but Outokumpu's lean duplex stainless steel is twice as strong as the standard grade and has met with great success in demanding applications. To facilitate market penetration, Outokumpu has granted LDX 2101[®] manufacturing licences to a number of stainless steel producers in Europe and Asia.

A new member of the Outokumpu lean duplex family was launched in 2010. Outokumpu LDX 2404[®] has a 3.6% nickel content and is well positioned in relation to 316L, the acid-resistant standard austenitic grade (10% nickel). As LDX 2404[®] has a higher chrome and nitrogen content than 316, it offers higher levels of corrosion resistance, making it an excellent choice for the salty atmospheric conditions which prevail in buildings located near the sea. The higher mechanical strength of LDX 2404[®] also allows the use of thinner gauges, offering additional benefits in bulk liquid storage tanks, road and rail tankers, pulp and paper machinery and water-treatment facilities. The combination of improved corrosion resistance and higher strength makes LDX 2404[®] a very cost-effective solution in such applications.



Group level functions

Outokumpu's main Group level functions include

- Group Sales and Marketing,
- Supply Chain Management and
- Research and development.

See the Group organisation [here](#).

Group Sales & Marketing

- End-user and project customers
- Distributor and processor customers
- Regions and stock & processing
- New products and solutions
- Taking our customers' pulse

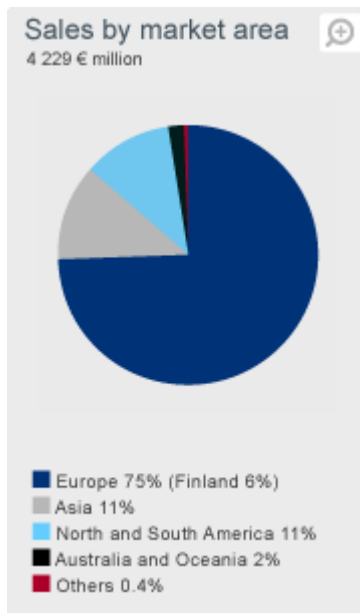
Outokumpu is a global leader in stainless steel with the vision of being the undisputed number one. Customers in a wide range of industries – from catering and appliances to building and construction, transportation and chemical, petrochemical and energy, as well as process and resources – use the Group's stainless steel and the services we provide worldwide. Fully recyclable, maintenance-free, strong and durable stainless steel is one of the key building blocks for a sustainable future.

What makes Outokumpu special is the superior level of technical customer service we offer: technically and commercially competent individuals located close to the customer, understanding our customers' processes and applications and employing environmentally-sound production processes to produce stainless steel.

Commercial organisation based on industry groups

Launched in April 2008, Group Sales and Marketing, the Group's commercial organisation, completed its second full year of operation in 2010. Sales and marketing is organised into customer-specific industry groups in order to best understand the needs of different customers and to provide them with the best possible service. Group Sales and Marketing consists of two global customer sectors: End-users and projects and Distributors and processors. Outokumpu supports its customers through its own sales and service centre networks (our Regions and Stock & Processing operations). Segmentation of customer industries into clusters allows Outokumpu to offer customers a complete range of products and services, to specialise in specific customer industries and to identify optimal solutions.

Headquarters in Belgium



Outokumpu's commercial headquarters is located in Zaventem, Belgium, close to Brussels. This office is the central meetings location for cluster teams, and also houses Group Sales and Marketing management as well as other central commercial functions.

Understanding the needs of end-user and project customers

Currently, approximately 35% of Outokumpu deliveries are delivered directly to end-user and project customers. Outokumpu develops its end-user business through local and global key accounts – seeking both new technical and business solutions, as well as continuously accurate deliveries. New solutions lead to additional growth in special grades of stainless steel, such as the Group's extensive range of duplex products.

Outokumpu's end-user and project business is organised into five industry-based clusters:

- Architectural, building and construction
- Transportation
- Catering and appliances
- Chemical, petrochemical and energy
- Process and resources

In addition to serving key customers, a significant amount of effort within each cluster is targeted at developing new business and product offerings. Each cluster is managed by cross-functional teams consisting of key account managers, application and product experts, R&D and supply chain specialists, as well as the Group's frontline sales force in the regions. In addition to its strong market position in Europe, Outokumpu has important markets and growth opportunities in China, India, Latin America and the Middle East.

A key component in Outokumpu's end-user and project customer business are the services we provide for key accounts. Dedicated key account managers and teams serve these customers in a personalised manner, offering the Group's full product portfolio and tailor-made solutions on a global basis.

To support end-users of stainless steel and related stainless solutions, the Group participates in exhibitions which focus on relevant industries. In 2010, Outokumpu was present at more than ten exhibitions of this type, including the 7th EverythingAboutWater (Chennai, India), Expomin (Santiago, Chile), and China Paper (Shanghai, China).

Distributor and processor customers – a focus on stable, long-term relationships

A significant proportion of the global stainless steel market is served by independent distributors and service centres. For Outokumpu, these customers are our key business partners and represent a large part of the Group's customer base and route to market. Together with our long-term distributors, Outokumpu is working to reinforce the Group's strategy of developing a more stable and profitable business model. This is of particular importance in high-volume standard products and making the best of the highly integrated and cost-efficient Tornio operations.

Processors such as large-volume re-rollers and tube makers are also an important sector for Outokumpu. Close relationships with these customers are important as they enable the Group to develop products, processes and working methods that deliver long-term advantages.

Outokumpu's distributor and processor business is organised into two clusters:

- Distributors
- Re-rollers, tube-makers and further processors

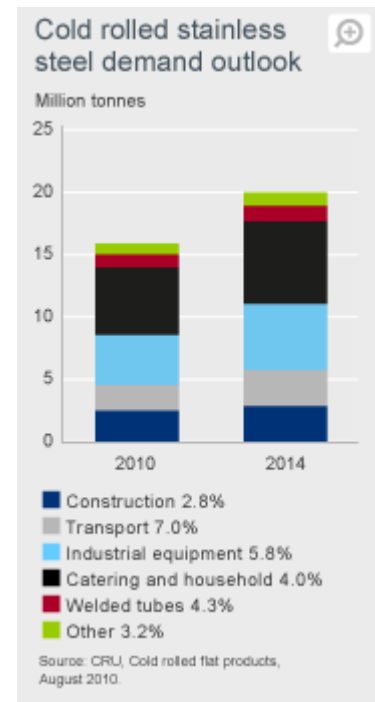
Some members of the Group's sales teams focus exclusively on these customers, enabling Outokumpu to respond to their specific needs.

Regions and stock & processing – the day-to-day customer interface

Outokumpu's network of sales companies and service centres is managed through the Regions and stock & processing operations function. The Group's more than 30 sales companies are divided into seven regions. Outokumpu has sales personnel in almost 40 countries with another 30 countries being served through dedicated agents.

Service centres operate as part of the sales company in the country in which they are located. A central team is responsible for both processing efficiency in the service centre network and for its supply-chain efficiency.

Outokumpu has nine coil service centres and eight plate service centres in 14 locations in 10 countries. Coil service centres typically have machinery such as cut-to-length and slitting lines, as well as different types of surface-finishing and polishing units. Plate service centres specialise in cutting shapes from heavy plates using laser, plasma or water-jet cutting equipment. Some of the Group's plate operations are also equipped with bending equipment.



Expansion of our service centre network

Outokumpu's service centre network plays a central role in serving end-user and project customers. In 2010, some 400 000 tonnes of deliveries to customers passed through the Group's service centres. A greenfield service centre in Kunshan near Shanghai in China which processes mainly special grades began operation in early 2010. Annual processing capacity at this facility will eventually total 30 000 tonnes.

New products and solutions

Outokumpu made two major product launches during the year: Ferritic 2BB and Outokumpu LDX2404®. Ferritic 2BB is a bright-surface, grade EN 1.4016 product targeted at the catering & appliances and white goods segments as an alternative to traditional bright-annealed products. It has already been certified by some major white goods manufacturers for use in washing machine drums and interior components in dishwashers. Invitations to a series of events organised for catering & appliances customers during 2010 were engraved on shiny ferritic 2BB stainless steel sheet.

Outokumpu LDX2404® is a new member of the Group's lean-duplex family. The high-strength and low nickel content LDX2404® offers better corrosion resistance than the Outokumpu LDX2101®. This new lean-duplex product was launched at two major stainless events: Stainless Steel World America in Houston, Texas, and at the Duplex World Conference & Exhibition in Beaune, France.

Read more about [Outokumpu's duplex grades](#).

Taking our customers' pulse

Outokumpu is in the process of harmonising its customer satisfaction surveys. In the past, separate surveys have been conducted by Group production units and Group sales companies and while these provided valuable information, the difference in approach meant that assessment of the overall situation was difficult. To overcome this drawback, a single Group-wide survey will be conducted in the future.

The system selected for this purpose is based on the 'net promoter' approach, and it does not involve completing lengthy questionnaires or engaging in extended interviews, it is 'respondent friendly'. In essence, it turns around a single question posed during normal Outokumpu/customer contacts, i.e. 'Would you recommend Outokumpu to your colleagues?'. Individual scores are then combined into a customer satisfaction score which is continuously updated. The survey will be an on-going process and will be piloted during the first half of 2011 in selected markets, with global roll-out in the second half of the year. Starting in the second half of 2011, the customer satisfaction score will be one of the Group's key performance indicators.

A final one-off customer survey was done in September 2010. Some 250 customers from France, Germany, Italy, Poland, Spain, Sweden and the UK participated in the survey. The three most important factors that customers use when selecting a stainless supplier were product quality, accurate delivery performance and competitive prices.

Compliance to ethical code in the heart of business

E-training in competition compliance continued during 2010, and some 500 Outokumpu sales personnel had either started or completed the three training modules by the end of the year. To supplement the English-language version, German, French and Italian versions were introduced in January 2011.

Compliance with UN, EU and US embargo lists was further enforced during 2010. An aggregated up-to-date list is available to Group sales personnel at all times. Using this, Outokumpu is able to ensure that the Group does not sell any of its products to totally-embargoed countries, or sell embargoed products to partially-embargoed countries.

During 2010, Outokumpu established a process that governs sales to the armaments and military sector, even though this sector receives only a marginal proportion of the Group's total deliveries. Customers in this sector are required to provide assurances that they will comply with the EU, UN and US embargo lists, and also asked to provide Outokumpu with evidence that they have in place measures comparable to Outokumpu's Code of Conduct and associated ethical standards. In cases of non-compliance, Outokumpu withholds sales to such customers.

outokumpu.com

The Outokumpu website at www.outokumpu.com, is widely recognised as one of the steel industry's most attractive and informative Internet locations. In 2010, it received more than a million visitors, making it the industry's second-most-visited website.

Supply Chain Management

- Procurement excellence
- Responsibility in procurement
- Product development and sourcing optimisation

Supply Chain Operations

The Supply Chain strategy supports the Group Commercial strategy through the focus on higher delivery performance, stable and shorter lead times and it supports the Group's overall strategy by optimising inventories, which results in efficient use of working capital.

The focus placed on delivery performance was very successful in 2010; achieving a significant improvement from the 2009 figure of 82% to 88% in 2010. Contributing factors included a diligent use of realistic available capacities for sales and increased operational focus on all shipments.

More efficient and lower working capital is a key strategic target for Outokumpu and in 2011 there will be extra focus on increasing efficiency of use of inventory in order to increase competitiveness. During 2010 Outokumpu's sales volume increased by 27% while inventory volumes increased by 12% compared to the situation in 2009.

Important activities in 2011 will consist of further increasing the efficient use of inventories, e.g. between the Group's service centres and production units in order to achieve more inventory consolidation opportunities within the Group. This is being supported by integrating the functions and business units. The existing common excellence tools and techniques will be used to achieve the ambitious long term supply chain targets especially in inventories, delivery performance and lead times.

Excellence programmes

The Operational Excellence programmes launched in 2005 and originally comprising Production and Commercial Excellence were expanded to include also Supply Chain Excellence in 2007. Work in all areas of the Excellence programmes has continued in order to achieve significant sustainable benefits for the Group. Benefits have been achieved through the Operational Excellence programmes for example by improved Group-level supply chain management, more efficient utilisation of raw and other materials, exploiting the procurement leverage, providing additional capacity for solving production bottlenecks, improved pricing discipline, and achieving growth in key customer accounts.

The project phase of the Operational Excellence Programmes ended at the end of 2010. The excellence work has now become part of daily operations management and will remain Outokumpu's method to identify, implement and maintain improvements. In the short term the Excellence work will continue to focus on working capital reduction, optimising raw material usage, quality development and capacity enhancement. All activities continue to be underpinned by the greater involvement of all Outokumpu employees to provide sustainable improvement and the sharing of best practise and rigorous standardisation where necessary.

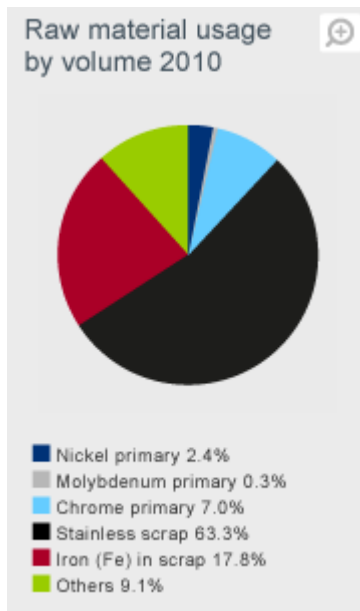
Procurement Excellence

General procurement activities

Under the pressure of a global downturn in economic activity, cost control has continued to play a crucial role in Outokumpu's sourcing operations. As an element of the Group's Supply Chain Excellence, Procurement Excellence is pursued as a key driver in reducing Group purchasing costs. Procurement Excellence aims at building capabilities for continuous improvement in procurement activity and reducing Outokumpu's total cost of purchasing by eliminating the losses that result from fragmented purchasing volumes, lack of alternative sources, untapped supplier know-how, and uncontrolled expenditure. This is a long-term project and a key driver for continuous improvement in the overall procurement function. Procurement Excellence is based on a category management approach leveraging knowledge of suppliers, products and services, development of professional procurement capabilities, optimal use of materials, products and services, and leveraging of the Group's purchasing power.

During 2010, steps were taken to intensify the efforts to realise sustainable cost savings in the area of general procurement. The number of sourcing categories to be pursued at a Group level has been increased to cover some 45% of the Group's general procurement spend. A new Group-level category-manager organisation was established with the responsibility for managing and coordinating the group's sourcing activities in accordance with strategies and plans developed in collaboration with the Group's business units. A revised general procurement policy was also issued in 2010, confirming the principles to be followed in connection with Outokumpu's sourcing activities, including the goal of dealing with those suppliers who operate to similar standards as Outokumpu when it comes to ethics and corporate responsibility.

Raw material procurement



The majority of Outokumpu's costs are associated with the purchase of raw materials. The primary raw materials used in stainless steel production – nickel, ferrochrome, recycled stainless and carbon steel – are purchased on the open market, but a proportion of the Group's ferrochrome needs are sourced internally.

Following the economic downturn in 2008–9, stainless steel volumes increased significantly in 2010 compared with 2009. Most of the raw material prices also increased and the average nickel price in 2010 was 21 809 USD/tonne, up about

50% compared to 2009. The ferrochrome price rose approximately 45% and molybdenum about 40%. With both higher volumes and higher prices, it meant that total raw material costs in 2010 almost doubled compared with 2009. The internal production of ferrochrome covered most of Outokumpu needs.

Outokumpu recognises its responsibilities towards suppliers and the communities in which we operate. Outokumpu is sourcing raw materials both locally and globally and the objective is to secure a wide enough network of various suppliers in order to minimise the risk of being dependent of a too small number.

Outokumpu continued to cover a reduced proportion of its primary metal needs with long-term contracts during 2010. Most metal markets were balanced during the year and there were no major problems in sourcing the required raw materials. One exception was the market for recycled stainless steel, which was somewhat tight during the first six months of the year.

Focus continues to be on optimising the sourcing of raw materials from recycled steel and this has been achieved with very good results. It is the most sustainable way to produce stainless steel. Outokumpu has also continued to optimise the usage of other raw materials at the melt shops with good and sustainable results. These activities will continue as part of daily operations.

Outokumpu managed to lower the total raw material inventories during 2010 and this will remain a priority in 2011.

The OUPEX programme

The Outokumpu Procurement Excellence programme (OUPEX) is a Group-wide procurement development programme for implementing both a common way of working and a common SAP system as well as raw materials purchasing and inventory management. The system is based on a common template jointly designed by a number of the Group's business units. During 2009 and 2010, OUPEX was taken into use at Tornio Works and the next steps in rolling it out to other units and sites are envisaged to be taken from 2011 onwards.

Responsibility in procurement

As the global financial crisis and the resulting global recession put pressure on Outokumpu and all companies in the industry, cost control has continued to be increasingly important. Outokumpu has continued to focus on corporate responsibility issues in both product development and our supplier evaluation processes. The Group's goal is to do business with responsible partners.

During 2010, a survey was conducted covering the Group's strategic suppliers in the area of raw materials and general materials, in order to assess the extent to which the suppliers take corporate responsibility, such as environmental, health and safety, discrimination and equal employment opportunity issues, into account in their activities. The outcome of the survey will be incorporated into the continued dialogue with the suppliers in order to ensure that the shared commitment to enhancing these values will continue. The same values will be further addressed in connection with the ongoing development of approval, evaluation and auditing routines in our supplier management processes.

In connection with our pursuit of Procurement Excellence, Outokumpu has continued to implement measures designed to further reduce procurement costs and additional cumulative savings have been realised. The company has also continued to focus on increasing business with those suppliers who offer more efficient alternatives from a total-cost of ownership perspective, thereby achieving increased efficiency in the use of those inputs and the company's assets overall.

Product development and sourcing optimisation

In addition to direct cost savings achieved in sourcing, optimisation of Outokumpu's product development and sourcing was carried out in number of areas such as:

- In the area of raw materials Outokumpu has continued to heavily focus on consuming as much recycled steel as possible with very good results. The company has also continued to optimise the usage of other raw materials at melt shops with sustainable good results. These activities will continue as a normal part of daily operations.
- In connection with graphite electrodes, refractory materials and related consumables, suppliers have been selected with a particular focus on total cost efficiency, including the total yield and energy consumption.
- In packaging materials, a number of sourcing categories are exploring ways of reducing overall costs, including the use of re-cycled and alternative material solutions.
- In covered rolls, Outokumpu is working with suppliers to investigate alternative materials which could provide further reductions to the total costs of using the rolls.
- During 2010, the general procurement excellence efforts have been expanded by establishing additional Group-level sourcing categories as well as deepening cross-functional and cross-business unit cooperation with the suppliers. All these activities have the aim of achieving additional savings in the future. In 2011, the category management approach will be expanded into Logistics to further reduce costs and improve efficiency.

In the long-term, Outokumpu believes that the most innovative ideas for optimising total cost ownership result from creative cooperation with suppliers and partners. The key to sustainable development is sharing mutual benefits with responsible suppliers who take economic, environmental, and social responsibilities into account in their daily operations. Outokumpu has a high regard for suppliers who maintain the highest ethical standards, respect human rights and work to protect the environment.

Research and development

- [Product safety](#)

Outokumpu's research and development operations involve process development, product development and application development. In process development, the aim is improved energy- and cost-efficiency in the Group's production processes while securing high-quality and consistent products and reductions in the environmental impact of our operations. In product development, the focus is on cost-efficient low-nickel and no-nickel stainless steel grades and on added-value special products such as high-corrosion-resistance, heat-resistant and high-strength stainless steels. Other important areas in R&D include applications development and providing our customers with comprehensive technical support. The Group's R&D function operates in close co-operation with Outokumpu's commercial organisation and is a source of valuable advice regarding material selection, properties and fabrication techniques. Outokumpu R&D personnel are also involved in joint projects connected with customers' product development activities.

Outokumpu invested EUR 22 million (0.5% of net sales) in research and development in 2010 (2009: EUR 19 million and 2008: EUR 20 million). The Group's two research centres are located in Tornio, Finland and Avesta, Sweden. R&D is also carried out at Outokumpu production sites. The Group R&D operations employ almost 200 professionals.

At the Tornio Research Centre, the focus is continuous improvement of production processes and the development of no-nickel ferritic steel grades. In 2010, delivery volumes of ferritic grades developed positively. One important recent development is the bright-pickled 2BB ferritic material produced at Tornio Works on the recently-modernised annealing pickling line. The surface finish of 2BB is a perfect alternative in applications which require a bright surface combined with good mechanical properties. Typical applications for 2BB are in the catering & appliances segment and in the architecture, building & construction segments.

At the Avesta Research Centre, special stainless steel grades including high-alloyed corrosion-resistant and heat-resistant grades and high-strength, corrosion-resistant duplex steel grades are under development. In 2010, Outokumpu launched LDX 2404[®], a new duplex stainless steel grade which features higher mechanical strength than other major duplex grades currently on the market. LDX 2404[®] is well suited to applications where its excellent mechanical properties and good corrosion resistance can be utilised – in storage tanks, in road and rail tankers, in building and construction projects and in a variety of industrial processes. Lower-weight, lighter designs mean cost-efficient projects requiring less material, and ongoing benefits include savings in transport and maintenance costs as well as reductions in energy consumption.

A broad expertise

Outokumpu's research and development organisation has extensive, in-depth experience and knowledge of the properties and use of stainless steels. This knowledge is utilised in both application development and in the technical support we offer our customers, helping them to select optimum steel grades and optimise their manufacturing processes. Areas of particular interest are lightweight structures which exploit stainless steel's high strength and low lifecycle costs, as well as applications connected with green energy and clean water solutions. As a part of our technical support activities, the first edition of the *Outokumpu Welding Handbook* was published in August 2010. Welding is the most important process when assembling stainless steel components. Through this new publication, Outokumpu is contributing to existing knowledge and offering hands-on advice on welding methods and processes, as well as providing designs and design information based on the use of stainless steel.

Outokumpu conducts joint development projects in co-operation with industrial partners, universities and research institutes within national and European research programmes. Together with representatives of other stainless steel producers, Outokumpu R&D personnel participate in activities in ISSF (the International Stainless Steel Forum), Eurofer (the European Confederation of Iron and Steel Industries) and EuroInox (The European Stainless Steel Development

Association). Outokumpu is a shareholder in two Finland-based strategic centres for science, technology and innovation – the Finnish Metals and Engineering Competence Cluster (FIMECC Ltd) and the Cluster for Energy and Environment (Cleem Ltd) – and is an active participant in associated research programmes. Three Outokumpu-related foundations – the Outokumpu Stainless Research Foundation in Sweden, the Outokumpu Stainless Research Foundation in the UK and the Technology Industries of Finland Centennial Foundation Fund for the Association of Finnish Steel and Metal Producers – provide support for researchers and students. In 2010, Outokumpu also supported higher education and research by donating EUR 1 million to Finland's Aalto University.

Research and development activities within Outokumpu resulted in the filing of four patent applications in 2010. The development of methods to increase internal efficiency in R&D activities was also promoted, as was an initiative on the subject of Innovation management aimed at increasing R&D output.

Product safety

Consideration of issues that affect health and safety is important not only during the process of manufacturing stainless steel, but also when Outokumpu customers are further processing the material, when stainless steel products are being used, and when steel is returned for re-melting.

As stainless steel is inert and non-reactive when employed correctly, potential health and safety impacts are extremely limited. This explains why stainless steel is so widely used in medical appliances and for equipment and tools employed in the food processing industry. In addition to long-term experience with stainless steel in a wide variety of applications, the material has also been tested and reviewed for possible health effects. The most recent review of this type was conducted by the Finnish Institute of Occupational Health and published in 2010.

Outokumpu manufactures stainless steel grades that are standardised and proven to be safe for their recommended use. To ensure that all products manufactured by the Group comply with the specified requirements, Outokumpu's main production sites are certified in accordance with the ISO 9001 quality standard. Many of Outokumpu's sales and distribution companies are also certified in accordance with this quality standard; in total 90% of Outokumpu's personnel work in companies that are certified.

REACH stipulates the safe use of chemicals

In 2010, thousands of chemicals had to be registered in REACH by their manufacturers or importers. Large quantities of test data and instructions for the safe use of chemicals were generated during this process. Outokumpu successfully submitted registrations for all the substances manufactured by the Group. As a user of chemical substances, we have actively approached our suppliers to ensure that they also fulfil their obligations under REACH. Products manufactured by Outokumpu do not contain any SVHC (Substances of Very High Concern) as defined by the European Chemicals Agency (ECHA).

Outokumpu also takes account of specific end-use concerns. As there are restrictions on the use of metal compounds such as lead, cadmium, mercury and hexavalent chromium in the electronics and automotive sectors, the Group does not use these substances in its manufacturing processes.

Safety and methods of risk evaluation

Most stainless steels contain nickel, a metal classified as harmful in the EU. As stainless steel is inert, there is however no risk to either humans or the environment from stainless steel products in their normal use, a fact that has been demonstrated through both laboratory studies and the material's long history of usage.

Unfortunately, the fact that manufactured steel is a very different material from the components used in its manufacture is sometimes not fully understood by regulators. For example, how can the same grade of stainless steel be judged

perfectly safe for use in equipment in which food is prepared, but considered hazardous when used in an elevator wall panel? It is of course equally safe in both applications. The difference lies in how possible risks are evaluated. Materials that come into contact with food are thoroughly tested to ensure they do not have any effect on food or release dangerous substances. But content-based methods of evaluation such as those used in eco-labelling criteria do not allow for an assessment of the manufactured material. If any substances classified as hazardous feature among the raw materials used to manufacture a new material, use of that material can be restricted simply on the basis of its contents. This approach does not take into account the fact that the properties of metal alloys such as stainless steel can be radically different to those of its initial constituents.

Information to customers

Outokumpu provides health and safety information on products and materials supplied by the Group. Technical data sheets offer detailed information on the chemical and technical properties of each stainless steel grade. Information on topics such as Occupational Exposure Limits for substances contained in stainless steel will also be provided in Outokumpu's Safety Information Sheets, as well as advice on safety measures to be employed when handling stainless steel, for example when welding.

Reports on the health and environmental impacts associated with the use of stainless steel are issued by marketing organisations such as EuroInox. Information is also available in the product safety bulletins issued by international organisations representing the nickel, chromium and molybdenum industries.

A long-term commitment to sustainability

Stainless steel is 100% recyclable, hygienic, corrosion-resistant and the environmental impacts resulting from its use are almost non-existent. On the other hand, its production – both the manufacturing and reprocessing stages – does have an impact on the environment. The most substantial environmental impacts which result from stainless steel production process include emissions of dust and particulates into the air, discharges of water from production plants, and the high levels of direct and indirect energy consumption during production. Landfill waste is also created during the production process.

Outokumpu's way of managing environmental issues

Guided by the Group's Environment, Health, Quality and Safety policies, Corporate Responsibility Policy and Ethical Principles, Outokumpu's firm objective is to minimise the environmental burden of the Group's operations as much as this is economically and technically feasible. All Outokumpu's larger production sites employ either Environmental Management Systems (EMS) or risk-based management systems which help in avoiding spills and accidents that could be harmful to humans or to the environment. All of these Group systems operate in accordance with ISO 14001, the international standard for environmental management systems. Outokumpu's aim is to achieve a single Group-wide certificate. Currently 90% of our production sites have individual certification. The functioning of these systems is monitored using both internal and external audits. The Group also provides the appropriate authorities with reports on Outokumpu's operations in all the countries in which we operate. At Group level, our operations are managed and best practices applied through our environment network, whose working groups and environment committee meet once during each quarter.

Outokumpu believes that stainless steel will play an important role in the sustainable development of global infrastructure.

Outokumpu to increase its focus on environmental footprint

Stainless steel's very low environmental impact during the use phase, its durability and very low maintenance requirements are recognised. At the end of each product's life, its constituent materials are also fully recyclable. The life cycles of stainless steel products consist of several phases. Outokumpu's aim is to improve levels of sustainability in each phase from production through to re-use, and also to secure a sustainable supply chain all the way from suppliers of recycled steel to the production of stainless steel products.

Many applications that employ stainless steel already have a beneficial impact by reducing the total environmental burden exerted by human society. On a global scale, current trends towards achieving sustainability and reducing the extent of climate change are strong. The EU Climate and Energy Package focuses on renewable energy sources, emissions control and energy efficiency. Almost all nations and regions are targeting less-carbon-intensive forms of society.



Stainless is optimal for sustainable solutions

Outokumpu strongly believes that stainless steel will continue to play an important role in the sustainable development of global infrastructure. New business opportunities can already be identified as the use of stainless steel represents an important component in solutions which address humanity's growing demands for clean energy and pure water. Renewable energy solutions such as solar power, biofuels and wind energy require components and materials that can be sustainably sourced and yield low life cycle costs. Stainless steel is an optimal choice in such areas. What could be more practical than a metal that can be fully recycled multiple times without losing its intrinsically excellent qualities and which can be produced using the materials obtained when decommissioning redundant structures? For example, the steel structures in old, inefficient facilities can be dismantled and recycled to make new stainless steel products with far more advanced properties and characteristics. Technologies that help us adapt to the effects of climate change such as water purification systems and infrastructure that can withstand severe weather are being added to the list of solutions that will be built using corrosion-resistant materials.

Stainless already a key material in many applications

Stainless steel is already a key material in desalination equipment and processes. High-strength grades enable the use of thinner gauges in a variety of applications such as tanks, pressure vessels and piping, and also in transportation, civil and structural engineering solutions, with considerable savings in material costs. The development on duplex steels allows e.g. most building requirements to be reached with the added corrosion resistance that helps to increase the structure's lifespan. In road tankers, the properties of Outokumpu's duplex stainless steels allow considerable reductions in tank wall thickness, yielding lighter and less costly solutions with corresponding energy savings and reduced emissions. Together with the provision of technical customer support, a major subject of focus in the Group's R&D activities is assisting our customers along the path to a more sustainable economy. Outokumpu's austenitic and special grades of stainless steel ensure that we will be making positive contributions to future developments in sustainable solutions.

Environmental management has to be able to answer these challenges and needs for sustainable products and solutions. In the future, Outokumpu will be paying more focused attention to life-cycle-oriented environmental management. The importance of life-cycle data, both for internal use in highlighting areas where improvements are required and for external purposes in communications with customers and other stakeholders, has already been

recognised. For example, Outokumpu has used Life-Cycle-Inventory data to publish an Environmental Product Declaration for Outokumpu Cr-Ni (chrome-nickel) stainless steel. This is a public document which describes the main environmental effects and energy needs of the Group's most common stainless steel grade throughout its supply chain. Outokumpu's environmental and energy reporting, data management and analysis are supported by an Energy & Environment Reporting (EER) system which provides internal reporting and analysis tools for all the Group's production sites. The availability of robust and verified data is the starting point for managing sustainability throughout a product's life cycle.

Read more on [defining issues of focus in sustainability at Outokumpu](#).

Environmental goals and results

Ambitious targets

Annual routines at all Outokumpu production locations include the setting and monitoring of independent environmental targets. These processes are built into the company's environmental management systems with key targets at Group level for each calendar year. Setting concrete, measurable targets for Outokumpu's operations is an effective way of focusing attention on specific environmental and energy issues throughout the Group.

Long term target

By 2020, a reduction of 20% in direct and indirect CO₂ emissions by the Group per tonne of stainless steel produced.

As mentioned in its Energy and low-carbon programme published at the beginning of 2010, Outokumpu is committed to the long-term target of reducing the Group's carbon emissions profile (both direct and indirect emissions) by 20% per tonne of stainless steel produced by 2020. This challenging target is a clear demonstration of Outokumpu's desire to improve the Group's energy efficiency, to contribute to a reduction in global emissions of carbon dioxide, and to participate in the transformation to a low-carbon society.

Group-wide environmental targets

Goals for 2010

- No significant environmental incidents.

- Climate change: Reduction of emissions in line with Outokumpu's long-term target of achieving a 20% reduction in direct and indirect CO₂ emissions by 2020 per tonne of stainless steel produced.

- Energy efficiency: A reduction of 1% in energy consumption per tonne of stainless steel processed with 2007 as the base year.

- Materials efficiency: Further reduction in waste to landfill per tonne of stainless steel produced.

Results 2010

- Environmental incidents: The target of zero incidents was not achieved. There was one incident classified as significant in 2010. A leak of acid at Tornio was detected but environmental damage was prevented. As the potential risks associated with this incident to both safety and the environment were very high, it was classified as significant.

- Climate change: A reduction of 0.3% in direct and indirect CO₂ emissions profile was achieved.

- Energy efficiency: Reduction of 3% in energy consumption per processed tonne was achieved (with 2007 as the base year). This has been a Group-wide target for three years, and was finally achieved. The main reasons were continuous investments in energy efficiency during 2008–2010 throughout the Group and

recovery of production volumes towards pre-2009 volumes enabling us to capitalise on the investments results.

- Materials efficiency: Reduction of waste to landfill per tonne of stainless steel produced was achieved. This was mainly due to improved processes in slag handling enabling a situation where no slag was landfilled at Tornio; instead, all slag was utilised or stored for future utilisation.

Goals for 2011

- No significant environmental incidents.
- Climate change: Reduction of emissions in line with Outokumpu's long-term target of achieving a 20% reduction in direct and indirect CO₂ emissions by 2020.
- Energy efficiency: A further reduction of 1% in energy consumption per tonne of stainless steel processed (with 2007–2009 as the base period).
- Materials efficiency: Further reduction in waste to landfill per tonne of stainless steel produced.

Site-specific targets

Goals for 2010

- Sheffield melt shop, the UK, water protection: To reduce water consumption by 5% compared to usage in 2007.
- Tornio Works, Finland, waste management: Produce steel slag products amounting to 32% of total slag production.
- Degerfors, Sweden (hot rolling): Waste to landfill target 2 kg per tonne.
- Tornio Works, air protection: Achieve usage level of dust-reduction units to more than 98% per month.
- Sheffield melt shop, soil protection: Complete hydrological assessment for the Tinsley Park landfill.
- Kemi mine, Finland, use of materials: Reuse 250 000 tonnes of lumpy rock and side rock from the Kemi concentrating plant to the underground mine.
- Richburg Bar plant, the US, SC: Reduction of hydraulic oil consumption by 50%.
- Avesta, Sweden, energy efficiency: Reduction of specific energy consumption by 3%.
- Management systems: Integrated Management System Manual to be published and IMS implementation to start from the business units Tornio Works and tubular products. IMS internal audit system starts to operate.

Results 2010

- Sheffield melt shop, water protection: The target was not achieved due to technical problems with filters.

- Tornio Works, waste management: The target was not achieved. A new process was implemented but planned levels of slag products were not reached. The amount of steel slag products amounted to 29% of total slag production.

- Degerfors, hot rolling: The target was achieved. Waste to landfill per tonne produced was 1.7 kg.

- Tornio Works, air protection: The target was not achieved. During the year there were 10 cases where the usage level was less than the target of 98%.

- Sheffield melt shop, soil protection: The target was not fully achieved. The assessment was started but not completed.

- Kemi mine, use of materials: The target was achieved. 300 000 tonnes of lumpy rock and side rock was reused.

- Richburg Bar, reduction of hydraulic oil consumption by 50%: The target was not achieved.

- Avesta, energy efficiency: The target was not achieved. Specific energy consumption was reduced by 1%.

- Management systems, Integrated Management System Manual to be published and implementation to start: The target was not fully achieved. The manual was not yet published. Implementation started in selected business units and the auditing system was finalised but not yet functioning.

Goals for 2011

- Avesta, Sweden, energy efficiency: Reduce specific energy consumption by 2%.
- Molkom, Sweden (tubular products): Reduction of total amount of heating oil usage by 2%.
- Wildwood, the US, FL (tubular products): Complete a lighting scheme at the south plant, with the aim of another 1000 MWh annual energy savings.

- Tornio Works, Finland, waste management: Produce steel slag products amounting to 32% of total slag production.

- Sheffield melt shop, water protection: reduce specific water consumption by 5% against 2010 usage.

- Kemi mine, Finland, materials efficiency: use more than 3000 tonnes of fly ash from the Tornion Voima power plant to backfill the stopes of the underground mine.

- Tornio Works, air protection: Achieve usage level of dust reduction units to more than 98% per month.

- Sheffield melt shop, soil protection: Complete hydrological assessment for the Tinsley Park landfill.

Materials efficiency

The recycled content in Outokumpu steel is as high as 90%

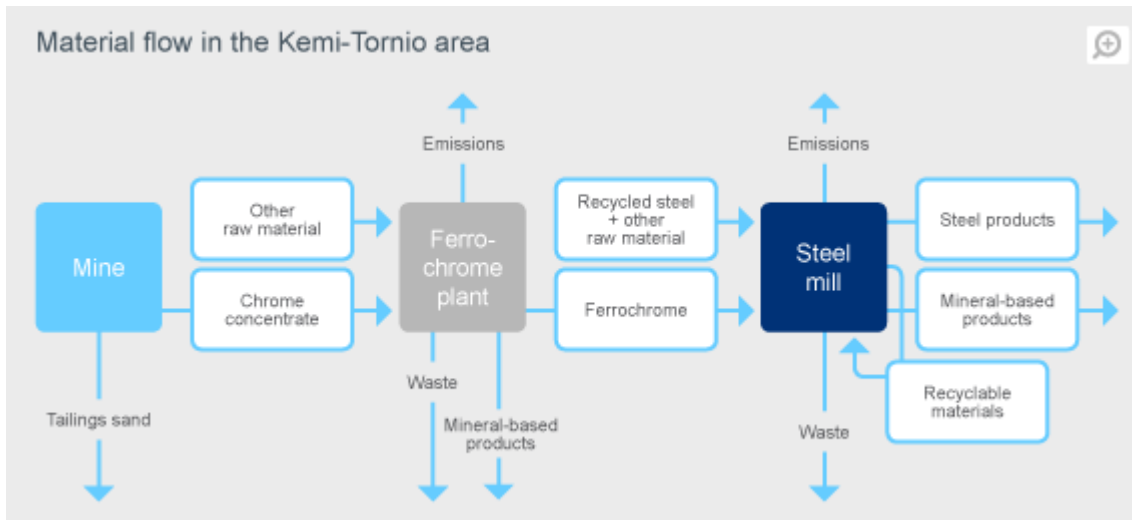
The most important raw materials used by Outokumpu in producing stainless steel are recycled stainless and carbon steels. Together with metals recovered from waste products and by-products of the production process, they enable the recycled content of stainless steel produced by the Group to be raised to approximately 90%, significantly higher than the global industry average of 60% (International Stainless Steel Forum ISSF). In addition to recycled steel, alloying elements including iron-containing alloys and other metals such as chromium, nickel and molybdenum are also required.

Raising the recycled content of stainless steel from 70% to a level of 90% reduces the environmental burden which results from manufacturing stainless steel. As recycled materials replace the raw materials that would otherwise have been required, the effects cover the whole supply chain. Taking the entire product life-cycle into account, achieving a 20% increase in recycled content avoids 1.2 tonnes of CO₂ emissions per tonne of stainless steel. At the 2010 production level of 1.6 million tonnes, the quantity of CO₂ emissions avoided in this way was 1.92 million tonnes. Outokumpu's ultimate target is zero-waste stainless steel production. This means that all material streams from production are studied in order to find means of fully recycling, reusing or selling them as by-products on the market. Generally, all processes are developed in a way that allows valuable metals to be recovered and retrieved from material streams.

Slag and dust are the main by-products of the steelmaking process. Considerable research and development effort has been invested by Outokumpu in methods of retrieving valuable metals from this slag and dust as such metals can be used as raw materials in the Group's melt shops. One example is the filters which minimise emissions into the environment by collecting more than 99% of the dust generated by Outokumpu's production operations. All of the dust generated by the company's melt shops is recycled, with collected dust fractions that have the highest metal content being recycled directly, and the remainder of the collected dust being recycled following a metal recovery process. In the Nordic region, this residue is transported to an external facility in Sweden which recovers the metals contained in the dusts. In the UK, the in-house metal-recovery facility is on site.

Materials efficiency and by-products

Outokumpu has invested several million euros in developing slag-based products that can be employed in the construction industry and for neutralisation purposes in industrial applications. In road construction, for example, slag products can be utilised to replace virgin materials such as crushed stone. In northern Finland, where frost resistance is a very important feature in road foundations, the technical performance offered by such slag-based materials is actually better than natural alternatives.



Until the beginning of 2009, slag from the steel melting process at the Tornio Works was processed in a grinding metal-separation process to retrieve the valuable materials it contained so that they could be re-used. The problem was that slag treated in this way turned into a very fine powder difficult to utilise. During 2009, the retrieval process was modified in a way that allowed the metal content to be extracted just as effectively but resulted in a coarser form of slag more suitable for use as a construction material. Operated by a local subcontractor, the new process was launched at production scale in 2010 and the achieved results, a high level of recovered metals from slag and possibility to utilise all steel slag, have been very good. During 2010, a total of 75 500 tonnes of steel slag products were sold and no slag was landfilled.

Another recycling project in Tornio involved the local utilisation of large volumes of the sediment derived from water-filtering processes in the ferrochrome plant. This waste material, which is inert, was used to seal surfaces during operations associated with closure of the Sallee landfill, replacing corresponding amounts of bentonite. Technical investigations revealed that the material's properties make it a very effective barrier to water flow. Results obtained from an experimental installation carried out at a landfill site in the City of Oulu in northern Finland were very promising, and the sludge continues to be employed in Outokumpu's own landfill areas, with approximately 7 015 tonnes being used as a mineral-sealing layer in surface in 2010.

Improved waste utilisation and less landfill waste

Outokumpu has the twofold aim of improving the Group's efficiency in the use of materials and reducing the quantities of waste sent to landfill. By paying special attention to waste management and segregation techniques, many waste fractions resulting from production operations are now recycled and the amount of waste sent to landfills has been reduced.

At the Sheffield melt shop in the UK, this has been achieved by both decreasing the total volume of waste and increasing the share of by-products. In the past years, two leading schemes have made it possible to significantly reduce the amounts of waste sent to landfill: first, the use of processed slag as a replacement for aggregate in asphalt; more than 85% of all the slag produced at the Sheffield melt shop is being used as an additive in asphalt used for road construction. Secondly, waste volumes have been decreased by production of a lime substitute manufactured by crushing refractory bricks no longer suitable for use in steel making. Compared to 2006, the total amount of waste sent to landfill in 2010 has been reduced by 87%. Development work is continuing with the aim of eventually achieving the full and complete utilisation of all by-products and waste materials produced at the Sheffield melt shop.

The Sheffield melt shop is licensed by the UK Environment Agency as an accredited packaging reprocessor, an important and vital component in the UK's packaging-compliance and waste-reduction efforts. Packaging waste from the Group's operations in Sheffield is recycled and used in the production of new packaging material.

Hydroflux, a product developed by Outokumpu, is manufactured from descaling waste generated on the Group's stainless steel annealing and pickling lines. It can be used to replace the calcium fluoride used as a flux in stainless steel slag management. In a joint project involving the Group's Avesta, Nyby and Degerfors production facilities, ways of re-using hydroxide flux instead of sending it to landfill are being developed. Avesta Melt Shop continues to use hydroflux on a continual basis. The next step is to enable full-scale production of hydroflux.

New Castle in the US completed several projects in 2010 with the aim of achieving lower levels of waste. For example, reductions targets in filter cake, mill scale, general trash and refractory waste were achieved.

Read more about [waste management](#).

Investing in research projects

Almost all of the significant waste streams from Outokumpu's production processes are studied with the aim of reducing their environmental impact. For example the Group's Tornio Research facility coordinated the following environment-related research projects during 2010:

- The ISSF GRASCA - FINCON (Granulation of Slag under Controlled Atmosphere and Use of Stainless Steel Slag as Filler in Concrete) project
- Tests to evaluate fine steel slag as a material for the neutralisation of acidic mine effluent.
- The re-use of OPAR acid regeneration salts produced at Tornio Works in nickel production.
- Bioleaching processes for converting metallurgical wastes into less-chemically-active and less-harmful forms (PROBIO) and the development of new, remote-monitoring systems for both ground water and waste water (MONIWATER).
- A dust-treatment study
- The recovery of metals from scale sludge, oily sludge and steel dusts.
- The use of oil-containing waste water in ferrochrome sintering plant.

Material balance

Materials used, tonnes	2010	2009	2008
Recycled steel	1 387 051	1 131 144	1 367 858
Recovered metals	80 408	45 513	97 463
Ferrochrome	230 508	168 600	265 412
Nickel alloys	71 674	63 837	100 654
Other alloys	82 356	63 272	86 564
Additives, tonnes			
Slag formers	251 446	191 190	227 302
Meltshop process gases	205 446	155 978	179 851
Pickling acids bought	12 668	10 106	13 220
Pollution prevention materials	34 705	25 715	27 216
Packaging materials used for final products	13 577	12 876*	15 856*
Energy, million GJ			
Electricity	10.0	7.4	9.9
Propane	4.1	3.7	4.5
Carbon monoxide gas	1.5	0.7	1.4
Natural gas	0.6	0.5	0.7
Light and heavy fuel oil	0.8	0.7	0.8
Output, tonnes			
Steel	1 610 053	1 245 532	1 650 068
Emissions to air, tonnes			
Carbon dioxide	827 256	568 000	871 000
Nitrogen oxides	1 742	1 207	1 925
Sulphur oxides	279	179	277
Dust	182	134	216
Ozone-depleting substances	0.000	0.016	0.019
Emissions to water, tonnes			

Metals	19.0	14.9	15.5
Nitrates	528	438	578
Hazardous waste, tonnes			
Oily sludge to the treatment	4 916	5 907	4 978
Hydroxide sludge landfilled	42 802	38 444	49 646
Steel making dust to recovery	37 047	25 265	37 240
Wastes and by-products, tonnes			
Slag, total	451 124	324 832	593 777
Slag utilised	121 847	185 576	443 517

* Figures in the 2009 and 2008 reports were incorrect. The figures presented here have been corrected.

Improving waste handling and preventing soil contamination

Waste materials recycling a priority

Dust and scale collected from stainless steel manufacturing operations are considered by Outokumpu to be significant waste streams. Wherever practicable, these waste materials are collected and recycled to recover the valuable alloying elements they contain – these include nickel, chromium and molybdenum. When necessary, specialist recovery techniques are employed such as the Direct-Current Arc Furnace at the Group's melt shop in Sheffield or external treatment facilities operated by other companies. The total quantity of dusts and scale collected and treated by Outokumpu in 2010 was 47 000 tonnes.

Wastes from Outokumpu production units are sent to appropriate treatment facilities or to landfill sites licensed to accept such materials. Both hazardous and non-hazardous wastes are involved, and pre-treatment of the waste material is completed whenever this is required. Hazardous wastes (oily wastes and hydroxide sludge) generated by the Group's operations in 2010 totalled 48 000 tonnes. All such materials are treated, re-used or disposed of in accordance with current legislation and best practices.

Outokumpu owns and manages landfill sites at some production sites in Finland, in Sweden and in the UK. In Tornio in Finland, a new 5-hectare landfill site for hazardous waste has been prepared, but an older one is still in use. The closure process for this landfill site has been initiated with completion scheduled in 2012. Both landfill sites fulfil all the high requirements and standards set by European legislation.

Read more about [materials efficiency](#).

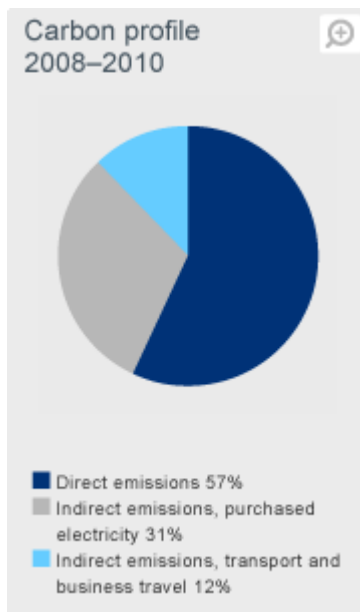
Working hard to prevent leakages and soil contamination

As planned, soil-contamination mapping or remediation operations were ongoing at several Outokumpu sites in 2010. Soil surveys were completed at Fagersta and Molkom in Sweden without any demands for further action. Studies were carried out also at Avesta and Nyby in Sweden together with Wildwood in the US. The decommissioning of Group plant located at Meadowhall and Stocksbridge in the UK continues. Closure of former landfill areas at Nyby in Sweden and Tornio in Finland proceeded as planned, and the capping of Tinsley Park Landfill at Sheffield in the UK, continued. Remediation activities in connection with contaminated groundwater continue at the Outokumpu site in Wildwood. Remediation work connected with a historic oil leakage at Montreal in Canada also continued, with normal operation of the system during 2010. Oil levels in this location are stable or declining.

Energy efficiency

Outokumpu sites use a range of fuels including direct energy sources such as natural gas, propane, heavy fuel oil and electricity. Direct energy use by the Group totalled 7.0 million GJ in 2010 and electricity consumption totalled 10.0 million GJ (2.8 million megawatt hours). Total energy consumption, 17.0 million GJ, increased some 31% compared to previous year mainly due to recovering process volumes and the long production stoppage of Ferrochromium smelter during 2009. Total annual energy consumption by Outokumpu is approximately equivalent to the amount of energy consumed by 210 000 Scandinavian households. Electricity consumption compares to about 30% of the annual output of a modern 1 600 MW nuclear power plant.

Outokumpu's Energy & low-carbon programme



In the last ten years, Outokumpu has reduced the Group's direct carbon dioxide (CO₂) emissions by 25% per tonne of stainless steel produced. In the Outokumpu Energy and low-carbon programme, published at the beginning of 2010, Outokumpu's target is a 20% reduction in the Group's specific carbon emissions profile in stainless steel production by 2020. In assessing and measuring the Group's carbon profile, we utilise a method of calculation which focuses on factors that Outokumpu can manage and control.

The targets set in Outokumpu's Energy and low-carbon programme highlight not only specific reductions but also the Group's production efficiency, as emissions are calculated per tonne of stainless steel produced. These targets connect our materials and energy efficiency and supply chain management to our business targets. The figure for monitoring progress is the 3-year moving average that is compared to the baseline, which is the 2007–2009 period. Targets of the Energy and low-carbon programme represent optimal Group-wide environmental objectives both for Outokumpu and for combating climate change. They also support the Group's strategic goals and their achievement is supported by different energy and quality programmes. As the targets are both quantitative and a clear demonstration of our long-term commitment in this area, they encourage continuous improvement.

Calculated in terms of current capacity and production, the annual reduction in CO₂ emissions being targeted is approximately 370 000 tonnes by 2020, which means a total reduction of 2 200 000 tonnes over the 2010–2020 programme period.

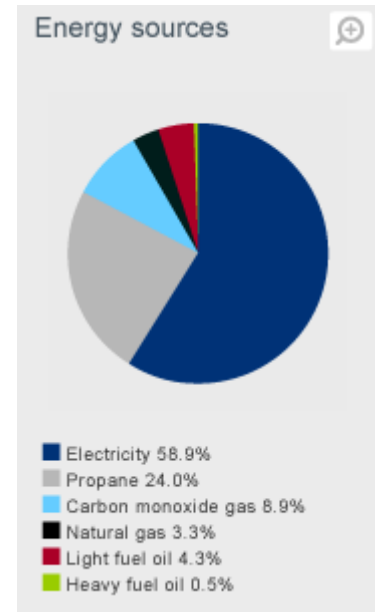
Our actions and the results achieved

Primary actions included in the programme consist of making further improvements in energy efficiency, increasing the proportion of low-carbon electricity and targeting efficiency improvements through optimal levels of production. An internal air-travel compensation scheme has been implemented for business travel, and sustainable aspects are gradually integrated to logistics and transportation solutions. These actions involve Outokumpu operations in all locations and in all business units.

Outokumpu's carbon profile consists of direct emissions from production operations, indirect emissions from electricity consumed and the emissions resulting from the transportation of products and business travel, expressed as a quantity per tonne of stainless steel produced. After 2010, the Group's carbon profile was 0.3% lower compared to the programme baseline 2007–2009 average. This result is primarily due to improvement in energy efficiency and the lowered emissions of transports. On the other hand, indirect emissions from usage of electricity were higher compared to the baseline, almost offsetting the advancement.

Improvements in energy efficiency achieved by Outokumpu during 2007–2010 totalled 3%, equivalent to annual savings of some 160 GWh. The proportion of low-carbon electricity obtained from renewables and nuclear power was 69%.

Emissions of CO₂ resulting from business travel in 2010 totalled 5 164 tonnes (includes business air travel and company cars). To compensate for emissions resulting from business air travel in accordance with guidelines in the Energy and low carbon programme that reflect such activity, an investment will be made in environmental projects that lead to emissions reductions. The level of such investments will depend on the price of emission allowances, the total number of kilometres travelled and specific emissions by air carriers. Outokumpu has invested in 2010 approximately EUR 90 000 in new lighting systems at the Group's Wildwood tube mill. The annual energy savings achieved total some 1400 MWh, with a corresponding reduction of 910 tonnes in annual CO₂ emissions.



Continuous improvement in energy efficiency

Outokumpu's approach to energy efficiency is long-term and the target is continuous improvement. Energy efficiency is a component in the environmental management systems at Group mills. Major Outokumpu production sites also have long-term, prioritised energy efficiency investment plans. In overall terms, the largest energy-saving potential lies in the recovery of waste heat, improved process integration and improved efficiency in using raw materials.

Large, energy-specific investments are however not the only way of improving energy efficiency within the Group. The systematic monitoring and analysis of energy consumption plays a very important role, as does life-cycle analysis when purchases of new electrical equipment are being considered. Outokumpu provides its production personnel with training in energy efficiency.

To meet long-term targets for improvements in energy efficiency, Outokumpu arranges for the mapping of energy-efficiency initiatives and investment proposals in order to quantify their improvement potentials and any associated costs. This mapping process helps optimise energy-efficiency investments at Group level. The aim is a 5% improvement in Outokumpu's energy efficiency by 2020.

Read more about [investments in energy efficiency](#).

Sustainable power solutions

Outokumpu's Energy function is responsible for procuring the electrical energy used in the Group's operations. The primary objective is to ensure favourable and stable prices for power supplies by hedging against future price changes. Other important tasks carried out by the Energy function include the management and optimisation of Outokumpu's physical energy portfolio and energy-production assets as well as the provision of support for Group companies in their energy-related activities.

Energy used 2010

GWh	Electricity	Fuel energy	Total
Tornio	2 032	1 237	3 269
Avesta	360	346	706
Sheffield	171	113	284
Other	224	247	471
Total	2 787	1 943	4 730

Origin of electricity 2010

%	
Renewable sources	47
Nuclear	22
Fossiles and turf	31



Outokumpu has adopted a long-term approach to developing its methods for procuring physical energy in the Nordic countries. The Group's power portfolio is handled by engaging in trading activities in the Nordic market for electrical power, through bilateral long-term supply agreements, and by making investments in power-generation capacity. By managing risks against price volatility, Outokumpu aims at competitive and stable prices for electricity. Another aim is to purchase environmentally-sustainable electrical power. Outokumpu has therefore acquired low-carbon nuclear, hydropower and windpower production assets.

Despite of protective actions against price risk, changes in the Nordic Power market still have a significant impact on Outokumpu. In 2010 the average system price of electricity in Nord Pool was 53 €/MWh. In the beginning and end of the year cold weather and weakening hydrological situation caused exceptionally high prices on the market. The hydrology remained weak throughout the year. As well, the low utilization rate of the Swedish nuclear stations pressured prices up during 2010.

Outokumpu's aim is to purchase low-carbon electricity

Nuclear power

Outokumpu has a 20 MW share in the new Olkiluoto 3 nuclear power project currently under construction in Finland. The Group's aim is to have access to an additional 150 MW of low-carbon power as one of stakeholders in Fennovoima, which plans to begin operating a new nuclear power plant in 2020. In 2010, Finland's Parliament granted Fennovoima permission to build this new power plant as a Decision-in-Principle. The location of the plant will be selected in 2011 and construction is scheduled to begin in 2012.

Hydropower

Through a long-term leasing agreement, Outokumpu has access to 104 MW of Norwegian hydropower capacity in Rana, Norway until 2020.

Windpower

Outokumpu is a minority shareholder in Rajakiiri Oy, a company that has been building a wind farm in Tornio. The winning proposal of Outokumpu's internal EUR 5 million competition in 2008 was to invest in power generation by wind turbines to reduce CO₂ emissions. The investment was made in Rajakiiri, and the eight shoreline wind generators with the total capacity of 28.8 MW started electricity production at the end of 2010. Rajakiiri is also drawing up plans for an offshore wind farm that will have an installed capacity up to 225 MW.

Combined Heat and Power

The Group has a minority stake in a Combined Heat and Power (CHP) plant in Tornio. This plant delivers heat to the Tornio Works, and a proportion of the fuel used is carbon monoxide gas created as a by-product of the ferrochrome production process. The CHP plant has also acquired a local heating business in Tornio. This acquisition will lead to better optimisation of the CHP plant, improvements in energy efficiency and a reduction in the level of CO₂ emissions in the Tornio-Haparanda region.

Energy and emissions trading

Outokumpu's main production operations in terms of energy consumption and carbon emissions are located in Europe. More than 90% of Outokumpu's direct emissions fall under the CO₂ Cap and Trade system. The European Emissions Trading Scheme places a direct financial cost on production emissions and the indirect costs of emissions trading are reflected through higher electricity prices. These two elements raise Outokumpu's marginal production costs in relation to our global competitors. Outokumpu emphasises the need for global regulation in efforts to transfer to the low-carbon society.

The major emissions of greenhouse gases by Group operations are twofold: direct releases of CO₂ from the company's sites as a result of combusting fossil fuels and process-related emissions from the Outokumpu's steelmaking operations. Outokumpu's carbon dioxide emissions in 2010 totalled 827 000 tonnes. Outokumpu's emissions trading activities fully comply with the relevant EU laws and regulations, with agreed procedures and with the Group's trading and risk policies.

Carbon dioxide emissions under EU Emissions Trading Scheme were still at lower than normal level in 2010 due to reduced levels of production, approximately 795 000 tonnes (2009: 540 000 tonnes). Outokumpu's carbon dioxide allowances in the UK, Sweden and Finland were sufficient for the Group's planned production.

The EU Emissions Trading Scheme after 2012

The European Commission (EC) and the European Parliament have agreed that the EU Emissions Trading Scheme (ETS) will continue, with the next trading period being 2013–2020. On the third emissions trading period, 2013–2020, the ETS will become a more restricting system. The total annual emission cap in Europe and share of free allocation of emissions will gradually decrease. Auctions will be the main form of issuing allowances. Outokumpu's operations under ETS will continue to receive free allocations according to efficiency-based benchmarks and historical activity. It is estimated that Group will be some allowances short and that the situation will most likely vary more than before within Group companies. One important issue for Outokumpu has been to qualify for a free allocation of emissions allowances during 2013–2020 by being part of an industry sector where there is a significant risk of carbon leakage. According to an EC decision, all of Outokumpu's ETS operations are currently qualified. Rules on how free allocations of emissions allowances are to be distributed will be finalised during 2011.

The renewed ETS directive states that member states can offer companies compensation for carbon dioxide related increases in electricity prices. As Outokumpu has three electricity-intensive installations in three different EU countries, this is an important aspect.

Read more about [emissions trading](#).

Voluntary energy efficiency agreements

Outokumpu has participated in voluntary national energy efficiency agreements in Finland, Sweden and the UK for many years. The Tornio Works joined the Finnish programme at the beginning of the 1990s. Energy savings in electricity, heat and fuel achieved during 2010 totalled 961 GWh. To ensure that systematic improvements in energy efficiency continue to be achieved, Outokumpu sites in Finland signed new energy-efficiency agreements in December 2007 covering the 2008–2016 period.

In Sweden, the first round of the PFE (*Programmet för energieffektivisering i energiintensiv industri*) agreement – in which the target was annual savings in electricity consumption of 4 GWh – ended in the summer of 2009 with savings of 8 GWh having been realised. The Group is a participant in the second period (2009–2014) of this agreement. In connection with energy issues, Outokumpu usually works closely with national authorities – with Motiva in Finland and by participating in the *Jernkontoret* forum in Sweden.

Stainless steel in innovations against climate change

The steel industry is energy intensive and Outokumpu's steelmaking and rolling processes are no exception. Despite of a large energy usage and carbon footprint, stainless steel is generally a solution in climate change related issues, not a problem. Decreases in carbon footprint and improvements in energy efficiency are, in many cases, based on the use of stainless steel. In the energy industry, transportation, as well as building and architecture, the use of stainless is essential, providing a way to achieve new climate targets by its energy-efficiency. For instance, some biofuel applications would practically not be possible without the use of stainless steel due to the required corrosion resistance.

Studies show an energy efficient material

Outokumpu has recently participated in a project to collect and update European Life Cycle Inventory (LCI) data for production of stainless steel. Comparing the results published in 2010 to those obtained from a similar exercise in the late 1990s, the carbon efficiency (i.e. CO₂ efficiency) of stainless steel manufacturing was found to have improved dramatically. According to this study, the carbon footprint of austenitic stainless steel is now approximately 40% smaller than it was a decade ago. Factors facilitating this improvement include better process efficiencies, the use of a higher proportion of recycled stainless steel and the less-carbon-intensive electricity mix currently being employed.

Another study made by Boston Consulting Group in Germany (*Steel's CO₂ Balance – A Contribution to Climate Protection, 2010*) analysed the impact of the steel industry on CO₂ emissions. It found that in sectors such as energy generation, traffic, and household consumption, innovations with the use of steel create a potential to decrease the carbon footprint by innovative, climate-friendly applications. By the year 2020 in Germany, a total annual reduction potential of approx. 74 million tonnes of CO₂ was calculated from the examined examples of steel applications alone. Compared with the total emissions of the German steel industry in the year 2007, approximately 67 million tonnes, the result is a positive CO₂ balance.

The largest potential was found in an efficiency increase in fossil fuel power plants and an expansion of renewable energy sources, and also in the reduction of emissions in traffic through lighter vehicles. Approximately one-third of the German federal government's climate target (a 40% reduction of greenhouse gas emissions by 2020 compared with 1990) could be achieved by increasing the usage of steel alone. A strong steel industry is therefore – also from a climate-policy perspective – an important link in the value chain in providing the required material innovation.

Outokumpu recognises the need for energy to be used efficiently and continued hard work has given us a very good record in energy efficiency. Outokumpu processes are considered to be Best Available Techniques (BAT) as defined in the EU's integrated pollution prevention and control directive. At our ferrochrome production unit in Tornio, for example, energy consumption is very close to the theoretical minimum and no more than two thirds of the amounts used in traditional processes. Both process heat and process gases are recovered and re-used as direct energy sources and heating.

Read more about [energy efficiency and programme results at Outokumpu](#).

The carbon footprints of Outokumpu products are lower than the EU average

Results from the European Life Cycle Inventory study in 2010 indicate that Outokumpu production sites are well placed in terms of "carbon-efficient" steel manufacturing. All Outokumpu products had smaller carbon footprints than the average for stainless steel manufactured in the EU. The carbon footprint of Outokumpu quarto plate products was almost 20% lower than the European average, austenitic flat products produced by the Group were about 10% more carbon-

efficient than average, and the Group's 430 ferritic grade performed well compared to the average. Data on Outokumpu's ferritic products was updated using 2009 information as ferritic production within the Group had only just begun when the LCI study began.

Outokumpu has also been an active participant in the Swedish Steel Eco-Cycle research project, the Swedish steel industry's first extensive and coherent research effort with an environmental focus. Improvements are being sought at all stages in the steel life-cycle, from mining through the manufacture of steel products to recycling. The project is currently in its second phase (2009–2012).

Outokumpu's Energy & low-carbon programme

The Group's long-term efforts and results achieved in the field of energy and material efficiency, R&D and product stewardship have reinforced our leadership position and provide a solid base for progress towards a low-carbon society. The Outokumpu Energy and low-carbon programme, published at the beginning of 2010 defines both the Group's ambitious targets and the actions required to reach them. In the last ten years, Outokumpu has reduced the Group's direct carbon dioxide (CO₂) emissions by 25% per tonne of stainless steel produced. Outokumpu's target is a 20% reduction in the Group's specific carbon emissions profile (direct and indirect emissions) in stainless steel production by 2020.

Read more about [risks related to climate change](#).

Emissions and effluents

One of Outokumpu's principles is that best available techniques (BAT) be employed to reduce emissions and minimise harmful environmental impacts which may result from the Group's operations. BAT means economically and technically best available pollution prevention technology. Employing BAT means that the latest technology is used to keep emissions from Outokumpu operations at the lowest achievable level. To maintain the best possible levels of emission control in the future, Outokumpu is continually developing its processes and pollution prevention techniques and is also an active participant in the process of updating the reference documents (BREF) which define related technologies, helping to set the high standards that are applicable within the European Union.

Efficient systems help to prevent spills and instances of non-compliance

All Outokumpu's larger production sites employ either Environmental Management Systems (EMS) or risk-based management systems which help in avoiding spills and accidents that could be harmful to humans or to the environment. All of these Group systems operate in accordance with ISO 14001, the international standard for environmental management systems.

In 2010, emissions and discharges were generally at normal levels and in compliance with environmental permits, but some spills and instances of non-compliances did occur. At Tornio in Finland, some violations of permitted emissions limits took place but were essentially insignificant. The required operational level of 97% in dust-filtering units was not achieved on some occasions, but the resulting emissions of dust totalled only some hundreds of kilos. The emissions limit on suspended solids in waste water was also exceeded on two occasions when construction work was being carried out in the area of the settling pools. These incidents only lasted for a number of days.

At Sheffield in the UK, minor breaches of emissions limits for the Direct-Current Arc Furnace extraction system occurred in 2010. At Nyby and Långshyttan (Kloster) in Sweden, and at Sheffield, incidents involving discharges into local watercourses occurred. On all of these occasions, the environmental authorities were informed and no environmental damage was reported. Environmental compliance data for 2010 shows 12 breaches of permitted limits, and 3 incidents for which there is a financial penalty.

Radioactive material detected before entering the process

Sources of radioactive material may enter the stainless steel production chain via the recycled stainless steel used in the process. Such radiation usually derives from naturally-occurring sources. In some cases, the source of radiation is components in the measuring equipment extensively used by heavy industry. These items can contain small amounts of radioactive isotopes – with the maximum quantity measured in grams. Sources of this type are normally detected before they enter the Outokumpu production process.

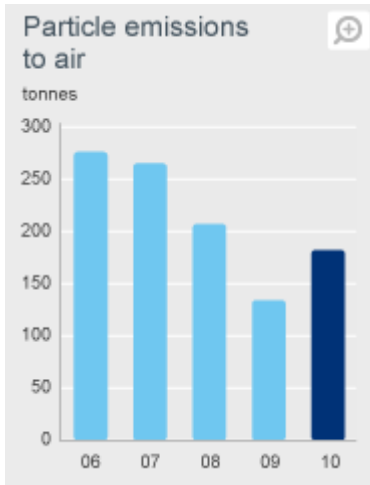
In 2010, three incidents in which radioactive material entered an electric arc furnace despite the presence of alarm systems occurred at the Group's facilities in Tornio in Finland (two incidents) and Sheffield, UK (one incident). The radioactive material concerned was identified as americium 241, an isotope employed in measurement instruments. All dusts and slag from the affected melt were separated and measured, and the radioactive materials were stored separately in accordance with guidelines provided by the national authorities. The dose rate associated with the radioactive material in these cases was not on a level harmful to humans.

Investments in technology are reducing dust emissions

Dusts of different types have traditionally formed the most significant emissions resulting from operations by the steel industry. The majority of Outokumpu's particle emissions originate from the Tornio, Avesta and Sheffield steel mills and the New Castle hot rolling mill. In 2002–2006, more than EUR 20 million was invested at the Group's steel plants to

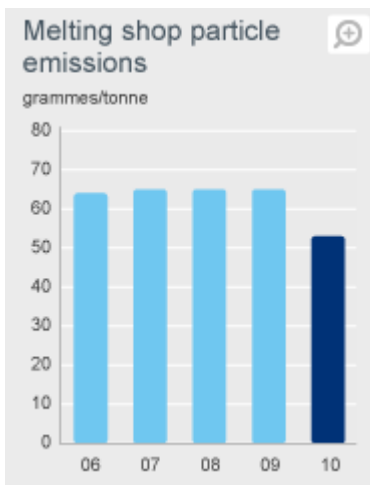
improve their environmental performance and minimise dust emissions. Even though total production of stainless steel has increased since 2000, levels of dust emissions from the Group's operations have declined significantly. In 2010, the dust emissions were 182 tonnes, ie. 36% more than in 2009, this was mainly due to increased production, especially at the Ferrochrome smelter, the production volumes of which nearly doubled.

A clean mine



The Kemi Mine is the only chromium mine located in the European Union. Because the ore-bearing minerals are very stable and chemicals are not used in the beneficiation process, operations at the mine have only a minor effect on watercourses. Metal discharges in particular are small, their effect only being observable as slightly elevated nitrogen, solids, calcium and iron concentrations in watercourses. The largest emissions into the air result from open-pit mining activity, the transportation of ore and waste rock, from operations in the product loading area and from piles of concentrate. During 2005, the Kemi Mine made a shift from open-pit operation to working underground. Mining operations including preliminary crushing are carried out underground. Therefore dust emissions into the air have become minimal (approximately one tonne in 2010). The effect of particulate emissions on air quality is still monitored regularly by studying levels of Suspended Particulate Matter. The results from the last monitoring period are currently being analysed.

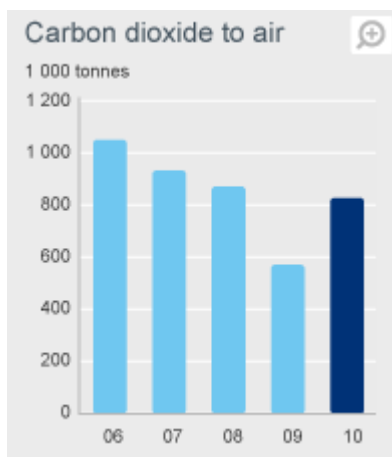
The mine's piles of gangue (waste rock), open-pit mining activities and the bene



ficiation and clarification basins all have a long-term effect on the landscape. Tailings basins are landscaped after they have filled up. The gangue will be used in backfilling the underground workings. The Kemi Mine only uses water (and a minor amount of flocculant) in its concentration processes as these are based on gravimetric separation. The amount of water used annually is approximately 0.3 million cubic metres. The noise caused by blasting operations is almost inaudible, even in the mine area. According to environmental impact assessments performed in 2009, the only significant effects result from the increased traffic generated by transporting concentrate from the mine to the Tornio ferrochromium plant. These effects were further mitigated by a new transport road taken into use in 2010, which minimises potential disturbance to residential areas.

Reductions in emissions

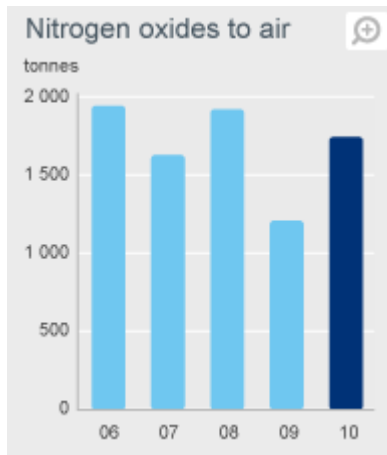
Dust emissions from Outokumpu's operations typically contain small quantities of metals (including iron, chromium and nickel) which are mainly present in a harmless form. Chromium, for example, is usually found in its trivalent form and not in the hazardous hexavalent form. In recent years, the Group has supported many studies investigating the effects of metal emissions on both the environment and human health.



Emissions of nitrogen oxides were on a higher level in 2010 (1 742 tonnes) compared to 2009 (1 254 tonnes) due to higher levels of production. To minimise emissions, Outokumpu production sites in Avesta, Nyby and Tornio are employing the latest burner technology and selective catalytic reduction technologies in certain processes.

Continually improved monitoring reduces environmental risks. For example, particle emissions from the steel melting shop in Tornio have been monitored using a continuous emissions-measurement system since the beginning of 2007. This more detailed daily emissions data helps immediate detection of potential filter leakages. The primary origin of the Group's sulphur dioxide emissions is the district heating unit at Tornio Works which is used only occasionally during the cold winter season.

Recovering heat from furnace gases at the Tornio and Avesta Works also reduces Outokumpu's energy consumption. Emissions of nitrogen oxides, carbon dioxide and



sulphur dioxide are correspondingly lower as fuel does not need to be burnt to produce heat. The energy efficiency measures which have been implemented have also reduced the Group's specific carbon dioxide emissions.

In general terms, ambient air quality in the Tornio and Haparanda communities is equivalent to that found in other communities of similar size in Finland and Sweden. Emissions from Outokumpu's production have not been found to deteriorate at any significant level the air quality in the regions.

Water – a natural resource for cooling

Steelmaking operations are based on high-temperature processes in which the cooling requirements are extensive. To protect people and equipment, Outokumpu's primary production operations employ water for this purpose, and considerable volumes – annually approximately 20 million m³ – are used, particularly in the Group's melting and rolling operations. In 2010, the figure was 24 million m³.

Availability of water is of major importance in high-temperature processes, since interruptions in the supply of water can result in significant damage. In many of the locations in which Outokumpu operates, local water supplies are abundant and the Group's usage of water has only a minimal effect on the resources available. Cooling water is used either directly through contact with steel surfaces, or indirectly through heat exchangers. In the latter, the only "contamination" to which the water is subjected is that its temperature is higher when it is pumped back into the watercourse from which it was extracted.

Water used in Outokumpu's operations in 2010 came from different sources. Over 95% was surface water (from rivers or the sea). Usage of ground water was minimal. Approximately 3% was rainwater (in the Kemi Mine), while municipal water sourced from rivers or lakes accounted for about 4%. Municipal water is used by the Group primarily in food preparation and for sanitary purposes, not in steelmaking processes.

90% of water recycled on average

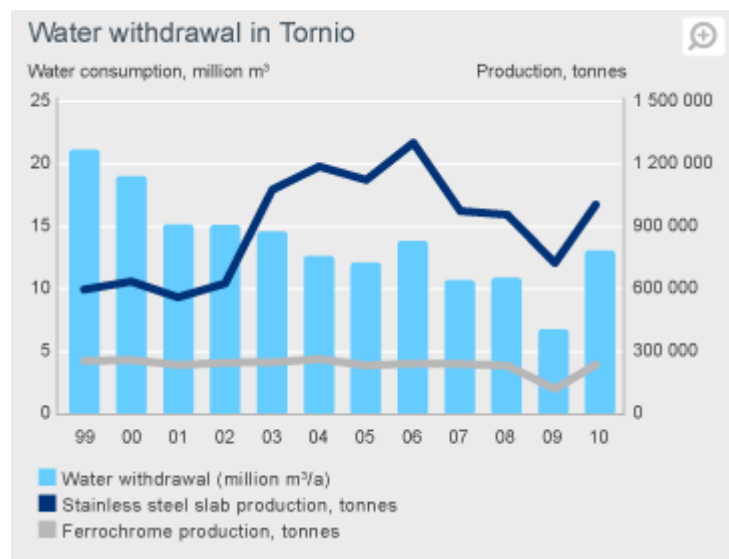
To minimise the risk of polluting local resources, a high proportion of water used in Outokumpu's production is cleaned and recirculated. At the Avesta site, for example, the total amount of water in circulation is approximately 50 million m³. To replenish the system, 4.5 million m³ are pumped from the Dalälven river annually, a recirculation rate of almost 90%. This means that water is used for cooling an average of 10 times, with cleaning between each use.

Water recycling rates vary with the seasons. In winter, only a proportion of the cooling water at Tornio Works is recycled as the balance is discharged into the harbour basin to help reduce the amount of ice in the port. Preventing ice formation in this way reduces the need for ice-breakers.

At the Kemi Mine, approximately 2.5 million m³ of water are used in the ore concentration process each year. This water is fully re-circulated via a settling-pool system which consists of three pools covering an area of more than 200 hectares. These pools are in an almost natural state.

Rainwater collected and treated

Many of the Group's sites cover large areas of land, and the volumes of rain and snow that fall on these areas are therefore considerable. Rainwater from Outokumpu sites is collected and treated in oil-separation facilities to minimise any environmental impact.



Smaller amounts of rainwater fall on landfill areas located on Group sites, and this water may come into contact with alkaline wastes that could be contaminated with the hazardous compound hexavalent chromium. Such waters are treated to reduce the already-small chromium content to its naturally-occurring level, either through direct treatment in landfill areas, or by pumping the water to neutralisation plants.

Paying attention to water discharges

From an environmental perspective, the most significant components in water discharges from Outokumpu's stainless steel production processes are metal compounds and nitrates resulting from the neutralisation of acidic wastes generated in the Group's cold rolling units. Effluent discharges at all of Outokumpu's production units are controlled so as to minimise their impact on the environment. At the Tornio Works in Finland, for example, external studies conducted in the 2000s have shown that levels of metals in the primary discharges from the plant are much lower than the natural loading of metals in local rivers flowing into the Gulf of Bothnia.

Developing discharge handling techniques

Nitrate loadings originate in the pickling acids used in descaling operations involving stainless steel. A number of different techniques are employed by the Group to reduce nitrate loadings in effluent discharges from these operations, including pickling-acid recycling technologies. Outokumpu continues to work on the development of discharge-handling techniques to further reduce effluent loadings.

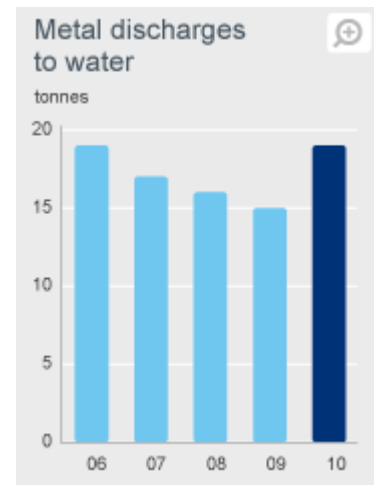
At the Group's Kemi Mine, the main source of nitrates is the explosives employed in blasting – a small proportion of the explosive charges used is washed out into the facility's water-circulation system. Passage through three large ponds (a total of almost 200 hectares) located upstream of the point at which discharges into the recipient water system take place results in the nitrate content of the water being reduced by some 60%. As these water ponds are natural removal units there are no associated negative impacts on the Iso-Ruonaoja, the recipient water system.

R&D to reduce discharges into water

Several research projects aimed at reducing nitrate discharges into the waterways have been carried out at a number of Outokumpu's production sites in Sweden. At Avesta, this resulted in the investment of EUR 28 million in a new acid-recycling system that was installed during 2010. Process start-up is scheduled for early 2011 and this method of handling acids will result in drastic reductions in the quantities of nitrates that are discharged in this location. As the new process also generates a metal oxide that can be used as a raw material in the steel melting process, the new system will also reduce the quantities of sludge sent to landfill.

At the Avesta site, the oil-separation station used for purifying cooling water and rainwater has been converted into a modern lamella filter unit. Process control ensures that oil is separated from water streams. At Tornio, to further reduce concentrations of nitrogen and suspended solids, plans to use the large dredging pond near the harbour as a post-treatment area for effluents from the Works have moved forward. The basin is expected to be taken into use during the year 2011. It has also been decided that the cleaning station for sanitary waters will be renewed.

Read more about [the health of water ecosystems](#).



Water withdrawal and discharges

Water withdrawal by source	2010	2009	2008
Surface water, million m ³	24.0	17.2	19.3
Municipal water, million m ³	1.0	0.9	1.1
Water discharges by type and destination			
Cooling water out, million m ³	8.2	8.1	11.5
Waste water out, million m ³	13.1	7.3	7.8
Metal discharges to water, tonnes	19.0	14.9*	15.5
Nitrogen in nitrates, tonnes	528	437	578

* The figure in this table in the 2009 report was incorrect.

Biodiversity

Natural surroundings at stainless steel production sites remain unharmed

The production of stainless steel does not employ or reserve large areas of land or have a significant effect on biodiversity in the surrounding natural environment. Outokumpu production facilities are not located in sensitive areas such as Unesco World Heritage sites, Ramsar sites or Unesco Biosphere reserves. During recent decades, Group sites have not been found to disturb local biodiversity in any manner which is unacceptable.

Impacts regularly evaluated

None of the species included on the International Union for the Conservation of the Nature and Natural Resources (IUCN) Red List (a list which identifies and documents species most in need of conservation attention if global extinction rates are to be reduced) are known to be affected by Outokumpu's activities. Although the Group does not have any significant operations in ecologically sensitive areas, impacts on biodiversity at Outokumpu production sites are evaluated on a regular basis as part of environmental management processes.

No disturbance to local biodiversity

The environmental authorities have investigated the EU Natura areas located near Outokumpu's Tornio site. Reports and statements issued in the 2000s indicate that the Group's activities do not have a significant negative impact or threaten biodiversity in these areas.

At the Outokumpu site in Sheffield in the UK, an area has been established to provide protection for wading birds which nest there in springtime. Measures are taken to ensure that these nesting birds are not disturbed.

Former production sites returned to their natural state

Outokumpu ensures that areas which have been used for production operations are returned to their natural state. At the Group's Kemi Mine, waste rock extracted from the mine workings is now being utilised and intermediate rock-storage locations are being used in underground construction and for gallery-filling operations.

At the Kemi Mine, the Group's use of one 22.5 hectare concentrating sand bond in production processes ceased in 2008. Drying out has commenced in 2010 and landscaping and reforestation will be carried out in accordance with the remediation plan. Bonds still in active use support a rich waterfowl population which includes rare species.

At the Tinsley Park landfill site in Sheffield in the UK approximately 50% of the landfill area has been capped as waste-tipping operations in these locations have been completed. As part of Outokumpu's commitment to the follow-up care of this area, restoration work being carried out by the Group will add to natural levels of biodiversity. Plants being used are native species and the operations being conducted include establishing areas of meadow. Wild flowers are being sown to provide an environment in which invertebrate life such as butterflies and bees can thrive.

The decommissioning of production sites at Meadowhall and Stockbridge in the UK closed in 2009 proceeded according to plans agreed with the local authorities in 2010. No environmental issues have emerged in these locations.

Marine ecosystems are in good health

With Tornio Works located in the estuary of the Tornionjoki river on the coast of the Gulf of Bothnia and close to nature reserves, Outokumpu's production operations have been developed to be ecologically friendly from the beginning. Many

studies monitoring the prevailing biological, physical and chemical conditions have been carried out near the Tornio site since the 1970s. In 2008, results of voluntary research concerning the impact of nitrates on recipient water at the Tornio site and the Kemi Mine were published. These showed that impacts are restricted to the immediate proximity of the discharge points at Tornio and cause slight eutrophication. At the Kemi Mine, the impacts on sea areas are essentially negligible.

Pollution prevention techniques being employed by Outokumpu mean that increases in emissions can be avoided, and further reductions from earlier emissions levels will be achieved in many cases even at higher-than-current production levels. Annual studies carried out by Pöyry, a consulting company, have shown that impacts on the sea areas close to the Group's production plants have diminished during the last ten years and that the associated marine ecosystems are in good health.

A number of studies which include the continuous monitoring of discharge levels have shown that discharges of chromium and nickel are now 60–80% below levels measured ten years ago. Considered to be the most significant metals released into the sea by Outokumpu's production activities at Tornio, current discharges of chromium and nickel only represent a fraction of the total metal loading, which originate in the main from natural sources in the northern part of the Gulf of Bothnia. This is because Tornionjoki and Kemijoki, the two local rivers, carry far greater concentrations of these metals into the sea than the combined amount discharged by the Group's facilities. Activity in local fisheries located near the Tornio Works is at healthy levels and commercial fishing operations are carried out close to the production plant. Research indicates that the metals released from the Outokumpu facilities do not accumulate in the marine food chain.

Continuing measures to improve the condition of the Baltic Sea

Outokumpu is participating in the Baltic Sea Challenge as mentioned in the programme published at the beginning of 2010. We use the practical measures already instituted at our Tornio Works in the 2000s and will also take action in the future to improve the condition of the Baltic Sea. In 2010, the required effluent permit was amended permitting us to take into use the 70 hectare-suction-dredging basin for effluents before they are discharged into the sea. During 2011–2012, the sanitary treatment facility of Tornio Works will be modernised to fulfil the new stricter efficiency requirements coming into force in 2013. These measures will help us reduce our impact on the Baltic Sea.

See the [Baltic Sea Action programme](#).

Transport efficiency plays a role in reducing indirect emissions

Outokumpu has been working hard to improve the environmental performance of the Group's transportation networks. As part of our long-term targets for reducing our indirect and direct CO₂ emissions, also targets for transporting products have been included. They all are specified in the Outokumpu Energy and Low-carbon Programme.

Outokumpu has a five-year contract covering the 2008–2012 period with the EuroLink railway system. EuroLink connects the Group's Avesta, Degerfors, Nyby, Sheffield and Tornio sites and is Outokumpu's primary internal, rail-ship-rail transportation solution for materials. Specialised equipment is used to transport raw materials and coil as well as slab and billet products. As finished material is transported on an intermodal basis, products are only handled during loading and offloading operations.

Supply Chain Management goals in system solutions such as EuroLink include the maintenance of a reliable and frequent service between Outokumpu sites throughout Europe. The system is low-cost, has high capacity and very good levels of reliability. As it is rail-based and most of the locomotives used employ electric drive, EuroLink has an excellent environmental profile when compared to alternative methods of transportation such as trucks or ships, which use internal combustion engines.

Moving from road to rail transportation

In 2010, CO₂ emissions resulting from the transportation of finished products by the Group totalled 157 752 tonnes (2009: 128 285). The proportion of products transported by road totalled 50% and the proportion transported by ship totalled 26%, with 24% being transported by rail. At 1.4 million tonnes, the volume of products transported in 2010 was higher than in the preceding year (2009: 1.0 million tonnes). The primary reason for the increase in associated emissions is higher volumes transported. Nevertheless our transport mix is more emission efficient; the share of road transports decreased from 55% to 50%, while the share of rail transports increased from 17% to a record high of 24%. The share of ship transports decreased by 1.6%.

Environmental investments further improve sustainability

Operational costs for Outokumpu's environmental activities totalled EUR 52.2 million in 2010, with costs associated with the treatment and disposal of waste totalling EUR 2.6 million. Provisions and guarantees connected with environmental considerations totalled EUR 16.1 million, and additional provisions for the aftercare of former mining sites totalled EUR 0.5 million. Environmental investments by Outokumpu in 2010 totalled approximately EUR 16.0 million (2009: EUR 11.7 million), a clear indication of the Group's commitment to achieving increased sustainability.

Main environmental investments

Work on the three-year project launched in 2009 – an investment totalling EUR 28 million – to install a new acid regeneration plant at Avesta continued. The objective is to reduce the quantity of nitrates discharged into the Dalälven river by one third. Start-up is scheduled to take place in the first quarter of 2011.

Other major environmental investments in 2010 included:

- District cooling at Tornio Works (EUR 8.6 million)
- Fume-extraction equipment at Sheffield melt shop (EUR 2.3 million)
- New dust filters at the Avesta slab-cutting station and hot-slab grinding equipment
- At Degerfors, completion of both a project to improve water treatment in the hot rolling plant and a project to reduce discharges of nitrogen from the neutralisation plant.
- At Special Coil and Plate in New Castle in the US, both the installation of an annealing furnace and the replacement of batch-pickle arrangements by a vertical pickling line were completed.
- A new feeder station for hydrogen peroxide at the pickling station in tubular products facility at Storfors.
- At Degerfors new exhaust gas analyser investment decision in the purpose to decrease energy consumption and nitrogen oxide emissions.

Investments to improve energy efficiency

Continuous improvement, efficient operations and maintenance are essential elements in our work to improve energy efficiency of Outokumpu's operations. At the Group's Avesta Works in Sweden, improvement measures undertaken during 2010 included:

- The installation of high-efficiency motors and frequency converters in the continuous-casting steam-extraction system.
- The introduction of set-up routines to locate and reduce leakages of pressurised air in a systematic manner.
- An increase in the usage of secondary heat in the ventilation of buildings where continuous-casting and grinding operations are carried out, reducing the consumption of external district heat.
- A considerable reduction in the consumption of Liquid Petroleum Gas achieved by optimising operating procedures and only using one of the site's two walking-beam furnaces.
- Reductions in electrical power consumption through improved control of the electrolytic process in the annealing and pickling line.
- Savings in the consumption of district heat achieved by lowering the LPG vaporisation temperature.

- Major actions to optimise and stabilise the Electric arc furnaces and converter processes in both the short-term and long-term. As well as providing immediate energy savings, this also enhances the potential for achieving savings in the future.

At the Tornio Works in Finland, the largest improvement in energy efficiency achieved during 2010 resulted from the decision to invest in a new centralised district cooling system. A total of 50 individual electrically-driven refrigeration compressors in Cold Rolling Plant 1 will accordingly be replaced, reducing annual electricity consumption by 11 GWh. Much of the cooling in the new system will come from absorption coolers utilising district heat in which the primary form of energy employed is waste heat. The Finnish Government has granted this project a subsidy of almost EUR 2 million in 2010 as it represents a major energy-saving action. Planning activities commenced in the autumn of 2010 and construction began at the beginning of 2011. The new system will be taken into operation by the end of 2011.

In the summer of 2010, Outokumpu invested some EUR 2.3 million at the Sheffield melt shop to replace the four main air fans and two reverse air fans in the primary fume-extraction equipment with new, water-cooled variable-speed drives. The associated programmable logic controller was upgraded to control the operation of the new fume-extraction system and fans in a more accurate and energy-efficient way. Aims of the project included reducing the amounts of electricity consumed by fume extraction technology, thus supporting the Group's CO₂ emissions-reduction targets. As well as achieving significant reductions in electricity consumption (approximately 20%), the new variable-speed fans have also improved operational control of fume-extraction processes, helping to reduce fugitive emissions from the melting shop into the external environment.

Read more about [energy efficiency](#).