

2024

IGNACIO
IBARRONDO Dr.
Formely
Professor in
U.P.V/E.H.U



**IRON & STEELMAKING INTERNATIONAL
COMPANIES. AND EQUIPMENT
MANUFACTURERS FOR THE IRON & STEEL
INDUSTRY AND INSTITUTES FOR STUDY
ENVIRONMENTAL AND CLIMATE CHANGE
IN IRON AND STEELMAKING INDUSTRY
2024**

The objective of this work is to show the main iron and steel makers as well as those that manufacture the equipment for their facilities, and the main institutes for the study of climate change

Note: If the URL addresses do not open directly, copy them directly into the corresponding web search and directly obtain the page from there

Iron & Steelmaking International Companies 01.07.2024

(*) They are multinationals so the country is indicative

List of the most important steel producers in the world

https://en.wikipedia.org/wiki/List_of_steel_producers

The world's top 10 steelmakers

<https://www.reuters.com/markets/commodities/worlds-top-10-steelmakers-2023-12-19/>

U. S. A. Estados Unidos

United States Iron And Steel Market Overview

https://www.reportlinker.com/market-report/Iron-And-Steel/666300/Iron-And-Steel?gclid=EAlaIQobChMI-onz0Nrp5QIVB7LtCh20EAFUEAAYASAAEgK8a_D_BwE

North America Iron and Steel Industry

<https://member.reportlinker.com/next/search?date=3y&query=Iron+And+Steel&country=726440&viewedItem=document::c55e85a0cb589aa33cebf0799d32a5d78a565976c159eea7d9921f4038067d16>

Iron and steel industry in the United States

https://en.wikipedia.org/wiki/Iron_and_steel_industry_in_the_United_States

U. S. Steel- Nippon Steel

<https://www.bestdealforamericansteel.com/>

<https://www.ussteel.com/>

<https://www.ussteel.com/documents/40705/43734/Climate+Change+Policy.pdf/e6633594-2286-0dfb-9815-2271f119ba89?t=1690380850106>

<https://www.ussteel.com/customers/solutions/automotive>

<https://www.ussteel.com/bigriversteeloverview> (Sustainable Steel)



Cleveland-Cliffs

<https://www.clevelandcliffs.com/>

<https://www.clevelandcliffs.com/news/news-releases/detail/8/cleveland-cliffs-inc-completes-acquisition-of>

<https://www.clevelandcliffs.com/news/news-releases/detail/639/cleveland-cliffs-announces-new-greenhouse-gas-emissions>

<https://www.clevelandcliffs.com/resources>

Nucor

<https://nucor.com/>

<https://nucor.com/history>

<https://nucor.com/products/steel/sheet>

https://imis.aist.org/AISTPapers/Abstracts_Only_PDF/PR-PM0708-4.pdf

Steel Dynamics, Inc

<http://www.steeldynamics.com/>

<https://www.steeldynamics.com/#>

MIDREX

<https://www.midrex.com>

<https://www.midrex.com/technology/midrex-process/>

<https://www.midrex.com/tech-article/midrex-direct-reduction-plants-2023-operations-summary/>

<https://www.midrex.com/green-steel-production/>

<https://www.midrex.com/technology/midrex-process/midrex-h2/>

BlueScope Steel Corporate (Main Products: Galvabond, Colorbond Zincalume)

<https://www.bluescope.com/>

<https://www.bluescope.com/our-steel/our-products>

<http://www.bluescopesteel.com.au/>

<https://steel.com.au/products>

<https://bluescopebuildings.com/>



PRO-TEC Coating Co.

<https://www.proteccoating.com/>

<https://www.proteccoating.com/why-pro-tec/product-information/>

<https://www.proteccoating.com/about-mission/>

Big River Steel (United State Steel)

<https://www.ussteel.com/bigriversteeloverview>

<https://bigriversteel.com/>

Algoma Steel Inc

<https://algoma.com/>

<https://algoma.com/sustainability>

Liberty Steel group

<https://libertysteelgroup.com/about/>

<https://libertysteelgroup.com/> (Sustainability Report)

<https://libertysteelgroup.com/liberty-successfully-completes-magnetite-testing-for-hydrogen-dri-eaf-production-in-whyalla/>

<https://libertysteelgroup.com/our-operations/liberty-steel-us/>

<https://libertysteelgroup.com/our-operations/>

AM/NS Calvert LLC (Arcelor Mittal)

<https://northamerica.arcelormittal.com/our-operations/am-ns-calvert>

California Steel Industries

CSI is the joint venture of the two of the largest steel companies in the world: NUCOR CORPORATION and JFE STEEL

<https://www.californiasteel.com/>

<https://www.californiasteel.com/products>

Carpenter Technology Corp.

(Special Alloys ; aerospace, defense, transportation, energy, industrial, medical, and consumer electronics markets.)

<https://www.carpentertechnology.com/>

Commercial Metals Company CMC

<https://www.cmc.com/>

<https://www.cmc.com/en-US/What-We-Do/Europe/Recycling-in-Poland>

<https://esg.cmc.com> (Building a sustainable World)

EVRAZ North America

(Long, Flat and Tubular Products)

<https://www.evrazna.com/>

<https://www.evrazna.com/sustainability>

Kyoei Steel (Japan) /Vinton Steel

<https://www.kyoeisteel.co.jp/en/index.html>

<https://www.kyoeisteel.co.jp/en/csr.html> (Sustainability)

<https://vintonsteel.com/>

Charter Steel (bar, rod and wire products)

<https://www.chartersteel.com/>

<https://www.chartersteel.com/about/careers/skilled-trades-brochure>

Metallus

<https://metallus.com/>

<https://metallus.com/sustainability/>

Canada

Canadian Steel Producers Association (CSPA)

<https://canadiansteel.ca/>

<https://canadiansteel.ca/climate-energy>

<https://canadiansteel.ca/environment>

<https://canadiansteel.ca/innovation>

Canada's backbone: 10 steel companies forging the nation. (Algoma, Canam, Solid Rock Steel Fabricating Co. Ltd., Stelco....etc)

<https://readsitenews.com/canadas-backbone-10-steel-companies-forging-the-nation/>

Benchmarking Energy Intensity in the Canadian Steel Industry

<https://natural-resources.canada.ca/sites/www.nrcan.gc.ca/files/oeefiles/pdf/industrial/SteelBenchmarkEnglish.pdf>

Champion Iron (High-Grade Mining & Development)

<https://www.championiron.com/>

Australia

The Australian Steel Institute.

Steel Long Products Made in Australia, Steel Flat Products Made in Australia ,Steel Manufacturing in Australia Australian Steel Industry Capability and Capacity .

<https://www.steel.org.au/about-us/our-industry/>

Australia Steel Companies (Materials, Metals & Mining , Steel ...etc)

<https://www.listcorp.com/asx/sectors/materials/materials/metals-mining/steel>

Fortescue (Mining)

<https://fortescue.com/>

<https://fortescue.com/sustainability/climate-change>

<https://fortescue.com/sustainability/environment>

<https://fortescue.com/what-we-do/green-energy-research/green-hydrogen>

<https://fortescue.com/what-we-do/fortescue-hydrogen-systems>



South America

Alacero, Asociación Latinoamericana del Acero

<https://www.alacero.org/> (Congress. News etc)

Gerdau

(Bars, Beams, Rebar, Piling, Semi-finished, Special products).

Gerdau is a leading global steel producer. Each year, we transform more than 11 million tons of recycled scrap metal into new, world-class steel products.

<https://www2.gerdau.com/>

<https://www2.gerdau.com/environment>

<https://www2.gerdau.com/digital-services>

https://www2.gerdau.com.br/?gclid=EAlaIQobChMI_Pz2gl-D6AIViLbtCh1BvwU1EAAYASAAEgIKM_D_BwE

Companhia Siderurgica Nacional

<https://www.bnamericas.com/es/perfil-empresa/companhia-siderurgica-nacional-csn>

Altos Hornos de Mexico (AHMSA)

<http://www.ahmsa.com/>

<https://www.ahmsa.com/nuestros-productos/>

<https://www.ahmsa.com/ahmsa-verde/>

Grupo Simec (Redondos Alambres Perfiles..., 600.000Tm/año, Situada en USA).

<https://www.gsimec.com.mx/index.php>

<https://www.gsimec.com.mx/proceso.php>

<https://www.gsimec.com.mx/productos.php>

Europe

Members of the European Steel Association

<https://www.eurofer.eu/about-steel/members>

<https://www.eurofer.eu/>

Thyssenkrupp

<https://www.thyssenkrupp.com/en/home>

<https://www.thyssenkrupp.com/en/hydrogen>

<https://www.thyssenkrupp.com/en/stories/digitalization/next-level-the-digitization-of-production-processes-at-thyssenkrupp-steering>



Voestalpine

<http://www.voestalpine.com/group/en/>

<https://www.voestalpine.com/greentecsteel/en/>

<https://www.voestalpine.com/group/en/group/environment/>



Gerdau Sidenor

<https://www.sidenor.com/es/>



Arvedi Steel technology

<https://www.arvedi.it/en/>

<https://www.arvedi.it/en/acciaieria/>

<https://www.arvedi.it/en/ast/> ISP-ESP Production Process

<https://www.arvedi.it/en/ast/technology/process/>

<https://www.arvedi.it/en/acciaieria/production-sites/cremona/>
Video

<https://www.arvedi.it/en/sustainability-and-quality/respect-of-the-environment/relationship-with-the-environment/>

Acciai Speciali Terni (Stainless steel).

<http://www.acciaiterni.it/en/>

<https://www.acciaiterni.it/en/sustainability/ast-for-the-environment/>

Ternium

<http://www.ternium.com/es/onboarding>

<https://www.ternium.com/en/>

<https://www.ternium.com/en/media/news/innovation-steel-industry-ternium--07026643921>

<https://www.ternium.com/en/sustainability/community>

TATA Steel Europa

<https://www.tatasteeleurope.com/>

<https://www.tatasteeleurope.com/sustainability>

British Steel LDT (Jingye Group)

<https://britishsteel.co.uk/>

<https://britishsteel.co.uk/what-we-do/>

<https://britishsteel.co.uk/who-we-are/sustainability/>

Liberty Group

<http://www.libertyhousegroup.com/products-services/ferrous-metals/>

<http://www.libertyhousegroup.com/our-businesses/liberty-steel/>

https://libertysteelgroup.com/delivering_cn30/sustainability-report/

SSAB

<https://www.ssab.com/en>

<https://www.ssab.com/en/company/about-ssab/the-earth-calls-for-action>

<https://www.ssab.com/en/fossil-free-steel>

SSAB is revolutionizing steelmaking with two unique steels with virtually zero fossil carbon emission

<https://www.ssab.com/en/fossil-free-steel/ssab-zero>

<https://www.ssab.com/en/fossil-free-steel#ffs>

LKAB (“the Ore Fields”)

<https://lkab.com/en/who-we-are/>

<https://lkab.com/en/>

<https://lkab.com/en/financial-information/financial-reports/annual-and-sustainability-report-2023/>

<https://lkab.com/en/press/hybrit-new-research-shows-hydrogen-reduced-iron-has-superior-properties/>

HYBRIT: New research shows hydrogen-reduced iron has superior properties October 12, 2022

Jernkontoret

<https://www.jernkontoret.se/en/>

<https://www.jernkontoret.se/en/the-steel-industry/companies-and-plants/>

<https://www.jernkontoret.se/en/energy--environment/>

<https://www.jernkontoret.se/globalassets/publicerat/handbocker/stalkret-sloppet-slutrapport-miljohandbok-engelsk-web.pdf>

ArcelorMittal – Aviles - Sestao - Lesaka

<https://spain.arcelormittal.com/que-hacemos/productos-planos/aviles/>

<https://spain.arcelormittal.com/que-hacemos/productos-planos/sestao/>

<https://spain.arcelormittal.com/sostenibilidad/>

<https://spain.arcelormittal.com/que-hacemos/productos-planos/lesaka/>

<https://aureliogutierrez.blogspot.com/2017/01/laminaciones-de-lesaka-de-varez-el-16.html> (Historia)

Rivagroup

<https://www.rivagroup.com/it/>

Vallourec (Tube)

<https://www.vallourec.com/>

Salzgitter AG

<https://www.salzgitter-ag.com/en/company/business-units/steel-processing.html>

Tubos reunidos

<https://www.tubosreunidosgroup.com/es/home>

Japan

JFe Steel Corporation

<http://www.jfe-steel.co.jp/en/>

<https://www.jfe-steel.co.jp/en/products/index.html>

<https://www.jfe-steel.co.jp/en/research/info.html>

<https://www.jfe-holdings.co.jp/en/index.html>



KOBE Steel

<http://www.kobelco.co.jp/english/>

<https://www.kobelco.co.jp/english/steel-aluminum/>

<https://www.kobelco.co.jp/english/sustainability/index.html>

Nippon Steel

<https://www.nipponsteel.com/>

<https://www.bestdealforamericansteel.com/>

<https://www.nipponsteel.com/en/csr/env/warming/zerocarbon.html>

Kyoei Steel

<https://www.kyoeisteel.co.jp/en/index.html>

<https://www.kyoeisteel.co.jp/en/business.html>

<https://www.kyoeisteel.co.jp/en/csr.html>

Korea

POSCO

<http://www.posco.com/homepage/docs/eng6/jsp/s91a0000001i.jsp>

<https://www.posco.co.kr/homepage/product/eng/jsp/support/s91c5000110c.jsp>

<https://www.posco.co.kr/homepage/docs/eng7/jsp/irinfo/irdata/s91b6000030l.jsp> Sustainability Report

<http://museum.posco.co.kr/museum/poscoHistory/eng/s91b90020001i.jsp>

Hyundai Steel

<https://www.hyundai-steel.com/en/index.hds>

(Products, Sustainability etc...)

India

ArcelorMittal

<https://corporate.arcelormittal.com/>

<https://corporate.arcelormittal.com/arcelormittal-websites>

<https://corporate.arcelormittal.com/corporate-library/reporting-hub?type=Country%20sustainability%20reports>

Low-carbon emissions steel standard

<https://corporate.arcelormittal.com/climate-action/low-carbon-emissions-steel-standard>

<https://corporate.arcelormittal.com/media/phendpxm/arcelormittal-low-emissions-steelmaking-standards-proposal.pdf>

Environment

<https://corporate.arcelormittal.com/sustainability/approach/environment>

<https://corporate.arcelormittal.com/climate-action>

TATA steel

<https://www.tatasteel.com/>

<https://www.tatasteel.com/#sustainability>

<https://www.tatasteel.com/sustainability/#spotlight>

<https://www.tatasteel.com/products-solutions/india/>

<https://www.tatasteel.com/products-solutions/europe/>

<https://www.tatasteel.com/products-solutions/south-east-asia/>



Cogent (TATA Steel Group)

<https://www.tatasteeleurope.com/products/electrical-steel>



JSW Steel (Grupo Indio)

<https://www.jsw.in/steel>

<https://www.jsw.in/steel#>

<https://www.jsw.in/steel/about-us>

<https://www.jindalsteelpower.com/>

<https://www.jsw.in/groups/sustainability-homepage>

<https://www.jswsteel.in/digital-transformation-manufacturing-transformation>

<https://www.jswsteel.in/digital-transformation-workplace-transformation>



Essar Steel

<https://www.essar.com/our-work/metal-mining/>

<https://www.essar.com/our-work/metal-mining/ksa-flat-steel/>



Steel Authority of India Ltd

<https://www.sail.co.in/>

China

China Steel Corporation

<https://www.csc.com.tw/indexe.html>

Baosteel Group

<https://www.baosteel.com/en/home>

<http://www.ibaosteel.com/ibaosteel/index?lang=en>

<https://www.baosteel.com/en/product/show>

<https://www.baosteel.com/en/develop/Operating>

http://www.baosteel.com/group_en/

NOTE : We're sorry but *baosteel*-stock doesn't work properly without JavaScript enabled. Please enable it to continue.

HIBIS Hesteel Group

<https://www.hbisco.com/en/>

<https://www.hbisco.com/en/business/iron>

<https://www.hbisco.com/en/sustainable/green>

<https://www.hbisco.com/en/sustainable/innovation>

Ansteel Group

<http://en.ansteel.cn/>

<http://en.ansteel.cn/chanpinyufuwu/gangtiechanpin/>

<http://www.bxsteel.com/en/>

Shandong Tanggang iron and Steel Co., Ltd.

<https://www.shandongtgsteel.com/>

https://www.shandongtgsteel.com/products_1244761.html

Shandong Sino Steel Co., Ltd

<https://www.sino-steel.net/index.html>

<https://www.sino-steel.net/products/>

Shandong Rigang New Material Co., Ltd

<https://www.rigangmaterial.com/>

<https://www.rigangmaterial.com/products.html>

Shougang Group

<https://www.shougang.com.cn/en/ehhtml/IronSteelIndustry/>

ShaGang Group

Shagang Group has five steel production enterprises in Jiangsu Province, Liaoning Province and Henan Province. Some of special steels.

<http://eng.shasteel.cn/ywbk/gtzy/index.shtml>

<http://eng.shasteel.cn/>

<http://eng.shasteel.cn/cpyfw/cpjs/cpjs/lwgcp/index.shtml>

<http://eng.shasteel.cn/cpyfw/yjkf/yfgk/index.shtml>

<http://engsg.shasteel.cn/cpyfw/cpjs/index.shtml> **Jiangsu Shagang Steel Co., Ltd**

Jianlong Group

<http://www.jianlongindustrial.com/Products/>

Maanshan Steel

<http://www.magang.com.hk/eng/companypofile.asp>

Benxi Steel

[http://www.bxsteel.com/en/Benxi steel plates co ltd/](http://www.bxsteel.com/en/Benxi_steel_plates_co_ltd/)

[http://www.bxsteel.com/en/Main Products/](http://www.bxsteel.com/en/Main_Products/)

Rusia Federation

EVRAZ

<http://www.evraz.com/>

<https://www.evraz.com/en/sustainability/environmental-stewardship/approach-and-policies/>

SEVERSTAL

<https://severstal.com/eng/about/>

<https://www.severstal.com/eng/>

<https://severstal.com/eng/media/archive/severstal-launches-educational-course-on-sustainability-/>

<https://severstal.com/eng/sustainable-development/climate/>

<https://severstal.com/eng/search/?search=Research>

Novolipetsk Steel NLMK

<https://lipetsk.nlmk.com/en/>

<https://nlmk.com/en/products/>

<https://lipetsk.nlmk.com/en/sustainable-development/>

Arabia North Africa and Midle East

Arab Iron and Steel Union

<https://aisusteel.org/en/home/>

<https://aisusteel.org/en/products-2/>

<https://aisusteel.org/en/mem/> (All Companies)

<https://www.rasmal.com/steel-companies-in-saudi-arabia/> (All Web Pages of Companies)

Turkey

Turkish Steel (Members, statistics etc....)

<https://www.cib.org.tr/en/>

Erdemir

<https://erdemir.com.tr/en/home-page>

<https://erdemir.com.tr/en/sustainability>

Kardemir

<https://kar-demir.com.mx/>

<https://kar-demir.com.mx/productos/>

Iran

Iranian Steel Producers Association ISPA

<https://steeliran.org/en/>

<https://steeliran.org/en/MEMBERS>

Esfahan

<http://www.esfahansteelco.com/en/>

<http://www.esfahansteelco.com/en/products/default.aspx>

Khouzestan steel Company

<https://www.ksc.ir/en/home>

<https://www.ksc.ir/en/introduction>

Direct reduction plant (DRI)

This unit converts the pellets into sponge iron the plant comprises four Midrex modules with a total capacity more than 4 million tons.

Khorasan Steel

<https://kscco.ir/en/at-a-glance>

Viet Nam

Pomina Flat steel

<https://pomina-flat-steel.com/en>

<https://pomina-flat-steel.com/en/product.html>

EQUIPMENT MANUFACTURERS AND **ENGINEERING for the IRON & STEEL** **INDUSTRY 01.08.2024**

Tenova

<https://tenova.com/>

Technologies iron - steel

<https://tenova.com/technologies/iron-steel>

See interactive map Very Interesting

Ironmaking & Smelting

<https://tenova.com/technologies/iron-steel/ironmaking-smelting>

Energiron

<https://tenova.com/technologies/energiron>

- Selective elimination of CO₂ for CCU ($\geq 60\%$ of total C-input).
- Processing iron ore BF grades, including sulphur (eliminated in CO₂ removal from top gas).
- Lowest NO_x emissions: 0,030 kgNO_x / tDRI
- Use of NG or H₂ implies that coke/coal is no longer needed as in blast furnace

iBLUE® - Ironmaking reinvented

<https://tenova.com/technologies/ibluer-ironmaking-reinvented>

- The preferred technology for low emission hot metal production, combining ENERGIRON®'s Direct reduction process with the Arc Furnaces.

Melt Shops

<https://tenova.com/technologies/iron-steel/melt-shops>

[Primary Metallurgy](#)

[Secondary Metallurgy](#)

[Process & Environmental Technologies](#)

Flat Products

<https://tenova.com/technologies/iron-steel/flat-products>

[Reheating Furnaces](#)

[Pomini - Roll Shops](#)

[Hot Annealing & Pickling](#)

[Acid Regeneration & Silica Reduction](#)

[Cold Rolling Reduction Mills](#)

[Carbon Steel Strip Processing](#)

[Silicon Steel Strip](https://tenova.com/technologies/iron-steel/flat-products/silicon-steel-strip-processing)[Processing](https://tenova.com/technologies/iron-steel/flat-products/silicon-steel-strip-processing)

[Annealing and Pickling Line \(APL\) for Silicon Steel Strip](#)

[Stainless Steel Strip Processing](#)

[Strip Finishing Equipment](#)

Long Products

<https://tenova.com/technologies/iron-steel/long-products>

[Reheating Furnaces](#)

[Long Carbon and Stainless Steel Heat Treatment](#)

Pipe Making

Tech : Energy transition, circular economy and digital transformation.

Green Solutions

Decarbonization

[Decarbonization in ironmaking and steelmaking](#)

<https://sustainabilityreport.tenova.com/> [DOWNLOAD](#)

Circular economy

[Recycling and By-products](#)

Hydrogen

Hydrogen in Ironmaking

Hydrogen Ready Burners

Digital and Process Control (Very Important)

Digital & Automation

Intelligent Process Control

Remote assistance & monitoring

Danieli

<https://www.danieli.com/>

Processes and Technologies

<https://www.danieli.com/en/products/processes-and-technologies.htm>

Ironmaking and Steelmaking

Iron ore processing

https://www.danieli.com/en/products/products-processes-and-technologies/iron-ore-processing_26_92.htm

Direct Reduction

https://www.danieli.com/en/ironmaking_and_steelmaking_43_1.htm

Direct Reduction – Energiron

https://www.danieli.com/en/products/products-processes-and-technologies/energiron_26_91.htm

Modern Blast Furnace Design

https://www.danieli.com/en/products/products-processes-and-technologies/modern-blast-furnace-design_26_71.htm

B.O.F (Basic Oxygen Furnace - Convertidor)

https://www.danieli.com/en/products/products-processes-and-technologies/bof-basic-oxygen-furnace_26_90.htm

Electric Arc Furnaces

https://www.danieli.com/en/products/products-processes-and-technologies/electric-arc-furnace_26_83.htm

Vacuum Treatment Plants

https://www.danieli.com/en/products/products-processes-and-technologies/vacuum-treatment_26_86.htm

Flat products

Casting, rolling, processing and finishing lines

https://www.danieli.com/en/flat_products_43_2.htm

Long products

Casting, rolling, tube, pipes, extrusion, forging and finishing lines

https://www.danieli.com/en/long_products_43_3.htm

MINIMILLS

https://www.danieli.com/en/competencies/minimills_87.htm

GREEN TECHNOLOGIES

<https://www.danieli.com/en/competencies/green-technologies-danieli-environment.htm>

https://www.danieli.com/en/products/products-processes-and-technologies/blast-furnace-gas-cleaning_26_68.htm

https://www.danieli.com/en/products/products-processes-and-technologies/pulverized-coal-injection_26_72.htm

AUTOMATION

https://www.danieli.com/en/automation_43_6.htm

ARTIFICIAL INTELIGENCY

https://www.danieli.com/en/search-results_42.htm?q=Artificial+inteligency

Videos

https://www.youtube.com/results?search_query=Danieli+steel

SMS Group

<https://www.sms-group.com/>

<https://www.sms-group.com/plants> (Very complet)

<https://www.sms-group.com/plants/metallurgy?sf=Material|91>

[Blast Furnace ,](#)

[Cokemaking technology ,](#)

[Converter steelmaking for stainless steel,](#)

[Converter steelmaking for carbon steel ,](#)

Continuous casting for flat products

Continuous caster for long products

Electric steelmaking,

Midrex direct reduction plants,

Secondary metallurgy,

CSP® technology

Etc, Etc.....

Hydrogen **Hydrogen will shape the future of the
metals industry**

Decarbonization of iron production **_(map)**

<https://www.sms-group.com/innovation/turning-metals-green/green-steel>

Green Steel **(Very Complet)**

<https://www.paulwurth.com/en/shaping-the-future/green-ironmaking>

Videos (SMS group) : Hot rolling, Cold rolling, Tube and pipe making.....

https://www.youtube.com/watch?v=_ghn6I7NSqw

<https://www.youtube.com/watch?v=E4iDpjzJB9g>

<https://www.youtube.com/watch?v=tz3W-czrHNU>

<https://www.youtube.com/watch?v=B5PnRqFPPz8>

PAUL WURTH SMS Group

Blast Furnace, Ironmaking, Direct Reduction, Cokemaking, Residue treatment.Etc...

<https://www.paulwurth.com/en/>

Green Steel

<https://www.paulwurth.com/en/shaping-the-future/green-ironmaking/>

Stepwise CO2 Reduction

<https://www.paulwurth.com/en/shaping-the-future/stepwise-co2-reduction/>

Digital Solutions

<https://www.paulwurth.com/en/shaping-the-future/digitalisation/>

SARRALLE

**We deliver innovation and modern solutions for your company.
We know how to do it.**

<https://www.sarralle.com/en>

<https://www.sarralle.com/en/sectors/steel-melting-plant>

<https://www.sarralle.com/en/sectors/continuous-casting>

<https://www.sarralle.com/en/sectors/rolling-mill>

<https://www.sarralle.com/en/sectors/processing-lines>

<https://www.sarralle.com/en/sectors/waste-recycling>

<https://www.sarralle.com/en/sectors/water>

Vesuvius

Iron Making

<https://www.vesuvius.com/en/our-solutions/international/iron-and-steel.html>

Steelmaking Solutions

<https://www.vesuvius.com/en/our-solutions/international/iron-and-steel/steel-making.html>

Continuous Casting

<https://www.vesuvius.com/en/our-solutions/international/iron-and-steel/continuous-casting.html>

Steel Finishing

<https://www.vesuvius.com/en/our-solutions/international/iron-and-steel/steel-finishing.html>

Electrical Steel

<https://www.vesuvius.com/en/our-solutions/international/iron-and-steel/steel-finishing/electrical-steel.html>

Sustainability

<https://www.vesuvius.com/en/sustainability.html>

https://www.vesuvius.com/content/dam/vesuvius/corporate/Sustainability/2023-update/Vesuvius_SR23_Online_v2.pdf



IHI Steelmaking Equipment

<https://www.ihl.co.jp/en/products/>

[https://www.ihl.co.jp/en/products/industrial_general_machine/steel manufacturing furnaces rolling mills/](https://www.ihl.co.jp/en/products/industrial_general_machine/steel_manufacturing_furnaces_rolling_mills/)

Environment

Carbón solutions

https://www.ihl.co.jp/en/products/resources_energy_environment/boiler/index.html

Nuclear Energy

https://www.ihl.co.jp/en/products/resources_energy_environment/atom/index.html

Nippon Steel Engineering Co.,Ltd

<https://www.eng.nipponsteel.com/en/>

Steelplants

<https://www.eng.nipponsteel.com/en/business/steelplants/>

Ironmaking

<https://www.eng.nipponsteel.com/en/business/steelplants/#ironmaking>

Steelmaking

<https://www.eng.nipponsteel.com/en/business/steelplants/#steelmaking>

Environment & Energy (Very complete)

https://www.eng.nipponsteel.com/en/business/environment_and_energy_solution/

Nippon Steel Carbon Neutral Vision 2050

https://www.nipponsteel.com/en/ir/library/pdf/20210330_ZC.pdf

Sustainability

<https://www.eng.nipponsteel.com/en/sustainability/>

<https://www.nipponsteel.com/en/csr/report/> (Report Download)

Contributing to Creation of a Circular Economy

<https://www.nipponsteel.com/en/csr/env/circulation/index.html>

<https://www.nipponsteel.com/en/csr/download/index.html>

Digital Transformation

<https://www.eng.nipponsteel.com/en/dx/>

VACUUM DEGASSIG

Tenova

The increasing demand for high quality steel makes the vacuum treatment an essential step in secondary metallurgy process.

<https://tenova.com/technologies/vacuum-degasser-vdvtdvod>

SMS Group

<https://www.sms-group.com/press-and-media/press-releases/press-release-detail/aceros-arequipa-orders-vacuum-tank-degasser-from-sms-group>

Leybold

A steel degassing plant is a facility used in the production of high-quality steels. It is designed to remove elements such as carbon, hydrogen, oxygen, and nitrogen from the molten steel by a process known as vacuum degassing.

<https://www.leybold.com/en-ie/applications-and-industries/vacuum-metallurgy/vacuum-degassing>

PRIMETALS Technologies

Hot Metal Treatment

<https://www.primetals.com/portfolio/steelmaking/hot-metal-treatment>

https://www.primetals.com/fileadmin/user_upload/content/01_portfolio/2_steelmaking/secondary-metallurgy/Brochures_2020/HIGHLY_EFFICIENT_TWIN_RH.pdf

<https://www.primetals.com/press-media/news/rh-vacuum-degassing-plant-with-dry-mechanical-pump-from-primetals-technologies-receives-fac-at-ahmsa>

<https://www.primetals.com/ua/press-media/news/am-ns-calvert-selects-primetals-technologies-to-supply-rh-degasser-and-continuous-caster>

<https://www.aist.org/primetals-technologies-receives-order-for-rh-degasser,-caster>

KISKO Nerves of Steel

<https://www.kiscosteel.com/what-is-vacuum-degassed-steel-why-do-we-do-vacuum-degassing/>

Edward Vacuum

<https://www.edwardsvacuum.com/en-uk/vacuum-pumps/our-markets/industrial-applications/steel-degassing>

FURNACES

EBNER

Heat treatment Products for the Steel Industry

<https://www.ebner.cc/en/welcome>

<https://www.ebner.cc/en/products-en> **(Important)**

Continuous annealing facilities for uncoated and coated steel strip

<https://www.ebner.cc/en/annealing-and-coating-line-acl-en>

Continuous hydrogen annealing lines for automotive steels, with H2Q quench technology

<https://www.ebner.cc/en/cal-continuous-annealing-lines-steel-en>

HICON/H2® bright-annealing lines for low-alloyed and high-alloyed steel strip and special grades

<https://www.ebner.cc/en/bright-annealing-line-for-steel-strip-en>

HICON/H2 bell annealer for steel strip.

<https://www.ebner.cc/en/bell-annealer-steel-strip-en>

Bell Annealers overview : Steel Strip, Wire, Electrical Steels

<https://www.ebner.cc/en/bell-annealers-overview-en>

ETC....

Electrical Steels :

EBNER

Non-grain-oriented Electrical Steel Strip (NOES) Annealing

HICON/H2® bell annealers for electrical strip (BAF)

<https://www.ebner.cc/en/bell-annealer-for-electrical-steel-strip-baf-en>

Grain-oriented Electrical Steel Strip (GOES) Annealing

HITT high temperature bell annealer facilities (HBAF): grain-oriented (GOES) electrical strip

<https://www.ebner.cc/en/hitt-bell-annealer-for-electrical-strip-en>

TENOVA

Annealing and Pickling Line (APL) for Silicon Steel Strip (NGO and GO)

<https://tenova.com/technologies/annealing-and-pickling-line-apl-silicon-steel-strip>

Annealing and Coating Line (ACL) for Silicon Steel Strip

<https://tenova.com/technologies/annealing-and-coating-line-acl-silicon-steel-strip>

Decarburizing and Coating Line (DCL) for Silicon Steel Strip

<https://tenova.com/technologies/decarburizing-and-coating-line-dcl-silicon-steel-strip>

CONTINUOUS FURNACES

DANIELLI

Heat Treatment Furnaces for Plates

https://www.danieli.com/en/products/products-processes-and-technologies/prodotto-turnkey-04_35_26_35.htm

Continuous Annealing Lines High-speed lines to process AHSS for automotive applications

https://www.danieli.com/en/products/products-processes-and-technologies/product-lines/continuous-annealing-lines_26_155.htm

PRIMETALS TECHNOLOGIES

Continuous Annealing Lines — future-oriented solutions for demanding products .

<https://www.primetals.com/portfolio/processing/continuous-annealing-lines>

ANDRITZ

Continuous annealing lines (CAL) are used to soften the material after cold rolling.

<https://www.andritz.com/products-en/group/metals/carbon-steel-annealing-coating/continuous-lines>

Annealing for carbon steel

<https://www.andritz.com/metals-en/metals-products-overview/processing-rolling/carbon-steel/annealing-lines>

SMS GROUP

Annealing and galvanizing lines and brochure

<https://www.sms-group.com/plants/annealing-and-galvanizing-lines-for-steel>

CISID THERMAL

Continuous and Bell Type Annealing Furnaces for Cold/Hot Strip Mills

<http://www.cisdiif.com/index.php?m=content&c=index&a=show&catid=67&id=2>

John Cockerill Group

Industry

<https://johncockerill.com/en/industry/>

Metals

<https://johncockerill.com/en/industry/metals/>

Pickling-Acid regeneration plant

<https://johncockerill.com/en/industry/metals/pickling/>

<https://johncockerill.com/en/industry/metals/acid-regeneration/>

Rolling mills – Heat treatment

<https://johncockerill.com/en/industry/metals/rolling-mills/>

<https://johncockerill.com/en/industry/heat-treatment/>

Environment

<https://johncockerill.com/en/environment/>

Hydrogen

<https://hydrogen.johncockerill.com/en/>

Andritz Group

<https://www.andritz.com/group-en>

Metals

<https://www.andritz.com/metals-en>

<https://www.andritz.com/group-en/products/search-our-products#page=1>

Environmental

<https://www.andritz.com/environmental-solutions-en>

Heraeus Group

<https://www.heraeus-group.com/en/heraeus-businesses/>

Steel and Iron Industry

<https://www.smart-steel-technologies.com/#1>

Green Steel

<https://www.smart-steel-technologies.com/green-steel>

Signal Metal Industries, Inc.

Heavy Steel Plate Fabrication and Machining

<https://www.signalmetal.com/index.html>

<https://www.signalmetal.com/work-examples.html>

Fives

Steel and Iron Industry

<https://www.fivesgroup.com/>

Process expertise, Reheating, Cold rolling, Strip processing, Induction, Tube mills, Tube finishing.

<https://www.fivesgroup.com/steel>

Digital solutions

<https://www.fivesgroup.com/steel/digital>

New hydrotester for greater productivity

<https://www.fivesgroup.com/newspress/detail-view/new-hydrotester-for-greater-productivity>

Berry Metal Company

<https://www.berrymetal.com/>

<https://www.berrymetal.com/products-services/>

<https://www.berrymetal.com/products-services/blast-furnace/>

<https://www.berrymetal.com/products-services/bof-products/>

<https://www.berrymetal.com/products-services/eaf-products/>

<https://www.berrymetal.com/news-downloads/brochures/>

CISDI

<http://www.cisdigroup.com/>

<https://www.cisdiusa.com/about-cisdi-usa/#>

Products

<http://www.cisdigroup.com/products.html>

<http://www.cisdigroup.com.cn/html/2/abou/>

<http://www.cisdigroup.com/3-ironmaking-instruction.html>

<http://www.cisdigroup.com/4-steelmaking-introduction.html>

<http://www.cisdigroup.com/5-rolling-introduction.html>

<http://www.cisdigroup.com/2-general-material.html>

Automation Control

<http://www.cisdigroup.com/6-automation-control.html>

Energy saving And Environment Protection

<http://www.cisdigroup.com/7-energy-introduction.html>

PRIMETALS Technologies

<https://www.primetals.com/>

<https://www.primetals.com/portfolio/ironmaking>

Ironmaking : Midrex® — the world's leading dri production process

<https://www.primetals.com/portfolio/ironmaking/midrexr>

Blast furnace technologies – Innovation and Incremental Decarbonisation

<https://www.primetals.com/portfolio/ironmaking/blast-furnace>

Finex® — innovative and environmentally friendly ironmaking

<https://www.primetals.com/portfolio/ironmaking/finexr>

Corex® — cost-efficient and environmentally friendly ironmaking

<https://www.primetals.com/portfolio/ironmaking/corexr>

Steelmaking:

Converter carbon steelmaking — boost your competitive edge with full-line solutions from the process inventor

Converter stainless steelmaking — increased efficiency with solutions from the world market leader

<https://www.primetals.com/portfolio/steelmaking>

https://www.primetals.com/fileadmin/user_upload/content/01_portfolio/2_steelmaking/converter-carbon-steelmaking/STEELMAKING TECHNOLOGY CONSULTING-NEW.pdf

Electric Steelmaking

The advantages of Primetals Technologies electric arc furnaces:

- **High productivity: EAF Ultimate**
- **High quality: EAF Stainless**
- **High flexibility: DC and AC EAF**

<https://www.primetals.com/portfolio/steelmaking/electric-steelmaking>

https://www.primetals.com/fileadmin/user_upload/content/01_portfolio/2_steelmaking/electric-steelmaking/EAF-QUANTUM.pdf

https://www.primetals.com/fileadmin/user_upload/content/01_portfolio/2_steelmaking/electric-steelmaking/EAF-ULTIMATE.pdf

Hot metal treatment to ensure highest steel cleanliness

<https://www.primetals.com/portfolio/steelmaking/hot-metal-treatment>

Continuous Casting

- **Bloom casting — high-performance, powerful machines to meet the market requirements**
- **Beam-blank casting — reduced energy consumption with near-net-shape casting**
- **Billet casting — from economic casters to high-speed sophisticated machines**
- **Vertical casting — straight talk about a straight solution**

<https://www.primetals.com/portfolio/continuous-casting>

Hot Rolling Long products

<https://www.primetals.com/portfolio/hot-rolling-long>

Hot Rolling Flat products

<https://www.primetals.com/portfolio/hot-rolling-flat>

Cold Rolling

<https://www.primetals.com/portfolio/cold-rolling>

Processing

- **Pickling lines — clean and scale-free surfaces for optimized downstream processes**
- **Continuous annealing lines — future-oriented solutions for demanding products**
- **Metallic coating lines — adding value for a wide range of applications**
- **Organic coating lines — colorful products for corrosion-protection applications**

<https://www.primetals.com/portfolio/processing>

Endless Casting and Rolling

- **Arvedi esp — real endless strip production**
- **Castrip® technology (see monography of the author)**
- **Endless bar production**

<https://www.primetals.com/portfolio/endless-casting-rolling>

Mini Mills

- **Minimills for long products — from scrap to the finished product in just two hours**
- **Minimills for flat products — generating time, cost, and productivity advantages**

<https://www.primetals.com/portfolio/mini-mills>

Automation & Digital Plants

<https://www.primetals.com/portfolio/automation-digital-plants>

Eco solutions

- Gas cleaning — highly efficient gas cleaning for ironmaking and steelmaking
- Energy efficiency — efficiency up – costs down
- By-product recycling — cutting-edge technologies for highly efficient by-product recycling

<https://www.primetals.com/portfolio/eco-solutions>

Nuova Carpenteria Odolese

Hot Rolling Mills

<http://www.nco.it/>

<http://www.nco.it/engineering.html>

<http://www.nco.it/hot-rolling-mill-automation.html>

<http://www.nco.it/manufacturing.html>

FIVES GROUP

<https://www.fivesgroup.com/contact/our-international-network>

Nuclear and industrial piping leader

<https://www.fivesgroup.com/piping-solutions>



BUTECH BLISS

<https://www.butechbliss.com/>

<https://www.butechbliss.com/our-products/coil-processing-lines/>

<https://www.butechbliss.com/our-products/rolling-mill-equipment/>

<https://www.butechbliss.com/services/custom-engineering/>

Inteco Melting and Casting Technologies GMBH

<https://www.inteco.at/en/home-en>

<https://www.inteco.at/en/product/>

Digitalisation & Smart Production, Electric arc furnace, Ladle furnace,

VD/VOD treatment, RH vacuum degassing. Ingot Casting, Continuous Casting, Rolling Mills, Etc....

<https://www.inteco.at/en/projects>

AmeriFab, Inc.

<http://amerifabinc.com/>

<https://amerifabinc.com/products/>

Melter

<https://melter.com.mx/>

High-spec solution design and fabrication

TMT

<https://www.tmt.com/en/>

Equipment for blast furnaces & smelters

https://www.tmt.com/fileadmin/produktflyer/update_mai-2023/2019_TMT_imageflyer_3.2_Einzelseiten_Web.pdf

AMI Automation (Industrial Systems and Meltshops Solutions)

<https://www.amiautomation.com/>

<https://www.amiautomation.com/meltshops-solutions/>

Calderys

Optimization of Fluid Flow Dynamics within the Tundish

By studying the flow optimization within a tundish using advanced mathematical study software, we are able to recommend the most suitable refractory furniture within the bath area.

<https://calderys.com/news-and-media/calderys-optimization-fluid-flow-dynamics-within-tundish>

Cold Rolling Technologies, inc

<http://www.coldrollingtechnologies.com/home.html>

DANIELI

Cold Rolling Mills

https://www.danieli.com/en/products/products-processes-and-technologies/cold-rolling-mills_26_50.htm

Braho machinery LLC

Braho Machinery LLC was founded in 2013 as an engineering firm providing process consulting and machine design for Process Lines and Rolling Mills.

<http://www.brahomach.com/>

The Systems Group

The Systems Group is a diverse group of companies that interact with each other to offer a suite of services specifically for the Steel Industry.

<https://tsg.bz/>

<https://tsg.bz/brochure-request/>

GSE Consulting Engineers

<http://www.gseeng.com/>

<https://gseeng.com/industries-metals/>

ELECTROTHERM Engineering & Technology Division

Our team focused on a Customer First attitude believes technology should be right-sized, with the process designed to minimize waste and selected to enhance product performance.

<https://electrotherment.com/>

Iron and steel making

<https://electrotherment.com/category/iron-steel-making>

<https://electrotherment.com/category/rolling-mill>

Air pollution Control Equipment

<https://electrotherment.com/category/air-pollution-control-equipment>

CDMG Engineering & Metal Bulding Systems Co.

<https://www.cdmg.com/>

<https://www.cdmg.com/metal-building-kits/metals/steel-mills>

<https://www.cdmg.com/services/automation/>

RUSSULA Engineering

Rolling Mills , Water treatment plants , Digitalización

<https://www.russula.com/>

BBA (Engineering Consulting)

<https://www.bba.ca>

Iron Ore and Steelmaking

<https://www.bba.ca/industries/mining-and-metals/iron-ore-and-steelmaking>

<https://www.bba.ca/industries/mining-and-metals>

Power and Renewables

<https://www.bba.ca/projects/wareham-dam-spillway>

<https://www.bba.ca/projects/deep-sky-labs>

Farnboroug Engineering Consultant

<https://www.fengcon.co.uk/>

Environmental and Sustainability Consultancy

Sustainable development has never been more important or more urgent, particularly in the minerals, metals and manufacturing sectors, which typically involve resource and energy intensive operations.

http://www.fengcon.co.uk/services/environmental_and_sustainability_consultancy.php

Manufacturing RSK Engineering and Environmental Consultancy

<https://rskgroup.com/sector/industrial/>

<https://rskgroup.com/service/climate-change/>

<https://rskgroup.com/sustainability/>

<https://rskgroup.com/service/climate-change/carbon-and-sustainability/>

Vepica Energy Engineering

<https://www.vepica.com/en>

<https://www.vepica.com/markets?market=mining>

EQM Environmental Consulting Firm

**Emission Measurement, Waste management & permitting,
Water quality management Etc....**

<https://eqm.com/>

Steel & Coke Manufacturing

<https://eqm.com/market/steel-coke-manufacturing/>

SteelConsult International B.V

SteelConsult International is an independent consulting firm, entirely dedicated to the carbon steel sector, serving clients in the iron ore, metallurgical coal and steel industries and markets.

<https://www.steelconsult.com/>

<https://www.steelconsult.com/co2-emissions/>

The decarbonisation of the European Integrated Steel Industry

<https://www.steelconsult.com/wp-content/uploads/2022/08/SteelConsult-Presentation-CO2.pdf>

CIX Inc.

To provide a resource in the steel industry for companies looking to improve their processes, rehab old facilities, build new plants, purchase operations- either running or closed, and provide training for employees at all levels of an organization.

<http://www.cixllc.com/>

TMT Tapping-Measuring-Technology

<https://www.tmt.com/en/>

<https://www.tmt.com/en/tapping/controls/>

https://www.tmt.com/fileadmin/produktflyer/update_mai-2023/2019_TMT_imageflyer_3.2_Einzelseiten_Web.pdf

LUBRICANTS and OILS

<https://home.quakerhoughton.com/about-quaker-houghton/>

<http://americanchemtech.com/>

INSTITUTES for STUDY ENVIRONMENTAL AND CLIMATE CHANGE IN IRON and STEELMAKING INDUSTRY .

NOTE : Everything related to pollution due to the steel industry and consequently to climate change due to it AND list of environmental organizations.

can be seen in detail:

On my website:

<http://www.ironandsteelmaking.com>

Section:

Climate Change in Iron and Steelmaking (Complete Review 07 In relation to the use of Hydrogen)

or also in the direction

<https://www.researchgate.net/profile/Ignacio-Ibarrondo/research>

Tech report :

IRON AND STEELMAKING Review: The Iron and Steelmaking Industry and its Impact on Climate Change. 2022 Ignacio Ibarrondo Dr. Catedrático EU. ISBN: 978-84-09-28360-6 A New and revised more complete version 2024, as the occasion of COP 28 – , especially in relation to the use of Hydrogen as a reducing agent, can be seen and Download from here .

January 2024

LIST OF SOME INTERNATIONAL ENVIRONMENTAL ORGANIZATIONS

https://en.wikipedia.org/wiki/List_of_environmental_organizations

HARSCO ENVIRONMENTAL

<https://www.harsco-environmental.com/>

<https://www.harsco-environmental.com/service-phase/iron-or-steelmaking>

INTERNATIONAL ENERGY AGENCY (IEA)

<https://www.iea.org/>

Iron and Steel

<https://www.iea.org/reports/iron-and-steel>

Carbon capture, utilization and storage

<https://www.iea.org/fuels-and-technologies/carbon-capture-utilisation-and-storage>

Carbon capture, utilization and storage (CCSU) in Clean Energy Transitions.

<https://www.iea.org/reports/ccus-in-clean-energy-transitions/a-new-era-for-ccus%23growing-ccus-momentum>

International Environmental Agency Greenhouse Gas (IEAGHG)

<https://ieaghg.org/>

AIST Association for Iron And Steel technology

<https://www.aist.org/home>

Worldsteel association

Climate change and the production of iron and steel

Steel is everywhere in our lives and fundamental to a sustainable future.

<https://worldsteel.org/climate-action/climate-change-and-the-production-of-iron-and-steel/>

Download

<https://worldsteel.org/es/media/press-releases/2021/climate-change-and-the-production-of-iron-and-steel/>

Responsible steel (Standards & Certifications)

In collaboration with our unique multi-stakeholder membership base, we have developed a standards and certification programme to provide steelmakers with a roadmap for producing responsible net-zero steel.

<https://www.responsiblesteel.org/>

IOM3 Institute of Materials Minerals & Mining

Sustainable Future

A curated series of virtual events, editorial content and Awards under the Sustainable Future theme.

<https://www.iom3.org/events-awards/sustainable-future.html>

EUROFER

Climate and energy

Steel - working to reduce the impact on the climate and reduce energy use.

<https://www.eurofer.eu/issues/climate-and-energy>

Sustainability

Remaining environmentally, economically and socially sustainable is a key objective for the European steel industry.

<https://www.eurofer.eu/issues/sustainability>

RMI

Steel: A Critical Piece of a Near-Zero-Emissions Future

<https://rmi.org/steel/>

American Iron and Steel Institute (AISI)

Sustainability

<https://www.steel.org/sustainability/>

HEINRICH BÖLL STIFTUNG (Tel Aviv Israel)

The Green Transition in the Nordic Countries: Lessons in Sustainable Development

<https://il.boell.org/en/2022/11/15/green-transition-nordic-countries-lessons-sustainable-development>

SINTEF

<https://www.sintef.no/en/>

Climate and environment

<https://www.sintef.no/en/climate-and-environment/>

Carbon capture and storage

<https://www.sintef.no/en/ccs/>

Hydrogen as a future energy source

<https://www.sintef.no/en/hydrogen/>

Swerea MEFOS

European Technology Platform on Sustainable Mineral Resources, and Partners.

<http://www.etpsmr.org/>
