Carbomax

Designing Raw Materials.

Agglomeration Seminar NyKoSi

Martin Bjurström, Technical Manager

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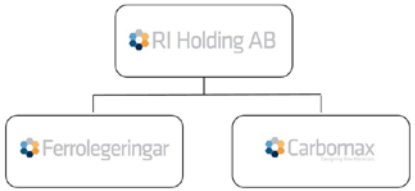
Briefly about Carbomax

- Founded in July 1992.
- The facility in Västerås was built in the summer of 1995 and has been expanded in 1999, 2003, 2007 and 2011.
- Owned 100% by Robert Idegren Holding AB
- AB Ferrolegeringar was acquired in 2014.



Carbomax
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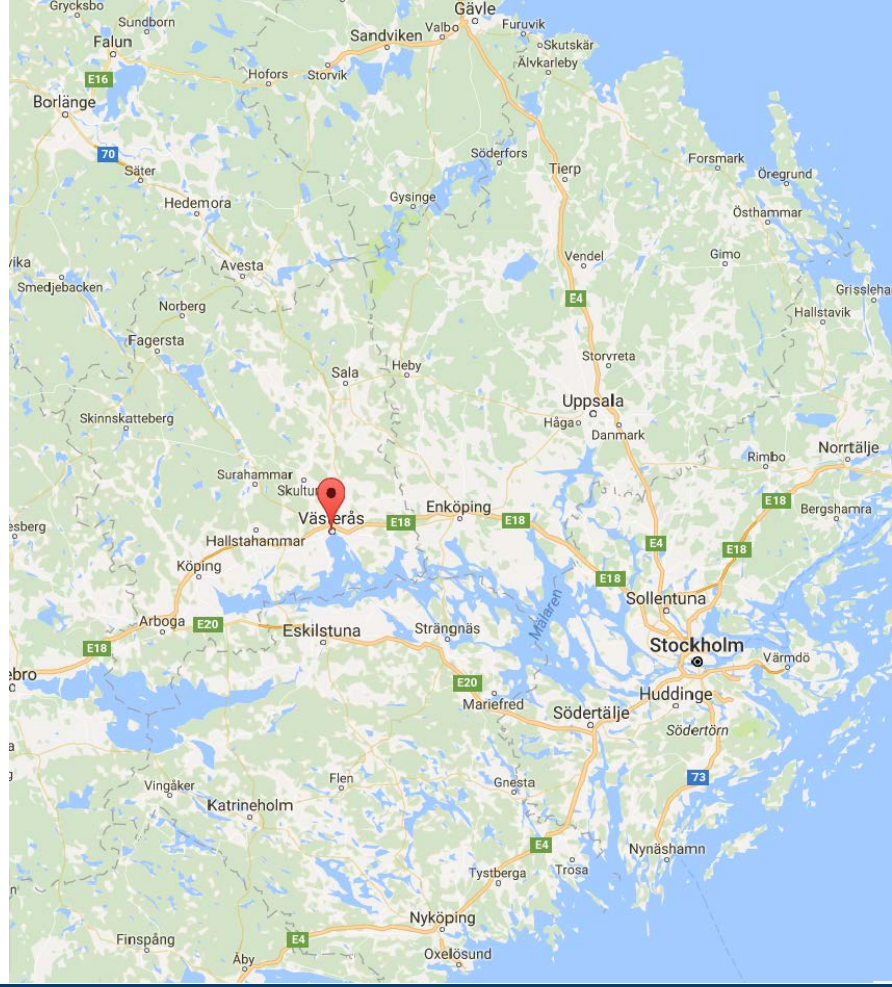
Briefly about Carbomax

- Carbomax imports, refines and deliver
  - carbon additives
  - alloys
  - mixtures and briquettes
- Our customers are steel works and foundries in northern Europe

Briefly about Carbomax

- Strategically placed in Västerås, in near proximity to Sweden´s major steel works and Västerås harbour.
- A briquetting and blending line was installed in 2012.
- A new market opened to handle waste when an environmental permit was given to Carbomax in 2014.



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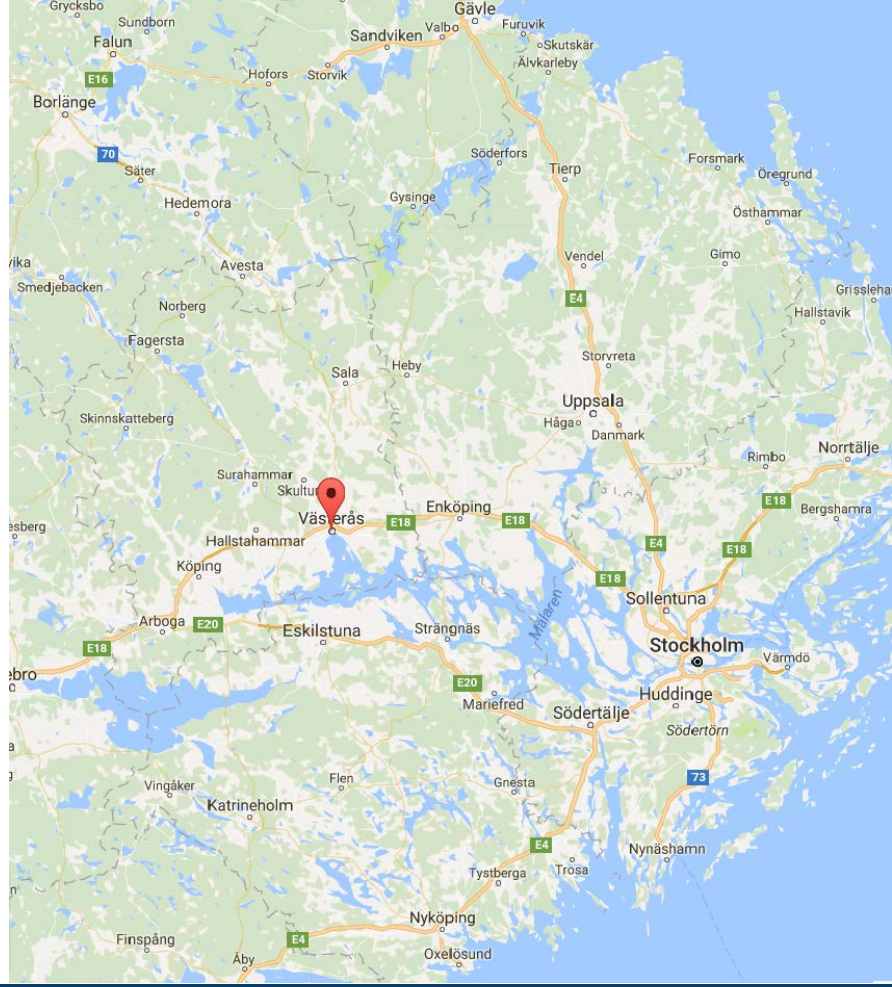
Briefly about Carbomax

- Briquettes based on primary raw materials and waste from customers and other businesses
- Many projects together with the trade organization “Jernkontoret”
- Project to start production of FeMo-DR and Mo-HY Oxide briquettes. (Patented process)



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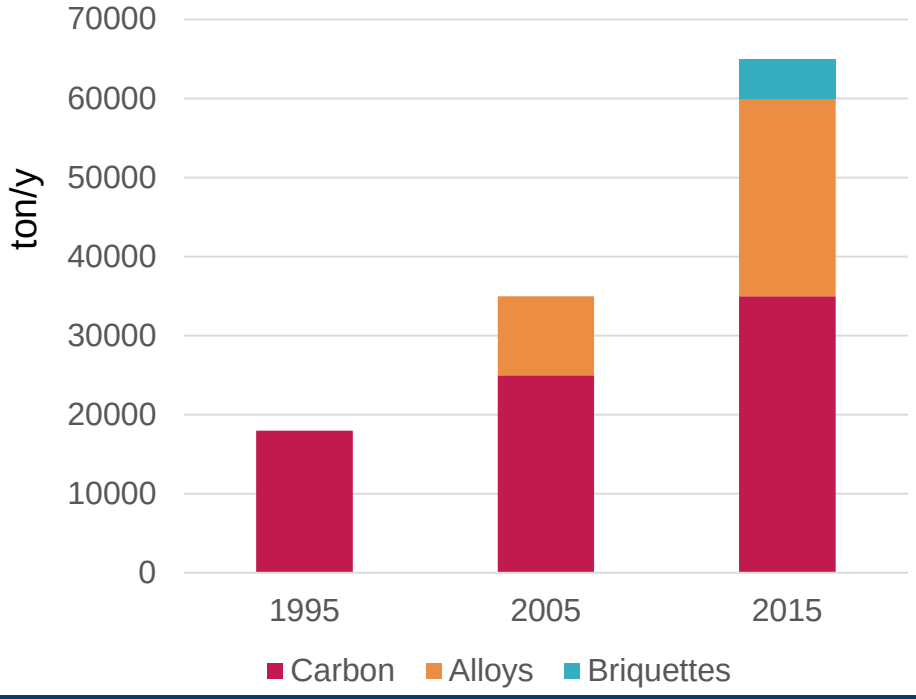
Growth development for the business areas



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Business area - Carbon

- Metallurgical use of carbon is needed for:
  - Carburizing
  - Reduction
  - Foaming of slag
- Carbon products are chosen depending on analysis, reactivity and handling.

Business area - Carbon

- Carbon products
  - Anthracite
  - Petroleum coke
  - Metallurgical coke
  - Graphite
- Carbomax provide the customers with the right carbon product, when it comes to analysis, grain size and packaging from our own stock.

Business area - Alloys

- Main alloys and their use:
  - ***FeCr,*** all qualities sorted after carbon content. Chromium gives the steel corrosion resistance and if the Cr content is above 12 % it is considered as stainless steel
  - ***FeMn,*** is used in almost every steel, both to neutralize the negative effects of remaining sulphur both also to increased hardenability
  - **FeSi,** widely spread use as reduction agent and for alloying in cast iron and steel

Business area - Alloys

- Other alloys:
  - FeP
  - FeTi
  - FeS
  - CaSi
  - FeSiMg
  - FeSiMn
  - FeSiCr
  - FeMo
- Wire and Cored wire

Business area - Mixtures and briquettes

- Mixtures and briquettes are based on fines, off grades and waste / hazardous waste generated at our customers or from other businesses.
- Cooperation with Nordic waste companies
  - STENA
  - Ragnsells

Business area - Mixtures and briquettes

- Some advantages for our customers
  - Lower cost for raw material
  - Improvement of the customers process
  - Higher metal yield compared to using fines
  - Lower consumption of virgin material
  - Reduced dusting (better working environment)
  - Custom fit analysis
  - A controlled recovery of residuals, classified as waste or hazardous waste
  - Deposition of waste can be decreased or avoided

Different types of briquettes

- Alloyed briquettes, based on Fines
- Reduction and energy briquettes for usage in electric arc furnaces and converters
- Briquettes based on oxidised residuals, e.g. mill scale, mill scale sludge, grindings and dust or chips.

Properties and variables

- Shape
- Toughness
- Analysis

- Moisture
- Particle size
- Binders
- Press configuration
- Composition
- Flow ability
- Chemical reactions

Qualification testing

- Drop test
  - Drop test from 6,4 m shall result in 90% > 10 mm
- Toughness test
  - Briquettes shall withstand 50 kg load without breaking
- Visual inspection

Briquetting equipment

- Blender
  - 1,5 m^3 capacity
  - 5-6 minutes processing time
- Roll Press
  - max 150 bar
- Output
  - + 6 MT / h

Environmental permit

From a notifiable C-facility to a B-facility with an environmental permit

Carbomax AB (556449-5744) received environmental permit in February 2014.

The permit allows Carbomax to process / handle tonnages of Carbon, Alloys and Process waste and Hazardous waste (see below)

- - 60 000 ton carbon products
- - 60 000 ton alloys
- - 30 000 ton waste
- - 2 500 ton hazardous waste

Permitted EWC-codes

EWC-code	Description
060399	Wastes from the MFSU of salts and their solutions and metallic oxides not otherwise specified
100201	Wastes from the processing of slag from the iron and steel industry
100202	Unprocessed slag from the iron and steel industry
100207	Solid wastes from gas treatment containing hazardous substances from the iron and steel industry
100210	Mill scales from the iron and steel industry
100211	Wastes from cooling-water treatment containing oil from the iron and steel industry
100212	Wastes from cooling-water treatment other than those mentioned in 10 02 11
100302	Anode scraps from aluminium thermal metallurgy
100318	Carbon-containing wastes from anode manufacture from aluminium thermal metallurgy, other than those mentioned in 10 03 17 (tar-containing waste)
100909	Flue-gas dust containing hazardous substances from casting of ferrous pieces
101009	Flue-gas dust containing hazardous substances from casting of non-ferrous pieces
101010	Flue-gas dust other than those mentioned in 10 10 09

EWC-code	Description
110109	Sludges and filter cakes containing hazardous substances from chemical surface treatment and coating of metals and other materials
110110	Sludges and filter cakes other than those mentioned in 11 01 09
120101	Ferrous metal filings and turnings from shaping and physical and mechanical surface treatment of metals and plastics
120102	Ferrous metal dust and particles from shaping and physical and mechanical surface treatment of metals and plastics
120103	Non-ferrous metal filings and turnings from shaping and physical and mechanical surface treatment of metals and plastics
120104	Non-ferrous metal dust and particles from shaping and physical and mechanical surface treatment of metals and plastics
120105	Plastics shavings and turnings from shaping and physical and mechanical surface treatment of metals and plastics
120116	Waste blasting material containing hazardous substances from shaping and physical and mechanical surface treatment of metals and plastics
120117	Waste blasting material other than those mentioned in 12 01 16
160216	components removed from discarded equipment other than those mentioned in 16 02 15
160801	Spent catalysts containing gold, silver, rhenium, rhodium, palladium, iridium or platinum (except 16 08 07 - hazardous)
160802	Spent catalysts containing hazardous transition metals or hazardous transition metal compounds
160803	Spent catalysts containing transition metals or transition metal compounds not otherwise specified

Environmental performance

- Environmental initiatives
  - Program to lower emissions to air and water
  - Program to recover waste from in house production

Thank you for your attention!