



Industry

# Project Profile

## Elkem Carbon

a Bluestar Company



### Elkem Carbon to reduce energy consumption by 35 %

Elkem Carbon Fiskaa is the first company within the Elkem Group to introduce energy management, and Norsk Energi is engaged by the company to assist in the process.

Norsk Energi is a leading consultancy company in the fields of energy, environment and safety; specialising in thermal energy systems.

Norsk Energi is actively engaged in a range of large and small projects focusing on energy efficiency and greenhouse gas reductions – primarily through consulting, design, technology development and training.

Elkem was searching for a flexible, user friendly and cost effective Energy Management software for the Group's energy management work and the process to be certified according to ISO 50001.

Elkem signed a 5 year contract for the Cebyc software Energinet, which was the only software which met the requirements Elkem and their consultants described in the tender documentation.

Elkem Carbon supplies speciality carbon products and services to pyro-metallurgical processes for the production of ferro-alloys, base metals and primary aluminium.

Elkem Carbon serves the ferro-alloys and primary aluminium industries from its operations in Norway, South Africa, Brazil and China, complemented by a global network of sales network.

They are one of the world's leading companies in terms of environment-friendly production of materials. The company's principal products are solar grade silicon, silicon, special alloys for the foundry industry, carbon and microsilica.



Elkem Alcoa, Fiskaa outside Kristiansand in Norway

Through systematic energy management, Elkem Carbon Fiskaa has identified great energy saving measures, of which heat recovery from the calcination ovens constitutes the greatest potential for energy saving.

In 2012, Elkem decided to introduce an energy management system in all of Elkem's production plants in accordance with the international standard (NS-EN ISO 50001). Elkem signed a contract with Cebyc relating to the use of Energinet ISO 50001 EnMs software for all of Elkem's production plants. Enova is owned in its entirety by the Ministry of Petroleum and Energy in Norway and new programmes within energy management opened up the opportunity for financial support. The Norwegian Environment Agency is currently to a greater extent making demands to energy management in accordance with the standard in connection with new discharge permits, so both threats and benefits have been a motivational factor.

As an introductory step, a GAP analysis was performed in order to map the status for energy management relative to the requirements in the standard pertaining to energy management. On the background of the results in the GAP analysis, an action plan was prepared as to how the various requirements in the standard were to be implemented.

In order to be able to follow up the energy performance and deviations from the normal values, as well as to measure the effect of the measures that were implemented, 42 new energy meters and the new Internet based energy monitoring system Energinet from Cebyc were installed.



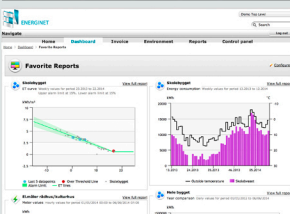
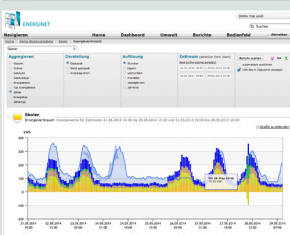
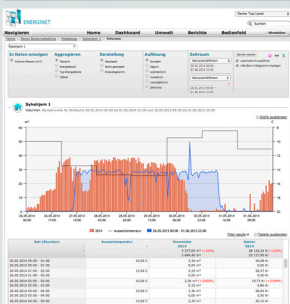
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Uncovered great energy saving potential in co-operation with Norsk Energi.

In advance of the energy management project, Elkem Carbon had, by way of a separate pre-project with the assistance of Norsk Energi, mapped 7 energy savings measures which in aggregate will constitute energy savings amounting to 34 GWh/year. These projects have also been granted 39 million NOK as part financing from ENOVA, owned by the Ministry of Petroleum and Energy, for realization. Through the process related to the introduction of energy management, further 12 new energy saving measures with a total potential of 40 GWh/year have been mapped.

Some of the measures have already been implemented with success, whereas bigger measures may be implemented with public support.

It is the heat recovery from the calcination ovens which constitutes the greatest energy saving potential. Currently, volatile gases from the calcination process are burned in a flare burner over the roof. Previous attempts at recovering the energy from these hot gases have failed because of problems related to fouling and corrosion.

Norsk Energi believe that they have a solution to the problem, and a test involving combustion of these exhausts in the will be made before the summer of 2014.

There are a few challenges related to handling the process variations and ashes/sulphur in the exhausts which must be tested before a full scale development is initiated.

If one succeeds with the test runs, the flue gas from the combustion will be exploited in a heater for heating hot oil. Hot oil at about 300°C is used for heating the process facility for pitch and electrode mass.

Currently, a lot of electric energy (6.2 GWh/year) is used for this process.

An equally important effect by burning the exhausts in a controlled manner in a heater is that one will be able to clean the sulphur from the flue. This will be the next step of this project in which one will be able to remove up to 99 per cent of the sulphur emissions from the calcination plant.

The energy management project has also mapped several other areas of use where waste heat may be exploited for heating or drying processes.

Elkem Carbon has certified management system within quality (ISO 90001) and environment (ISO 40001). The energy management system (ISO 50001) has several common denominators with quality and environment, and is therefore in part integrated with the established systems. Elkem Carbon has an ambition to be certified in accordance with ISO 50001 during the course of 2014.

## About Elkem Carbon

Elkem Carbon is the world's largest manufacturer of electrically calcinated anthracite and electrode mass, and has as its vision to be among the world's leading companies within environmentally sound production.

Electrically calcinated anthracite and electrode mass are necessary in the production process for steel, aluminium, silica and other metals. At Elkem Carbon Fiskaa in Kristiansand, coke and anthracite are heat processed at about 2000°C in twelve calcination ovens which each has an electric power of about 1MW.

The heat processing makes the anthracite into an electrically conductive, clean and stable material so that it may be used as electrodes in ovens and electrolysis cells for the production of metals.

The annual energy consumption in the production plant is about 105 GWh electrical energy. Elkem Carbon Fiskaa has around the clock production and 69 employees.

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