

Annual report 2009

Efficient, environmentally friendly and safe utilisation of energy



NORSK  **ENERGI**

ENERGY • ENVIRONMENT • SAFETY



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This is Norsk Energi

- **Norsk Energi** was established as Norsk Dampkjelforening on 16 March 1916, at a time when time businesses faced not only high coal prices and energy costs, but also the challenge of finding the high levels of expertise required to run boiler plants both efficiently and safely. Norsk Dampkjelforening was established to create a central source of expertise.
- Membership was initially restricted to businesses in the paper and wood pulp industries. Two years after the association was founded, however, membership was opened to businesses in other sectors and companies involved in oil, energy and district heating, as well as local authorities, gradually came on board.
- **Norsk Energi's** head office is located at Hoffsvai 13 in Oslo (see photo above). The association also has branch offices in Bergen and Gjøvik. In the operating year 2009, Norsk Energi employed 76 staff, distributed across eight departments. At the end of the year, the association had 90 members from various sectors of industry and commerce.
- **Norsk Energi** offers consultancy, planning and design, control, auditing, technology development and training services within the areas of energy, safety and the environment. The association also invests in major international environmental projects, organised through bodies including the Norwegian Ministry of Foreign Affairs.
- Many of our largest clients are also members of the association, allowing us to combine advanced technical expertise with a solid grounding in Norwegian commerce. The association's members are responsible for around 80% of all Norwegian industrial energy consumption.



Exciting times ahead

2009 was an excellent year for Norsk Energi, with many energy-related and environmentally friendly projects. Together with our sound financial results, these projects will bring us closer to achieving our goal of being a leading adviser within thermal energy systems in Norway.

Many outstanding renewable-energy-based projects are being – and will be – realised within industry and the district-heating sector. This is reflected in statistics showing that Enova (an official Norwegian body established to promote environmentally friendly restructuring of energy consumption and energy production), achieved a contractually agreed goal in excess of 5 TWh. Contributions from industry and the district heating sector totalled more than 4 TWh, making these industries the largest contributors to Enova's achievement of its goal. Norsk Energi has been involved in many of the projects that made this possible.

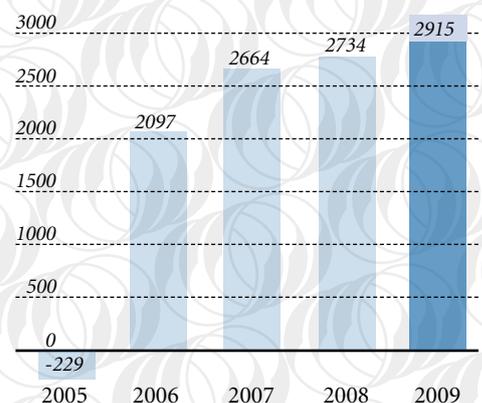
Thermal energy systems have demonstrated their flexibility in utilising new energy sources to generate renewable energy with relatively low levels of support. We believe one of the most important benefits of thermal energy systems lies precisely in this capacity to utilise most types of energy sources.

Most people know only too well that efficiency improvements and reduced energy consumption represent the most beneficial measures for the environment. Even so, such measures will be difficult to put into effect if they are not attractive from an industrial perspective. Nonetheless, we remain hopeful that potential energy savings will be more extensively realised in the future and that Enova's initiatives to promote energy efficiency in industry will result in many exciting assignments within Norsk Energi's core competences in the coming years. In particular, collaboration between the energy and industrial sectors will play an important role in the process of converting to renewable energy for industrial purposes. Already we are starting to see several such projects being realised.

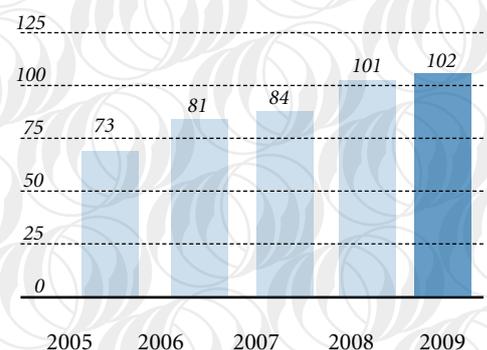
It was important to focus on planning and design and project management in the year under review. Consequently all employees received introductory training in project management. Our staff development and training programme makes Norsk Energi an even more attractive workplace, allowing us continually to increase the strength of our organisation.

Exciting times lie ahead!

Profit/loss for the year: (NOK '000)



Operating revenues: (NOK million)



District heating *boost* for Kristiansand

Kristiansand's district heating plant is to be expanded at a cost of NOK 500 -700 million. Norsk Energi has played a key role in planning and designing the transmission line that runs from the new incineration plant at Langemyr to Kristiansand city centre.

Kristiansand's local authority aims to make the city one of the greenest in Norway and has implemented a series of measures to reduce the city's greenhouse gas emissions.

The cost of the waste incineration plant at Langemyr has been projected at NOK 1.2 billion.

"A transmission line is being constructed from the new incineration plant at Langemyr to Kristiansand, covering a distance of around five kilometres. This work is due to be completed in autumn 2010," says Linda Pedersen Haugerud, senior consultant at Norsk Energi. Pedersen Haugerud is project manager and a member of the Norsk Energi team assisting Agder Energi Varme AS. Kristiansand local authority aims to make the city one of the greenest in Norway and has implemented a series of measures to reduce the city's greenhouse gas emissions. So far, district heating plants with a capacity of 70 GWh have been constructed in Kristiansand. 60 per cent of this capacity comes from waste heat generated by the Xstrata Nikkelverk

metal refinery, which commenced district heating supplies in 2004. Norsk Energi was also involved in the construction of the new heating plant to process waste heat from Xstrata Nikkelverk.

Construction of the district heating grid in Kristiansand started back in 1999, when a bioplant was built at Gimle to supply heat to customers including Kristiansand College.

The new waste incineration plant at Langemyr is due to be completed during summer 2010. The DN 400 transmission line from Langemyr will be connected to the rest of the district grid during autumn 2010.

"We are also working on the planning and design of a new peak load plant at Langemyr," says Pedersen Haugerud. "This will initially have an oil boiler capacity of 25 MW, plus a further 15 MW if this should be required. The plant is located right alongside the waste incineration plant at Langemyr, north of Kristiansand city centre."

The incineration plant will receive waste from the Agder county authorities and will have a power generation capacity of 10 MW and a heating capacity of 32 MW. The electricity will be fed into the grid and the heat will supply a number of buildings, enabling them to phase out their oil boilers. The heat supplied from production at Langemyr alone will correspond to the annual consumption of 15,000 households in Kristiansand. The expansion of district heating in Kristiansand is proceeding smoothly.

Øystein Holvik, environmental manager at Kristiansand local authority, explains that the grid will be extended towards Vågsbygd and that there are major development plans for Sørlandsparken.



*A new district heating milestone
will be passed in Kristiansand in
autumn 2010.*





Måløy herring oil factory

Risk analysis for herring oil factory

Måløy Sildoljefabrikk's production activities can give rise to a risk of explosion. Odour problems can also be a challenge.

Norsk Energi's Department for the Environment and Safety has assisted the business with risk analysis and odour mapping.

We are required to perform odour analyses, and for this we have engaged experts from Norsk Energi.

Arve Hjelle, Måløy Sildoljefabrikk
quality manager

Welcon AS, a subsidiary of listed company Austevoll Seafood ASA, has five fishmeal and fish oil factories in Norway, including Måløy Sildoljefabrikk.

The herring oil industry has a long history in Norway, stretching back to 1884, with initial applications including lighting and heating. In the industry's heyday, Norway boasted 100 herring oil factories, but only a few now remain. The factory at Måløy started operation in the early 1990s and currently has processing capacity for 1,500 tonnes of fish per day. The factory can also store 8,300 tonnes of fishmeal and 2,300 tonnes of fish oil.

"Måløy Sildoljefabrikk is a modern business,

but we still face a number of challenges, including dispersion of odours," explains Arve Hjelle, Måløy Sildoljefabrikk's quality manager.

"The chief administrative officer's environmental department has established maximum limits for emissions from the factory. We are obliged to perform odour analyses and for this we have engaged experts from Norsk Energi. Because we are also subject to stringent regulations in respect of the risk of explosion, we have also received assistance from Norsk Energi in performing risk analyses and preparing an explosion prevention document," explains Hjelle.

Norsk Energi

Helping to make the Balkans greener

The International Department is performing important environmental work in the Balkans. Norwegian experts are currently involved in a number of initiatives in Macedonia and Bosnia and Herzegovina.

“There is considerable environmental potential and it is particularly pleasing to see how much our foreign partners appreciate our transfer of expertise,” explains Hans Borchsenius, head of the International Department.

Several of his colleagues from Norsk Energi are involved in the projects, which are financed by the Norwegian Ministry of Foreign Affairs. The climate projects in Bosnia and Herzegovina will be developed in stages. Norsk Energi runs courses for local consultants on energy efficiency measures and the use of renewable energy in district heating, as well as on seeking financing. The aim is to enable the companies to manage further implementation of the projects unaided. Based on past experience, Norsk Energi possesses a great deal of knowledge concerning local conditions in the Balkans. In conurbations where our local knowledge is more limited, we establish contact with the local authorities.

“We map local energy needs and record local communities’ current energy supply arrangements. We then propose expansion- or improvement-related measures based on the particular situation. We map opportunities to use bioenergy and implement energy efficiency improvements, both of which qualify as Clean Development Mechanisms (CDMs) and as such represent an important part of the Kyoto Protocol,” explains Borchsenius.

CDM projects provide participating countries with carbon credits, which can then be sold on the international market in accordance with defined guidelines.

Senior consultant Åse Sørensen is project manager of Norsk Energi’s operations in Bosnia and Herzegovina.

“The local people appreciate the importance of climate-related issues, but climate work is often given lower priority on economic grounds. Bosnia and Herzegovina is not subject to the

same emission reduction requirements as Norway. If there’s a choice between jobs and environmental measures, it is easy to prioritise the former,” says Åse Sørensen.

The initiative in Macedonia covers industrial energy efficiency measures, environmental management and student exchanges. Consultant Magnus Løseth is focusing on environmental management in Macedonia. He has held seminars for 30 local businesses and has received a very positive response.

“The Macedonians quite clearly want to learn more about environmental management and what needs to be done to make things more environmentally friendly. They realise that they need a great deal more expertise and value our expertise-enhancing work,” says Magnus Løseth.

The aim is to identify four businesses in Macedonia, which will all introduce environmental management into their daily operations. This could have a major knock-on effect in encouraging other businesses to introduce local environmental management procedures, not least because this generates competitive advantages internationally.

Senior consultant Ann-Iren Glimsdal is project manager of Norsk Energi’s operations in Macedonia.

“The Macedonians are very committed, not least because they know that consideration of the environment plays an important role with regard to possible EU membership and new environmental requirements in tender rounds,” remarks Glimsdal.

The businesses Norsk Energi works with are also keen to identify and develop energy efficiency measures in order to become more competitive. Norsk Energi assists businesses in documenting projects to enable them to apply for financing.



“The local people appreciate the importance of climate-related issues, but climate work is often given lower priority on economic grounds.”

Senior consultant Åse Sørensen, project manager of Norsk Energi’s operations in Bosnia and Herzegovina.



From left: Hans Borchsenius, Åse Sørensen and Ann Iren Glimsdal. Photo: Bård Ek.

The initiative in Macedonia covers industrial energy efficiency measures, environmental management and student exchanges.



Major investment in district heating in Lillestrøm

The expansion of the district heating plant in the Lillestrøm area will cost close to NOK 470 million. Akershus Energi Varme AS, a wholly owned subsidiary of Akershus Energi, is carrying out the expansion.

The most significant construction activity will take place over the next few years, and the district heating grid is due to be completed in 2016.

Frank Sagvik, CEO,
Akershus fjernvarme AS

In order to supply Kjeller and the upper section of Storgata, a new cooling plant will be constructed in the Kjeller area, which will be connected to the district cooling network in Lillestrøm.

Norsk Energi has planned and designed the project and managed the expansion of district heating and district cooling in Lillestrøm Centre, Lillestrøm North, Kjeller and Skedsmo.

“Our advisors have planned and designed the project and monitored the upgrading of Energisentral Syd. We are now continuing with the planning and designing of the external grid and internal arrangements. We are also contracting in connection with the connection of Strømmen Shopping Centre, which comprises a 2 MW cooling plant with a 3 MW peak load from local cooling plants,” explains Hallstein Brandal, head of the District Heating and Renewable Energy Department.

Enova has approved grants totalling NOK 73.1 million for the expansion of district heating facilities in the Lillestrøm area. The plant is due to be completed in 2016 and will provide 152 GWh of district heating and district cooling.

Between 2001 and 2005, Akershus Energi Varme AS constructed an energy plant and a pipe network in Lillestrøm South. The licence area for this project is situated between Nitelva and Lillestrøm Railway Station and the plant takes the form of a sewer-based heat pump

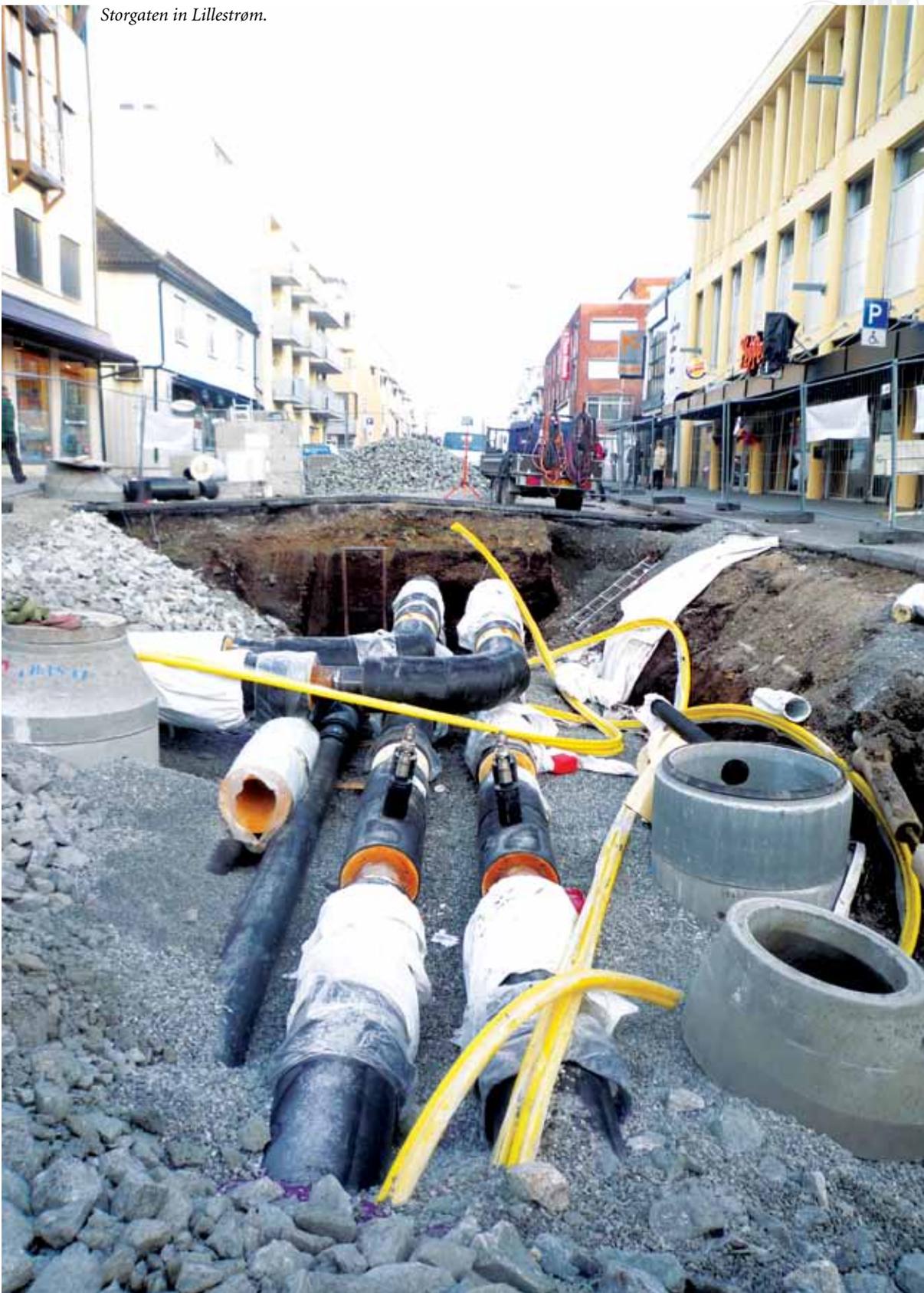
located in Rælingen. The heating plant has installed a heat pump and cooling machinery to supply heat and cooling to Lillestrøm South, which is home to Norway Trade Fairs and the Arena hotel, among others.

Last year another heating plant, with the capacity to supply the whole of Lillestrøm and Strømmen, was built north of the town's Åråsen stadium. The plant will primarily use wood chippings, but can also use biofuel oil as a backup. Construction of a solar heating plant is also being considered in this area.

The most significant construction activity will take place over the next few years, and the district heating grid is due to be completed in 2016,” says Frank Sagvik, CEO of Akershus Fjernvarme.

Over the next few years, Akershus Fjernvarme AS will look at opportunities to expand towards Lørenskog, Rælingen and Hvam.

In order to supply Kjeller and the upper section of Storgata, a new cooling plant will be constructed in the Kjeller area, which will be connected to the district cooling grid in Lillestrøm. The plant is expected to be gradually expanded by 3.3 MW in time for the 2010 cooling season, to be followed by a further phased expansion to 6 MW in 2012.



Important control body

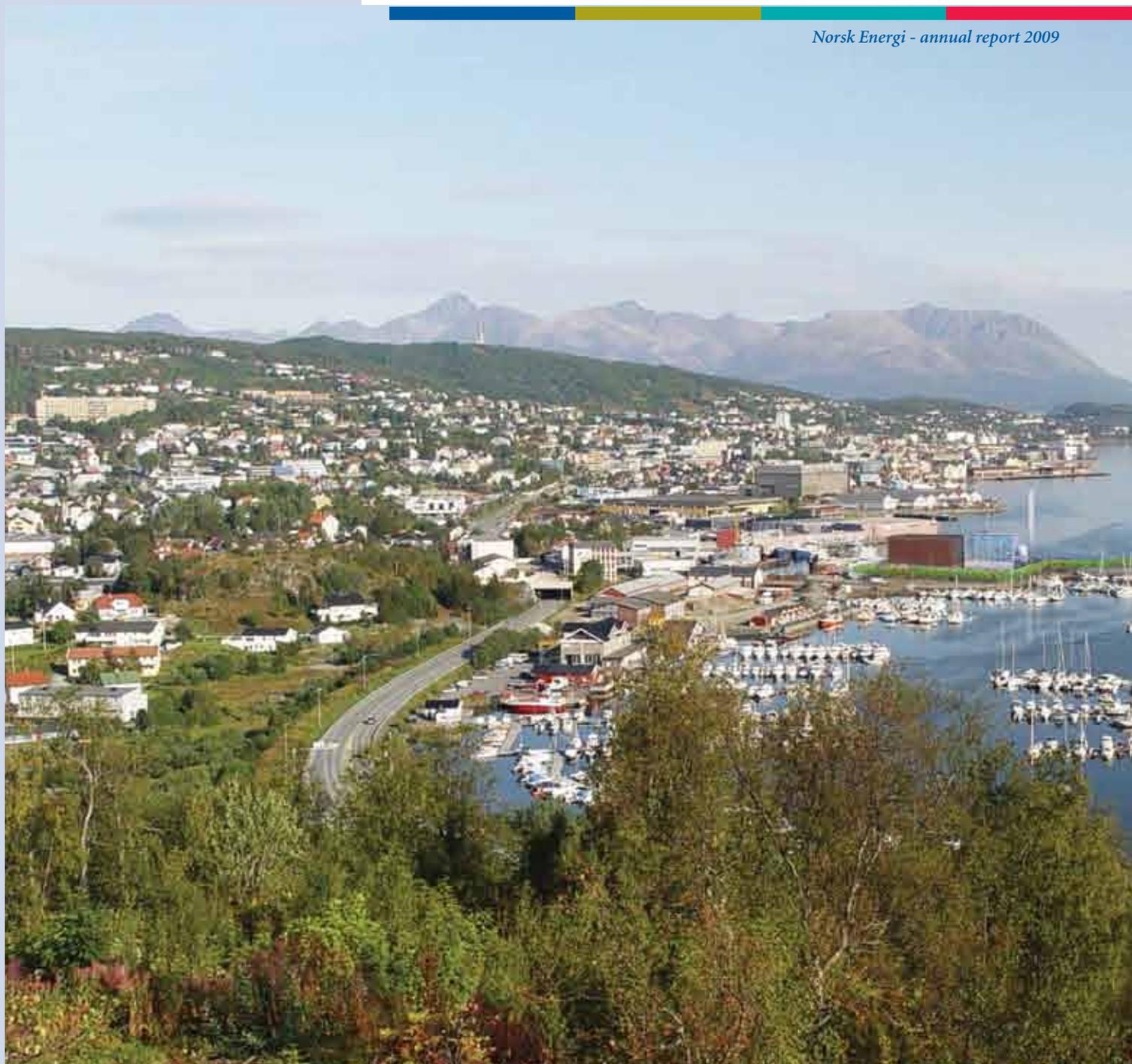
Norsk Energi Kontroll AS is an independent third-party body which performs control tests on pressurised equipment and pipes.

Norwegian businesses above a certain size that use steam or hot water plants are required by the Norwegian Directorate for Civil Protection and Emergency Planning (DSB) to perform periodic

status controls, normally every five years. Such plants are also subject to regulations governing risk assessment.

Norsk Energi Kontroll AS is accredited as a type A inspection body by Norwegian Accreditation to carry out controls on all types of pressurised equipment. We work with steam, hot water and tank systems, as well as with new, used or converted or relocated materials.

Each year Norsk Energi Kontroll AS carries out control assignments for clients including district heating companies, the food industry, laundries and central and local government clients.



Construction will take place during 2010 and 2011, with the first heat supplies possible in 2011.

The new capacity will mainly replace oil-based heating and electricity with renewable bioenergy.

NOK 200 million investment in district heating in Harstad

Trondheim Energi Fjernvarme has been granted a licence to expand district heating facilities in Harstad. Norsk Energi is heavily involved in the project, which is scheduled to cost in the region of NOK 200 million over a 10-year period.

In the centre of the picture is the model of the new heating plant, the cost of which has been estimated at around NOK 90 million.



The project at Harstad involves the construction of a complete district heating grid in Harstad centre, comprising a street grid, customer centres and a new heating plant. The heating plant will initially consist of an 8 MW woodchip plant and a 16 MW LPG plant. The plant is being prepared to generate a further 8 MW using woodchips and 16 MW using LPG. The cost of the heating plant is projected at around NOK 90 million. Construction will take place during 2010 and 2011, with the first heat supplies possible in 2011. Annual supplies are forecast at around 45 GWh in 2015 and 70 GWh in 2020. The new capacity will primarily replace oil-based heating and electricity with renewable bioenergy. Around 85% of the pow-

er supplied from the heating plant will come from bioenergy, and the remaining 15% from LPG.

“Norsk Energi has assisted in planning and designing the heating plant, issuing invitations to tender for the electromechanical plant, contracting, and dispersion calculations. We are also further contributing to follow up of construction of the plant and overall planning and design with the property developer,” says Anders L. H. Eide, senior consultant at Norsk Energi.

The heating plant is equipped to utilise a wide range of bioenergy sources, from standard woodchips to GROT (tree tops and branches)

and sawdust. Accordingly the silo and input system have been designed to achieve an optimal fuel mix, allowing operators to determine their own fuel mixes for the furnace. The plant will also be equipped to use woodchips delivered in bulk to the plant’s quay by ship.

“The plant is located by the sea in the centre of Harstad. This presented a number of challenges regarding foundations and the embedding of gas tanks and silos as a result of high tides,” says Eide.

Järnforsen Energi AB was chosen to supply the electromagnetic heating plant.



Vidar Mathisen,
CEO of Drammen Fjernvarme.



Johan Grinrød, project manager at Norsk Energi responsible for the processing plant at Drammen.



District heating with new heat pump technology

Drammen was one of the first cities in Norway to expand its district heating. A new energy plant that will deliver up to 60 MW of heat is currently under construction. One of the ways this will be achieved is by using new heat pump technology.

Seven consultants from Norsk Energi are involved in the work on processing plants, district heating and seawater pipes in Drammen. "It is exciting to be involved in the planning and design of the energy plant, which will feature the world's first large-scale ammonia heat pump delivering heat at 90°C. Ammonia is more environmentally friendly than traditional cooling agents as the gas is CO₂-neutral and raises efficiency levels. The process does not result in any harmful emissions," explains Norsk Energi's Johan Grinrød, project manager of the processing plant at the new energy plant in Drammen.

The heat pump plant is due to be completed by the end of the year, while the technical installations are scheduled to be fitted during summer 2010 and the peak load centre will be completed on 1 December.

"The new heat pump plant will have an installed capacity of around 15 MW. In the initial phase, two gas boilers will be installed with a capacity of around 30 MW, while a 15 MW boiler will subsequently be installed if required. A propane tank system, which will deliver gas to the boilers, is also being constructed. Norsk Energi has designed the technological processing section of the energy plant, which will have

the capacity to supply up to 60 MW of heat. The heat pumps will cover 80% of the energy requirements of Drammen's district heating grid and thus boost the percentage of renewable energy in the system," he continues.

Norsk Energi is also preparing contracts to purchase equipment and supplies for the plant. The seawater is retrieved from a depth of 30 metres and delivers 10 MW of heat via the heat pump plant. The heat pumps will raise the temperature level of the district heating from 60°C to 90°C and have a power factor of around 3. This will facilitate the supply of around 15 MW of heat to the district heating grid by adding around 5 MW of electricity.

Vidar Mathisen, CEO of Drammen Fjernvarme, explains that Norsk Energi was chosen to plan and design the processing plant, seawater plant and transmission pipes to the city as a result of the association's extensive expertise in all the professional areas covered by the project.

"For the same reasons it was also natural to chose Norsk Energi to carry out the tender and contracting process," explains Mathisen.



*Odd Garberg, technical manager
at HOFF Norske Potetindustrier
Sundnes Brenneri.
Photo: Jan Christian Sørli*

Saving industry millions!

Each year Norwegian industry saves millions in energy efficiency improvements. HOFF Norske Potetindustrier has introduced a number of measures that are expected to generate energy consumption savings of NOK 1 million a year over a three-year period.

HOFF Norske Potetindustrier is one of many businesses that received assistance from Norsk Energi in 2009. The company is aiming to reduce its energy consumption by 2 GWh a year.

Annual savings of 0.5 GWh will come from lower electricity consumption, while reduced oil consumption will generate savings of 1.5 GWh a year. Active energy management, mapping of energy consumption and employee involvement will all play an important role in helping HOFF Norske Potetindustrier Sundnes Brenneri achieve its targets.

Hoff's technical manager Odd Garberg explains that it is important to involve and make all employees aware of the savings process, something Norsk Energi senior consultant Hans Axel Fauske is happy to confirm. "It is important to foster a locally anchored commitment to energy efficiency improvements," explains Fauske. Head of department Knut Sandvold often finds that significant energy savings can be realised by introducing energy management and long-term energy efficiency improvement measures.

"Many businesses have reduced their energy consumption by up to 30% by focusing on introducing energy management and actively working to cut energy consumption,"

comments Sandvold.

Focusing on energy efficiency improvements can often also result in other non-energy-related savings.

"Energy management projects encourage management and staff to consider the overall efficiency of the business," remarks Ronny Valjord, head of department at Norsk Energi.

Norsk Energi has extensive expertise in energy efficiency initiatives in many industries, and many of the measures involved can be applied in several sectors.

"We can help businesses by assisting throughout the entire process, from applying for financial support from Enova and introducing energy management measures, through establishing energy follow-up measures and performing audits, to implementing energy efficiency measures and documenting measures and savings," explains Valjord.

Norsk Energi and Nepas are to help realise several energy efficiency projects in the food industry with a total energy savings potential of around 30%, or 1,300 GWh a year. The client for these projects is Enova and the programme, which covers the meat, baking, brewing, grain and feed industries, is called "Energy in Focus".



We were assigned a very demanding task, but our expert colleagues from Bergen and Oslo overcame the challenges very satisfactorily.

Tove Sigvartsen, head of department at Norsk Energi in Bergen.

Norsk Energi has also carried out strength calculations on the tanks with regard to different loads and weather conditions.

The new terminal will receive refined oil products.



The new oil terminal at Sløvåg enjoys a very central location.

New oil terminal in Sløvåg ready for operation

The new oil terminal in Sløvåg in Gulen will be Norway's most modern tank system. Norsk Energi has been responsible for ensuring compliance with safety, control and quality assurance procedures and was appointed following an explosion at the site in 2007.

Prior to the explosion, Sløvåg was best known as a ferry and industrial location in Gulen in Sogn og Fjordane. Sløvåg experienced strong industrial growth throughout the 1980s. Thanks to its favourable location for the oil refinery at Mongstad and the petroleum industry in the North Sea, Vest Tank established a tank system here to handle oil-contaminated water. In the accident in 2007, one of the tanks exploded and another was destroyed by fire. Norsk Energi was given a pivotal role when the tank system's new owner, Alexela Sløvåg, started construction of a new, modern oil terminal.

The new terminal at Sløvåg is subject to the Norwegian Major Accidents Hazard Regulation, and consequently extensive risk analyses have been performed. Norsk Energi has assisted Alexela Sløvåg in preparing safety

reports and extensive explosion prevention documentation – all in line with the requirements of the above regulation.

“We were assigned a demanding task, but our expert colleagues from Bergen and Oslo overcame the challenges very satisfactorily,” explains Tove Sigvartsen, Norsk Energi's head of development in Bergen. Morten Soma and the Oslo-based Safety Department were heavily involved in the work.

The tank system comprises 11 tanks. The age of the tanks, however, made checking and assessing the status of the tank system a major undertaking. Extensive repair and improvement work had to be performed on the tank system. The oil terminal, and its installations in the quay area, pump stations and pipelines are all new. Norsk Energi Kontroll AS was responsible as an independent third



party for assessing the condition of the tank system. This meant that the Norwegian Directorate for Civil Protection and Emergency Planning (DSB) could not approve the start of oil terminal operations before Norsk Energi Kontroll AS was able to guarantee that the tanks satisfied the applicable quality standards. This proved a demanding assignment for Inge Schei at the Bergen office. Norsk Energi also carried out strength calculations on the tanks with regard to different loads and weather conditions.

The site was completely cleared following the explosion. A new state-of-the-art fire prevention system has been installed. A brand new oil separator will capture minor oil leaks at the terminal. Alexela Sløvåg's CEO Håkon Ivarson explains

that the cost of the new oil terminal has been projected at NOK 270 million. The accident has further highlighted the need to focus on safety, and Ivarson speaks highly of the work performed by Norsk Energi and Norsk Energi Kontroll AS in this regard.

The new terminal will receive refined oil products. The products will be temporarily stored and then transported onwards by ship to international customers.

“The terminal can receive class A liquids in the form of petroleum products of varying octane content. It will be possible to mix petroleum products at the terminal to the specific quality requested by the customer,” remarks Håkon Ivarson. Alexela Sløvåg is a Norwegian company owned by an Estonian holding company.





Finnfjord AS in South Troms.

Saving energy in the smelting industry

The smelting industry has significant energy recycling potential. Finnfjord AS, which is based at Finnsnes in South Troms, has implemented an energy reduction programme designed to generate savings of 349 GWh per year.



In addition to electricity, the project will deliver 125 GWh of process heat to a planned biopellets factory.

The waste gases from ferro-silicon and silicon plants contain large amounts of high-temperature waste heat, which makes them suitable for producing electricity, steam and district heating.

Thanks to its cutting-edge expertise in recycling energy from smelting works, Norsk Energi was commissioned to work on two major projects in 2009: Elkem Thamshavn and Finnfjord AS. As these projects had already been started when the financial crisis had its most serious impact on the smelting industry, the project owner decided to continue.

Finnfjord AS in South Troms produces ferro-silicon (FeSi metal) from three furnaces with respective capacities of 18 MW, 44 MW and 44 MW. Finnfjord wishes to invest in a heat recycling plant, with the primary aim of recycling 224 GWh of electricity from the waste gases from power production. The amount of energy saved corresponds to the annual electricity consumption of 8,400 detached houses.

In addition to electricity, the project will deliver 125 GWh of process heat to a planned biopellets factory.

Norsk Energi worked on the main study for this project throughout 2009, and the association's remit included processing responsibility and preparing a design basis for the main equipment: boilers, turbines, seawater

plants etc.

“Projects like this have a long road from conception to implementation. With 50 years’ experience in this area, Norsk Energi can boast unique expertise in this field,” says head of department Ronny Valjord.

Elkem Thamshavn at Orkanger produces silicon metal in two furnaces with respective capacities of 25 MW and 45 MW. Elkem Thamshavn installed power production energy recycling plants in 1980 and now generates 120 GWh-130 GWh of electrical power each year. Elkem planned to expand this capacity to 190 GWh-200 GWh by investing in new steam boilers and other recycling process improvements.

Norsk Energi has acted as consultant for Elkem Thamshavn concerning the establishment of a new plant and refurbishment of the existing plant.

The extremely high amount of dust contained in the flue gases places great demands on the steam boiler. Norsk Energi has significant expertise in this area.

By the end of 2009, interest in energy recycling from smelting works was once again experiencing an upturn, suggesting a bright future for Norsk Energi in these types of projects.



The new customer centre means energy readings are more accurate.

Remote management of customer centres

Following the automation of 100 of its largest customer centres in Oslo, Hafslund Fjernvarme can now automate the remote reading of energy meters. Automation increases the accuracy of energy readings.

Norsk Energi's Automation Department possesses solid processing expertise on boiler plants and thermal energy systems, and also assists other internal departments with its leading expertise on management, regulation and monitoring. The Automation Department's mandate includes problem solution, process improvements and remote management of thermal energy systems. The department assists in all phases of preliminary studies, planning and design, enquiries, commissioning and function control of managing and regulation systems. The department also assists with dynamic simulation of processing plants.

Major projects from 2009:

- Commissioning of a new district heating plant at Klemetsrud and the DN700 transmission pipes to Oslo city centre
- Conversion of Fana heating plant in Bergen to connect with the new waste line and coordination (boiler selection system) of this with existing heating plants at Fana and Haukeland
- Simulation and planning and design of a new 53-bar steam accumulator at Borregaard's processing plant in Sarpsborg
- Project for tender specification, evaluation and recommendations for acquisition of 100

- customer centres for Eidsiva Bioenergi's district heating grid in Hedmark and Oppland
- Project to replace and upgrade management, regulation and monitoring systems for shared PLSs at Hafslund Fjernvarme's heating plants in Vika and Haraldrud in Oslo
- Upgrading of processing and management systems for Lillestrøm South heating plant, including new boiler selection system
- Commissioning of management system for hot-oil-based cooling plant at Elkem Solar's new production plant in Kristiansand.

Many people attend courses run by Norsk Energi.



Business training activities to be modernised

Each year Norsk Energi runs 15 - 20 statutory certification courses for boiler tenders, at beginner and continuing professional development level.

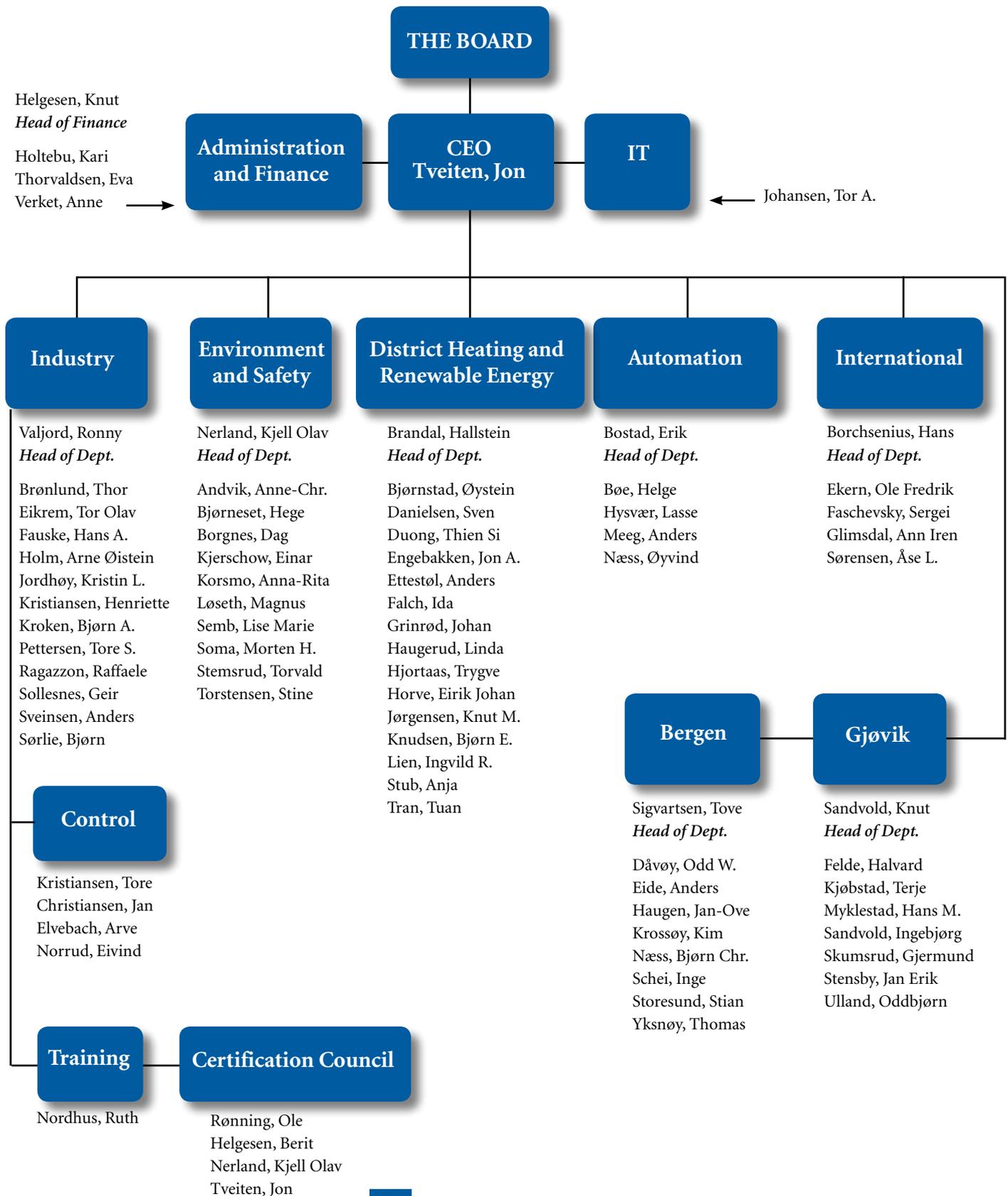
Norsk Energi's training activities are set for modernisation.

"We want to freshen up our course offerings to incorporate videos and an online e-learning programme," explains Ruth Nordhus, Norsk Energi's course secretary.

Norsk Energi is accredited to issue certificates, and is Norway's largest player in this field. The number of course participants is stable. In addition to advertised open courses, Norsk Energi's experts contribute to internal, customer-specific courses and seminars in Norway and abroad.

"We are encountering major demand for our courses and we will now reorganise our training activities in order to boost capacity," explains Nordhus.

Organisation chart 2009



Managers, Norsk Energi 2009



From Left: Knut Helgesen, Hallstein Brandal, Knut Sandvold, Jon Tveiten, Erik Bostad, Hans Borchsenius, Tove Sigvartsen, (back row) Tor Johansen, Kjell Olav Nerland, Ronny Valjord.



Photo: Bård Ek • baardek@foto.no



Report of the board of directors 2009

In 2009 Norsk Energi posted turnover of more than NOK 100 million, which was on a par with turnover for 2008. The consultancy business achieved a profit margin of 8% before employee profit sharing. The corresponding profit margin in 2008 was 11%.

Activity levels remained high throughout the year. Demand for our expertise on energy, the environment and safety within thermal energy systems was buoyant in most service areas.

Description of business

Norsk Energi's object is to promote operational economy, safety and environmental issues for the association's members and other customers through consultancy business, training and research. The business is headquartered in Oslo and has regional offices in Bergen and Gjøvik. In brief, our business relates to the efficient, environmentally friendly and safe utilisation of energy.

Norsk Energi has built up a solid reputation within its service areas over more than 90 years. The association supplies services throughout all phases of a project, from pre-project studies to commissioning of plants.

At the end of the year under review, Norsk Energi employed 77 staff. During 2009, the association performed around 440 assignments for a customer base of around 400 businesses.

Association business

The general meeting, followed by the annual meeting, was held on 4 June 2009 in Vika Atrium Konferansesenter and attended by around 100 participants. The annual meeting concluded with a boat trip and a meal at the Christian Radich. The theme of the annual meeting was Energy Efficiency Improvements in Industry – an Important Contribution to Achieving Climate Targets and Establishing Alternatives to Fossil Fuels.

The Energy and Environment Prize was presented to Elkem Thamshavn by Norwegian MP Ola Borten Moe for the company's initiatives to recycle energy from waste gases at its factory at Thamshavn.

With around 22 member visits, member activities remained on a par with previous years. Membership decreased by 10 in 2009. At year-end 2009, the association had 90 registered and paid-up members. The fourth issue of Norsk Energi Magazine was published in 2009. This professional journal continues to enjoy high regard within the industry.

Report on the annual financial statements

In accordance with Sections 3-3a of the Norwegian Accounting Act, it is hereby confirmed

that the company fulfils all the prerequisites necessary to continue as a going concern. This assumption is based on the association's result for 2009, its market and financial position, the budget for 2010 and the business's strategic plan for future years.

Norsk Energi posted gross operating revenues of NOK 101.5 million in 2009, which was on a par with the previous year. The operating profit after profit sharing came in at NOK 4.8 million. The profit for the year after financial items and taxes was NOK 2.9 million. Liquidity Ratio II (the ratio of current assets to current liabilities) was 0.8, which was unchanged from 2008. The equity ratio was 35.9%, compared with 30.0% in 2008.

The project portfolio has been closely reviewed and any project losses have been written off in the financial statements.

The vast majority of revenues and expenses are denoted in NOK, which means that fluctuations in exchange rates pose little risk. The association is exposed to changes in interest rate levels, as the association's debt is subject to variable interest rates. The risk of economic counterparties being unable to meet their obligations is deemed low, as historically bad debts have been small. The association's liquidity is acceptable, and no measures have been resolved that impact liquidity risk.

Organisational matters

As of 31 December 2009 the association employed 76 staff, compared with 77 at the end of the previous year. At 10.7% and 45.4 years respectively, staff turnover and the average age of employees in 2009 were both broadly on a par with in 2008.

Norsk Energi's activities lie within historically male-dominated professions. However, the percentage of women at Norsk Energi is rising, and increased by more than 2% to 25.3% in 2009. There is one woman on the management team. The percentage of women on the board, including deputy members, is 18%. The business aims to be a workplace with full equality between men and women and where there is no gender discrimination with regard to issues such as salaries, promotion and recruitment.

Working environment

Sickness absence in 2009 amounted to 3.8% of total hours, which was down on the figures for the previous year. A working environment survey was performed in 2009. The general findings of the survey were very positive, although a few improvement areas were identified. The survey showed better results in all sub-areas

INCOME STATEMENT	2009	2008	2007	2006	2005
Operating revenues	101 576	101 085	83 643	81 487	72 686
Operating expenses	96 770	96 366	79 609	77 898	72 304
Operating profit	4 805	4 719	4 034	3 589	382
Net financial items	-728	-922	-889	-669	-688
Tax expense	-1 163	-1 063	-881	-823	312
Profit/loss for the year	2 915	2 734	2 664	2 097	-229
BALANCE SHEET					
Assets					
Non-current assets	34 747	31 395	26 333	24 369	19 703
Current assets	16 386	20 008	18 044	15 802	13 858
Total assets	51 133	51 403	44 377	40 170	33 561
Equity and liabilities					
Equity	18 352	15 437	12 703	10 438	8 342
Deferred tax	3 577	2 435	1 372	0	332
Long-term liabilities	7 313	7 925	8 537	9 150	9 762
Current liabilities	21 891	25 606	21 765	20 091	15 457
Total equity and liabilities	51 133	51 403	44 377	40 170	33 561

compared with the previous survey performed in 2007. The Working Environment Committee met regularly in 2009. Collaboration with the employees' organisations was constructive and contributed positively to operations.

External environment

One of Norsk Energi's products and focus areas is climate consultancy and carbon footprint analysis. Based on key figures and calculations, emission levels are mapped at 130 tonnes/year, with business travel making the largest individual contribution at 90 tonnes/year. The association purchased carbon quotas from the Norwegian Climate and Pollution Agency (SFT) for these emissions for 2009. Work on environmental strategy, targets and concrete measures to reduce greenhouse gas emissions will continue in 2010.

With the exception of these emissions, the business's activities do not impact the environment to a noticeable extent.

Strategy

Our vision is for Norsk Energi to be the preferred partner within thermal energy systems focusing on energy efficiency, renewable energy, the environment, climate and safety. The association's primary targets in the next three years are to achieve profit levels on a par with similar businesses and a growth rate comparable with the rest of the industry, and to be

the preferred workplace and partner within our professional areas.

In 2009 we specifically targeted planning and design and project management, as these represent important skills areas for all projects. All employees have received basic training in project management. The aim is for up to 20% of employees to be certified project managers by 2010.

Turnover and employee numbers for 2010 are budgeted at broadly the same level as in 2009. There have been no events since the end of the reporting period of material importance for an assessment of the association's annual financial statements or financial position.

Allocation of profit for the year

It is proposed that the profit for the year of NOK 2,915,105 be transferred to other equity.

Concluding remarks

The board held seven board meetings in 2009.

The association posted good results in 2009. The board would like to thank all employees for their excellent contributions and is pleased to announce that the result for the year triggers profit sharing with employees.

Oslo, 10 April 2010

In 2009 Norsk Energi posted turnover in excess of NOK 100 million, which was on a par with turnover for 2008.

In brief our business relates to efficient, environmentally friendly and safe utilisation of energy.

One of Norsk Energi's products and focus areas is climate advice and carbon footprint analysis.

Our goal is for approaching 20% of employees to be certified project managers by 2010.

Håkon Delbeck
Chairman

Berit Helgesen
Vice chairman

Svein Brokke
Board member

Odin Krogstad
Board member

John Marius Lynne
Board member

Ronny Valjord
Board member

Bjørn Knudsen
Board member



The board of Norsk Energi 2009

Back row:

Board member:
Operations Manager at Dynea,
Svein Brokke

Deputy member:
Process Engineer
Norske Skog Saugbrugs,
Kjetil Bjørlo

Board member:
Head of Department
at Norsk Energi,
Ronny Valjord

Board member:
Director
at Eidsiva Bioenergi,
John Marius Lynne

Front row:

Board member:
Senior Consultant
Norsk Energi,
Bjørn Egil Knudsen

Chairman:
Director of Technology
Elkem ASA,
Håkon Kristian Delbeck

Deputy member:
Head of Department
Utbygging OSL,
Roar Grønnesby

Vice Chairman:
Head of Finance at
Sødra Cell Folla,
Berit Helgesen



Norsk Energi's product matrix

<i>Competence area</i>	Product/Product area	<i>Competence area</i>	Product/Product area	
<i>Process design</i>	Energy	<i>Development assistance</i>	Environmental accounting and carbon footprint analysis	
	Vapour condensate systems		GAP analyses environmental requirements	
	District heating/district cooling		Technical environmental analysis	
Hot oil	Emission-reducing measures			
Gas	Climate strategy			
<i>Energy efficiency</i>	Industrial processes		Climate audits (quota trading etc.)	
	District heating		Courses/training	
	Construction		Water cleaning processes	
<i>Energy production</i>	Renewable energy		<i>Climate</i>	Project evaluation
	Heat pumps			Competence transfer programmes
	Bio	Energy policy consultancy		
	Waste	CDMs and JI project identification		
	Gas/oil	Preparation of PINs and PDDs		
	Turbines	Business plans for JI and CDM planning design		
<i>Automation</i>	Processing plants	Safety		
	Dynamic simulation	Construction control		
<i>Energy distribution</i>	District heating	Completion control		
	District cooling	Status control		
	Hot oil	Production control		
	Gas	Risk analyses incl. HAZOP		
	Condensate systems	RAV analyses		
	3D industrial plants	Explosion evaluations		
<i>Construction</i>	Stress calculations	Dispersal concepts acute emissions		
	Construction management	Safe Job Analyses		
<i>Project management</i>	HSE/IC	CFDs		
	Environment	Impact studies fire/explosions		
<i>Environmental audits /consultancy</i>	Feasibility studies	Technical safety/SIL		
	Environmental management	HSE og QA systems		
	Impact studies	Contingency plans/exercises		
	Dispersal calculations	Operator and boiler tender courses		
	Emissions and licence applications	Safety courses		
	Quality systems fuel	Client-specific courses		
		<i>HSE</i>		
		<i>Training</i>		



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