



SUMMARY OF
ROADMAP FOR ELECTROTECHNICAL INDUSTRY



Our vision is that the upstream electrotechnical industry will contribute to value creation, new products and new solutions through skills and technological development. Our aim is for this to make a significant contribution to solving current climate and environmental challenges. A low-emission society will see an increased demand for products and technologies that produce the smallest possible carbon footprint during production, use and recycling. Using electricity for future energy consumption will give rise to increased demand for smarter and better technologies for the production, transformation, transport, storage and use of renewable energy. The Norwegian electrotechnical industry is in a strong position and therefore wants to become a global leader in energy, climate and environmental technologies.





Photo: Norsk Hydro

THE ELECTROTECHNICAL INDUSTRY

The Federation of Norwegian Industries (Norsk Industri) represents around 200 member companies in the electrotechnical industry. Combined, these companies employ just under 7,000 people and produce an annual turnover of more than NOK 18 billion.

The electrotechnical industry has played an important role in Norway ever since the development of our hydroelectric power resources began more than 100 years ago. With this as its foundation, the industry has expanded into new and related areas.

Alongside oil and gas technologies, electric power is an area in which Norway has taken a leading technological role worldwide. Operations are historically based in a domestic market characterised by significant market-related and technological challenges. The Norwegian electrotechnical industry has identified substantial opportunities in both the national and international markets. The broad domestic market and concentrated niche areas in the international market make up its foundation. Having a strong position

in the demanding domestic market is a significant advantage for success in the export market. Combined with a strong focus on research and development and competitive conditions, this will provide the necessary preconditions for increased internationalisation and value creation. The electrotechnical industry will play an important role in the low-emission society, and there are opportunities for significant growth in this area.

Norway and Norwegian industrial companies are increasingly influenced by what happens in the Nordic region, Europe and the rest of the world. Global mega-trends – such as globalisation, climate change, urbanisation and demographic changes and digitalisation – affect us and our market. Among other things, globalisation brings more cross-border trade, both between Nordic countries and the rest of the world. Climate change is one of the biggest challenges facing the world today, and the Paris Agreement has set ambitious goals. Norway has signed up to the agreement and its international climate commitments. This will have an important impact on domestic development as well.



THE MARKET

The power sector

Today's world is facing significant changes in the way we generate, distribute and use electrical power. These changes are mainly driven by a substantial focus on the environment and climate, although trends such as population growth and urbanisation are also having an impact. Worldwide, the electrical power sector is a significant source of global greenhouse gas emissions. Consequently, we now face a technological shift in this sector. But the power sector will also be part of the solution for reducing pollution and facilitating other sectors to achieve their targets through electrical energy consumption.

Norway holds a unique position in the power production industry. In the past, we have relied on a stable and reliable hydropower production with substations and high-voltage power lines supplying the electricity. In the future, we will see more power sources needing to use the same distribution network. Solar and wind

power are obviously entirely dependent on sunlight and wind, and can therefore not be planned and managed in the same way as water from a reservoir. In addition, an increasing number of households and housing associations will produce a portion of their own electricity consumption with the help of solar panels and other energy sources. During periods when these sources produce surplus power, people will want to sell this back to the power grid. All this places completely new demands on the power companies, who will need to develop good solutions and business models in order to accommodate technological developments beyond their control.

The transport sector

On the consumption side, using electricity for different types of consumption, such as for all kinds of transport, will offer major opportunities. Norway is leading the way in the sale of electric passenger vehicles per capita. And Norway also has the potential to adopt electric buses, trucks and ships.

In the vehicle industry, battery and vehicle technology will be put to the test, and substantial research initiatives are being directed towards improving charging times and the storage of electricity. Battery systems are a key component of an electrified society and will lead to significant technological improvements and price reductions. The transport sector will also see public communication facilities in cities become largely electrified. Today, trains, trams and the underground railway network are powered by electricity. In the future, an increasing number of buses and taxis will also be running on electricity in city centres and urban areas. This will require charging stations and infrastructure to be established to fit to the future energy need.

In 2015, the world's first all-electric ferry, Ampere, was launched in Norway. The electrical propulsion system was developed in Norway and is based on technology developed for and used in offshore ships. One of the challenges of electrifying the ship was the lack of sufficient capacity in the local electrical grid to charge the ferry quickly enough. This was solved by installing battery systems on land that would be charged while Ampere was at sea, and then be ready to supply sufficient power when the ferry docked. Several additional ferry tenders, based on the same technology, have since been announced and contracts awarded. Reports indicate that it will be profitable for seven out of 10 ferry routes to become electrified.

The petroleum sector

The electrification of the production on the Norwegian shelf (onshore power) is a new step towards making the petroleum sector more


environmentally friendly. It relies on incorporating robust and advanced technologies into its power supply solution, as well as on having a robust central grid capable of delivering sufficient onshore power. Long stretches of cable at sea bring significant challenges when requirements for security of supply and stability of the grid are given top priority. In addition to land-based power, we envisage a combination of offshore wind power with the capacity to store electricity and different subsea configurations in terms of the distribution network.

The process industry

The Norwegian process industry will be confronted with very high demands in respect of the environment, quality and efficiency. The industry therefore comes across as a highly demanding customer. Coupled with the right collaboration between the electrotechnical industry and the process industry, this will lead to positive technological and product development. We envisage an even more efficient use of energy in the process industry.

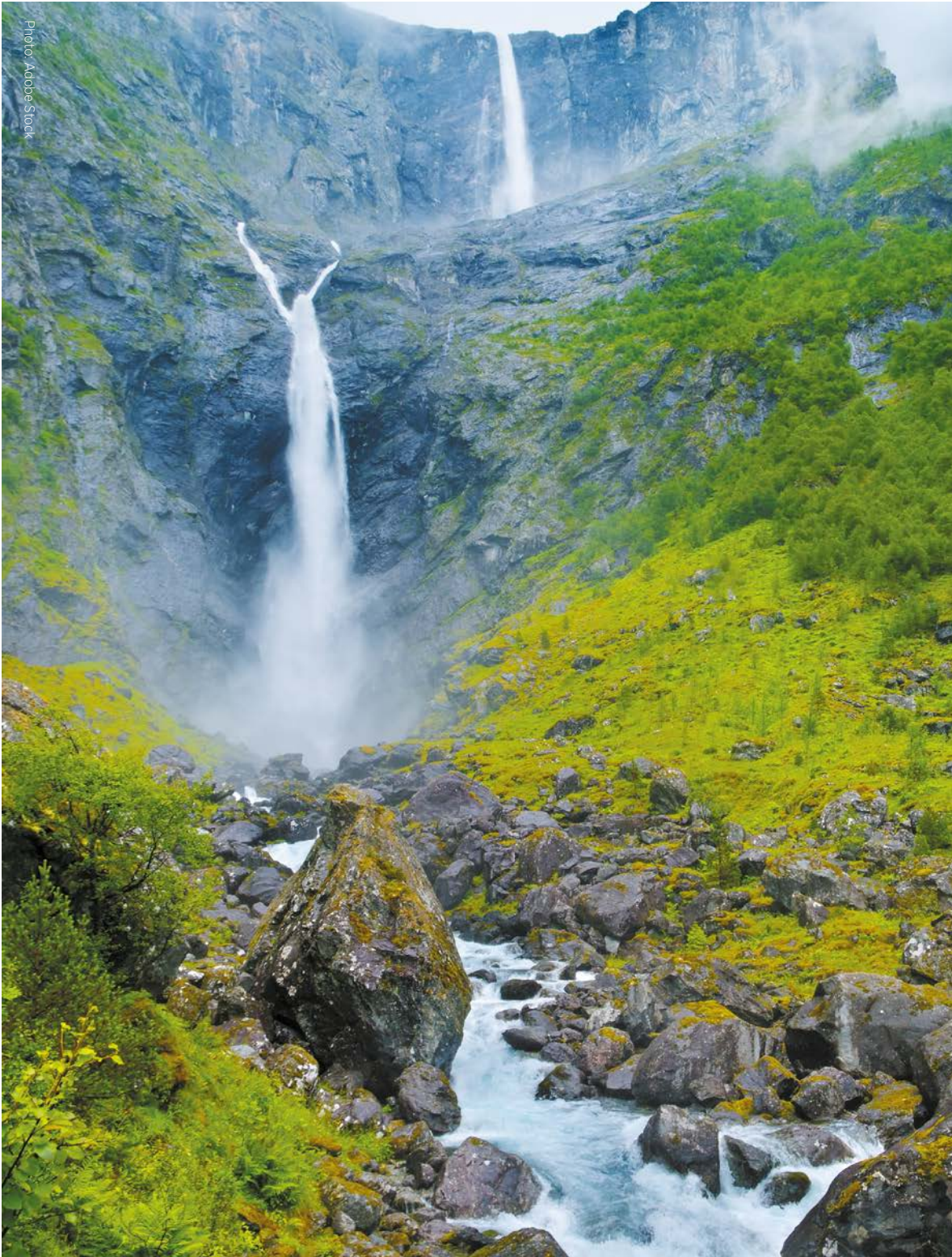
Aquaculture

The aquaculture industry is also focusing on optimising production processes in order to streamline operations and reduce operational costs. Today, the industry delivers everything from electronic equipment, automation and robotics, to fish farms, harvesting plants and wellboats. An electrification of the fish farming industry will contribute to reducing the environmental footprint of the Norwegian aquaculture sector, by enabling diesel generators and diesel-powered boats to be phased out in favour of onshore power and vessels using hybrid engines or all-electric solutions.



In a low-emission society, we will become more dependent upon electrical power. Electricity will be regarded as the energy carrier of the future; more areas of society will become electrified and the demand for renewable energy will increase significantly. The electro-technical industry is well positioned to spearhead this development. Increased investment in skills, research and development will give companies a competitive advantage in the resource-efficient and sustainable production of input factors for the production, transmission and consumption of electricity. Technological progress requires expertise and collaboration, predictable conditions, and investment. Increased investment in industry-focused and user-guided research is necessary. The industry must be “the driving force” behind this part of the research.

Investment in pilot testing must be strengthened. The current system is good – but must be expanded to compensate for the limited domestic market. Norway must become the pilot country for the sustainable society of the future. As one of the world’s smaller countries, Norway and Norwegian industry must develop niches and elevate them to market-leading positions in their respective areas.





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The Federation of Norwegian Industries
is the largest sectoral federation in
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