Annual Report 2017

SINTEF Energy Research has a pronounced research profile and is involved in six of the Research Council of Norway's Research Centres for Environmentally-Friendly Energy (FMEs) in partnership with industry and other research institutions. The institute maintains a strong position in the EU's Framework Programme for research, and participates in an extensive range of projects linked to issues such as energy planning, energy efficiency, hydropower, wind-power, CO_2 transport and storage, and cleaning technologies for gas and coal-fired power plants. The high-level technical profile developed by the institute, via activities such as assisting the Norwegian Parliament to achieve its cross-party Climate Change Policy Consensus, means that the institute's researchers are now at the forefront of European energy research.

SINTEF Energy Research is part of the SINTEF Group and is a non-profit research organisation. It works closely with the Norwegian University of Science and Technology (NTNU) in support of teaching and research work that forms a natural part of its activities. It makes every effort to maintain good dialogue with enterprises engaged in its field of business activities.

SINTEF Energy Research is a non-profit organisation and awards no dividends to its owners. Any resources generated by our activities are allocated solely for the purpose of achieving the institute's objectives. The institute is identified by the EU Commission as a non-profit organisation.

It is located on the Gløshaugen university campus in Trondheim and its business address is Sem Sælands vei 11, 7034 Trondheim. The SINTEF Energy Lab is located at Risvollan, three kilometres south of Gløshaugen. The institute's owners consist of the SINTEF Foundation (61.0%), Energi Norge (33.4%) and Norsk Industri (5.6%).

"Technology for a Better Society"
SINTEF Energy Research carries out R&D with the aim of promoting cost-effective and environmentally sound solutions for energy use and the supply of heat and power. The institute contributes towards the mitigation of negative environmental impacts, wealth generation for energy sector companies, and the enhanced exploitation of energy resources by society as a whole.

It also contributes towards boosting the safe and environmentally-friendly exploitation of Norwegian oil and gas resources by means of developing innovative technologies, such as energy efficiency and subsea power supply systems, for oil companies and the supply industry.

Clients

Our projects are funded primarily by the industrial sector. Funding from industry is a prerequisite for obtaining additional funds from the Research Council of Norway. It is thus crucial to SINTEF Energy Research that our research work continues to contribute towards growth in knowledge and wealth generation within the industrial and business sectors.

As a result of the Norwegian Parliament's cross-party Climate Change Policy Consensus, public sector funding of energy-related research increased considerably during 2008, 2009 and 2010 in comparison with previous years. These new levels have been maintained to the present day. The Research Council of Norway established the Research Centres for Environmentally-Friendly Energy (*FME*), starting in 2009. SINTEF Energy Research headed four of these centres, and was a partner in two.

In 2016, a decision was taken to establish eight new *FME* centres. SINTEF Energy Research is currently the host institution for three of these centres, and participates in three others as a partner. The centres which SINTEF Energy Research is heading, and in which it participates, focus on CO_2 capture, transport and storage (CCS), energy efficiency in the industrial sector, smart grids, hydropower, bio-energy and smart cities.

The institute currently has an extensive project portfolio for the Research Council of Norway. One of the Council's initiatives involves the so-called Knowledge-building Projects for Industry (KPN) scheme, which is key to the development of new skills and expertise in Norway. In order to ensure that relevant research is carried out as part of these projects, it is of vital importance that commercial businesses and the public authorities are also involved. In 2017, we launched a total of 15 new KPN projects and innovation projects for the industrial sector (IPN projects), as well as three INFRA research infrastructure projects.

In the case of EU projects, the institute focuses on participation and assuming the role of project coordinator. This enables us to obtain funding for skills and expertise development and to establish networks with current and potential European clients and research institutes. Participation in EU projects enables us to contribute towards achieving the aims set out in the SET (Strategic Energy Technology) Plan, and to realise our vision – "we shape the future's energy solutions". In 2017, we participated in a total of 27 EU-funded projects, and acted as coordinator for five of them. Turnover linked to our EU projects was NOK 43 million.

SINTEF Energy Research is an active participant in several of the EU's technology platforms in which strategies for the various research disciplines are shaped. It also participates in strategic fora such as the European Research Area Board (ERAB), the European Energy Research Alliance (EERA) and EARTO – an association of European research organisations. We also have a seat on the EU Commission's advisory group for energy issues as part of the Horizon 2020 programme.

Twelve per cent of the institute's turnover is generated from foreign organisations based in countries both inside and outside the EU. The most important among the latter is the USA.

Research fields

The global community is facing major challenges in terms of obtaining sufficient energy to meet its needs and in implementing the shift in energy supply systems needed to ensure that the impacts of climate change can be resolved as quickly and as cost-effectively as possible. At the UN Climate Change Summit in

Paris in December 2015, all the nations of the world agreed on a target to restrict global warming to 1.5 degrees.

The institute is engaged in many research disciplines within the fields of energy supply, energy use and oil and gas technology, all of which are relevant in this context. Our ambition is to become a world leader in the field of energy-related research.

Our collaboration with, and close proximity to, NTNU is our greatest scientific comparative advantage. Both institutes make good use of our shared resources such as laboratories, workshops and scientific instruments. Both parties are very closely involved in each other's research activities. Collaboration between the two organisations is exercised systematically at all levels. This includes the mentoring of Master's and Ph.D. students.

2017 was yet another excellent year for scientific publications produced by the institute. The provisional number of publications is around 200. The number of publications and accumulated publication credits for 2017 will be published in the online version at the beginning of April.

People

At the close of 2017, SINTEF Energy Research employed a total of 244 people, of which 190 were research scientists, 14 were technical personnel and engineers, and the remainder managers and administrative support personnel. In 2017, the institute employed 78 women and 166 men from 19 different countries. The average age of employees is 43.

In collaboration with NTNU, NVE, BKK Nett, Lyse Elnett, Statnett, Hafslund and Energi Norge, the institute has established a trainee scheme under which two new persons are employed every year on two-year contracts. This has become a popular initiative and has drawn attention from outside the institute.

Ethics

SINTEF operates with a Code of Ethics that is published as a pocket handbook and posted on the institute's intranet. This handbook is an excellent aid in the institute's day-to-day activities.

SINTEF has established a system by which employees can apply in confidence to an Ethics Council and an Ethics Ombudsman if they wish to circumvent line management to discuss an ethical issue.

SINTEF is a member of the anti-corruption organisations Transparency International and UN Global Compact which work in the fields of human rights, employee rights, the environment and anti-corruption.

Diversity and equal opportunity

The institute meets the requirements of its employees with special needs. In 2011, the institute was granted status as an Inclusive Working Life (IA) organisation, and we enjoy good working relations with the Norwegian Labour and Welfare Administration (NAV).

To ensure that foreign employees are made to feel welcome, SINTEF operates with an integration programme for employees from other nations and their families. The programme offers traditional integration and ex-pat services, free Norwegian language courses, and tuition in English at the SINTEF School. During the recruitment process we evaluate applicants' qualifications in compliance with the intentions set out in legislation.

Work to promote equal opportunity is a fundamental principle exercised by SINTEF Group Management. Our personnel policy and administrative personnel procedures meet all the requirements set out in the Norwegian Equal Opportunities Act. The proportion of women employed at the institute is 32 per cent, and 44 per cent of the institute's management team is female. We are making every effort as part of our recruitment policies to increase the proportion of women, and are preparing plans to promote career development among our senior female research scientists. Forty-three per cent of shareholder-elected, and 33 per cent of employee-elected, board members are women. The institute operates with flexible working hours and offers employment benefit arrangements. We contribute funds towards a kindergarten service run by the Aurora Foundation.

Anonymised working environment surveys are carried out every two years. These have demonstrated that our employees regard the work carried out by the institute to promote equal opportunity as adequate, and that there is no gender discrimination in terms of opportunity. An in-house survey carried out by SINTEF in 2008 concluded that there was no gender discrimination in terms of salary policy at the institute. Salaries and conditions of employment are determined by negotiation and discussion with employee representatives in the respective employee organisations. We are a signatory to the agreements that the Confederation of Norwegian Enterprise (NHO) has entered into with the employee organisations Tekna, NITO and NTL. We only rarely enter into temporary employment contracts.

Communications and public relations

Cristin is the name given to a Norwegian system used to assess scientific publications. Statistics from this system constitute the platform for basic funding allocations from the Research Council of Norway. Although popular science contributions do not form part of the evaluation criteria for basic funding, we also register these contributions in the Cristin system. The institute has had a major increase in registrations in the Cristin system in recent years. The “#SINTEFenergy” blog was launched in December 2014 and has boosted the number of popular science publications sourced from SINTEF Energy Research.

Summary:

- Media contributions: 132
- Information material (brochures, blogs, etc.): 134
- Facebook followers: 4439
- Twitter followers: 1981

Health, Safety and the Environment (HSE)
Absence due to illness was at 3.8 per cent in 2017, which was on a par with 2016.

The institute has an active sports club that receives internal financial support.

SINTEF Energy Research has experienced four incidents formally classified as accidents:

- One employee suffered serious fracture injuries after being struck by a car while cycling to a meeting (critical risk potential)
- Superficial cut in the finger. First aid administered locally. Physician not required (first aid injury)
- A truck driver damaged a gate (material damage only)
- A truck driver damaged a climate cabinet (material damage only)

In addition, four near misses and 68 hazardous situations/observations were recorded.

The institute operates with proactive procedures designed to ensure that our activities focus on protection of the external environment. These include the management of various types of waste, including hazardous waste. Our research mainly focuses on environmentally sound solutions and this is our contribution to protecting the external environment. SINTEF Energy Research carries out systematic risk assessments and analyses that take the external environment into account. Our activities do not result in any pollution of the external environment that is in contravention of existing legislation. SINTEF is certified in accordance with the ISO 14001 standard.

SINTEF Energy Research carried out an emergency response exercise. The Norwegian Police Security Service (PST) took part in the planning and the topic for the exercise was "Intelligence activities". The management team took part in SINTEF's "emergency response day", at which SINTEF Energy Research this year played a key role in planning and organisation. The emergency response plan was updated once in 2017. In addition, separate operative emergency response plans were prepared for the electrotechnical and thermal engineering laboratories. The plans focus on collaboration between SINTEF and NTNU in shared areas, as well as facilitating the emergency service's response.

Financial aspects
The Annual Accounts have been prepared under the going concern assumption, and reveal an after-tax profit of NOK 28.4 million. Total net operating revenues were NOK 361.6 million, with an operating profit of NOK 32.6 million. The pre-tax profit was NOK 37.5 million, and net financial revenues NOK 4.9 million.

Equity as of 31 December 2017 is NOK 367.7 million, and constitutes 60% of total capital, of which the company's share capital is NOK 7.5 million. The liquidity situation is described as good.

The company is exposed in some degree to currency exchange fluctuations in that 12 per cent of its project revenues are in foreign currencies. On the other hand, project costs are entirely or in part in Norwegian kroner. This exposure is primarily in Euros and US dollars. In order to mitigate the risk, we operate with future exchange contracts in the currencies concerned. The company also operates in a global and highly competitive market in which several of our competitors are located within the Euro zone.

SINTEF has established a joint arrangement for the investment of its liquidity reserves. The portfolio is allocated according to the "Rules governing financial management", which are revised annually.

The Board is not aware of any circumstances that have arisen since the balance sheet date that affect its opinion regarding the company's financial status.

In the opinion of the Board, the Annual Accounts as presented provide a true picture of the company's financial status as of 31 December 2017.

Corporate management

Since 1999, the institute has been working with a dedicated focus on the introduction and implementation of a value-based management system, and with organisational development initiatives that continue to operate at all levels within the organisation. Focus is directed on the development of human capital in which the abilities to build networks and promote continuous innovation are assigned high priority.

SINTEF Energy Research carries out systematic working environment surveys, and works methodically to follow up the results.

SINTEF is certified in accordance with the standards ISO 9001:2015 (quality), ISO 14001:2015 (external environment) and OHSAS 18001 (working environment).

Client satisfaction surveys are carried out at the close of selected projects. The results reveal an overall high level of satisfaction with our project participation and implementation.

Administrative personnel at SINTEF Energy Research assist the research departments with specialist expertise in the fields of finances, HR, HSE, quality, safety, and administrative and operational services. Shared services work in accordance with a client and service-oriented model that overlaps across the aforementioned areas in order to ensure efficient administration and adequate redundancy. Specialist units exist to ensure that the institute continues to operate within prevailing legislation, regulations and procedures, that the research departments receive the services they need, and that the institute always obtains adequate decision support and correct governance information.

All institutes at SINTEF have introduced a system of four-monthly risk reporting. These reports are discussed by the institute's Board and risk-mitigating measures are implemented, as appropriate.

Shared corporate risk and uncertainty are linked to factors such as the market and our major clients, the terms and conditions of participation in EU projects, industrial espionage and intelligence, reputation, liabilities linked to major contracts, the loss of core expertise, management of immaterial rights, recruitment, and safety linked to laboratory and field work.

Future prospects and challenges

At the end of 2017, the economic prospects for Norway appeared more promising than at the beginning of the year. In recent years, the current global economic situation has resulted in many companies cutting back on their research budgets. The challenges created by climate change continue to attract major political focus in Europe, and this trend has intensified following the UN Climate Change Summit in Paris. This results in policy decisions triggering major levels of public sector investment in research and technology development, which in turn encourages the private sector to focus on capturing market shares linked to new energy technologies. The world's largest research programme, known as Horizon 2020, is following this trend, reflected in an almost two-fold increase in funding for renewable energy projects. In connection with the Paris summit, Norway and 19 other countries signed a letter of intent to increase their research efforts in the field of climate change by one billion by 2020. The programme has been given the name Mission Innovation.

In the long term, oil and gas will continue to be important energy carriers, including in scenarios in which global warming is restricted to +1.5 degrees Celsius. It is important for Norway to ensure that this sector also has a role to play within the framework of a future, sustainable, energy supply system. This is best achieved by developing technologies linked to environmentally sound oil and gas production, such as subsea power supply systems, energy efficiency and the environmentally-friendly use of fossil fuels, such as carbon management.

Digitalisation provides end-users with more power and connects energy providers with their consumers in a way that makes the previously "necessary infrastructure" and "perpetual value chains" slightly less necessary and perpetual. Digitalisation accelerates globalisation and challenges distinctive national products and regulations. Increased access to inexpensive local power generation, consumers' ability to control their own production and consumption, combined with more service-oriented market solutions are paving the way for new business models that will challenge the established value chains. In collaboration with our customers and research divisions, the institute is seeking to advance the research frontier and contribute to growth and innovation in the energy sector.

2015 saw the launch of SINTEF's new principal strategy. The strategy incorporates five areas of focus, and SINTEF Energy Research has been active in contributing sub-strategies for these areas. In order to achieve meaningful links between SINTEF Energy Research's strategy and the core strategies, it has been necessary to update the institute's areas of focus. SINTEF Energy Research worked on a revised strategy in 2017. The strategy work was carried out in close dialogue with our clients, other SINTEF institutes, NTNU, Energi 21 and the public funding agencies. The SINTEF Group will complete its revised strategy in 2018, and SINTEF Energy Research's strategy revision is scheduled for completion during the last four months of 2018.

The key drivers behind this strategy are as follows:

1. Secure and cost-effective energy systems for application in Norway
2. Wealth generation based on Norwegian energy resources
3. Technology development in the global market place

Eleven strategic areas of focus have been identified, all of which are linked to specific action plans:

1. Energy efficiency
2. Carbon Capture and Storage (CCS)
3. Hydropower
4. Marine wind power
5. Bioenergy
6. System integration of renewable energy sources
7. Smart grids
8. Transmittance
9. Gas technology, LNG and hydrogen
10. Subsea power supply and processing systems
11. Green transport

The EU's proactive and long-term focus on energy research provides a sound foundation for international collaborations in which the institute can participate as a project partner. It is to our advantage that the EU's energy research strategies encompass the entire range of activities within the sector, and that they are compatible with both Norway's and our own strategies.

Expansion in the energy segment of the Horizon 2020 programme, and the Norwegian Government's expectations in terms of increased levels of interaction and participation, mean that the volume of research that Norwegian research institutes can expect to obtain from Europe is almost half of that earmarked in Norway. Our participation in strategic energy fora within the EU, combined with our good

name and willingness to assume the role of project coordinator, will improve our opportunities both to be able to participate in the shaping of the research agenda and to take part in projects.

In the future it will be important for the institute to adapt and focus on areas where it is, or has the potential to be, in the forefront of global research. It will also be important to build the right kind of alliances both in domestic and international arenas. Our close collaboration with NTNU is becoming increasingly important, both in terms of the implementation of major research projects and recruitment. Our clients will continue to an ever-increasing degree to seek out the best international research institutes. This trend represents both a challenge and a major opportunity for the institute. SINTEF Energy Research's focus on the industry's needs, combined with its close working relationships with industry partners, provides us with a good base from which to make the most of these opportunities.

Thank you.
The Board takes this opportunity to thank all employees at SINTEF Energy Research for an excellent year's work, both in terms of our scientific and financial results.

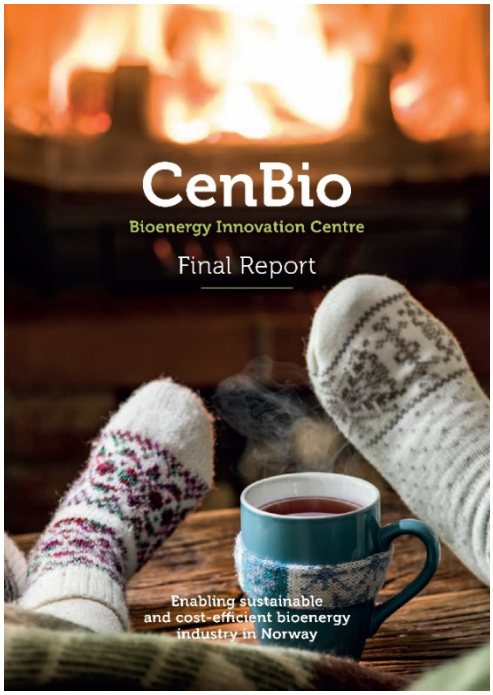
Trondheim, 13 March 2018

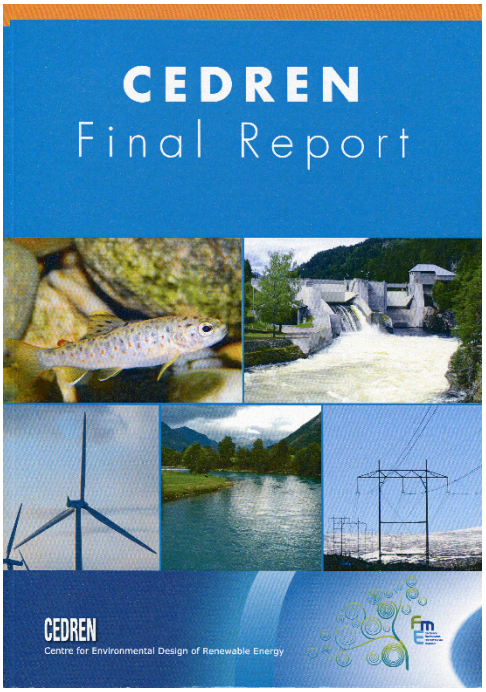
Inge R. Gran
President Director

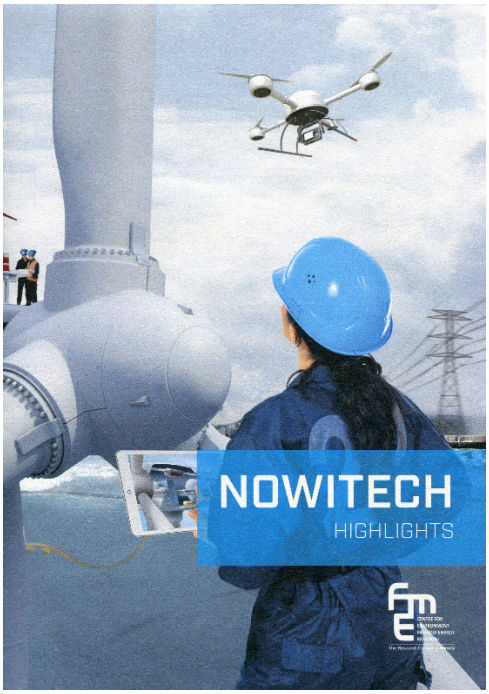
Alexandra Bech Gjørv Board Chair	Oluf Ulseth Board member
Kristin Lian Board member	Ingvald Strømmen Board member
Stein Iver Koi Board member	Randi Viksund Board member
Ove Wolfgang Board member	Marit Jagtøyen Mazzetti Board member
Svend Tollak Munkejord Board member	Geir E. D. Øien Deputy board member

SINTEF Energy Research 2017: Some highlights

Our centres for Environment-friendly Energy Research (FME) CenBio, Cedren, Nowitech and BIGCCS concluded their activities in 2017. To mark their closure, the centres organised conferences and presented their final reports, summing up eight years of research.

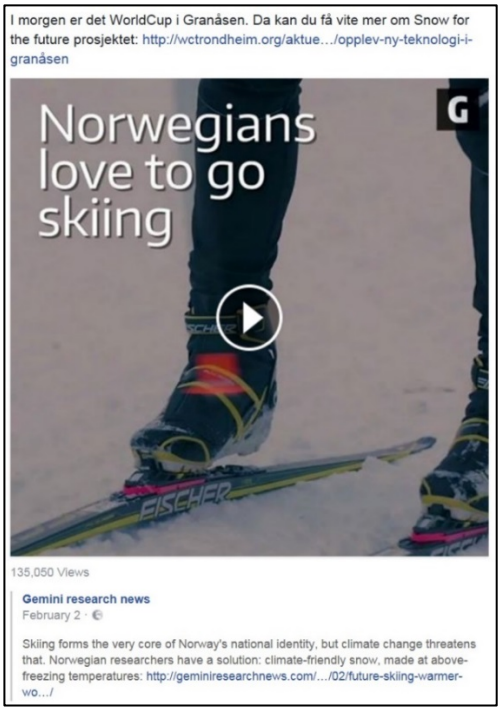


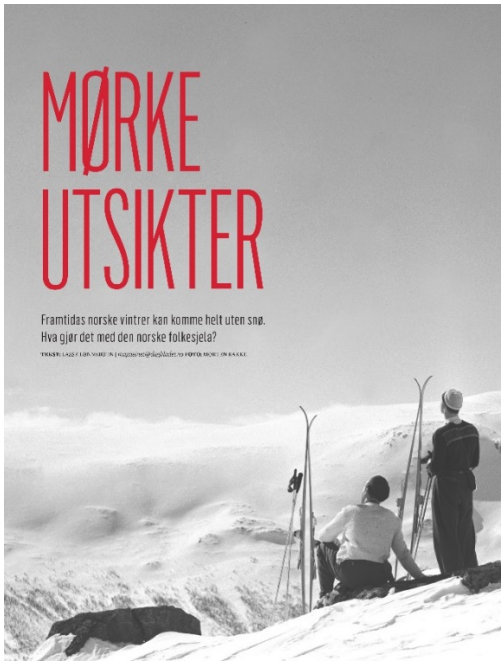




The research project “Snow for the Future” attracted major national and international attention.

The film made for the project has been viewed more than 135 000 times on Facebook. The project was widely presented in the media, including on the TV2 and NRK news as well as in the newspaper magazine *Dagbladet Magasinet*.





NASJONENS REDNING: Teamet bak «Snow for the future», som jobber med et banebrytende forskningsprosjekt som kan sikre snø selv i plussgrader. Foran: SINTEF Energis sjefsforsker Petter Nekså. Bak f.v.: Ingrid Camilla Claussen (SINTEF Energi), Jacob Stang (SINTEF Energi), Trygve M. Eikevik (NTNU), Anne Karin T. Hemmingsen (SINTEF Energi), Marit Gjerland (Norges Skiforbund) og Ole Stavset (SINTEF Energi).

In May, SINTEF's Executive Vice-President for Sustainability, Nils Røkke, was elected Chairman of the European Energy Research Alliance (EERA).

Gemini.no Forskningsnytt fra NTNU og SINTEF

Videoer Arkivet MER

Bekymret, men klar til kamp: Når amerikanske klimaforskere er redde for å publisere må vi stille opp med forskersolidaritet. Det betyr for eksempel å jobbe systematisk med å fortelle fakta og engasjere oss med amerikanske forskere, sier den nye norske lederen av den europeiske energiforskningsalliansen EERA, Nils Røkke. Foto: Thor Nielsen

Fra Arendal til Brüssel med klimafakta i bagasjen

SINTEFs klimaambassadør Nils Røkke er tilbake fra Arendalsuka, på vei til Brüssel. Der skal han lede den europeiske energiforskningsalliansen EERA i en verden der klimatrusselen stadig oftere blir framstilt som fake news.

Av Christina Benjaminsen
Publisert 29.08.17

– *I tillegg til å forberede flytting og tiltredelse i ny sjefsjobb i Brüssel har du hatt travle dager*

SINTEF Energy Research has extensive experience in the production of large illustrative images showing research activities at our laboratories. In 2017, we cooperated with the NTNU on two new images; one in the new thermal engineering laboratories and the other in the Smart Grid laboratory which opened in 2016.

The SmartGrid laboratory

The thermal engineering laboratories

The new thermal engineering laboratory opened on Monday 12 June. The laboratory form a part of the European research infrastructure ECCSEL, coordinated from Trondheim. State Secretary Ingvil Smines Tybring-Gjedde hosted the official inauguration ceremony.

In June, NTNU and SINTEF organised the international conference TCCS-9, under the direction of the *FME* centre NCCS. More than 350 researchers and industry professionals with an interest in carbon management attended the conference.

Also in June, SINTEF Energy Research was awarded infrastructure funding by the Research Council of Norway for two new laboratories: HighEffLab and ElPowerLab.

Minister of Education and Research Torbjørn Røe Isaksen (second from the right) visits one of SINTEF's laboratories with Espen Eberg, SINTEF (left), Dag Eirik Nordgård, SINTEF, and Chief Executive John Arne Røttingen of the Research Council of Norway. (Photo: Astrid Lundquist, SINTEF)

NTNU Energy and SINTEF Energy Research took a broad approach and presented the politicians with four recommendations during the Arendal Political Week (Arendalsuka) 2017. A brochure was prepared together with a film, and a feature article was published in the Norwegian newspaper *Aftenposten*. The recommendations were presented during an open meeting and received broad news coverage on TV2.

Impello Management prepared an analysis of seven of NOWITECH's innovations and estimated their value at NOK 50 billion.

This received substantial media attention in a feature article published in the Norwegian newspaper *Dagens Næringsliv* on 17 August, during the Arendal Political Week. The innovations were also presented in *Klassekampen* newspaper on 23 and 25 September.

Lønnsomme nyvinninger i havvind

Åtte tekniske nyvinninger på havvind kan skape verdier for 50 milliarder kroner i form av kostkutt og produksjonsøkning. Grønt nyskapingsarbeid lønner seg.

Norge har, som gryende storleverandør av vindkraftteknologi til havs, nylig nådd to milepæler. 18. juli startet sjøreisen fra Stord for den første av fem vindturbiner som snart blir verdens første flytende vindpark, Statoils pilotanlegg Hywind utenfor Skottland. Parallelt markerer forskning og industri at Nowitech, norsk forskningslandslag i offshore vindkrafteknologi, har gitt hele 40 nyvinninger.

Åtte av dem kan alene gi en verdiskaping på 50 milliarder kroner de neste 12-13 årene, ifølge ferske anslag fra et norsk konsulentselskap. Det er over hundre ganger mer enn innsatsen: de 320 millionene som Forskningsrådet, forskningsmiljøer og industri har skutt inn i det nå fullførte åtteårige innovasjonsprogrammet.

Den anslåtte gevinsten er beregnede kostnadsbesparelser og økninger i kraftproduksjonen. De åtte utvalgte innovasjonene spenner bredt. Teknologi for robotisert tilstandskontroll i turbinenes indre er en av nyvinningene. Derfra går spekteret via metode for minimering av energitap i lange overføringskabler, til beregningsverktøy for design og styring av havvindparker.

Vindkraft offshore vokser. Vindturbinene utaskjærs - de fleste på britisk sokkel - har en totalproduksjon som tilsvarer halve det norske elforbruket. Men i 2030 er produksjonen i Europas havvindsektor trolig firedoblet.

Dagens havvindparker har bunnfaste installasjoner. Med

Med Hywind går Statoil foran med flytende turbiner, skriver artikkelforfatteren. Her statsminister Erna Solberg (H) på båttur for å få se Hywind-prosjektet på Stord. Foto: Johannes Worsøe Berg

Teknologi
John Olav Gjæver Tande

Hywind går Statoil foran med flytende turbiner. Dette åpner for å utnytte de rike vindressursene over dypt vann og gir tilgang til nye markeder. På sikt er det også fullt mulig at flytende turbiner kan bygges enklere enn dagens bunnfaste - og dermed billigere.

Mange trodde ikke på flytende vind før Statoil bygde den første Hywind-turbinen i 2009. Fire år før hadde selskapets løsning fått viktig fødselshjelp i Sintefs havbasseng. Takket være påfølgende utvikling, som både industri og forskning har stått for, kan Hywind Skottland realiseres til en kostnad per kilowattime som er 60-70 prosent lavere enn det som var mulig i 2009.

Nowitech-programmet, som startet samme år, har gitt løsninger som både bunnfaste og flytende vindparker kan utnytte. Programmet inngår i Forskningsrådets FME-ordning - forskningssentre for miljøvennlig energi - som sprang ut av Stortingets klimaforlik fra 2008.

Med ordningen fikk fornybar-Norge sine landslag. I Nowitech har Sintef, NTNU, Institutt for energiteknikk (IFE) og ni industripartnere sammen løftet norsk kompetanse på havvindteknologi. De fleste resultatene

John Olav Gjæver Tande, sjefforsker i Sintef

bygger på kunnskap og ferdigheter fra Norges olje- og gassvirksomhet.

Vi i Sintef, som leder Nowitech, ønsker å tallfeste hva samfunnet får igjen for budsjettpengene. Ved programmets avslutning i år ba vi derfor konsulentfirmaet Impello Management beregne verdiene Nowitech alt har skapt, pluss verdiskapingen programmet kan forventes å gi.

Impello-rapporten viser at to av programmets resultat på egen hånd har nedbetalt hele innsatsen på 320 millioner kroner som gikk inn i Nowitech. Over halve inntjeningen er besparelser som kompetanse fra programmet gjorde mulig på understell i Statoil og Statkrafts britiske vindpark Dudgeon.

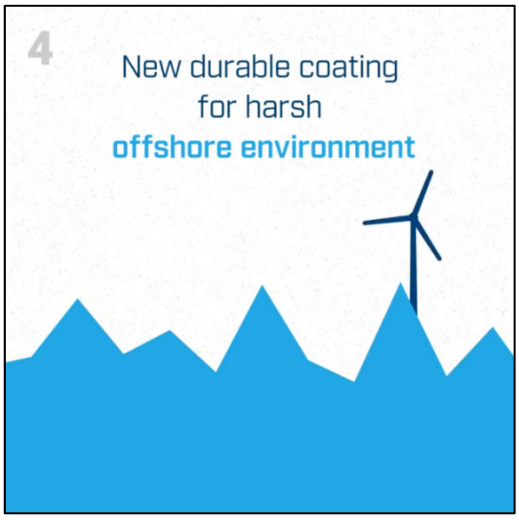
Det andre bidraget er inntekter norske Fugro Oceanor har fra omsetning av en flytende laser-vindmåler som er bygd på en Nowitech-idé.

FME-ordningen skal først og fremst bygge kompetanse og drive anvendt forskning. Derfor har brorparten av Nowitech-resultatene ennå ikke nådd industrialiseringsfasen. Det anslåtte verdiskapingspotensialet på 50 milliarder kroner som Impello kom frem til, gjelder åtte av de mest lovende innovasjonene. Beregningene er gjort ut fra forventninger om at de åtte teknologiene blir kommersialisert, og ut fra antagelser om i hvilken grad disse vil bli valgt til hver og en av de nye vindparkene Europa har planlagt offshore frem til 2030.

Anslag er alltid usikre. Men tallene fra Impello gir all grunn til å tro at Nowitech har vært en fornuftig investering for samfunnet.

John Olav Gjæver Tande,
sjefforsker i Sintef

Teknologisk gjennombrudd? Stor ingeniørkunst? Skriv til teknologispalten. Tekstlengde inntil 4000 tegn (inkl. mellomrom). debatt@dn.no




NYHETER

Melder om økning i terrorangrep

Manglende satsing på havvind får slakt fra opposisjonen

Flau bris rundt ned

FORSKNING

Lover havvin


ØKONOMI

diskapning for Norge, viser ny utregning:

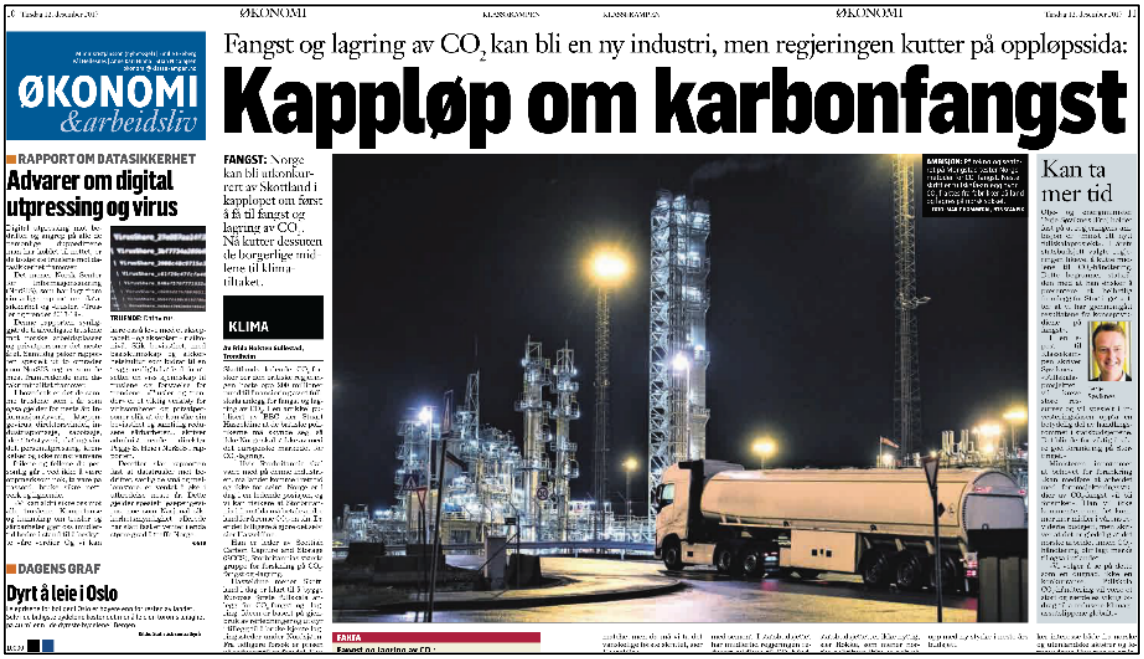
an gi milliarder

«Havvind er nå konkurranse-dyktig på pris»

On 14 August, the #SINTEFenergy-bloggen became #SINTEFblogg for the entire SINTEF organisation. All institutes contributed blog articles in 2017.

- English: https://blog.sintef.com/
- Norwegian: https://blogg.sintef.no/

On 12 December, Klassekampen newspaper interviewed NCCS Director Mona Mølnvi about CCS.


ØKONOMI &arbeidsliv

Fangst og lagring av CO_2 kan bli en ny industri, men regjeringen kutter på oppløpssida:

Kappløp om karbonfangst

RAPPORT OM DATASIKKERHET

Advarer om digital utpressing og virus

FANGST: Norge kan bli utkonkurrert av Skottland i kappløpet om først å få til fangst og lagring av CO_2. Nå kutter dessuten de borgerlige mid lerte til klima tiltaket.

KLIMA

Kan ta mer tid

DAGENS GRAF

Dyrt å leie i Oslo