



## Contents

- 2 – Upcoming Events
- 3 – January Lunch-meetings
- 5 – The future of Norwegian Biofuels
- 6 – Energy Master Alumni Interview – Hilde Skeie
- 7 – EERA DeepWind Conference

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## Welcome to the first newsletter of 2017!

**With many interesting events planned for the spring and some already well-executed, the Bergen Energy Lab is off to a good start to 2017.**

A goal set by the Norwegian government to reach 20 % biofuels in road traffic in 2020 triggered heated debates on the use of biofuels. The Bergen Energy Lab invited both scientists and representatives of the industry to give their views on the future of Norwegian biofuel on a half-day seminar arranged at the Western Norway University of Applied Sciences. Read all about it on page 5.

Read also on page 3 about the five weekly lunch-meetings we have had with Crina Ilea (Prototech), Arne Klein (Department of Informatics, UIB), Per Bull Haugsøen (Oceanvis AS), Kevin Johnsen (Nordic Energy Research) and Håvard Haarstad (Department of Geography, UIB). Do not miss the interview with previous Energy Master student Hilde Skeie, who now works as a trainee in project management in Bane NOR, and our report from the EERA DeepWind Conference. Enjoy reading!

Hans-Kristian Ringkjøb



## Upcoming Events

There are many interesting events in store for the Bergen Energy Lab. Please keep an eye on <http://www.uib.no/en/energy/calendar> for additional events and eventual changes in the program.

<p><b>14. February - Finn Gunnar Nielsen: Wave Energy - The basic principles</b> 12:00–13:00, Helland-Hansen, GFI</p>
<p><b>21. February (Extended Lunch-meeting)</b> <a href="#">Ignacio Herrera Anchustegui: Role of the state in implementing renewable energy in public procurement</a> <a href="#">Finn Gunnar Nielsen: Electrification of Norwegian cars with offshore wind</a> 12:00–13:00, Auditorium 5, Realfagsbygget</p>
<p><b>28. February</b> <a href="#">John Carter: Designing a course on Wave Energy</a> 12:00–13:00, Helland-Hansen, GFI</p>
<p><b>09. March (Half-day seminar) - Emerging technologies and their impact on the society</b> Full program available online 09:15–14:00 Auditorium 2, Faculty of Law, Magnus Lagabøtes plass 1</p>
<p><b>21. March - Hilde Holdhus: GreenSight</b> 12:00–13:00, Helland-Hansen, GFI</p>
<p><b>04. April - Birgitte Rugaard Furevik: The potential for wave energy in the North Sea</b> 12:00–13:00, Helland-Hansen, GFI</p>

Other events: [Mini seminar on climate and energy transition](#) (20.02.2017; 14.00-16.00)

## Summer Schools

[The NorRen Summer School](#)

[AGF-853 Sustainable Arctic Energy Exploration and Development \(5 ECTS\)](#)

[AGF-353 Sustainable Arctic Energy Exploration and Development \(5 ECTS\)](#)

## Funding Opportunities

### E.ON Stipendienfonds

E.ON Stipendienfonds is a scholarship fund designed to promote and strengthen German/Norwegian academic relations in the field of energy sciences. The exchange scholarship is offered by E.ON Stipendienfonds to Norwegian and German Master and PhD students studying Energy Sciences in the partner country, Germany or Norway, with a strong and clear focus on Energy in a wide sense.

See more [here](#).

### Energy Efficiency (EEA Grants)

EEA grants for possibility of organizing workshops, seminars, conferences under Energy Efficiency.

See more [here](#).

## Open positions

[Post-doctor in meteorology \(GFI\)](#)

[Full-time assistant professor in Geophysics and Energy at École Polytechnique \(Paris, France\)](#)



## January Lunch-meetings

### Crina Ilea (Prototech): Fuel Cell – What is it and what are the benefits?

In her presentation, Crina gave a brief introduction on the basics of how a fuel cell works and the various applications and benefits of them. She also spoke about previous and current projects at Prototech. Already in 1997, Prototech together with Statoil developed a 2.5 kW SOFC prototype, the first planar SOFC with a complete balance of plant to be tested. Afterwards Prototech has also designed and manufactured a 3+3 kW SOFC for combined heat and power, sponsored by BKK and Innovation Norway. Now they are working on several projects such as [Clean Highly Efficient Offshore Power \(CHEOP\)](#), [hydrogen ferries](#), the [Green Fish Farm](#) and fuel cells for space applications.

You can download Crina's presentation [here](#).



Crina Ilea (Photo: UiB Energy Lab)

### Arne Klein (Department of Informatics): Optimising cable routes in offshore wind

Arne Klein is a PhD-student from the Department of Informatics. He visited the Energy Lab lunch meeting on the 17<sup>th</sup> of January to present some of the work he has been doing during his thesis.

Arne is working on how to optimise cable routes in offshore wind farms. In such a problem, Arne wants to find optimal cable paths in a wind farm in order to minimize the total cable length and thus the total cost of the cables. He uses a mathematical model to solve an Integer Linear

Programming (ILP) problem, which is implemented in Python and solved by CPLEX.

In an experimental study of the Walney 1 wind farm, Arne was able to achieve cost savings as high as 14 % on total cable costs. This is a significant improvement based on a applying a "free" optimisation method.

You can read more in Arne's presentation [here](#), and if you are interested in more details Arne has published a [paper](#) on this topic.

### Per Bull Haugsøen (Oceanvis AS): Alternative Wind Energy Concepts (SkyWind two-bladed turbine)

Per B. Haugsøen held a presentation for the Bergen Energy Lab on the 24<sup>th</sup> of January 2017.

He has experience from the wind energy sector since 2001. With a background from the oil and gas sector, Haugsøen has long experience from working with structure and foundation concepts.

His presentation focused on new concepts for wind turbines developed through the company SkyWind.

The concepts included a two-bladed configuration instead of three blades, a centralized electrical system for several turbines, alternative installation strategies without the use of cranes and several synchronized rotors on the same tower.

Read more about this interesting concept in Per's presentation [here](#).





## Kevin Johnsen (Nordic Energy Research): Challenges related to carbon neutral Nordic countries in 2050

Kevin Johnsen graduated from the Energy Master in 2016, and immediately started working for Nordic Energy Research based in Oslo. He held a presentation for the Bergen Energy Lab on the 31<sup>st</sup> of January 2017.

Kevin presented work done through Nordic Energy Research to identify challenges faced by Nordic countries to achieve goals of decarbonisation by 2050.

The project was based on international reports from the IEA as well as national reports from Nordic countries on future energy scenarios. Some challenges were pointed out to be electrification of the primary energy supply, renovation of existing buildings to become more energy efficient and long distance transportation like air traffic.

Read more in Kevin's presentation [here](#).



Kevin Johnsen (Photo: Stian Backe)

## Håvard Haarstad (Department of Geography): Energy transition – A view from the social sciences

Håvard Haarstad held a presentation for Energy Lab 7. February 2017.

Håvard is a Research Professor at the Department of Geography at the University of Bergen. His work considers sustainable city planning, and he is one of the initiators of the Centre for Climate and Energy Transformation at the University of Bergen.

The presentation entitled "Energy transition: a view from the social sciences" focused on understanding prerequisites for energy changes in a complex techno-social regime. Håvard pointed at how factors like infrastructure, lifestyle and culture affect implementation of sustainable energy solutions, and he emphasized the importance of recognizing social aspects alongside technological innovation.

Read more [here](#).



Håvard Haarstad (Photo: Stian Backe)





From the left: Lars M. Nerheim and Gunnar S. Eskeland discuss the future of Norwegian biofuel. On the right: Sample of renewable diesel from Eco-1 Bioenergi AS. Photo by Stian Backe

## Seminar: The Future of Norwegian Biofuel

The Energy Lab committee arranged the first half-day seminar on February 8th 2017 at the Western Norway University of Applied Sciences (HVL). Speakers from different fields were invited to discuss perspectives and opportunities for Norwegian biofuel. The presentations are available [online](#).

By: Stian Backe

Professor Gunnar S. Eskeland from NHH presented biofuel from an economical point of view. He made a point that the huge fuel demand for road transport could not be met by biofuel alone, but suggested biofuel to be a good alternative for other transportation sectors like air traffic.

Lars M. Nerheim from HVL represented the technical side by telling the interesting history of spark plugs in combustion engines. With technical arguments concerning efficiency and emissions, Nerheim argued fuels in the form of gas to be superior to liquid fuels in combustion engines.

From the commercial side, Geir H. Ingeborgrud from Eco-1 Bioenergi AS gave a talk about working as a Norwegian biofuel distributor. He emphasized the importance of certifying biofuel producers to ensure quality and environmentally friendly products.

A lot of research is being done on biofuel. Tanja Barth from the Department of Chemistry at UiB gave an overview of different types of biofuel, and presented some of her research using residue products from pulp production to produce fuel. She recognized several promising technologies, and that some of these ideas were hard to realize due to lack of funding. Tor Ivar Eikaas from The Research Council of Norway gave a presentation on how such funding is being distributed through European goals and projects.

The airport director at Bergen Airport, Aslak Sverdrup, finished the seminar with his talk on opportunities for biofuel in the aviation industry. Goals of 30 % biofuel in all Norwegian airplanes by 2030 are already set, and existing projects are fueling airplanes with a blend of up to 50 % biofuel.



## Energy Master Alumni Interview – Hilde Skeie

**Hilde Skeie graduated from the Energy Master in 2016 with a specialisation in thermal machines. In her master thesis she wrote about noise and vibrations from a diesel motor, which she tested in the machine laboratory on the Western Norway University of Applied Sciences (HVL). Now she works at Bane NOR (former Jernbaneverket) as a trainee in project management.**

### ***Tell us about your background***

I have a bachelor's degree in Energy Technology from HiB from 2011. After I finished my bachelor I worked as an HVAC engineer, first in Norconsult and later in Multiconsult. In 2014 I started on the master program in Energy at UiB/HVL, whilst working 50 % in Multiconsult. I graduated in 2016, with a specialisation in thermal machines.

### ***Why did you choose to study energy technology and why did you choose the program at UiB/HVL?***

I chose the energy master because it was the most relevant one for my bachelor and my discipline. The specialisation within thermal machines was the most engineer-focused on the program, which is where I have my main interest. Energy is a broad concept, so to have an education within this field gives a lot of opportunities.

### ***Tell us about your current job?***

Today, I'm a trainee within project management in Bane-NOR, where I started on the 15<sup>th</sup> of August last year. There were almost 1500 applicants to what ended up being 25 positions. The trainee program is a unique opportunity for young and recent graduates to start in the railway sector and to get a thorough education in project management. The internship begins with five weeks of introductory courses on project management and railway in Oslo. Every trainee gets their own mentor, and the opportunity to see all the aspects of Bane NOR's work, as we are placed on three different locations during two years. In addition we get about 30 ECTS from the various courses in the trainee-period.

### ***What is the best thing about your job?***

The railway sector is in strong growth. We work with many large and interesting projects that promote the use of environmental-friendly transport. I get the opportunity to participate in some of the largest development projects in our

country and they affect the daily lives of a considerable part of the population.

### ***How has the master in Energy become useful in your job?***

Without the master in Energy I wouldn't even be able to apply for my current job, and I would have missed a great opportunity.

### ***Why would you recommend others to work in the energy field?***

The energy field is big and varied, and you have the opportunity to work within many different industries.



Hilde Skeie (Photo: private)







Kristin Guldbrandsen Frøysa during her keynote speech (Photo: NOWITECH)

## EERA DeepWind 2017

**The 14th annual Deep Sea Offshore Wind R&D Conference organized by the research parties in NOWITECH was held in Trondheim from 18.-20. January 2017. The conference gathered researchers and professors from several countries to share their work on topics related to offshore wind.**

By Stian Backe

The conference started off with an opening and welcome by the organizing committee represented by John Olav G. Tande. The Deputy Mayor of Trondheim Hilde Opoku also gave an opening talk acknowledging the importance of offshore wind research.

NORCOWE was well represented at the conference. The Centre Director Kristin G. Frøysa gave a summary of the centre's achievements as part of the opening session. Several attendants represented Bergen, including Professor Finn G. Nielsen who is NORCOWE's Scientific Manager. Other

participants mainly represented universities and research organizations.

The conference spanned three days of parallel sessions covering several topics like new turbine and generator technology, met-ocean conditions, grid connection and power system integration and floating wind turbine research.

A total of 64 posters were displayed and presented in between the sessions, among which energy master student Stian Backe presented his thesis project on [strategic optimization of offshore wind installations](#).

All presentations and posters can be found [here](#).

