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Welcome to the Energy Lab newsletter!

You are now reading the first monthly newsletter from the Energy Lab. Here we will present news from the Energy Lab activities, interviews of master students and alumni as well as other energy related news from the region.

The fall semester will be full of exciting activities in the Energy Lab. In addition to our weekly lunch-meetings, students from the Energy master will arrange a one day energy-conference during this fall. In addition, we will also try to have our first Webinar, where we intend to present ongoing and interesting research from our region.

Energy Primer

Energy Primer is an introductory course to energy with a lot of useful information, quizzes and links to digital learning resources. The course covers the whole energy field, and is organized in modules. It covers topics such as energy basics, fossil fuels, renewables, smart energy use and much more. The webpage is meant for current and future energy students as well as everyone interested in energy. It was created this summer by three summer interns; Ingvild Øijorden, Meng-Chieh Yang and Kevin Johnsen. You can find Energy Primer [here](#), and we would very much appreciate your feedback.

Feedback on the newsletter

This is the first edition of a planned monthly newsletter from the EnergyLab. In order to improve upcoming editions, we would like to hear your feedback (both positive and negative). You can find contact information on the left-hand side of this page. Please send us an e-mail!



Opening meeting of the fall semester

The 23rd of August marked the start of the fall semester for the Energy Lab. About 40 attendants were treated with two very interesting talks from Lars Henrik Paarup Michelsen, the CEO of the Norwegian Climate Foundation and Sølve Sondbø, the head of climate and resources at the Hordaland County Council.

The event started with an introduction to the EnergyLab by Professor Peter Haugan. Then, Lars Henrik Paarup Michelsen gave a talk about the status and possibilities associated with the green shift. He suggested that now is the critical time for the world to focus on reducing CO₂ emissions in order to reach the 2 °C target.



Lars Henrik Paarup Michelsen, CEO of the Norwegian Climate Foundation (Photo: Energy Lab)

During the period between 2004 and 2014, energy produced from renewables has showed a significant increase worldwide, especially in Europe and for solar and wind.

According to Paarup Michelsen, the energy use in the transportation sector should be one of our major foci. Currently, 55 % of the oil is used in transportation in the world; therefore, it will make a huge impact on our environment if we can use cleaner ways of transportation.

Norway is one of the biggest markets in the world for electric cars at present. Moreover, battery technologies that are used in electric cars or in renewable energy systems have also shown improving capacity and decreasing price.

Through the past years the power system has gradually transferred from a centralized power system to a more clean and local power system. The green shift is ongoing and it is the whole world's responsibility to put in more effort to protect our environment.

After a short break with some coffee and mingling, Sølve Sondbø, the head of climate and resources at the Hordaland County Council, gave a talk about regional climate and climate action plans from 2014 to 2030.

Sondbø spoke about energy and electricity production and greenhouse gas emissions in Hordaland, where the industry holds the largest emissions.

He then focused on Hordaland County Council's own emissions from fossil fuels and the plans and actions taken. Even though the emissions of greenhouse gasses are increasing, the goal is to reach a reduction of 22 % by 2020 and of 40 % by 2030. The main focus is on transport, but also on distribution of renewable energy, energy efficiency, land use, industry and climate change adaptation, where the latter mainly focuses on better handling of surface water.

Lars Henrik's and Sølve's presentations can be found on our [website](#).



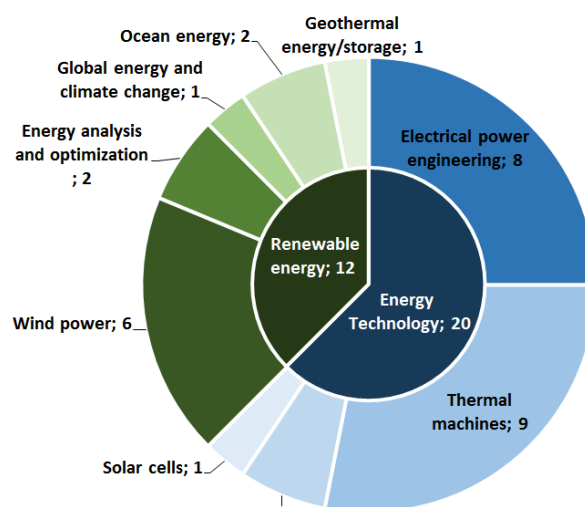
Sølve Sondbø, head of climate and resources at Hordaland County Council (Photo: Energy Lab)

New Energy Master Students



14 of the 32 new Energy master students (Photo: Energy Lab)

The high number of applicants for the UiB/HiB two-year energy master this year has resulted in master students on a very high level. In total 32 new students are distributed on different specialization topics, with 12 students on Renewable Energy and 20 students on Energy Technology. Many interesting specializations are represented, including geothermal energy/storage, wind power, thermal machines, solar cells and many more. A distribution of the different topics is shown to the right.



Energy Master Distribution 2016 (Illustration: Energy Lab)

Alice Casagrande Cesconetto from Brazil is one of the new students of the Energy Master. We had a talk with her to get to know her better and to hear about her expectations of the master program.

Tell us a bit about yourself?

I am Alice Casagrande Cesconetto, 28 y.o., Brazilian, dipl. Mechanical Engineer - Federal University of Santa Catarina, Brazil. After presenting my bachelor thesis and graduating, I moved to Bergen, where I worked (mainly offshore) since Dec 2012 as a Wireline Field Engineer.

Why did you choose to study the energy master at UiB/HiB?

I've chosen it because I already live in Bergen, and don't intend to move. Moreover, I have been working in the oil industry area for more than 3.5 years, and I want to expand my horizons and possibilities, by mastering my skills in Renewable Energy as well.

What are your expectations of this master program and in the future?

I expect to be able to be inserted in the industry after finishing the master, with the knowledge acquired during the whole program. I also expect self-development and continuously seeking for more knowledge through my whole life.



Alice Casagrande Cesconetto (Photo: Private)



NorRen Summer School 2016



Participants of the NorRen Summer School in front of Jostedalsbreen (Photo: NorRen/UiO Energy)

The 2016 edition of the NorRen summer school took place in Sogndal from 8th to 13th of August. Advertised as a journey throughout the Norwegian renewable energy landscape, the summer school covered the whole value chain from production to consumption of clean renewable energy.

NorRen (Norwegian Research School in Renewable Energy) focuses on bringing together PhD-students within renewable energy, and one of their main activities is to organize an annual summer school.

Two PhD-students from the University of Bergen attended this year's edition, Ida Marie Solbrekke and Hans-Kristian Ringkjøb. Both PhD-students and postdocs attended the summer school, from 13 different nationalities covering the whole world.

NorRen consisted of a mix of lectures from top international scholars and industry experts, discussions, group works, site visits and social activities. We visited among other things Jostedalen hydropower plant, Mehuken wind farm and a new transformer station at Fardal.

For more information about NorRen and a full description of the weeks' activities, see <http://norren.no/>.



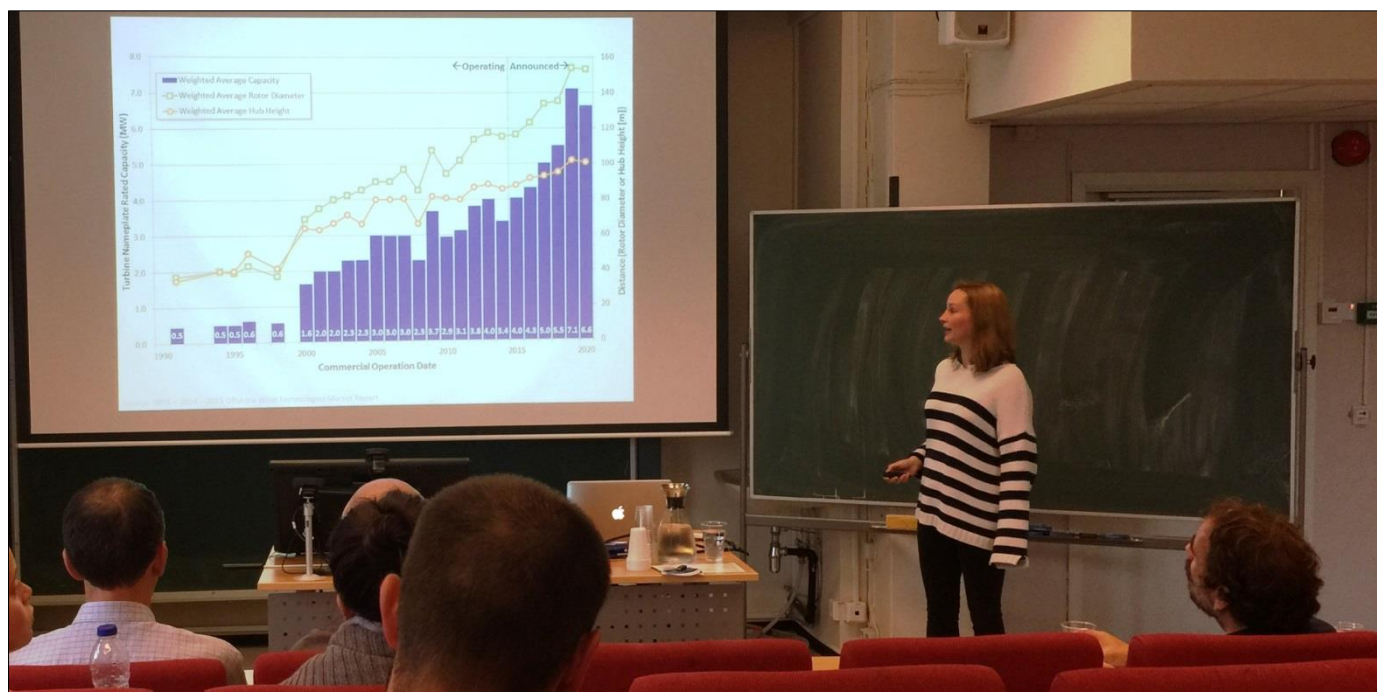
Wind Turbine on Mehuken (Photo: NorRen/UiO Energy)



Trial Lecture – Valerie-Marie Kumer

Offshore Wind Energy – Potential, Challenges and Limitations

The 29th of August, Valerie-Marie Kumer, a PhD student from the Geophysical Institute, held her trial lecture for the PhD-degree with the title “Offshore Wind Energy - Potential, Challenges and Limitations”.



Valerie-Marie Kumer during her trial lecture (Photo: Energy Lab)

Valerie started off by explaining the basics of wind turbines, how the various components in the nacelle work and how a wind turbine is capable of generating energy. After explaining the technological aspects of the wind turbine itself, she turned to offshore wind turbines and talked about the different foundation designs and how they depend on the water depth.

According to Valerie the main reasons for going offshore is that offshore locations have much higher and more stable wind than onshore locations. In addition, there are noise limitations onshore and turbines installed offshore can be installed out of sight avoiding the “not in my back yard” issue.

The UK is the world leader of offshore wind power generation, followed by Germany and Denmark. The global markets show that offshore wind reached 12 GW of capacity by the end of

2015 and is predicted to be 45 GW in 2020. Nevertheless, the environmental challenges for offshore wind are big, including the fishing industry, whale and dolphin conservation society, bird routes, seabed and fish ecology, and governmental policies, etc.

Finally, Valerie talked about the Hywind Scotland project, which is the first floating wind park in the world. Floating wind parks face many challenges, for example, the need for better control systems to keep the turbines stable in wave motions, turbine spacing, and the need for longer cables. The wind turbines for Hywind Scotland are assembled in Norway but installed outside Aberdeen in Scotland leading to major challenges in transportation of the turbines.

Valerie-Marie Kumer’s presentation can be found in the [online version](#) of this article.



Interview with Stian Backe – Energy Master Student



Stian Backe - Energy Master student (Photo: Energy Lab)

Stian Backe is currently in his second year of the master program in Renewable Energy at UiB. With a solid background and a strong interest in mathematics and energy, he has chosen to write his master thesis about logistics and optimization of the installation process of offshore wind farms.

Stian Backe considers himself as a practical person and wishes to contribute to the world, the society, and the environment in a more technical way. The energy transition needs to be done and he hopes he can use his knowledge to help improving the energy system.

Why did you choose to study a Master in energy and at UiB/HiB?

I think energy is a very interesting topic, and I would like to contribute to changing our energy system. It is a very specific task that needs to be done and this is what I want to do in my career and in my life. It is also related to the value of the environment and I feel the way I can contribute the most is by doing technical stuff.

I like the Master program at UiB. It's nice, interesting and more than I expected it to be. Once you start learning you will realise how useful the knowledge can be in many different fields. I'm very happy with the choice.

What is your best experience with this program?

The moments when I suddenly understand the complicated problems related to math that I have been stuck with for a long time. It's almost like a glimpse. From not understanding anything to understand everything. I really enjoy those moments.

Tell us about your master thesis.

My thesis is about optimizing the installation of offshore wind farms. I work on creating a model



to optimize the process of installing the different components. It's not specifically related to wind energy, but it's about how to arrange the different installation vessels. Decide who is going to transport what from which port so that the cost is minimized. Since offshore wind is a very expensive way to produce energy, it is essential to minimize costs.

My research cooperates with Marintek and is linked to an EU project - LEANWIND. A model with similar function has been developed in this project, and my research is focused on making it more detailed and to see if it makes a difference to take more small factors into account. I use a program called AMPL and I write everything in LaTeX.

Optimisation models are very general tools, which can be used in many different industries and aspects. I'm very happy to do this research topic, because I have been always enjoying math and optimisation is very much about math.

How do you think this education can be used in your future career?

I really think this education and getting the knowledge of creating these models, which has wide applications, will be very useful for my future career. It would be very nice if I can have an opportunity to continue working on this topic.

How do you think your research can influence the world?

The model can make installation cheaper, and I hope it will be able to solve the problems of size. In addition, this is not only useful for people who arrange the installation ships, but also the people who build the installation ships.

What is the coolest finding of your research?

I think the coolest thing of my research is that you only need to put in the parameters in the model and get the optimal solution out. Also, I think the realization that I can write the models out mathematically and be able to find an optimal solution is the coolest thing.

How do you picture the energy future? What are your visions or hope?

I picture the energy future to be very different in not so many years. The question is whether you can find the balance quickly and transfer the energy consumption from certain resources to different resources. I think making the energy transition and clean energy production happen during the same period is crucial if we want to shift to cleaner energy in the future.



What's happening within energy in Bergen?

Climate Profile Hordaland: More extreme rainfall and more rainfall records

From Energi & Klima ([Click here for the original news article](#))

Prepare for more rain – more powerful rain – in the coming decades in Hordaland.

The findings of the Climate Profile Hordaland show that rainfall amounts in Hordaland will increase with 15 percent by 2100 compared with today's climate. Not only will it rain more, rainstorms will also become more powerful. One consolation is that perhaps then that the intense rainfall episodes are not expected to increase as much as nationwide, where doubling is likely.

The climate profile Hordaland is developed through the Norwegian Climate Service Centre, a cooperation between NVE, the meteorological institute, Uni Research and the Bjerknes Centre. Climate profiles are being made for all counties in Norway, in order to give a basis for decision-making regarding climate adaption.

The electric bus without driver is coming to Bergen

From SYSLA: ([Click here for the original news article](#))

In this fall, residents of Bergen will be acquainted with driverless electric buses.

The Bergen Chamber of Commerce and Industry collaborates with the City of Bergen, Tide, Skyss and Sparebanken Vest to get the driverless electric buses to Bergen. The bus will come to Norway in October and to Bergen in November. Where it will run has not yet been determined.

- This is a small transport revolution. The bus can go for ten hours when it's charged. Today's model can go in regular routes, where the route is preloaded so that it stops at the fixed point and take up people, said Industrial Policy chief Atle Kvamme in Bergen Chamber of Commerce and Industry. He envisions that areas like Sandsli and Kokstad, where it is just a bit too far to walk to Bybanen, might be suitable for electric buses.

Can fish waste be fuel for buses?

From SYSLA: ([Click here for the original news article](#))

In both Bergen and Stavanger, new biogas plants will soon open. Fish waste can eventually become one of the raw materials.

During autumn, Bergen Kommune will open new biogas plant in Rådal Bergen, while the inter-municipal sanitation company IVAR Rogaland opens its new facility Grødaland in Hå. Both will produce biogas which can be used in buses, and the main ingredient is sewage sludge and food waste.

But a new research project will determine if fish waste and fish sludge also can be used in the production of biogas. Before the summer, water and wastewater agency in Bergen Kommune got up to three million from the West Norway regional research fund to research into the use of fish waste in biogas plant. They will do this together with, among others IVAR in Rogaland.

Other interesting articles

[Norsk oljepolitikk i lys av klima – Energi & Klima - Lars Henrik Paarup Michelsen](#)

[I Tyskland er vanlige folk med på en klimarevolusjon - Aftenposten](#)

[Afrika må bli fornybart - Aftenposten](#)

