COMMODITY CLUB
— Center of Competence —

Oslo Educational Tour
Renewable Energy Initiatives
September 12th – 15th, 2019

Report written by Nicolas Bürkler and Helena Steiner

Aero View over Oslo

The organizer's Intro, by Charles King

It gave me great pleasure to organize our trip to Oslo. I was convinced we had a good program suitable for many tastes and expectations. I would like thank the team, Olga, Francesca, Camilo and Peter for their efforts in supporting the organisation and success of the trip and of course a special mention for dear Olga without who's determined organisation skills dealing with Oslo Government representatives, we would not have been where we went. I was especially gratified by the positive feedback I heard and had the personal feeling that things went rather smoothly with only a few minor hiccups. My personal highlight was lunch at the Sailing club hut. Here I had the feeling we were seeing something special and traditional which few tourists get to experience. Thank you again everybody for participating and I hope we can all look back on the weekend as a great memory for the rest of our lives.

Sailing Club House where we had the opportunity to enjoy an authentic Norwegian Lunch

Waste to Energy plant

There are definitely prettier sights than a Waste-to-Energy plant, especially taking the smells inside the facility into consideration. Nevertheless it was impressive to see how well such a facility can be designed and managed. Outside of the facility, there were no signs, that inside they are processing all the household bio waste of Oslo and the corresponding fermentation processes. We received a detailed explanation of the issues facing bio Wasteto-Energy facilities, and the political as well the economical challenges which arise with such an endeavor.

After the presentation we got equipped with the right safety gear and were instructed where to meet and who to follow in case of an emergency. We were very thankful to Peter for volunteering to the rear guard and ensure every last member made it to the designated area. We started the tour in the arrival sector where the trucks off-load the collected waste - which was specifically designed to trap smells and prevent odors from escaping the facility. The next station was the waste storage area where we were treated to an in-depth explanation of processes which everyone found quite challenging to take notes of due to the overpowering smells pervading the whole area. Luckily the "smell trapping" mechanisms in place worked quite well so no smells followed us to the next sector.

A bit of curiosity arose to notice, that all the bio waste was packaged in small green plastic bags which then had to be sorted out and delivered to an traditional waste burning facility as biodegradable plastics are unsuitable for the sorting machines as their stretchy fibers clog, and quickly break, the machinery. Even the green city of Oslo seems to have some sort on improvement in that case. We were informed that, even after municipal education initiatives and pushes, less than 30% of household bio-waste is ending up at the facility as they face challenging in convincing families to change their behavior or to convince them of the value rather than just being seen as a burden. Also, only household waste is allowed to be processed, due to political and licencing limitations, so all the food waste from the public canteens and hospitals are still being sent to incinerators.

Oslo Municipality Plants

Waste-to Energy plant, Haraldrud – 100 000 t/y

- Energy recovery of the cities household waste
- Energy delivered to Oslo's district heating system (together with Fortum Oslo Varme AS), 160 000 living units (1,7 TWh)

Sorting plant, Haraldrud/Klemetsrud – 150 000 t/y

- Sorting of green bags for biogas/bio fertilizer
- Sorting of blue bags for new plastic products

Biogas plant, Romerike – 50 000 t/y

- Produce biogas for transport industry and bio fertilizer for agriculture
- Capacity of 4,5 mill. Nm3 liquefied biogas (LBG)

Another strong point to note is that the trucks collecting the waste are all run on the bio-fuel created at the plant so they have nearly achieved a close-loop cycle with this process. Additionally, fertilizer production for the surrounding farmers play an important role. Skepticism by the local farmer of using nontraditional bio waste vanished after realizing that the crops actually yield much higher returns using this mineral and nutrition rich fertilizer.

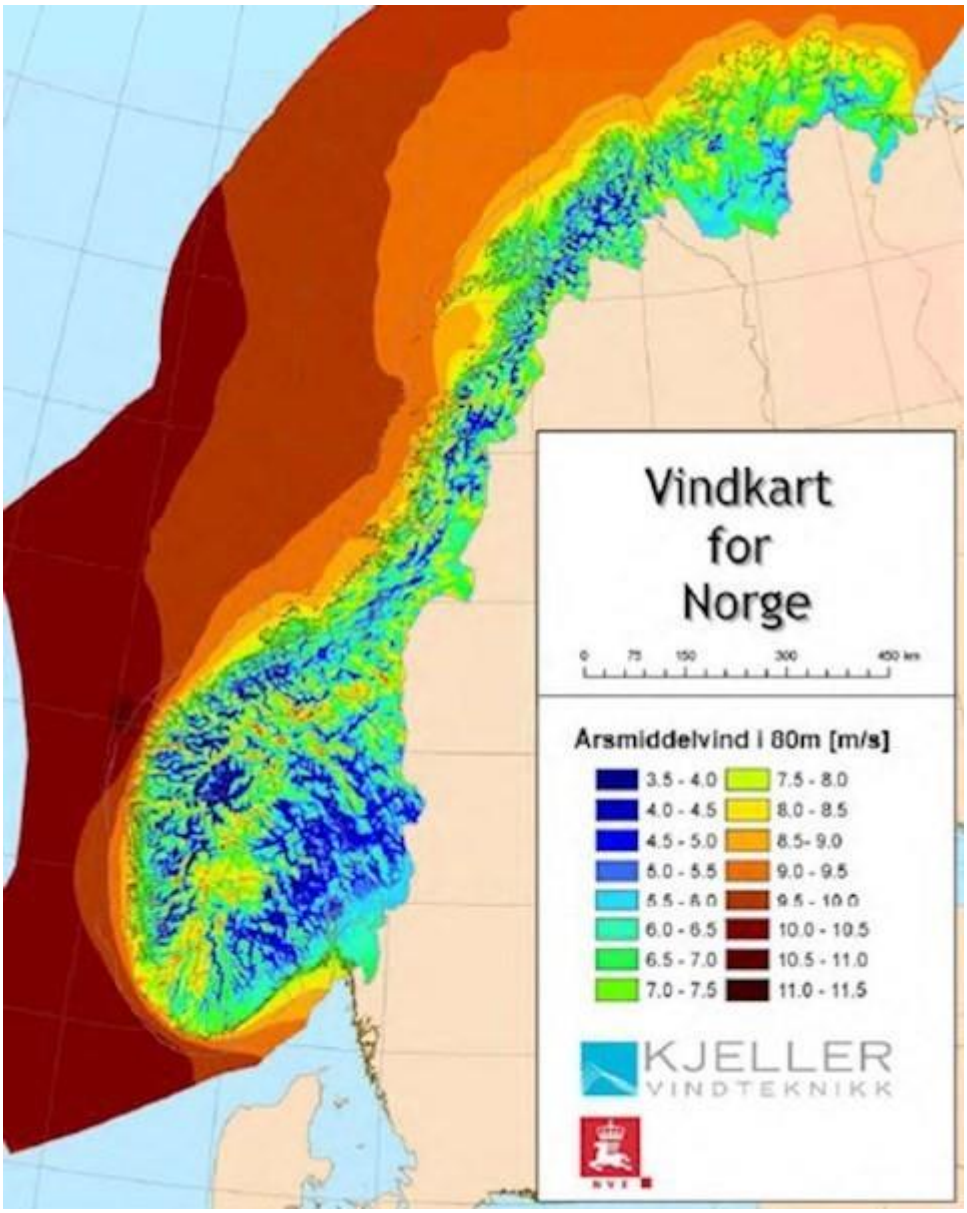
All in all, the Waste-to-Energy plant is not a financially self-sustaining business, but more a intelligent way of dealing with reusable waste, as such it could be better viewed as a way to bring down the public costs of garbage disposal rather than a way of creating wealth in the private sector.

Especially the concept to collect and use the waste locally was very convincing as we were surprised to hear that the UK is actually paying lot's of money to export their surplus waste to Scandinavia countries. We thought a local solution would also be beneficial for the UK as well as for the environment. But there seems to be more of an political issue than a pragmatic way of finding good solutions. From an environmental perspective it was also hard to understand that tiny Switzerland is trying to export CO2 via ships to sunk in the North Sea. There are probably easier and more efficient way to deal with a potential surplus of CO2.

On the way to receive safety instruction and the tour on the Waste-to-Energy plant

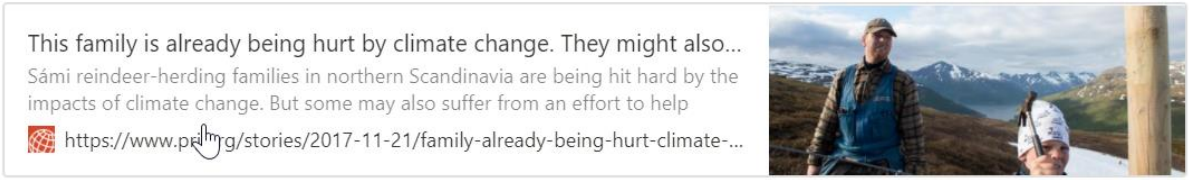
Norwegian Wind Energy Association

Norway is a blessed country when it comes to Energy resources. Beside abundance amounts of Oil and Gas reserves, Norway also has large hydroelectric potential and there is also a very steady strong airflow which makes Norway the prime region for wind energy usage.



Wind Map for Norway showing the potential for wind energy plants

Currently there are about 1750 Megawatt of Wind turbines in operation and 2400 under construction. With that, the transportation grid reached its limit. But we also have to phrase the question whether such low density energy which uses a lot of construction material and space should be preferred over high density energy such as nuclear power plant. The whole Norwegian wind sector, in operation and planned, could be replaced by two nuclear power plants which offer plannable and steady energy flows despite any weather situation. In the Norwegian case at least one can argue that there are enough land reserves and plenty of hydro power plants in order to level the wind energy production.



www.pri.org/stories/2017-11-21/family-already-being-hurt-climate-change-they-might-also-be-hurt-solution

Our discussion is purely hypothetical given that the Norwegian people decided to use their wind power to create a new export good and selling large amounts to their southern neighbors. Currently 15 percent of power production in Norway is due to wind whereas the rest of electricity production comes from hydro-power plants. Norwegian wind power plants don't need subsidies and are easily competing with traditional power production sights.

One issue of wind power plants are there relatively short life span of approximately 25 years and high maintenance costs, especially when they are built in remote areas, a fact that is largely ignored in the discussions of "environmentally friendly" solutions to fossil fuels as there seems to be no active discussions surrounding what to do with this excess of waste material produced by dead turbines, or if any parts of it can be feasibly reused or if they will eventually end up on a land fill.

The biggest challenge though is the build up of north-south power grid through Europe in order to distribute the energy produced in norther wind parks to more south placed consumers.

Oslo European Green Capital 2019

Oslo won the European Green City Award for 2019. Listening to the presentation in the city hall makes this decision very reasonable. Besides opening up former river bed and given nature space to show its beauty, the city of Oslo also decided to put the free movement of individuals on bikes, by foot or in public transportation before motorized vehicles. And within the motorized sector, battery powered cars are favored compared to combustion engines

which can also be seen by the ratio of electric vehicles which is probably a world record for any major city.

Their push to put pedestrians first created a beautiful walking street area which connects the municipal buildings to the small docks and water-front restaurants and cafes. It has also created an environment in which the ondemand electric scooter makes sense as a cheap form of mobility that doesn't detract from the pedestrian-focused areas.

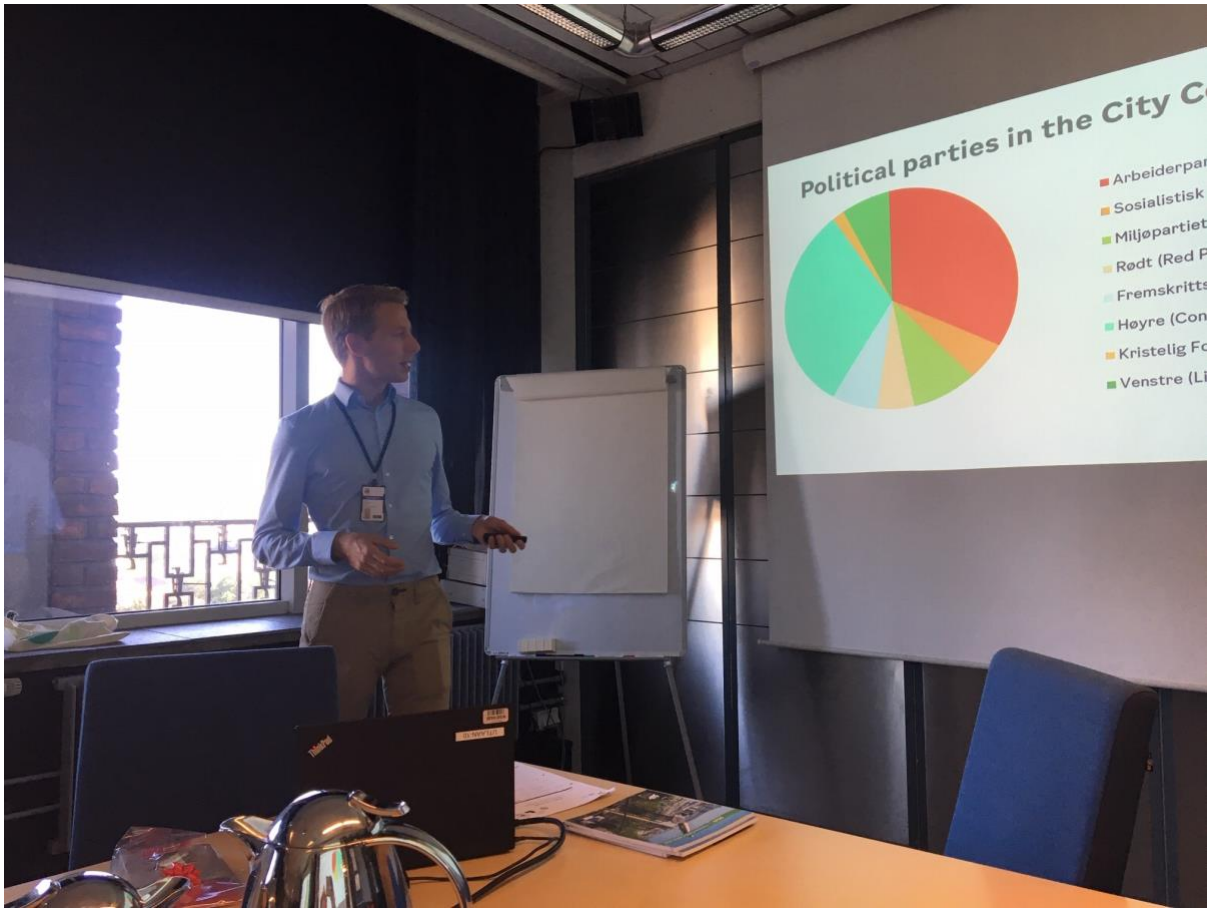
Our visit to the town hall happened after hours and we were able to take a private tour of the beautifully decorated entrance hall, complete with great Norwegian art from 1900 1950, with motifs from Norwegian history, culture and working life.

Lucky for us, our presentation at the town hall coincided with a public event that features climbers scaling the outside walls of the town hall towers. This meant the doors to the outside balconies were, on this rare occasion, unlocked, granting us a unique view overlooking the center of Oslo out to the water-front small docks and out to the fjords beyond. Even for the presenter was happy at this unique opportunity as it was his first time viewing the city from such a beautiful perspective.

The two long islands Langoyenes), once separated become one island due to landfills of waste. Nowadays with an holistic product life cycle approach and proper waste management, Oslo does not maintain any more landfills. On the former landfill between the Langoyenes is now a sport and leisure park situated.

Impression of an old landfill between the Langoyene islands

Norwegian specialties: The translation from the Fremskrittspartiet Foreigner Criticism Party) to progress party lead to special discussion about whitewashing certain developments and also open some questions about the costs of freedom due to all the interventions by the political system in the public's daily life. As nice and exciting the Green City Initiative sounds, the personal price considering alternative views and freedom seem to be limited by the dogmatic solution process by the governing bodies. Nevertheless, many cities could learn from the progress made by Oslo and apply some of their policies in their own area. Especially giving the people the first right to the limited city space and not the car lead to a very nice feeling strolling through the area.



Discussion on the Fremskrittspartiet in Oslo City Hall during the presentation on Oslo European Green Capital 2019

We were also facing some obstacles trying to find our way around on the surrounding islands of Oslo. The people first slogan forgot that Oslo and the surrounding area are covered with construction sites blocking many paths and ways which lead to the funny situation that even being in touching distance, some part of the group had to find a new way and were delayed for nearly half an hour for the amazing lunch in the private clubhouse of one of Oslo's exclusive Yachting clubs.

One of the many blocked pathways on a touristic Island outside of Oslo

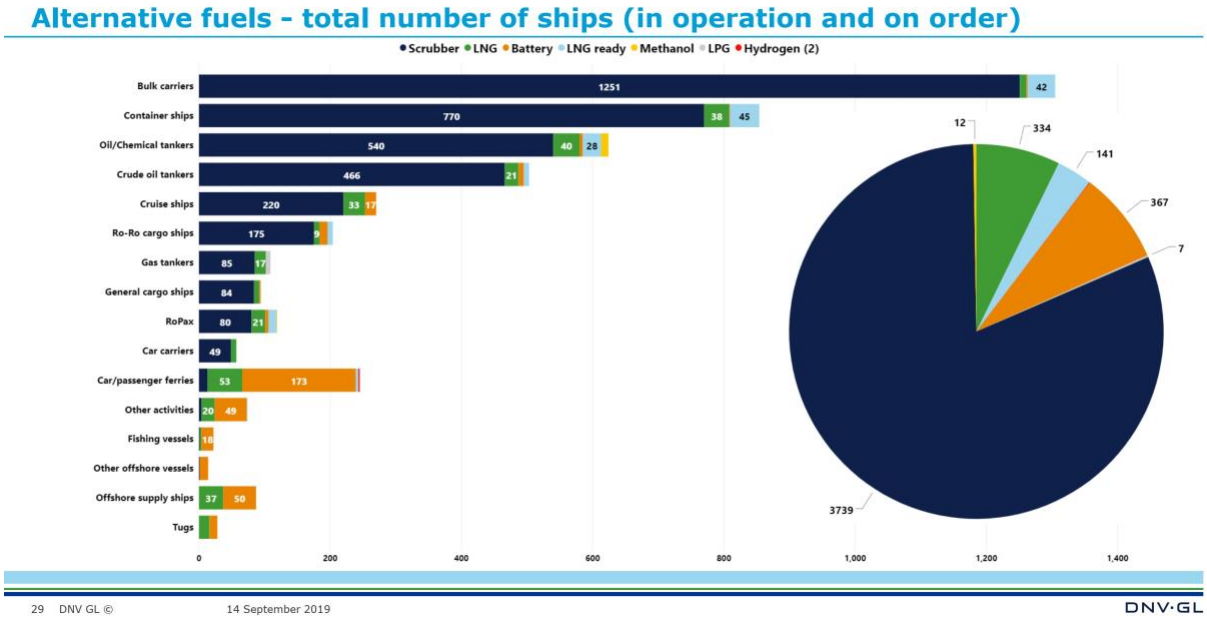
DNV-GL

Shipping firms were apparently unaffected by land-based emission targets as it falls outside of the parameters of UN-led initiative such as the Paris Accord. A shipping oversight body came together to adopt their own measures to reduce emissions, focusing on sulfur emissions. Their goal is to switch to a lighter cleaner fuel; however, an open question remains as to what will happen with the bunker oil that is now being burnt by these massive tankers as there is currently no other industry that can use this type of fuel. A similar situation happened when

Western nations decided to reduce the amount of lead in gasoline which led to the high-lead fuel being shipped off to developing nations who lacked regulations and led to a higher concentration of lead in their emissions, effectively shifting the issue from richer nations to poorer ones, but not reducing global emissions.

BALTIC DRY index is higher than expected considering global economic slowdown. We learned this was due to the new regulations which has an excess amount of ships docking to be fitted with new scrubbers or switching their engines to burn the cleaner recommended fuel.

The efforts to reduce sulfur emissions was inconclusive as it was unclear what was to be done with the excess sulfur buildup from the scrubbers, or where or how it is meant to be properly disposed of. One of the recommended scrubber systems seems to be capturing the sulfur from the exhaust and washing it back into the ocean, which seems, overall, to have no effect on the amount of sulfur ending up in the ocean, whether by acid rain or direct deposit.



Aftermath

As much as we appreciate and realize the necessity of more environmental conscious, although for our Russian friends it was a bit harder to understand why Norway is fighting climate change given their influence is less than a normal Russian city could do plus Norway could be a net profiteer from a warmer clima as Russia will be, one question always remain in the shape of the Jevon's Paradox:

In economics, the Jevons paradox occurs when technological progress or government policy increases the efficiency with which a resource is used (reducing the amount necessary for any one use), but the rate of consumption of that resource rises due to increasing demand. The Jevons paradox is perhaps the most widely known paradox in environmental economics. However, governments and environmentalists generally assume that efficiency gains will lower resource consumption, ignoring the possibility of the paradox arising.

Jevons paradox, https://en.wikipedia.or g/wiki/Jevons_paradox

As every participant found their personal highlight such as the lunch in the yachting club or the evening crab and shrimp cruise. Helena found her own personal yacht she would have liked to take a cruise on. All together, it was an excellent, insightful, and very enjoyable trip!

One of many beautiful yachts in the Oslo harbor