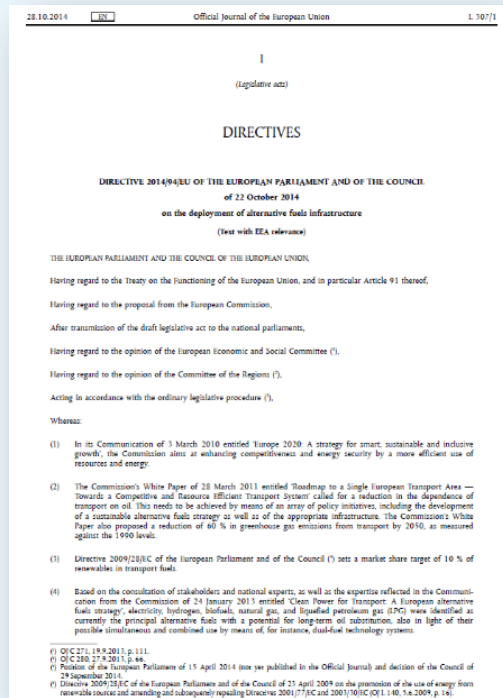




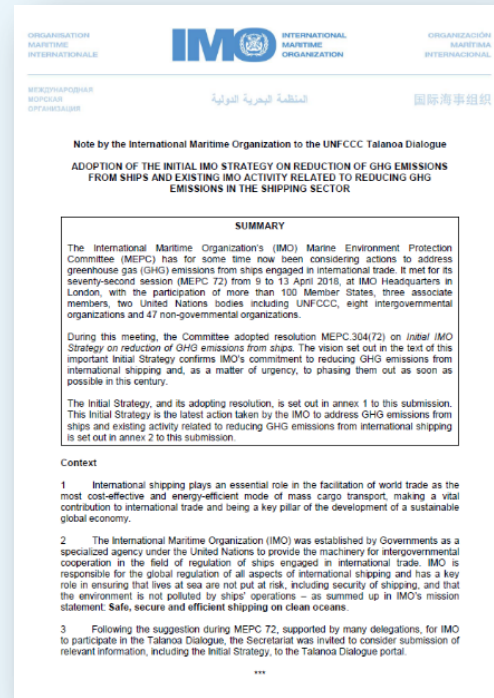
Prospects for energy and maritime transport in the Nordic region  
Expert workshop 26-27 February 2020  
Thor André Berg - Plug

# Shore Power – There is work to do!



*Member States shall ensure that the need for shore-side electricity supply for inland waterway vessels and seagoing ships in maritime and inland ports is assessed in their national policy frameworks.*

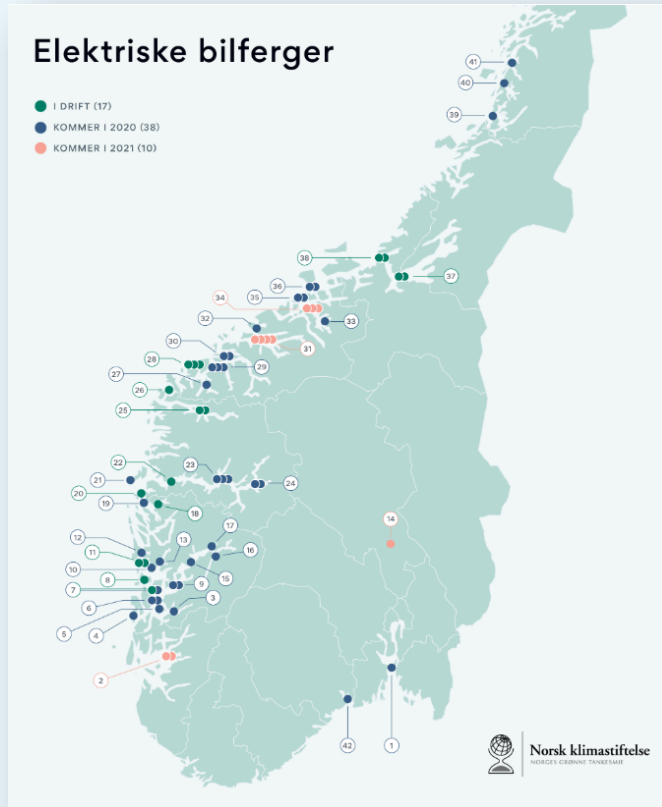
*...encourage port developments and activities globally to facilitate reduction of GHG emissions from shipping, including provision of ship and shore-side/on-shore power supply from renewable sources...*



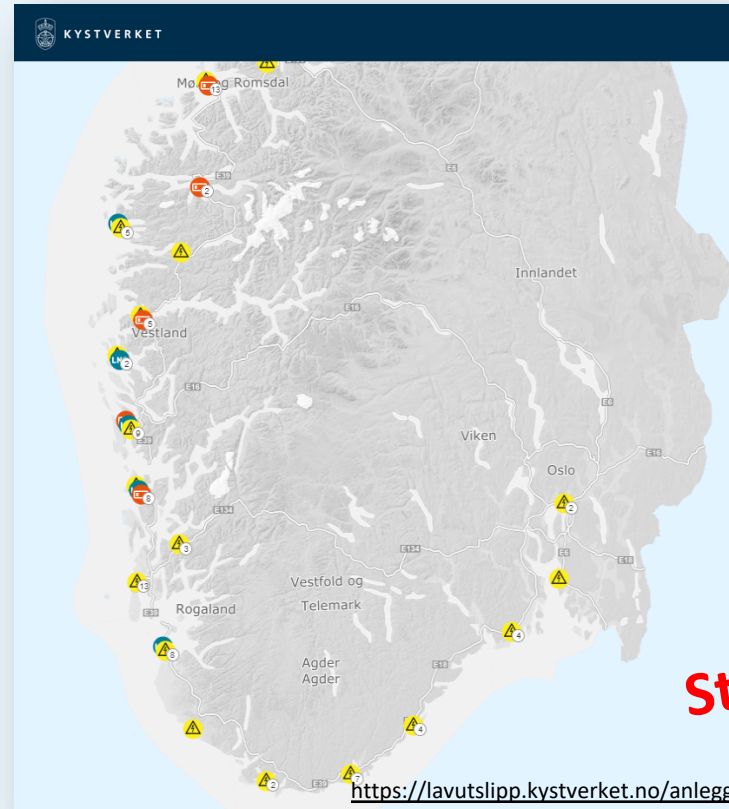
Keeping in mind it's only part of the solution.



# Things are happening



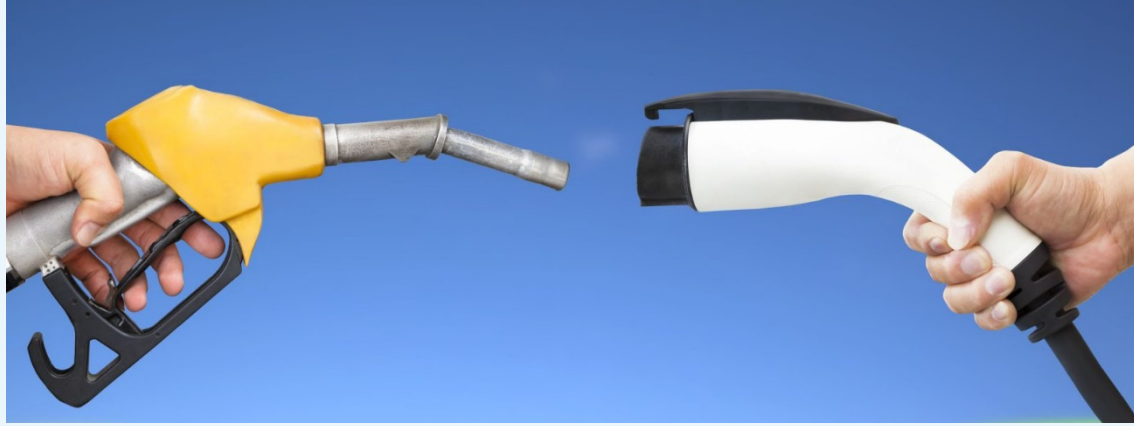
Electric car ferries



Shore Power facilities

Still to slow!

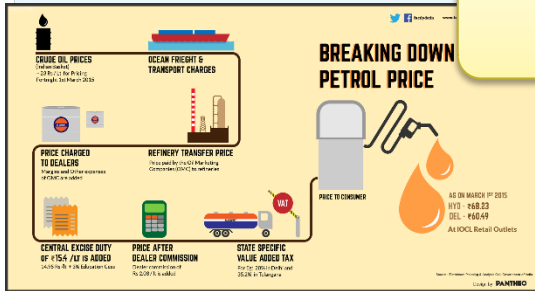
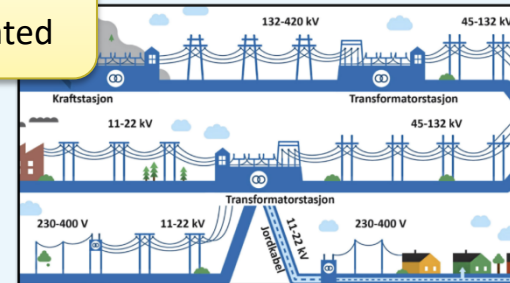
# It's a competition!



OK

I have energy needs!

It's complicated

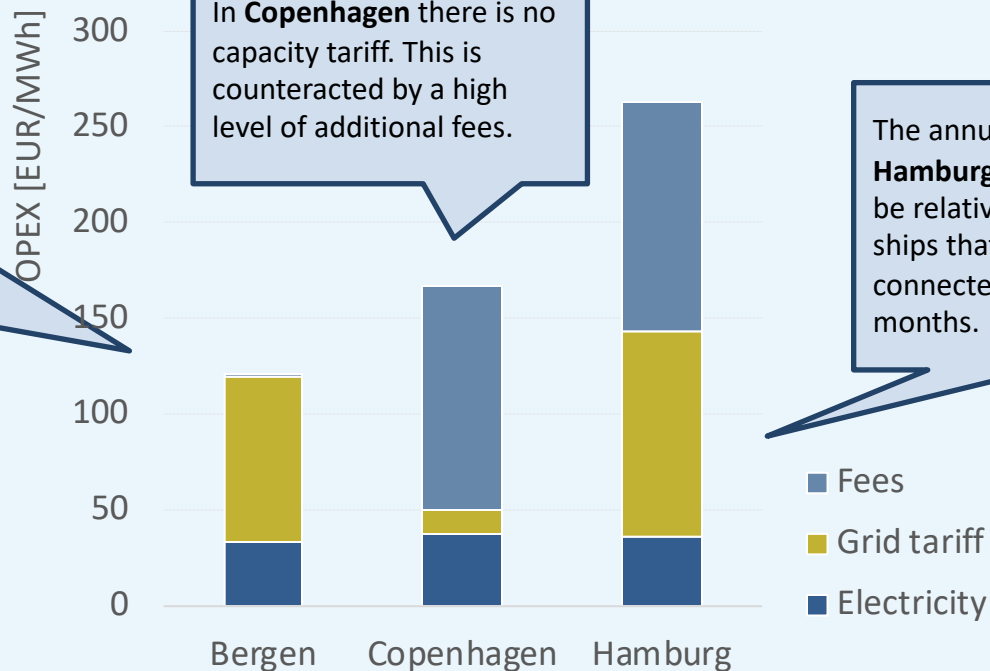


# You can always get fossile fuels. You may/may not get renewables because...

In **Bergen** commercial vessels pay close to zero energy levy. They pay the low rate reserved for power intensive consumers rather than the regular rate.

In **Copenhagen** there is no capacity tariff. This is counteracted by a high level of additional fees.

The annual capacity fee in **Hamburg** causes grid tariffs to be relatively high for cruise ships that are docked and connected only in the summer months.



## Example case:

10 MW peak for 5 months,  
Total consumption 3 GWh,  
Only daytime connection 9 am-4 pm



pluc



**We want happy customers!** And a level playing field with fossils...

Combining forces with the local harbour  
Taking care of everything shoreside



## Municipality of Bergen



# Different Harbours – Different ships – Different needs



	Supply (OSV)	Coastal express	Cruise	Ferries
Calls per year	800 +	365	340+	4-15 000
Simultaneous	up to 14	1	3 / 4	1
Lenght of stay	Hours - weeks	5-9 hours	6 hours - 3 days	4-15 minutes
Frequency	60 Hz (50 Hz)	50 Hz	60 Hz (50 Hz)	50 Hz (DC/Induction)
Power need	200-600 kW	800-1200 kW + charging	2000-12000 kW (+ chg.)	500-9000 kW charging
Voltage	400 V / 440 V / 690 V	690V (660 V)	11 kV (6,6 kV)	Low / High
Plug	IEC 80005-3	NG3 Plug	IEC 80005-1	All kinds



# Europe's largest Shore Power facility for Cruise

- Opens in May 2020
- 3 cruise ships simultaneously
- 3 x 16.000 kVA
- Max 32.000 kVA at the same time
- And there's more...







- The fourth quay
- Uses the same converters
- 2,6 km sea cable
- Opens in June 2020...

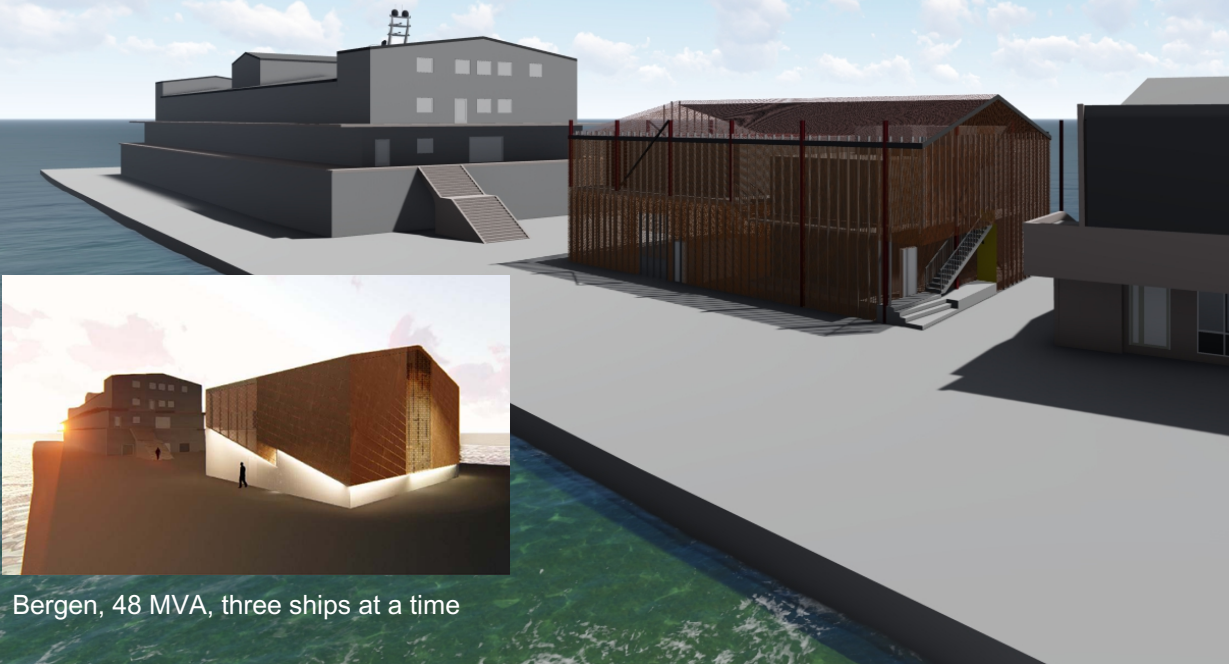
Image Landsat / Copernicus

Google Earth



# Converters 50/60 Hz

The big cost, and footprint, of shorepower



Bergen, 48 MVA, three ships at a time



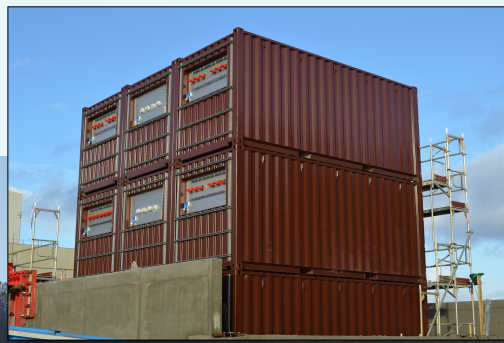
Hamburg Altona, 12 MVA, one ship at a time



Kristiansand, 16 MVA, one ship at a time



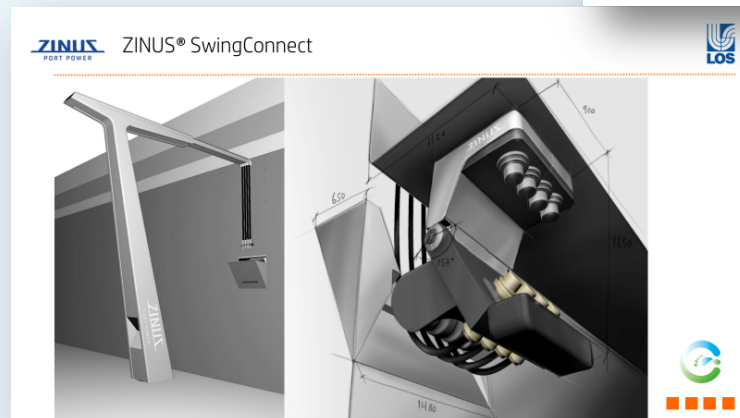
One week ago.



Converters



# Cable Management Systems.



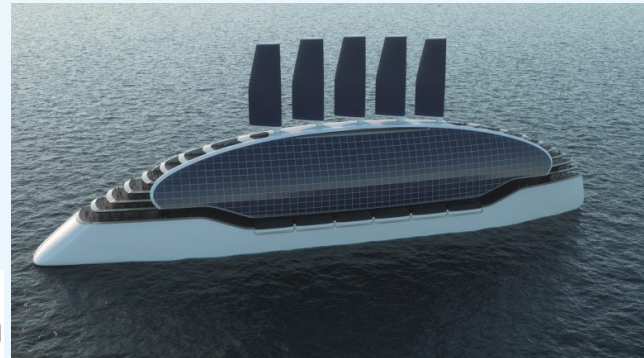


# The industry is gearing up!

To reach the goals set by the Nordic countries,  
clean shipping has to be a big industry.

Who will act on it?

In time?



*Cruise concepts from:*



Norwegian Centres of Expertise

**NCE Maritime CleanTech**



# Any ideas? Questions?

Thor André Berg

[thor-andre.berg@plugport.no](mailto:thor-andre.berg@plugport.no)

+47 950 82 255

[www.plugport.no](http://www.plugport.no)

