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# NSC mapping of alternative fuels

*in public transport and other transport services*



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## Strategies, objectives and measures

- All regions have policy goals and objectives about getting to zero emission public transport in between 2023 and 2035:
  - Rogaland County Council aims for it 2022 for the Stavanger region;
  - Central Denmark Region aims at 50% renewables in 2025;
  - Northern Netherlands in 2030 for the buses and 2035 for the trains.
- Furthermore some regions also have goals in number of vehicles overall to be zero emission (like Nord Pas de Calais) and overall transport goals to be zero emission (Aberdeen City Council for 2050, Northern Netherlands for 2035)
- We can already see that these objectives do help, also for private parties so they know where the focus is. Maybe a North Sea Region common goal (or goals) is a good idea?



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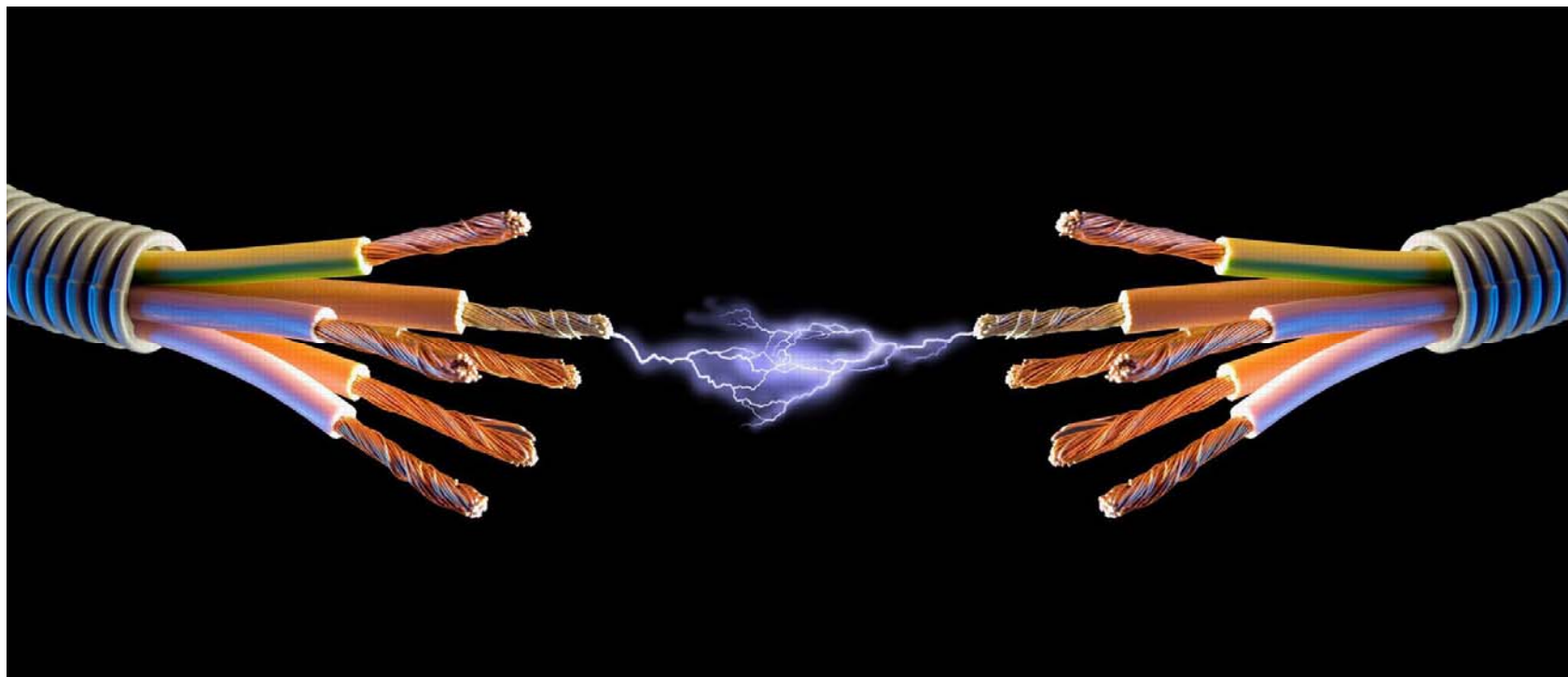
## Biofuels

- How to get to zero emissions?
- Biofuels as a first step and for longer distances
- Västra Götaland for instance already has 72% of their buses on biofuels (HVO and biogas)
- Vestfold also has 70% of their buses on biofuels
- And several other regions have at least a part of their total bus fleet running on biofuels



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The future is electric





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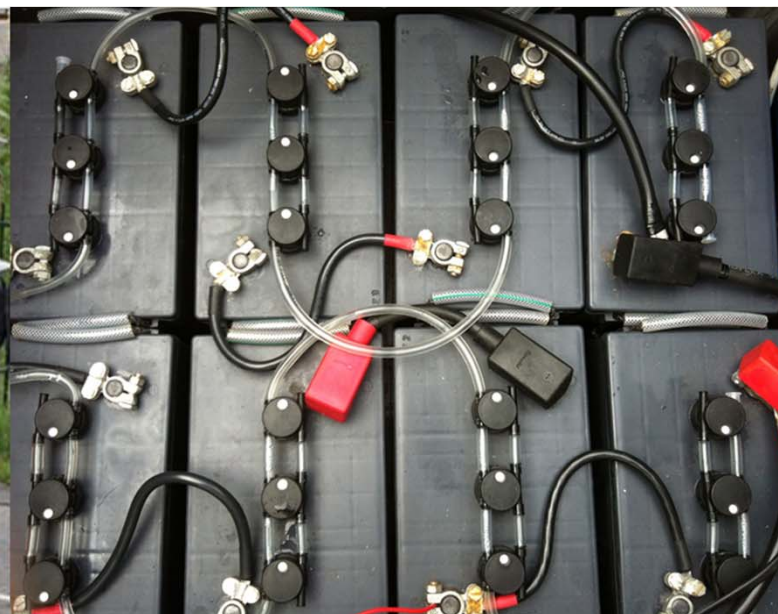
## Electricity

- For the cities and shorter distances in the regions outside of the city the battery definitely seems to be the way to go to zero emission in our public transport
  
- Almost every region has already part of their busfleet on batteries:
  - Groningen and Drenthe will have 155 battery electric buses starting by the end of this year (50% of the total busfleet);
  - Hordaland County Council already has 80 electric buses and 100 will be running in 2020;
  
- And there is other public transport as well:
  - Several regions have electric lightrail systems;
  - More and Romsdal County has plans to electrify 20 ferry connections and in Kristiansand (Vest-Agder) a shore power facility for cruise ships is already open since september 2018.



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## Batteries or people?





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# Hydrogen

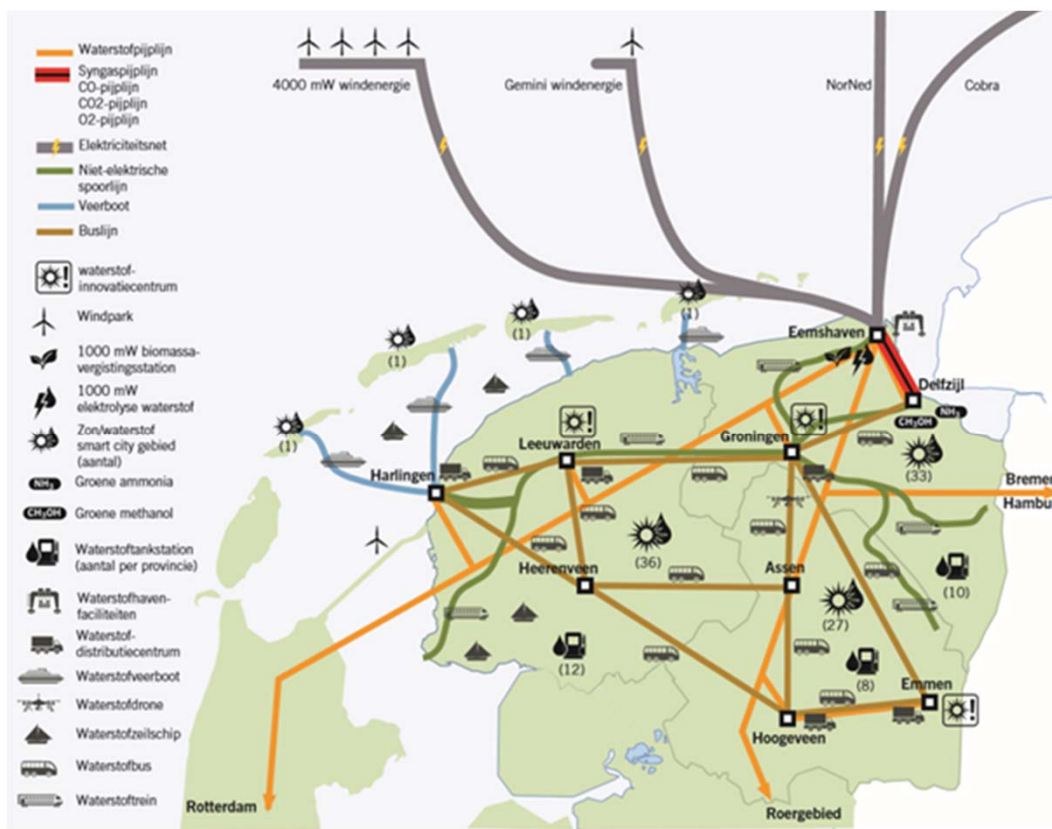
- Longer distances/bigger range
  - For larger vehicles/ships, etc.
  - Make energy available when you need it
  - Less efficient
  - More expensive
- 
- Aberdeen City, Groningen and Drenthe (buses)
  - Orkney (first ferry)
  - Germany (trains)





# Hydrogen economy

Regions like Aberdeen, in Norway, Lower Saxony and Northern Netherlands



Het waterstofplan in Noord-Nederland.





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## LNG

- LNG is mainly used for ferries
- Hordaland, Central Denmark Region, Schleswig-Holstein and More and Romsdal County all have a couple of them
- Hordaland also has 100 buses on LNG



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## Charging and fueling stations

- Almost every region has a big and growing number of public charging stations for cars and public transport
- Sweden, Groningen, Germany, Nord Pas de Calais, Aberdeen City and Hordaland have at least one hydrogen fueling station
- Västra Götaland its public transport system has its own dedicated infrastructure for HVO and biogas, Vestfold and the South Denmark region have HVO and biogas stations as well



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## Autonomous Transport

- Can be a possible solution for instance for public transport in rural areas as a replacement of small buses and it is fully electric
- Rogaland and Northern Netherlands have autonomous shuttles on the road
- Vestfold opened the first sea-based testing ground for autonomous maritime transport
- Groningen recently did a first test with a partly autonomous passenger train
- Several regions are testing with drones



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Questions?