

Mistä energiaa liikenteeseen?

Autoliiton 100-vuotisjuhlaseminaari

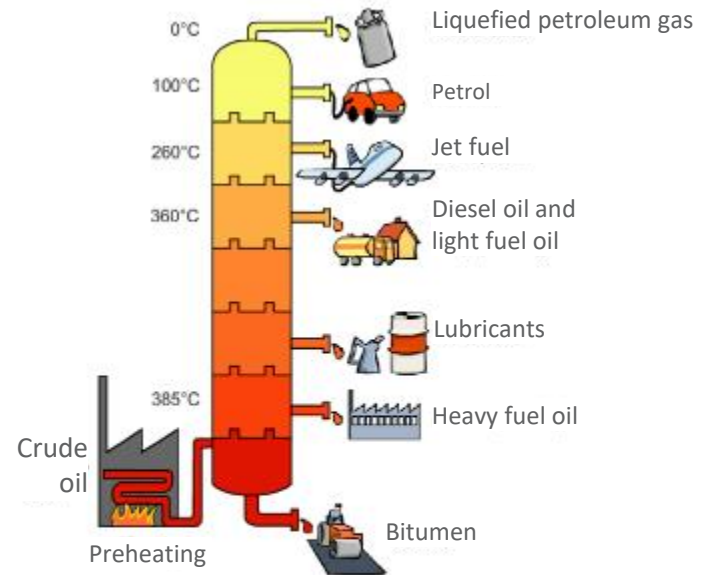
19.11.2019

Mika Anttonen, St1 Nordic Oy

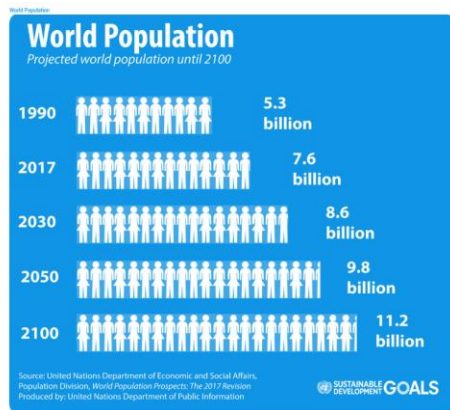
The challenge – oil refining products

Crude oil refining produces always the same oil products:

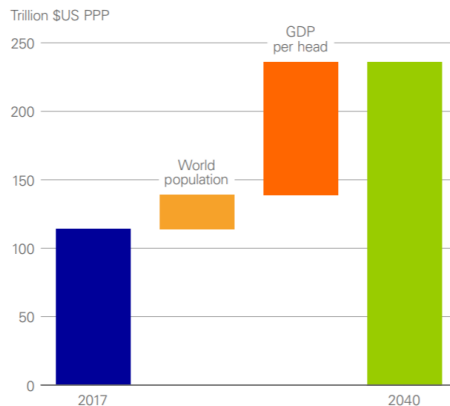
- light distillates, middle distillates, heavy distillates and residuum
 - i.e. if you produce Jet fuel, the process produces the other products as well



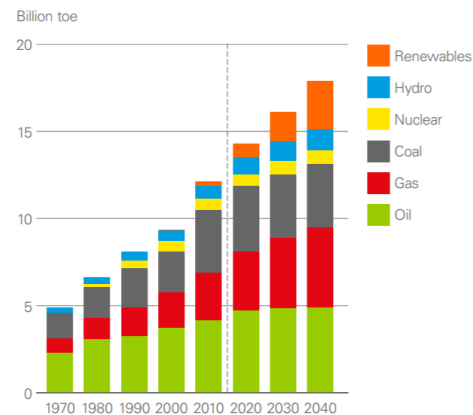
The Global Energy Challenge



Increase in global GDP, 2017-2040



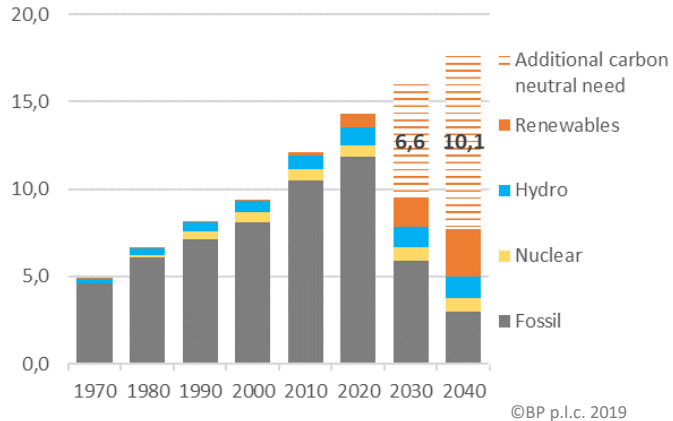
Primary energy consumption by fuel



- 1) UN News [World Population Prospects: The 2017 Revision](#)
 2,3) BP Energy Outlook – 2019 edition <https://www.bp.com/en/global/corporate/energy-economics/energy-outlook.html>

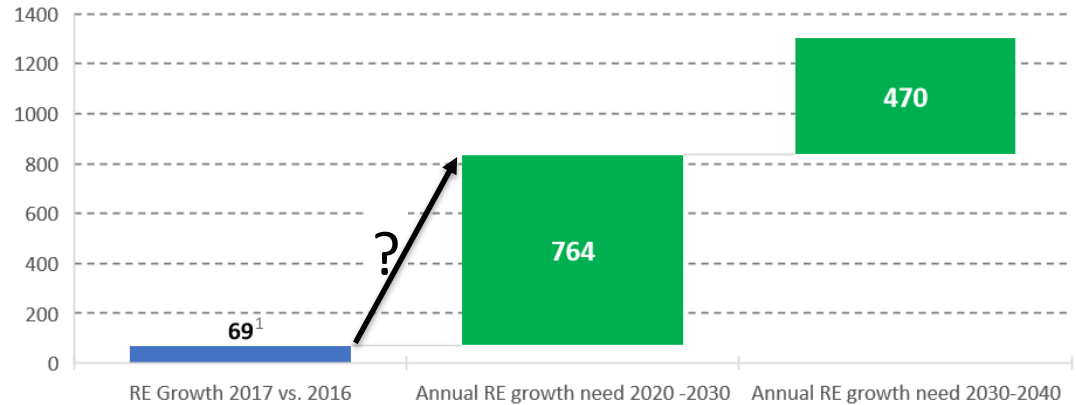
Growth in Renewable Energy needs to be >10 times higher than today

Carbon neutral energy gap to keep under 1.5° C, through 50% reduction in fossil per decade (Bn toe)



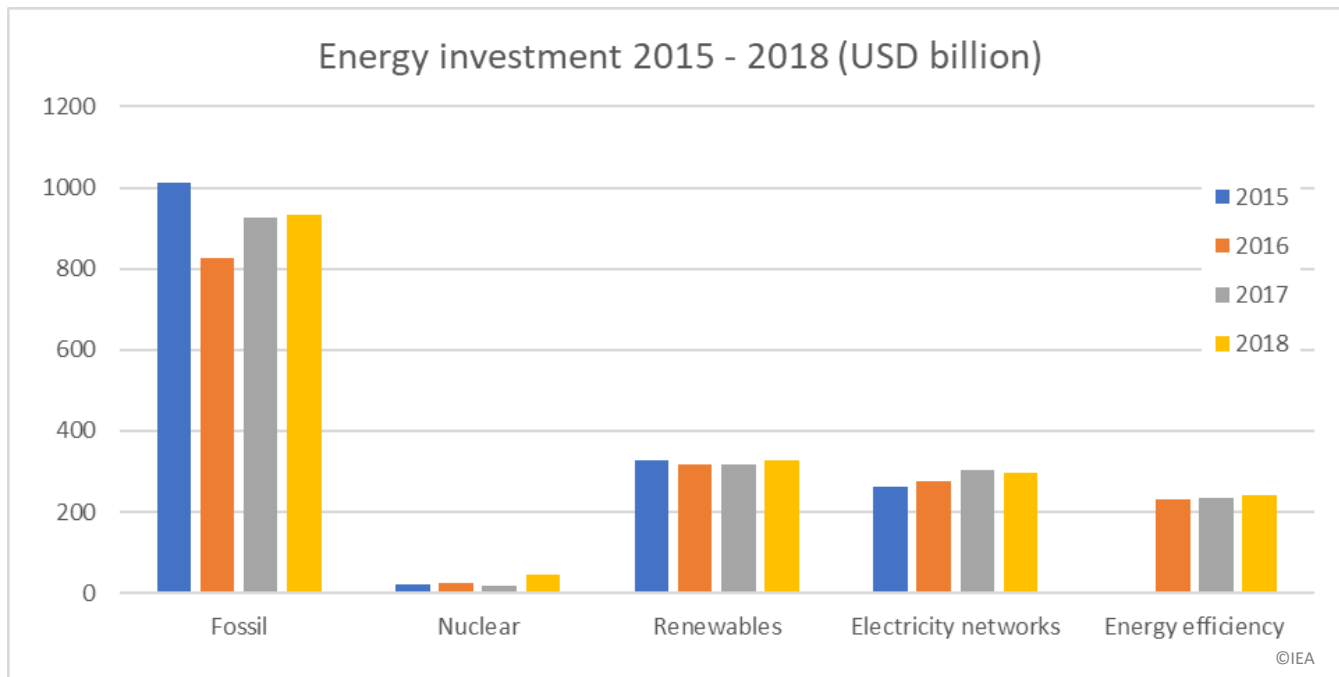
To stay within the Carbon Budget of 580 Gt the use of fossil energy needs to halved every decade

Incremental annual Renewable Energy growth needed²(Mtoe) for the next 20 years to meet 1.5°C target



The **annual** growth of RE in primary energy consumption would have to be ~760 Mtoe between 2020 and 2030. In 2017 it was only 69 Mtoe.

Global Renewable Energy investment gap. . .



IEA World Energy Investment 2019 <https://www.iea.org/wei2019/data/>

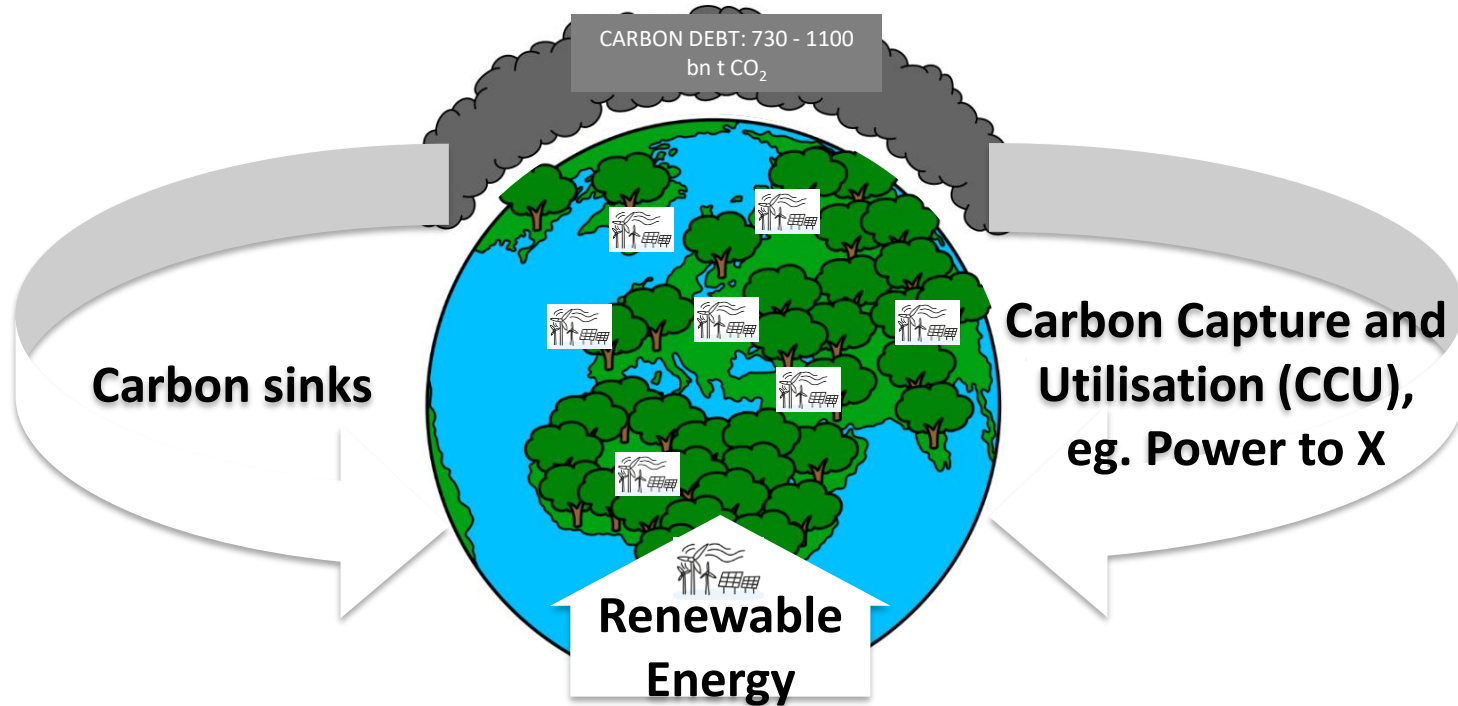
IEA World Energy Investment 2018 <https://webstore.iea.org/download/direct/1242?fileName=WEl2018.pdf>

IEA World Energy Investment 2017 <https://webstore.iea.org/download/direct/225?fileName=WEl2017.pdf>

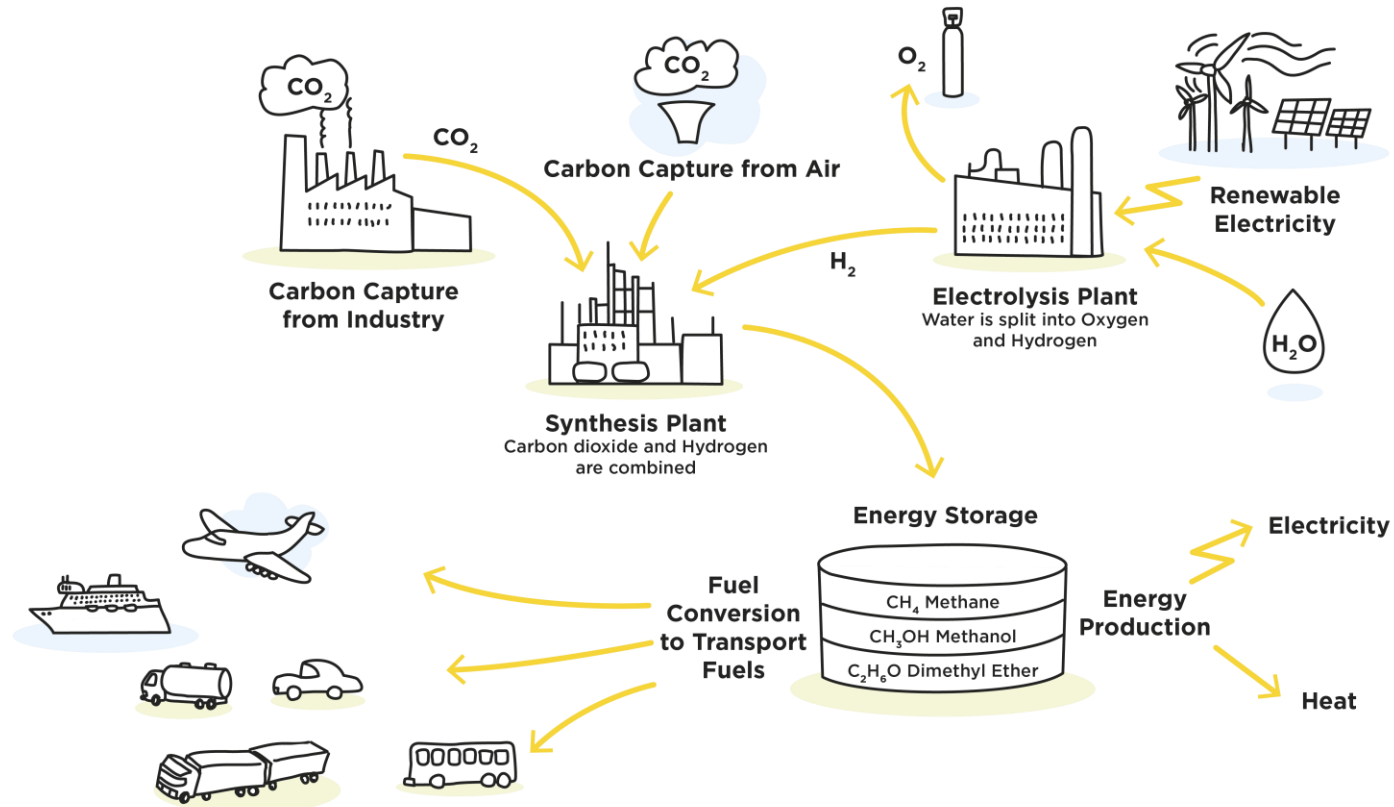
IEA World Energy Investment 2016 <https://webstore.iea.org/download/direct/235?fileName=WEl2016.pdf>



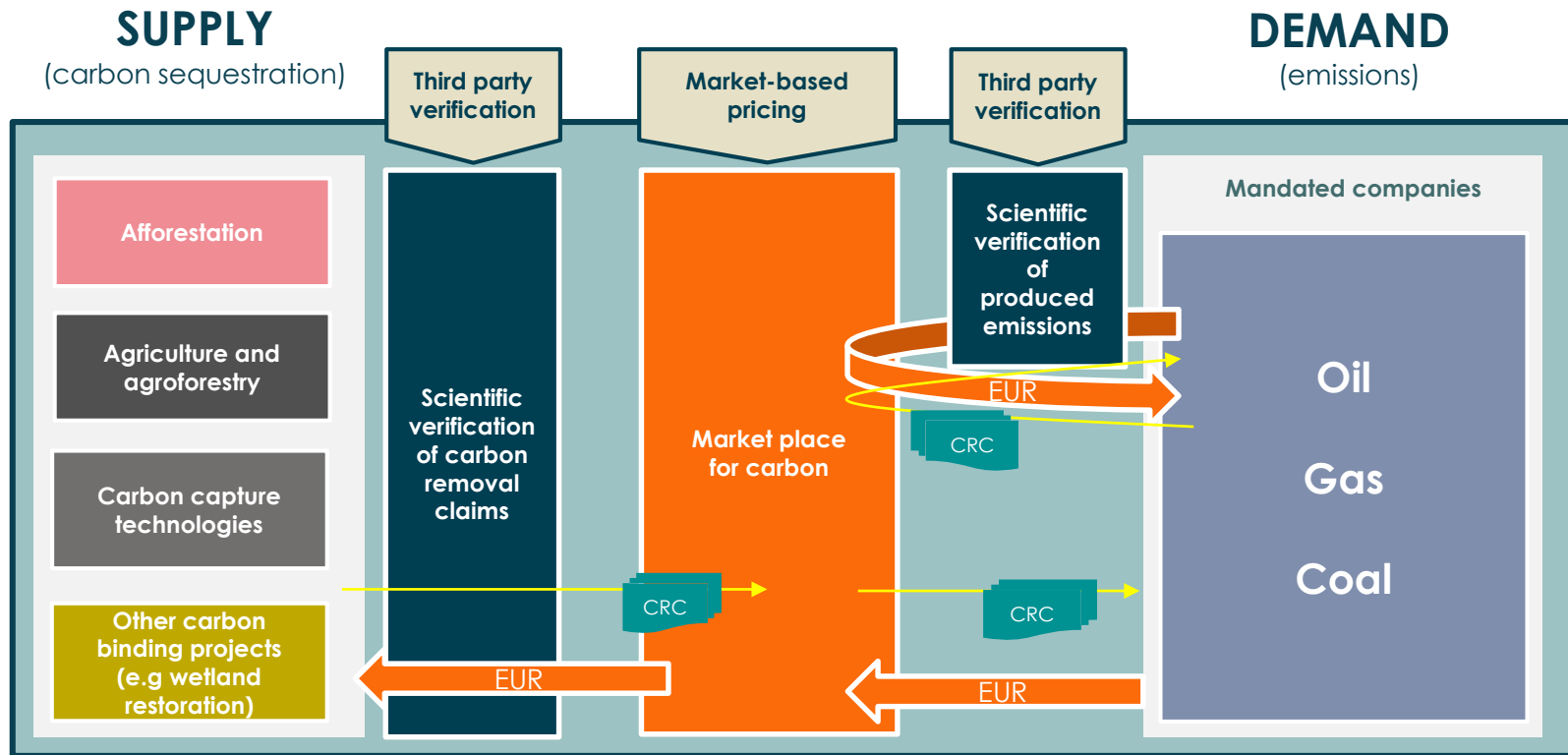
Sustainable Carbon Cycle requires massive investments in...



Production of Synthetic Fuels



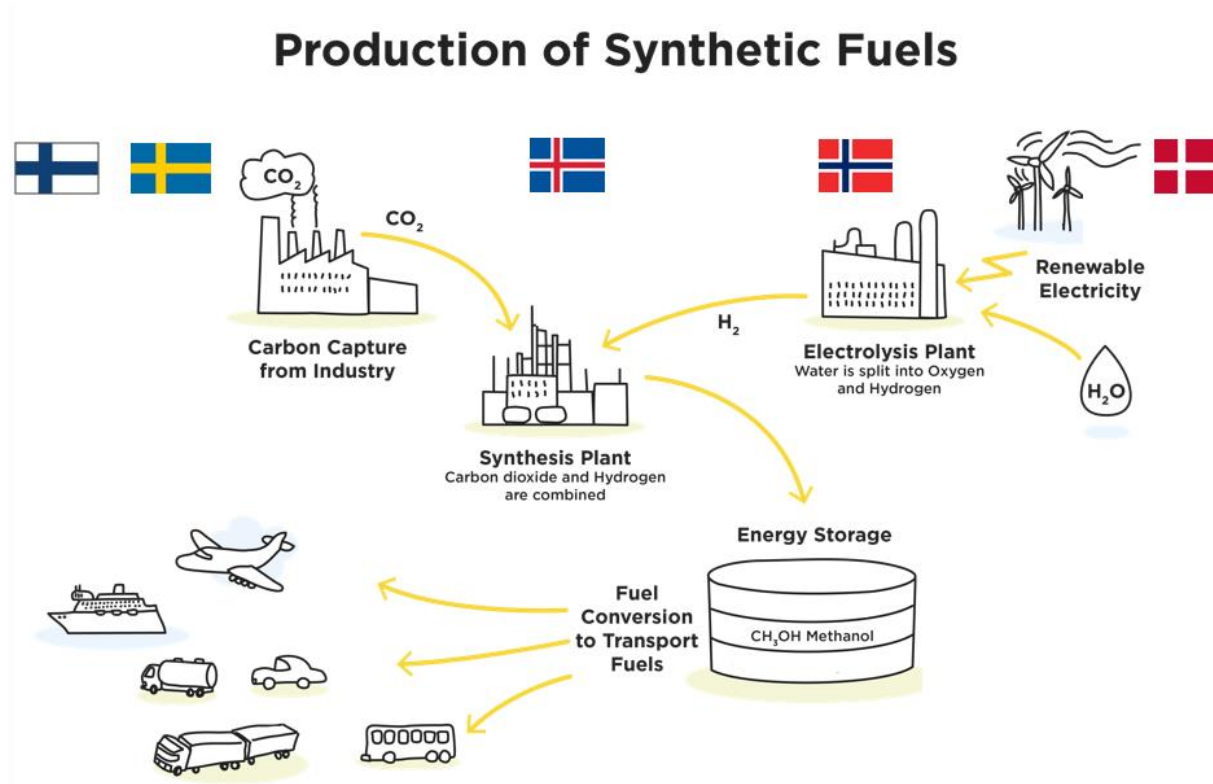
Carbon Market



CRC (Carbon Removal Credit) traceability ensures the authenticity and traceability of carbon credits



An example how available technologies could be deployed and combined across the Nordic countries



Summary

- Significant increase of investments to Renewable Energy, Carbon Sinks and CCU is paramount
- Set CO₂ emission reduction obligations to companies, and allow them across the sectors (including carbon sinks) and also in the countries outside of EU
- Create a Carbon Market for sequestered and emitted CO₂, where the emitting companies will pay and carbon sequestering companies will get an income to finance for carbon removing investments, eg. Afforestation and Carbon Capture and Utilisation
- The Nordic countries are well-positioned for combining available technologies for developing scalable solutions for the rest of the world