

Can the Nordic countries live up
to the Paris Agreement?

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Nordic Energy Research
Nordic Council of Min



Nordic Energy Research



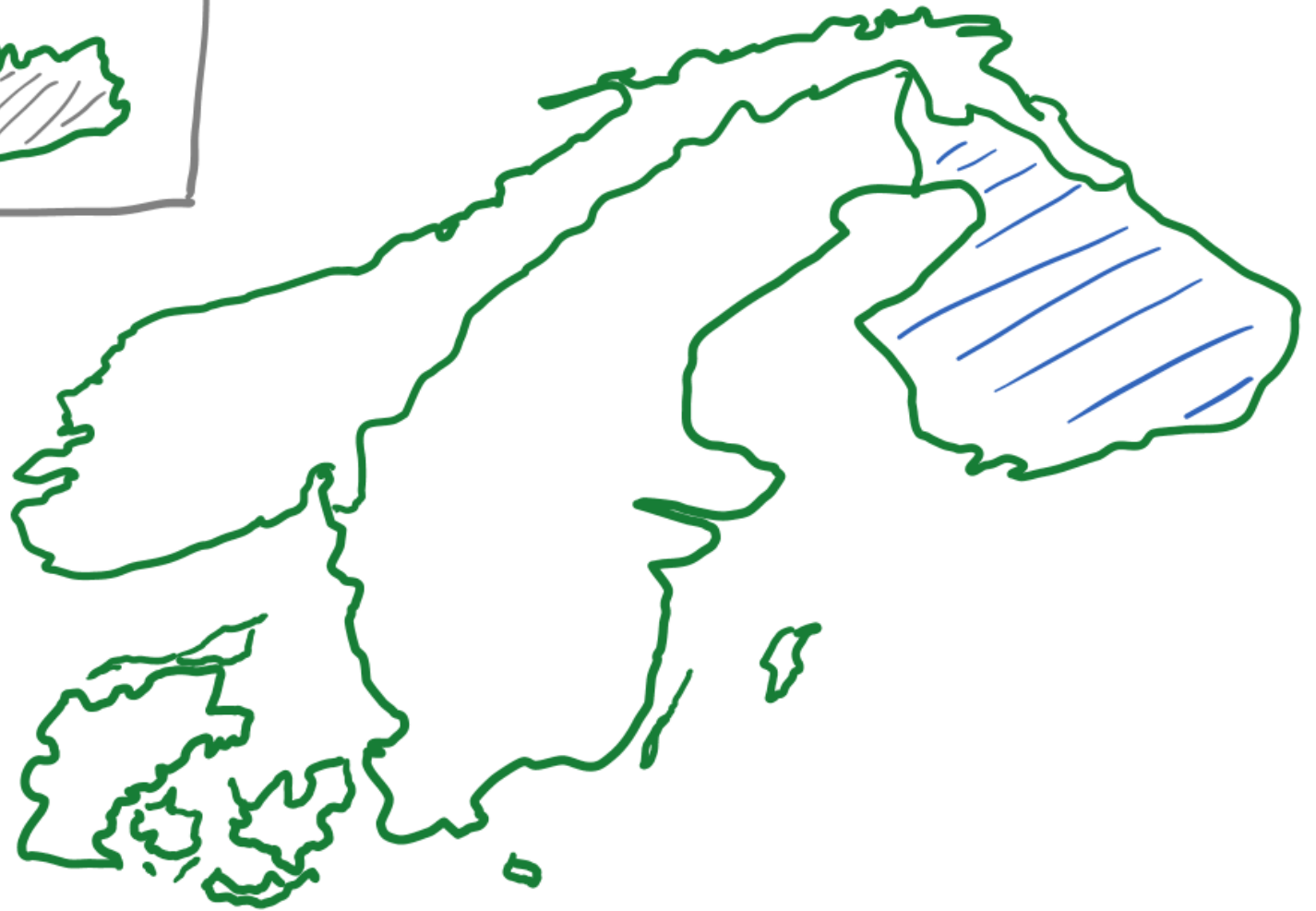
Negative CO₂



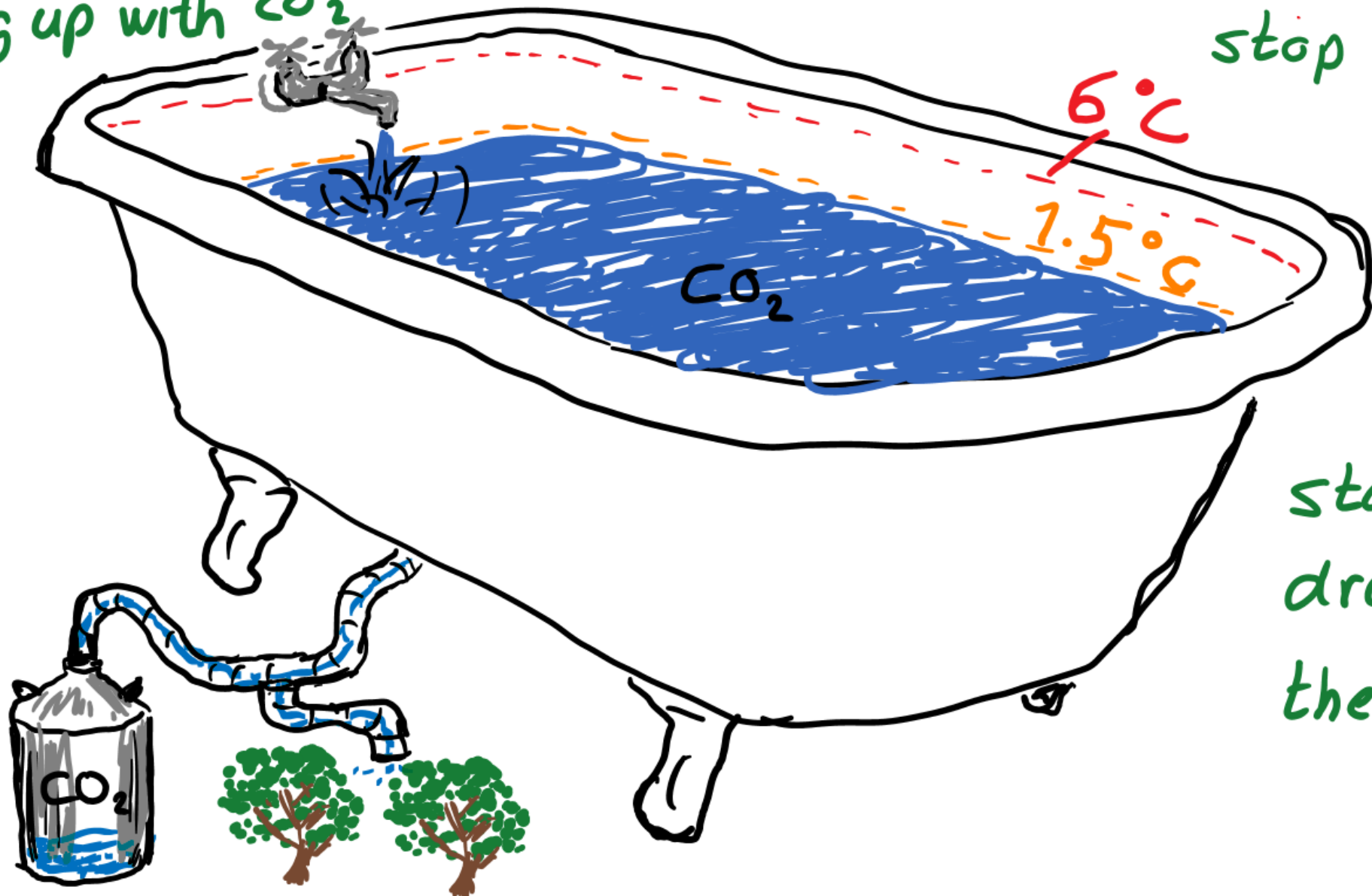
Project Shift



Flex4RES

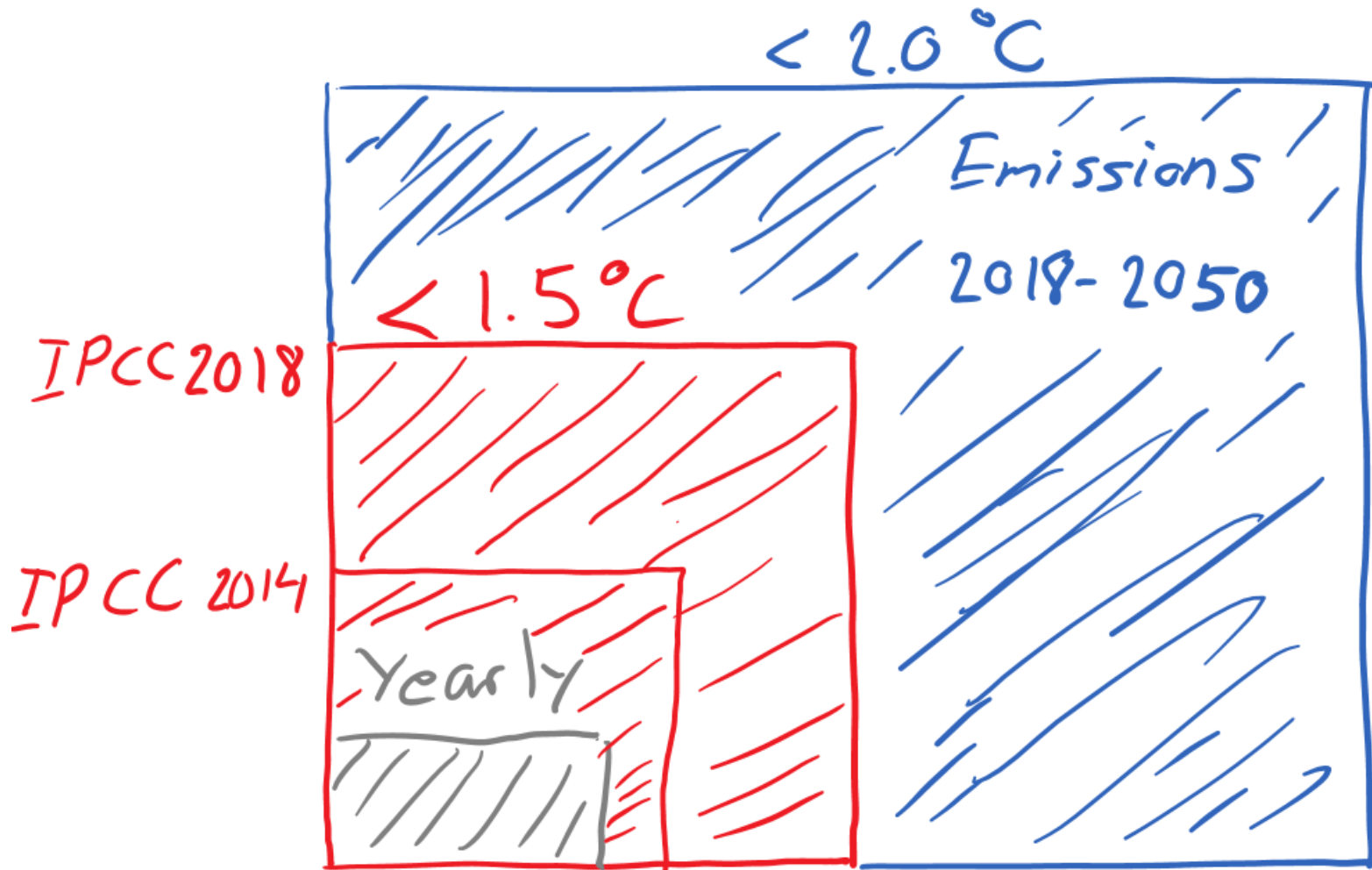


Our atmosphere is like a bathtub \Rightarrow We need to stop the tap filling up with CO_2



and start draining the tub

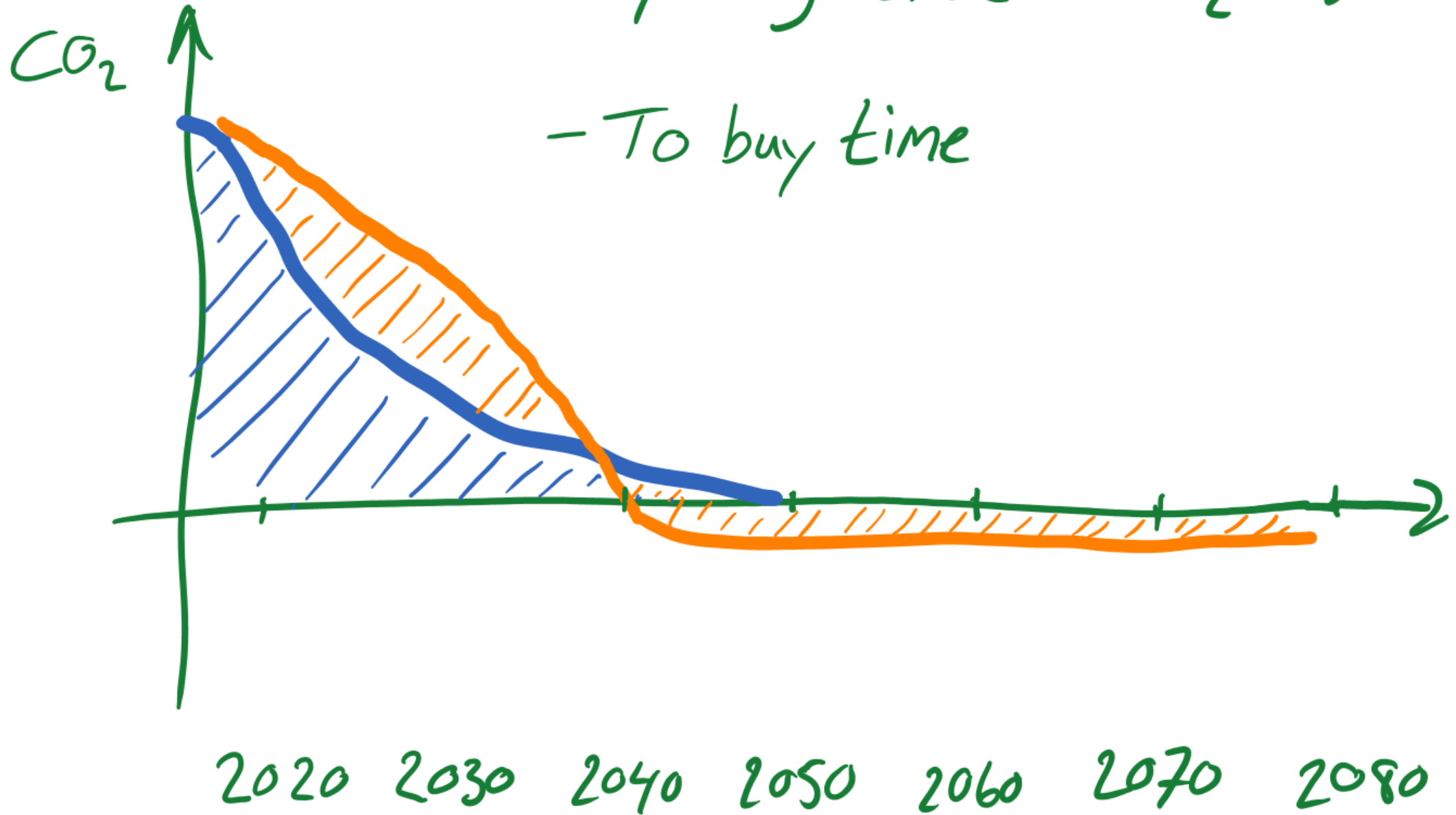
The Nordic Carbon Budget from 2018



~2-10 years
with same
emissions
as today

Why negative CO₂ ?

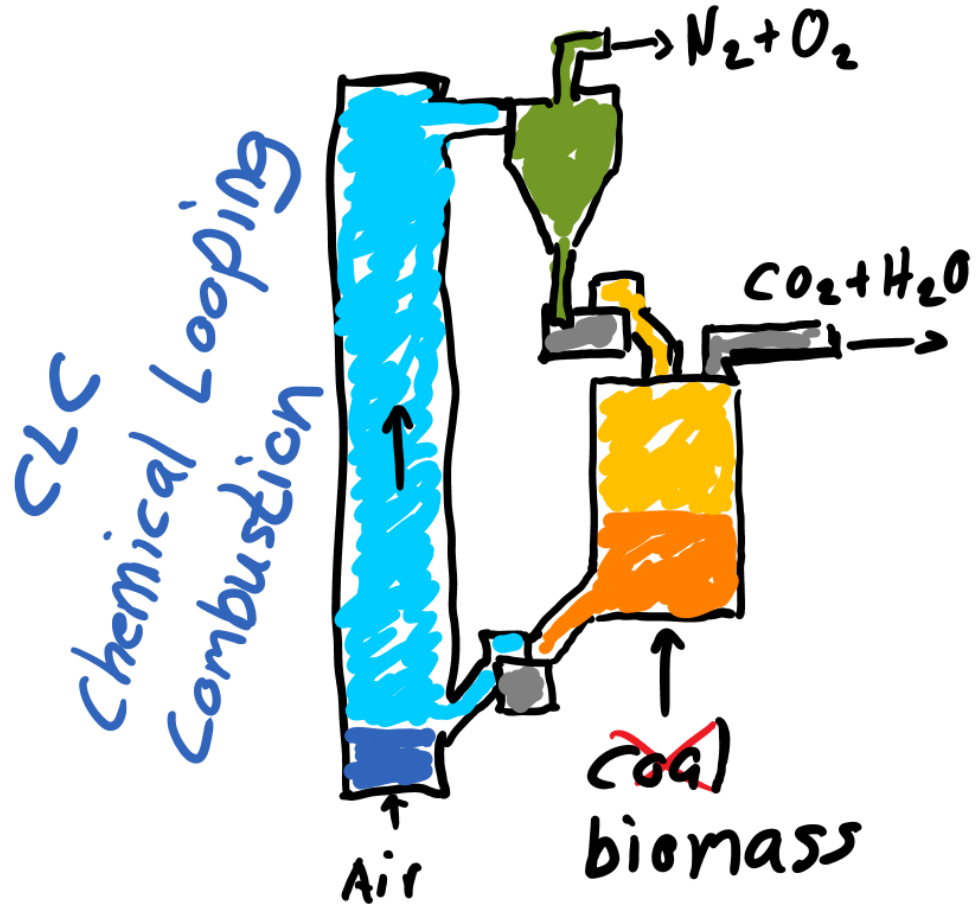
- To buy time



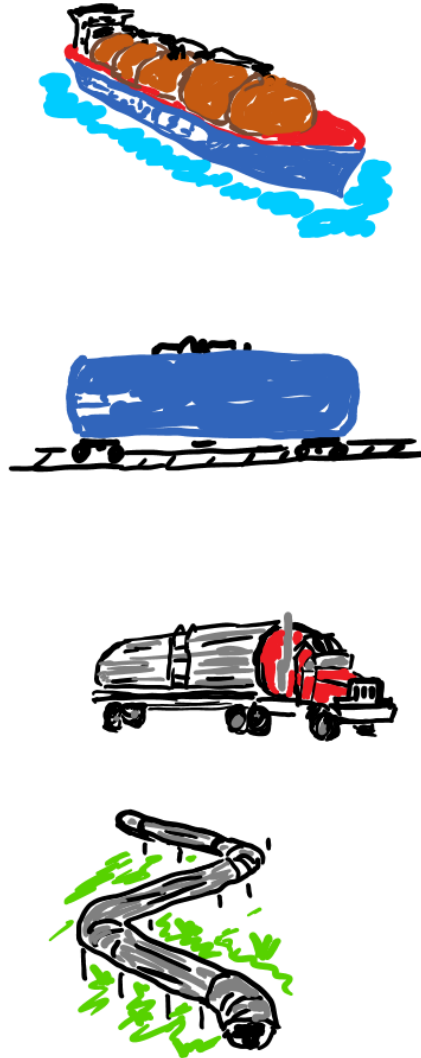
Critical Points

- Enough Sustainable Biomass ?
- Sector Coupling and Integration
- Carbon Capture and Storage
- Greening Transport
- Disruptive Technology Development

Capture



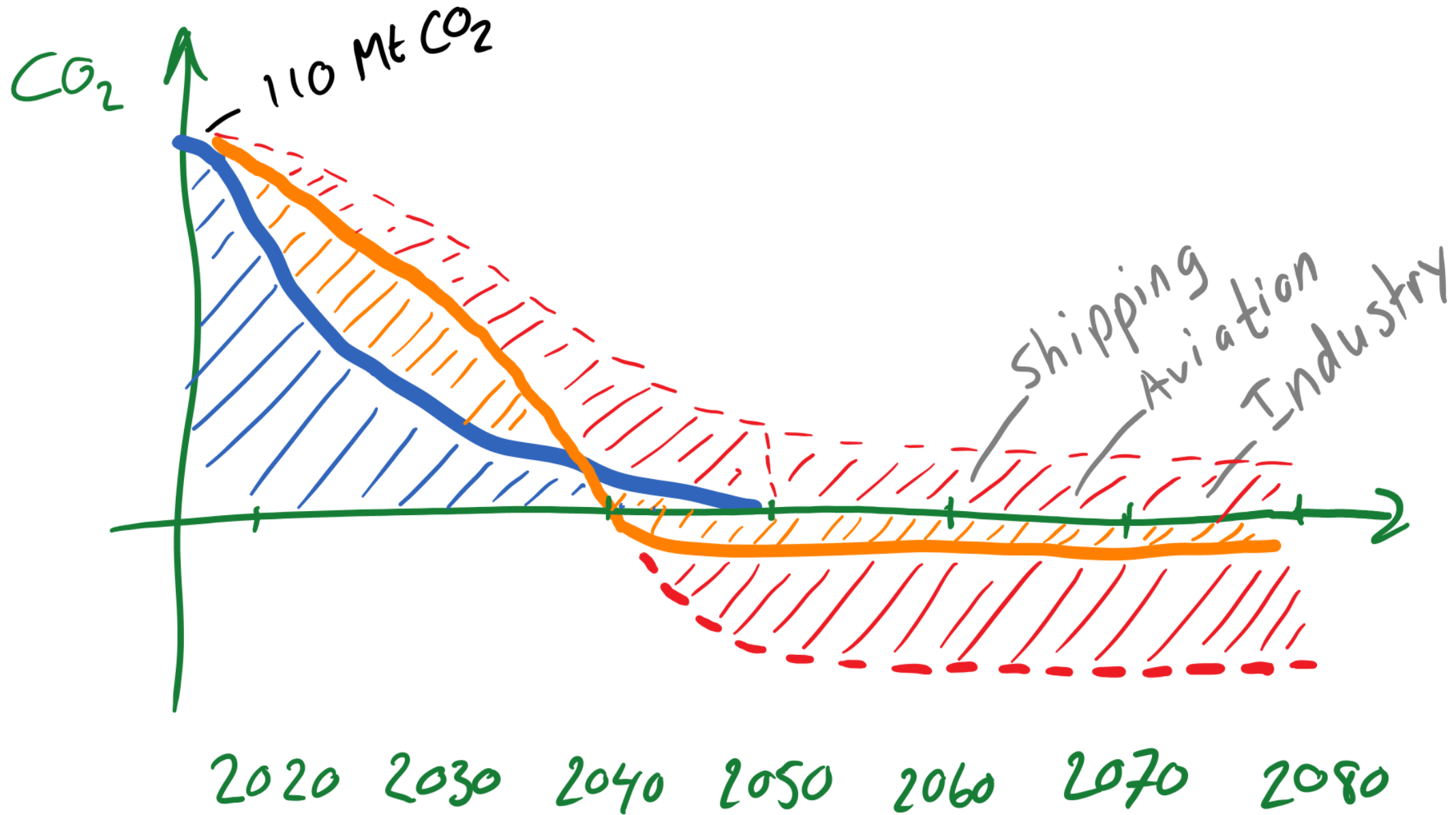
Transport



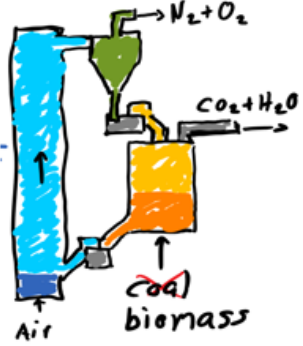
Storage



How much CO₂ should we store?



Yearly CO_2 stored
from 2040



10-18 Mt/y



Power sector

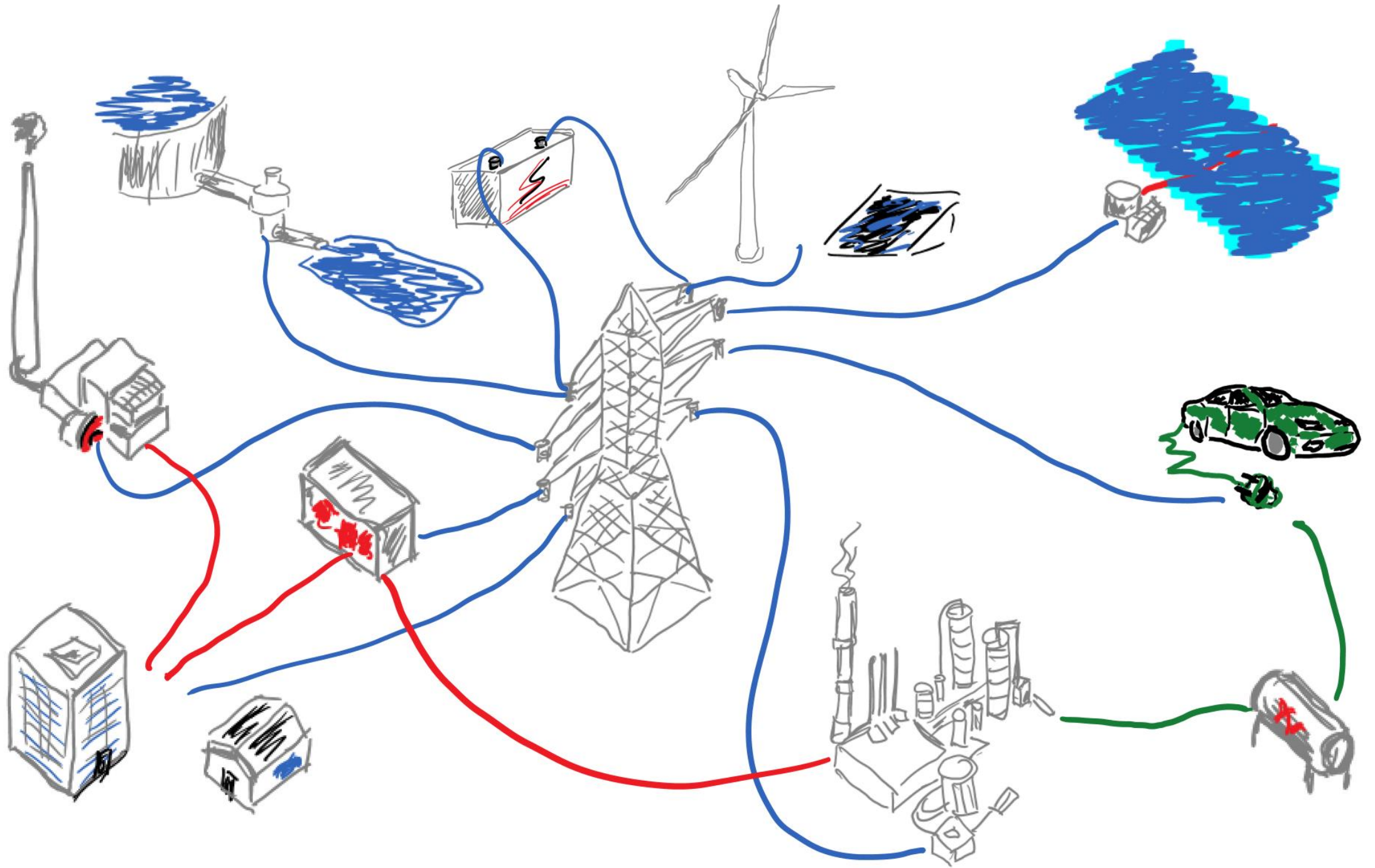
Industry

1-3.5 Mt/y



10-20 Mt/y





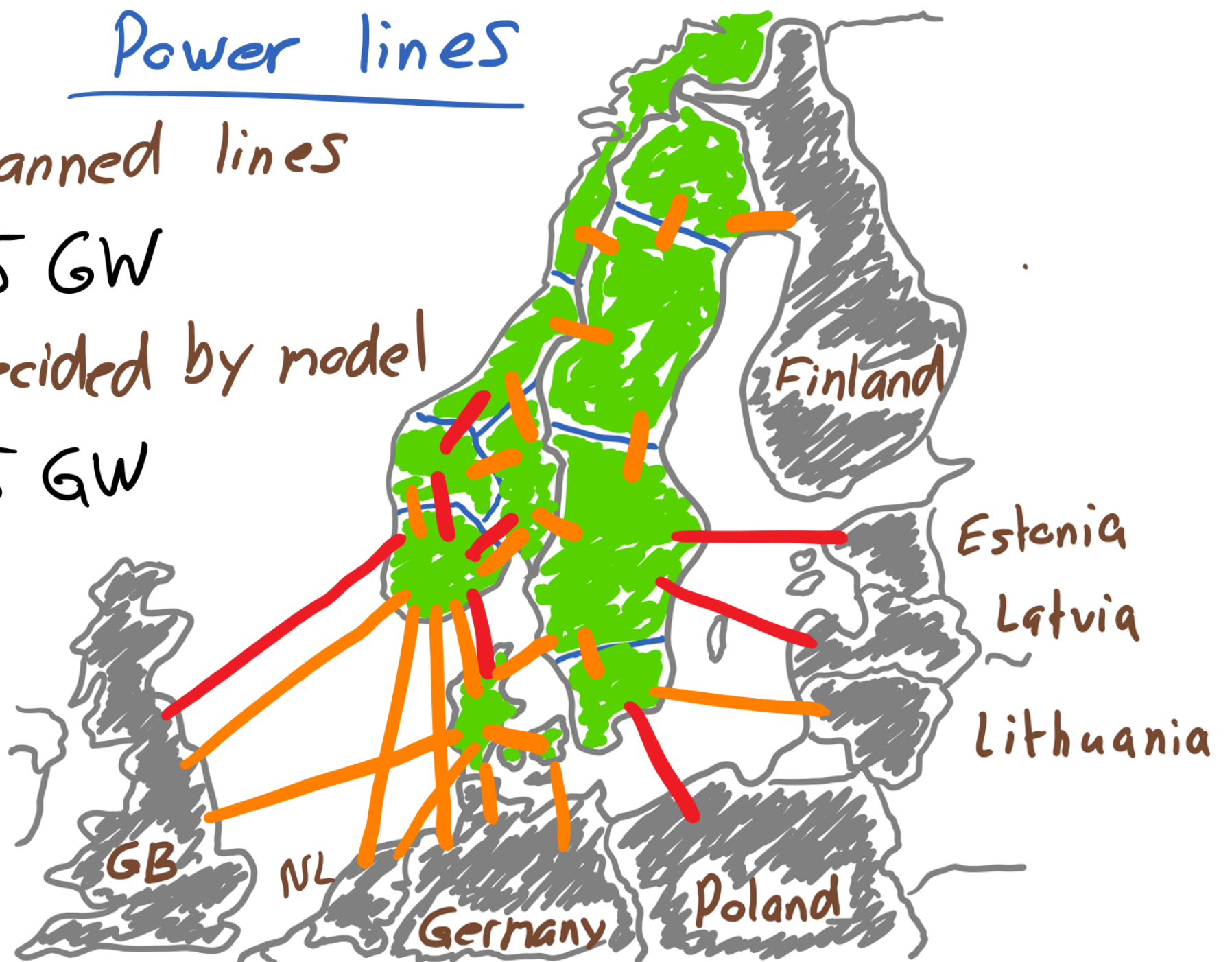
Power lines

Existing + planned lines

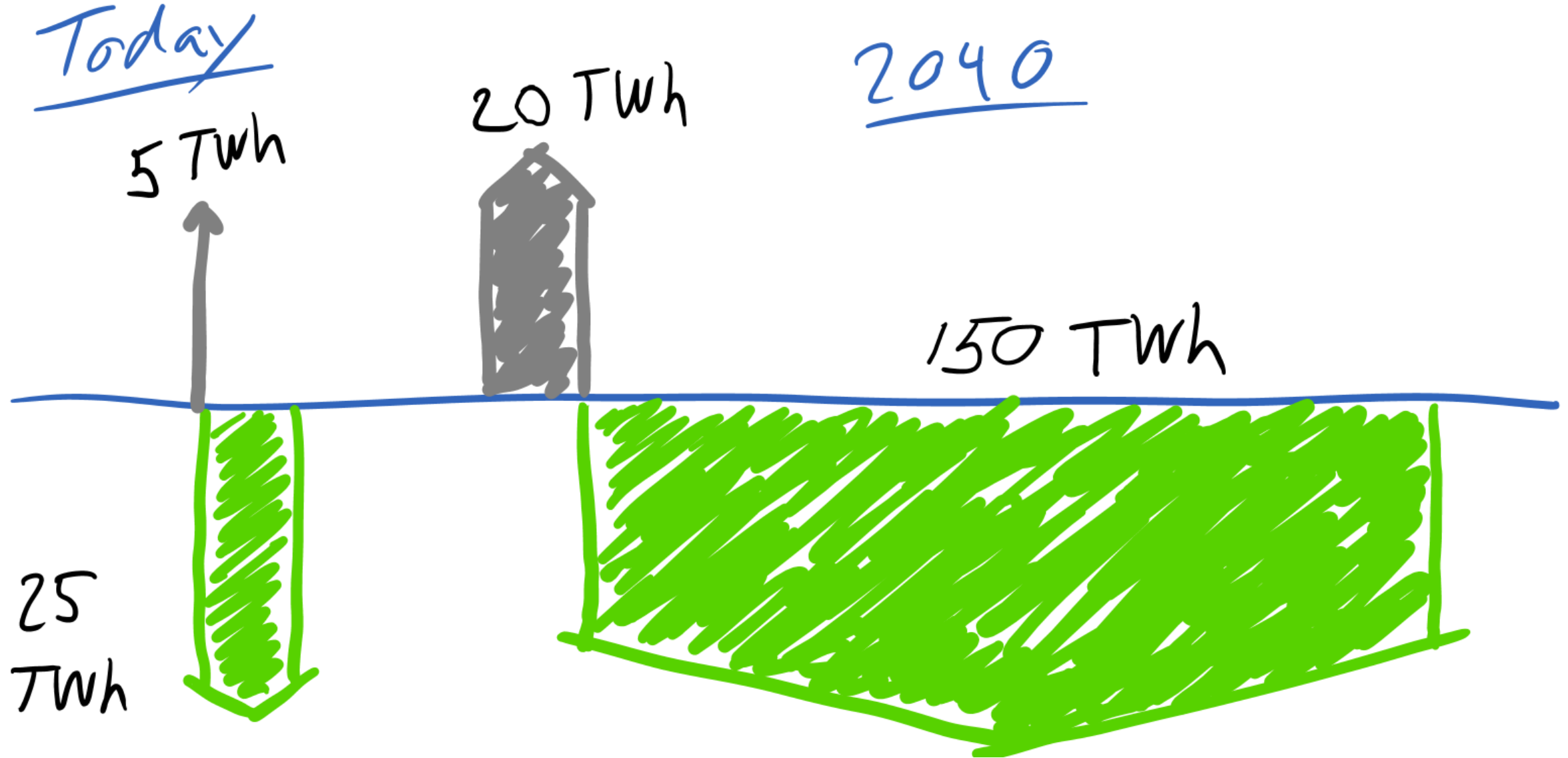
— 75 GW

New lines decided by model

— 35 GW



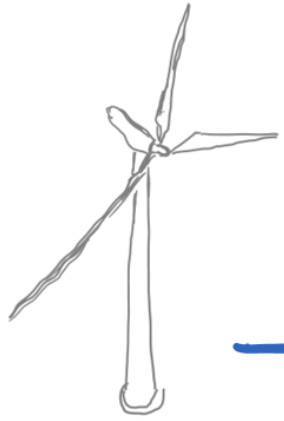
Power trade with other countries



Heat Pump

District heat Production

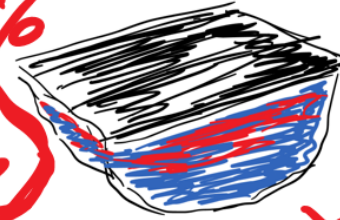
Heat Storage



150 PJ



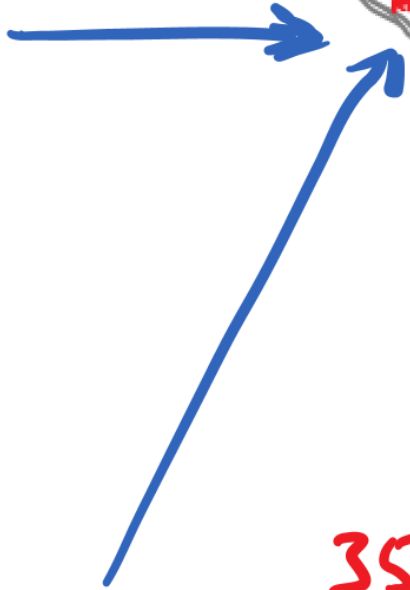
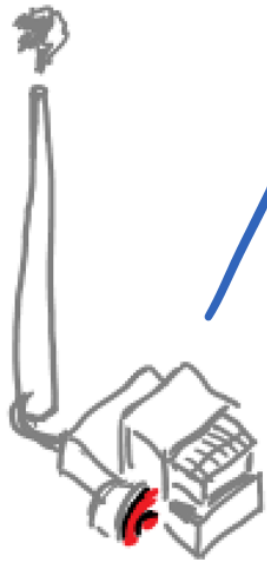
50%



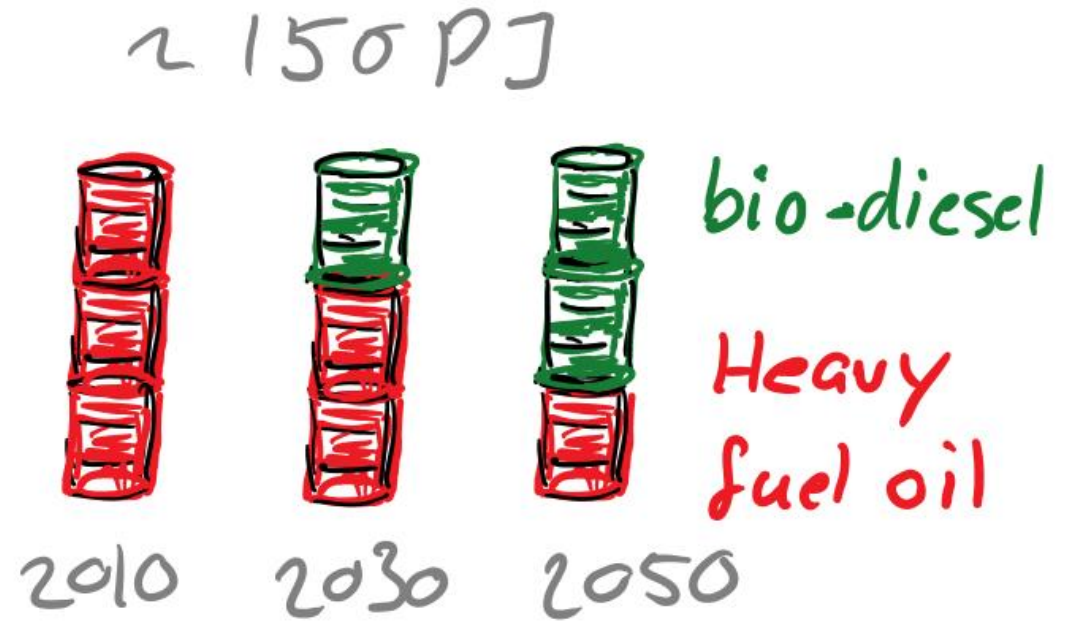
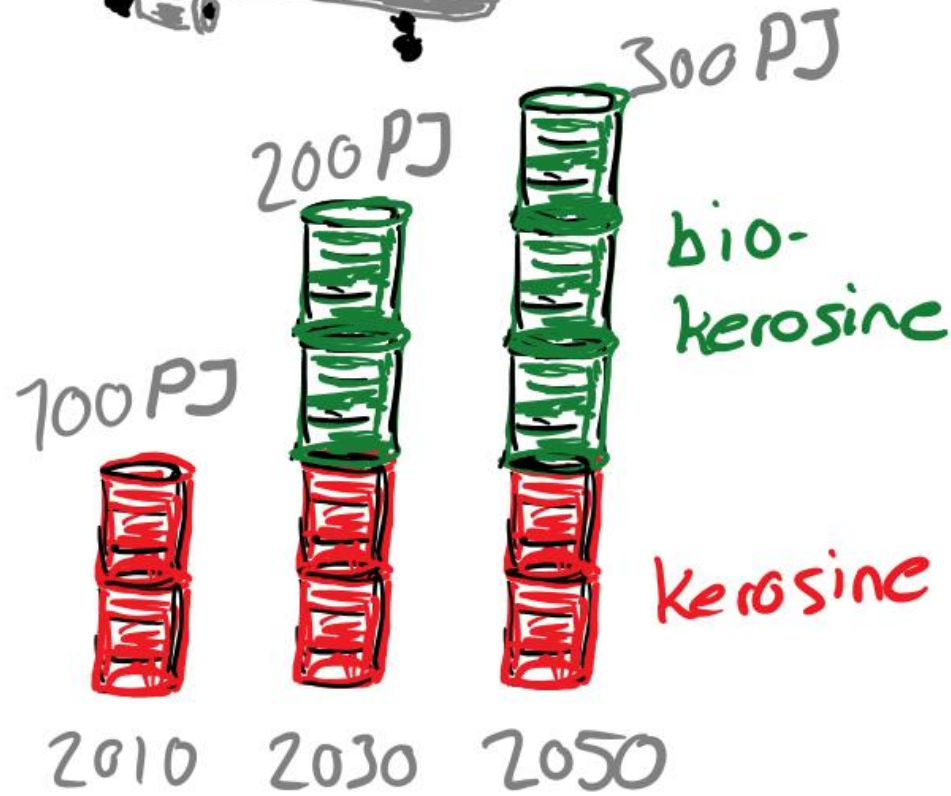
50%



350 PJ



National and international aviation + shipping



Scenarios

Demand
proj.

Fuel
prices

CO₂
tax

Carbon
budget

No biomass
and biofuel
import

Nordic NETP

NETP

NETP

X

Nordic
IPCC 2014

--"

--"

X

Nordic
IPCC 2014 Bio

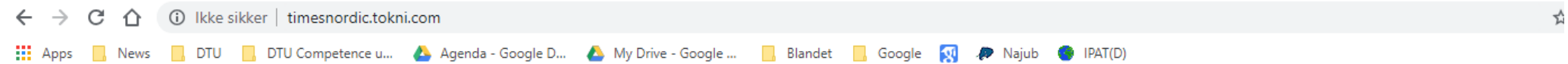
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X

X

Result homepage – timesnordic.tokni.com



TIMES-Nordic DTU

About the tool

Scenario descriptions

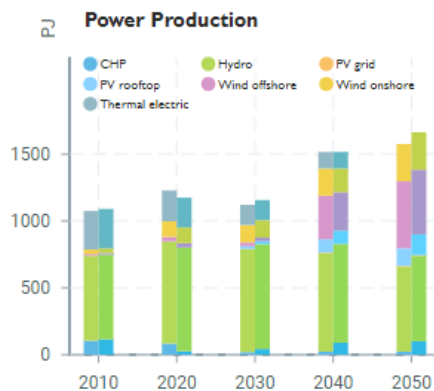
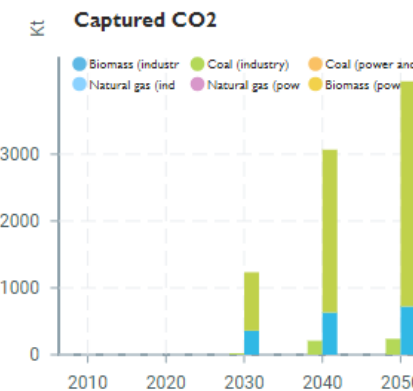
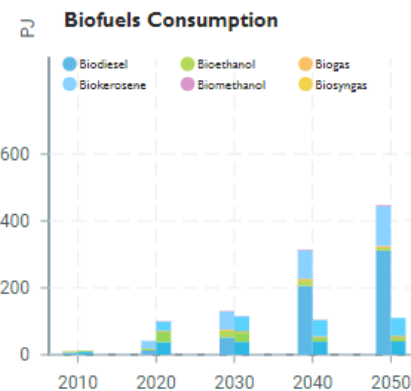
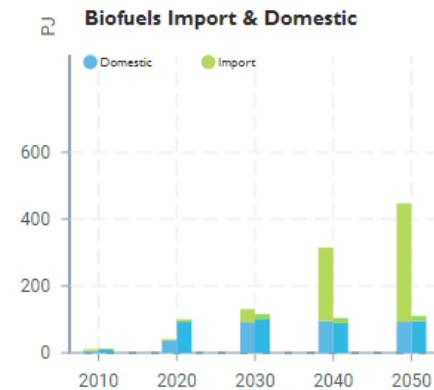
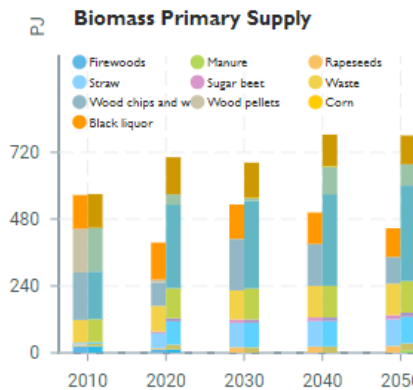
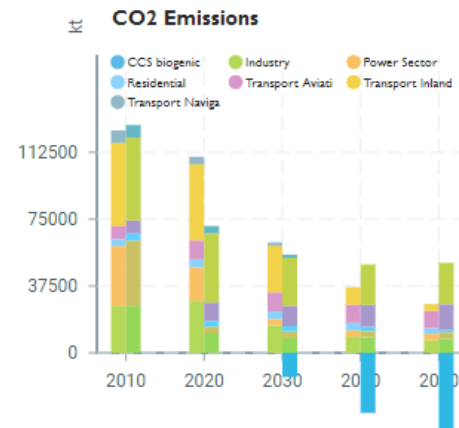
Scenarios

- Nordic NETP
- Nordic IPCC 2014
- Nordic IPCC 2014 Bio

Regions

- Denmark
- Norway
- Sweden

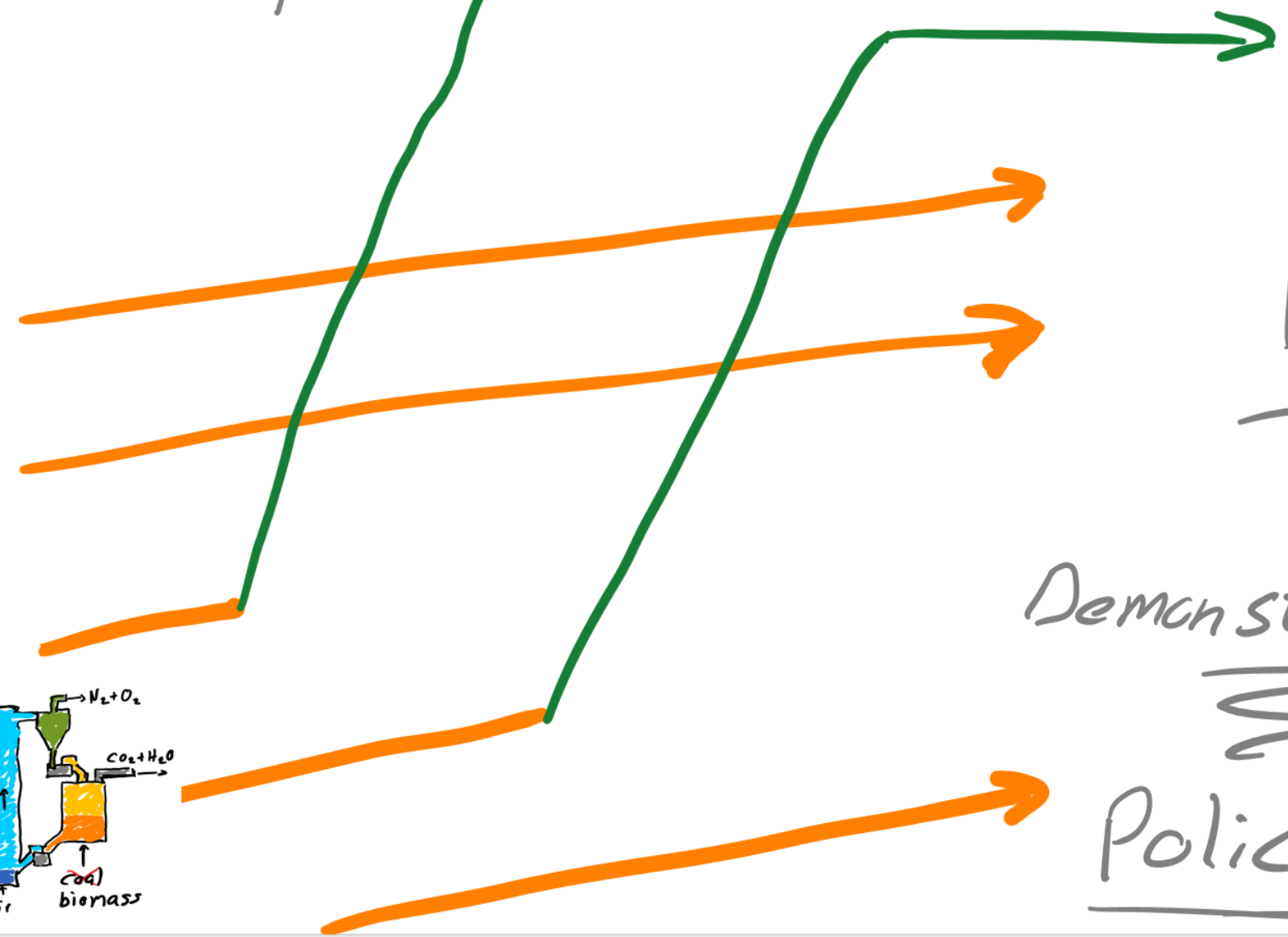
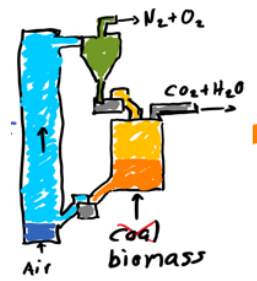
Online version from Tokni



Research needs

- Electrofuels - H_2 , Ammonia,
- Smart fuel factories
- What is sustainable biomass?
- Smart policies

We need to push technology development



R & D

Demonstration

Policies

Abraham Lincoln



"Best way to predict
the future is to
create it"

- Yes, but we need to speed up!

check results : <https://timesnordic.tokni.com>

Projects : www.nordicenergy.org/projects/

contact :

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