WHEN TRUST MATTERS

Energy Transition Outlook 2022

Hydrogen demand in a changing world

2022-11-16

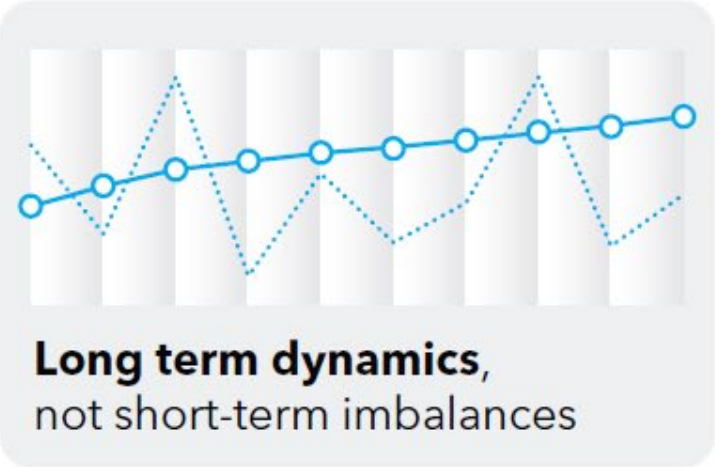
H2 Value Chain Conference

Mats Rinaldo – Researcher and Deputy Director Energy Transition Outlook

Energy Transition Outlook

Our **best estimate**,
not the future we want

A single forecast, not scenarios



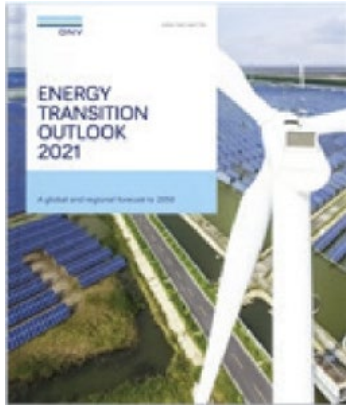
Long term dynamics,
not short-term imbalances

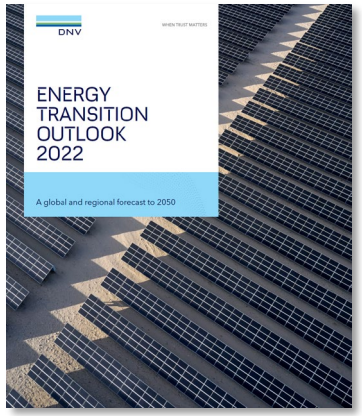
ENERGY TRANSITION
OUTLOOK 2017

ENERGY TRANSITION
OUTLOOK 2018

ENERGY TRANSITION
OUTLOOK 2019

ENERGY TRANSITION
OUTLOOK 2020





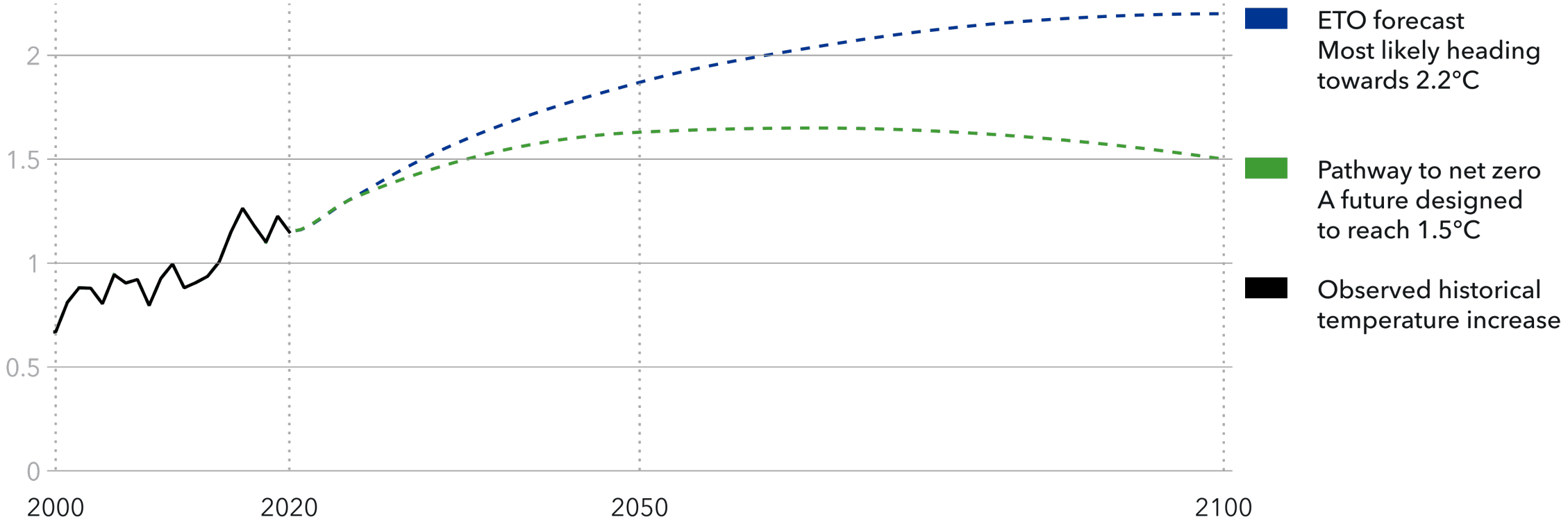
DNV

The two futures

Closing the gap to 1.5°C

Change in global surface temperature relative to 1850-1900

Units: °C



Historical data source: IPCC AR6 WGI (2021)

Highlights

High energy prices and energy security focus due to the war in Ukraine has a strong short-term impact, but will not slow the long-term transition

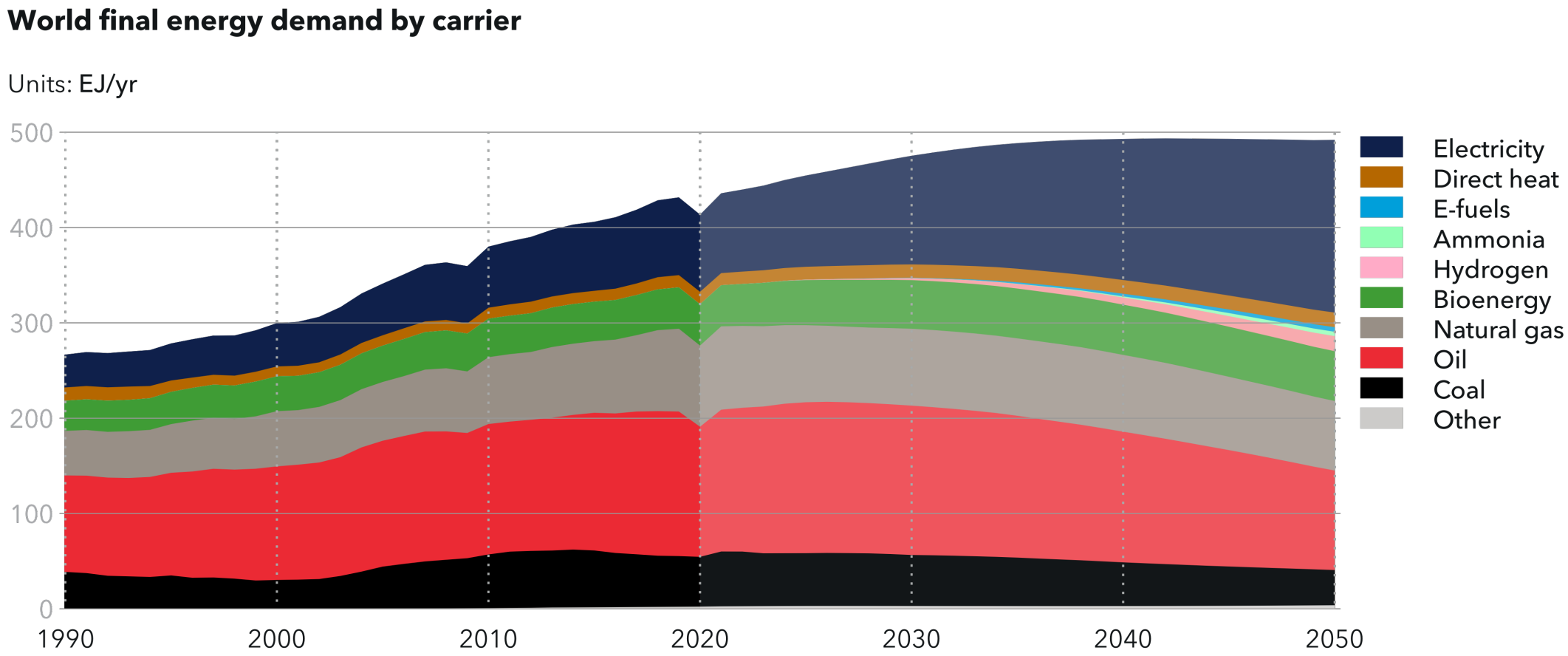
Despite urgency of action, global CO_2 emissions remain at record levels.

We forecast global warming at 2.2°C by 2100

Electricity is growing and greening everywhere — reaching an 83% renewable share in 2050 electricity mix

Hydrogen reaches 5% of the 2050 global energy mix – a third of what it should be in a net zero future

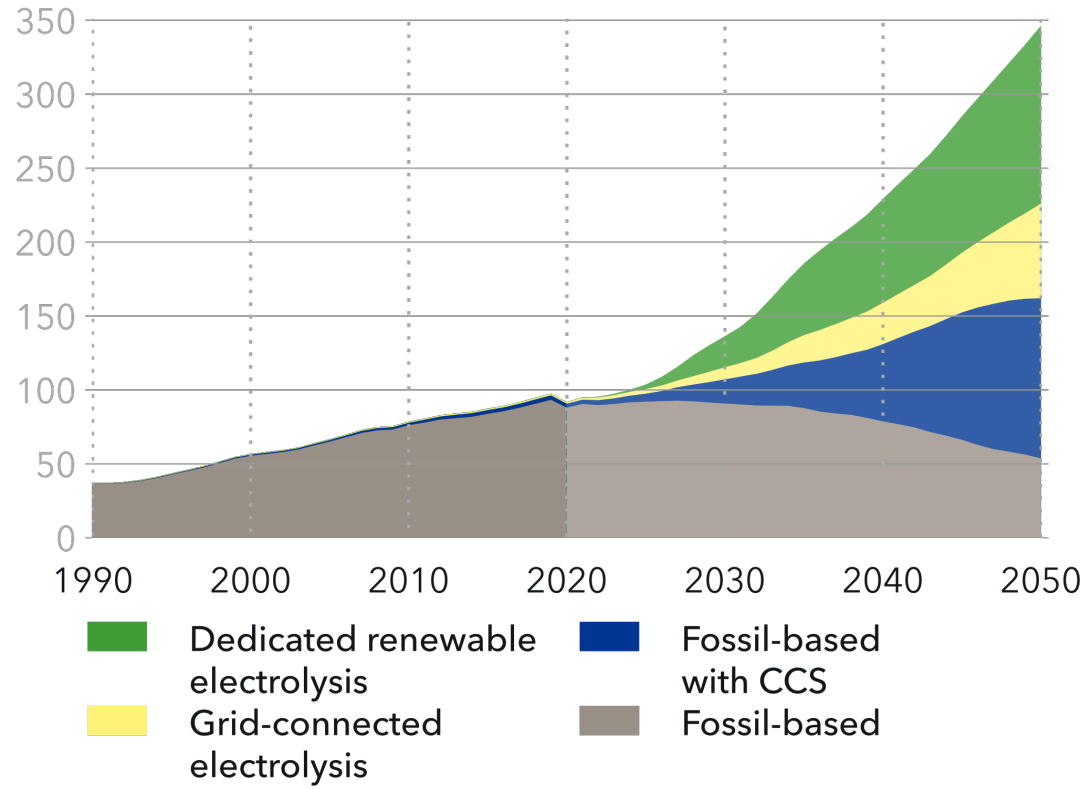
The share of electricity in the final energy demand mix doubles



Hydrogen key findings

- Hydrogen and hydrogen-derivates are the most promising solution to decarbonize hard-to-electrify sectors, but will still be only 5% of global final demand in 2050
- Hydrogen will only be competitive globally vs incumbent technologies in 2040s
- Green hydrogen will dominate over time, mainly from dedicated renewables sources

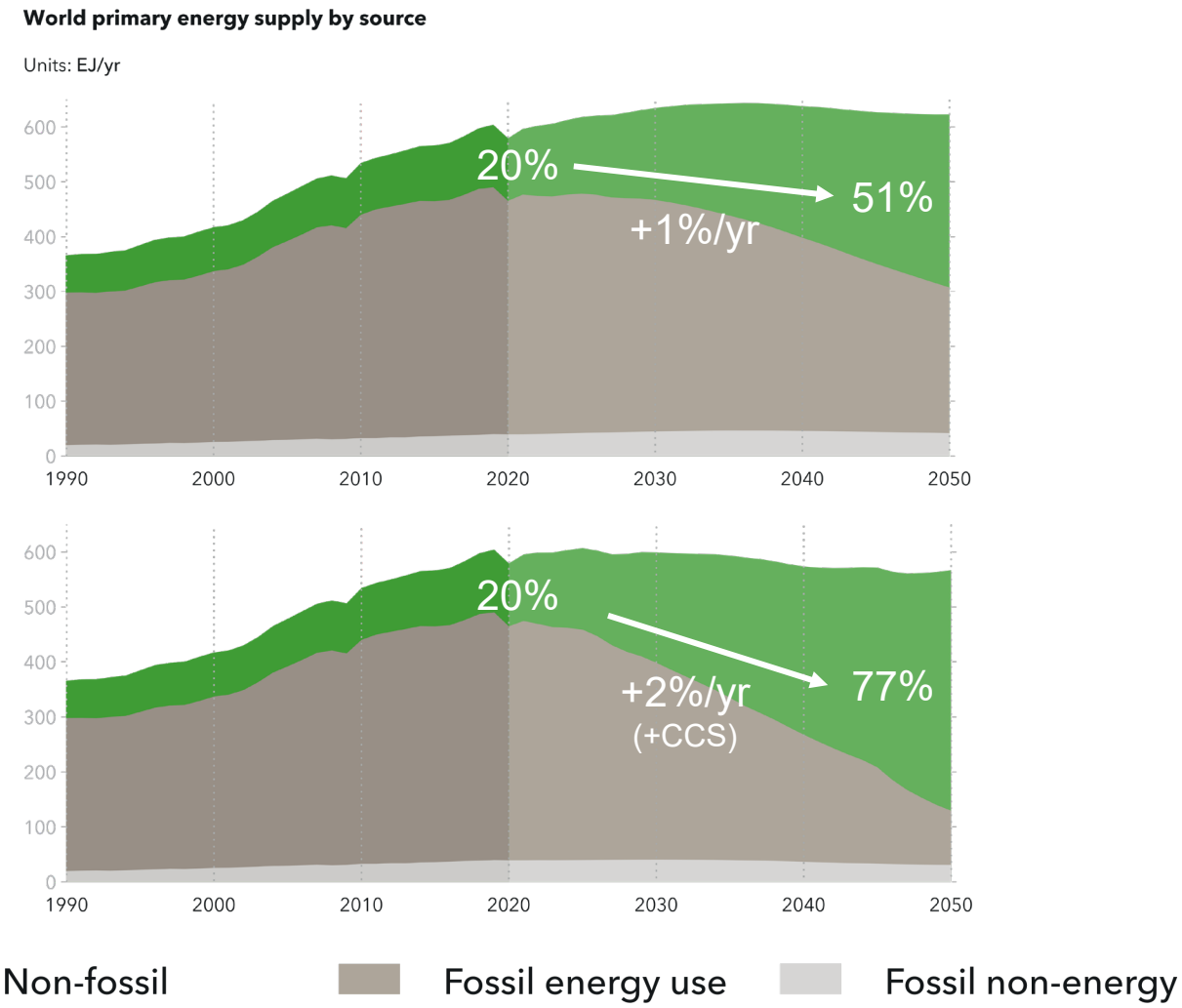
World hydrogen production by production route



The transition must be twice as fast to reach 1.5°C

ETO forecast

PNZ



The expected economic, political and technological developments will lead to a 2.2°C warming in 2100

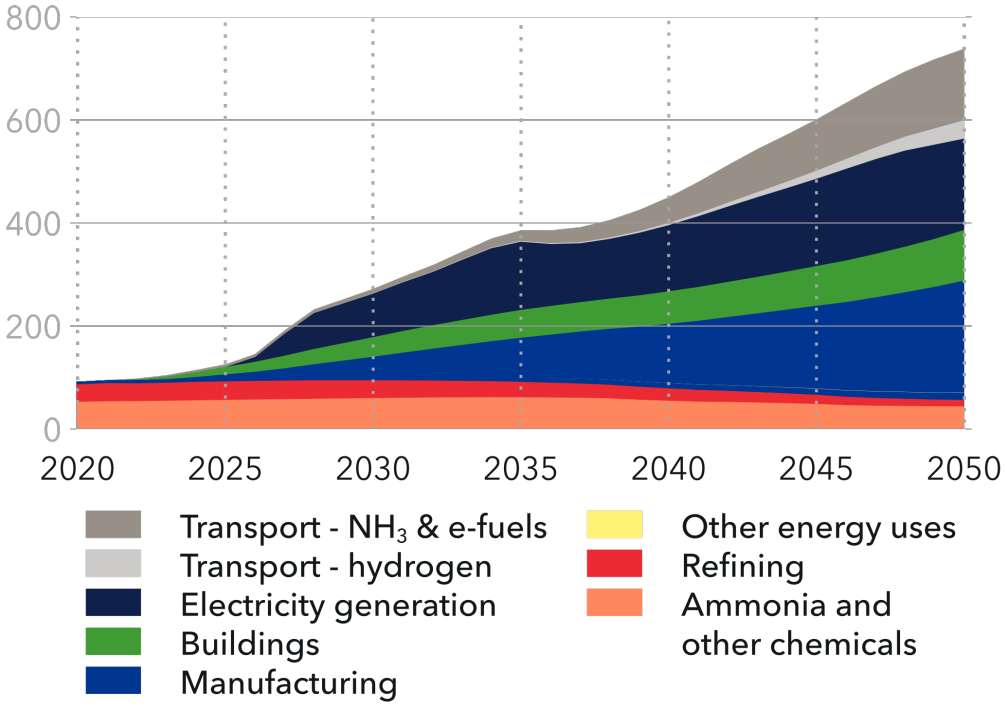
Paris agreement and a 1.5°C warming could be met if we reach net zero in 2050.

For this future to happen, most of oil, gas and coal use must be stopped, and carbon capture and removal compensate for the remaining emissions.

Hydrogen demand and production by sector and source

Global demand for hydrogen and its derivatives by sector - PNZ

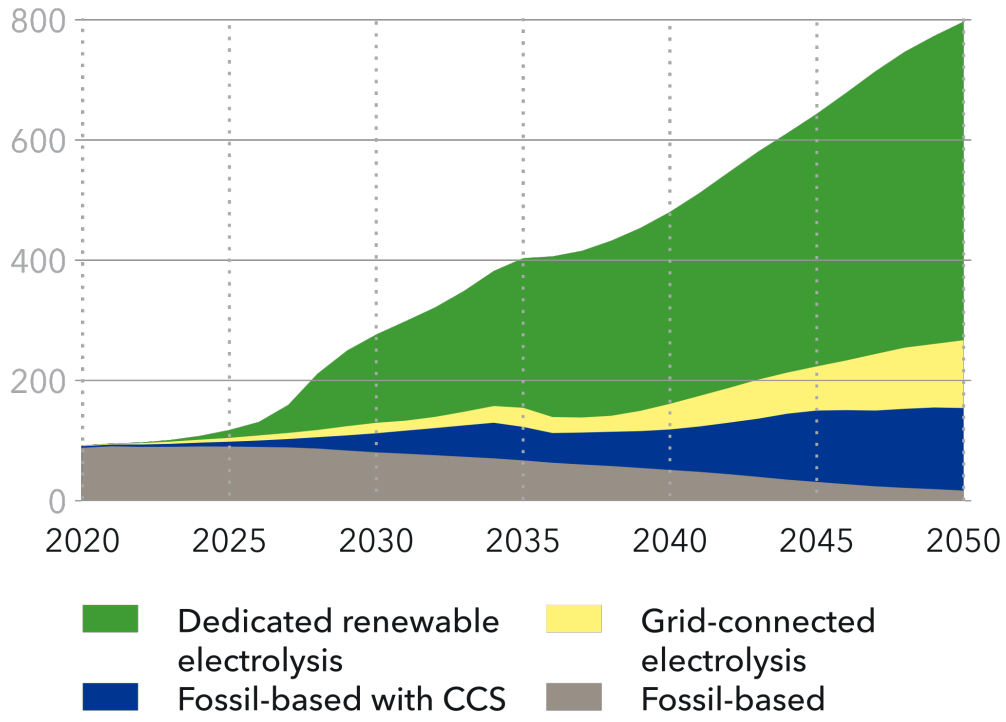
Units: MtH_2/yr



All non-transport uses are pure hydrogen.

Global production of hydrogen and its derivatives by production route - PNZ

Units: MtH_2/yr



Ukraine war is shifting priorities

- High energy and food prices move attention to short term priorities
- Europe is increasing effort on renewable buildout and energy efficiency to improve energy security
- Long term transition will not slow down due to the Ukraine war; plunging renewable costs and rising carbon prices are more important

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WHEN TRUST MATTERS

THE UKRAINE WAR WILL NOT DERAIL EUROPE'S ENERGY TRANSITION

As Europe struggles to build energy security in response to Russia's invasion of Ukraine, uncertainty looms on many fronts. By turning its back on Russian oil and gas, will Europe speed or slow down its response to the more global crisis – climate change?

By Sverre Alvik
Director of Energy Transition Research, DNV
Sverre.alvik@dnv.com
6 April 2022

That is a complicated question, and hinges on the extent and duration of the war. But, as things stand, our conclusion is that improved energy security does not come at the cost of decarbonization and there is likely to be a small acceleration in Europe's energy transition.

This feature outlines DNV's provisional view on how the ongoing war is likely to impact Europe's energy transition in the short, medium, and long term. Our emphasis here is on the consequences of the unfolding developments and not on making policy recommendations. The present commentary is confined to the implications of current developments in Europe. Elsewhere, in our Pathway to Net Zero Emissions (DNV, 2021), DNV sets out what we believe to be a feasible way for the world to achieve the Paris ambitions. The results from DNV's energy transition model underpin the conclusions we present here, but we underline the uncertainty in the quantification. We also acknowledge that the small acceleration of progress towards the Paris Agreement in a geographically limited part of the world, comes at the cost of a profound humanitarian crisis.

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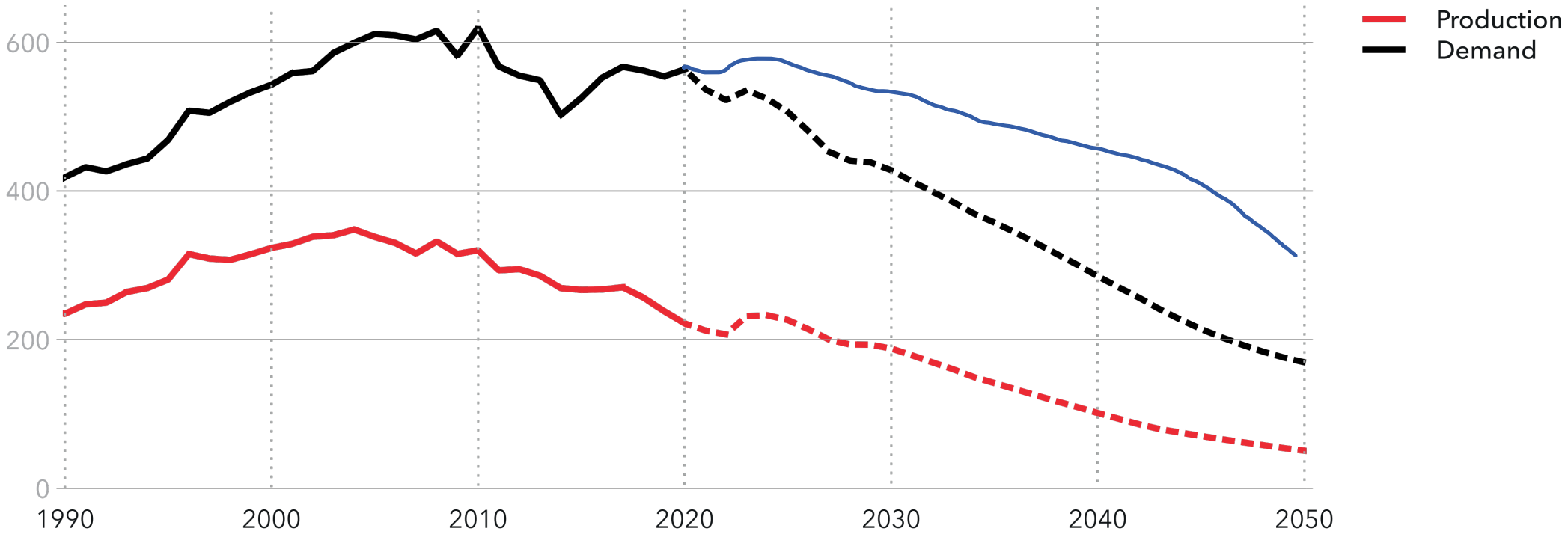
Gas production and consumption

Europe

Natural gas production and demand

Units: Gm^3/yr



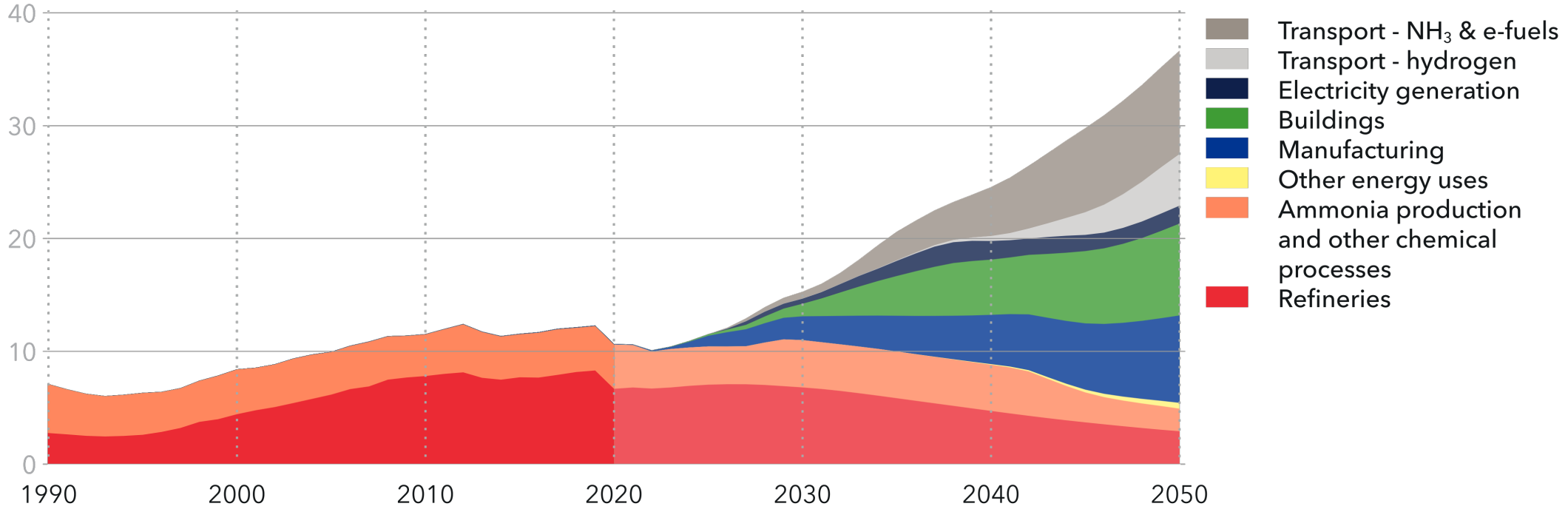
Historical data source: IEA WEB (2022)

Hydrogen demand

Europe

Demand for hydrogen and its derivatives by sector

Units: MtH_2/yr



All non-transport uses are pure hydrogen.

Lansering av Energy Transition Norway 2022

22. nov 2022, kl. 10.00–11.30 Næringslivets hus, Oslo / digitalt

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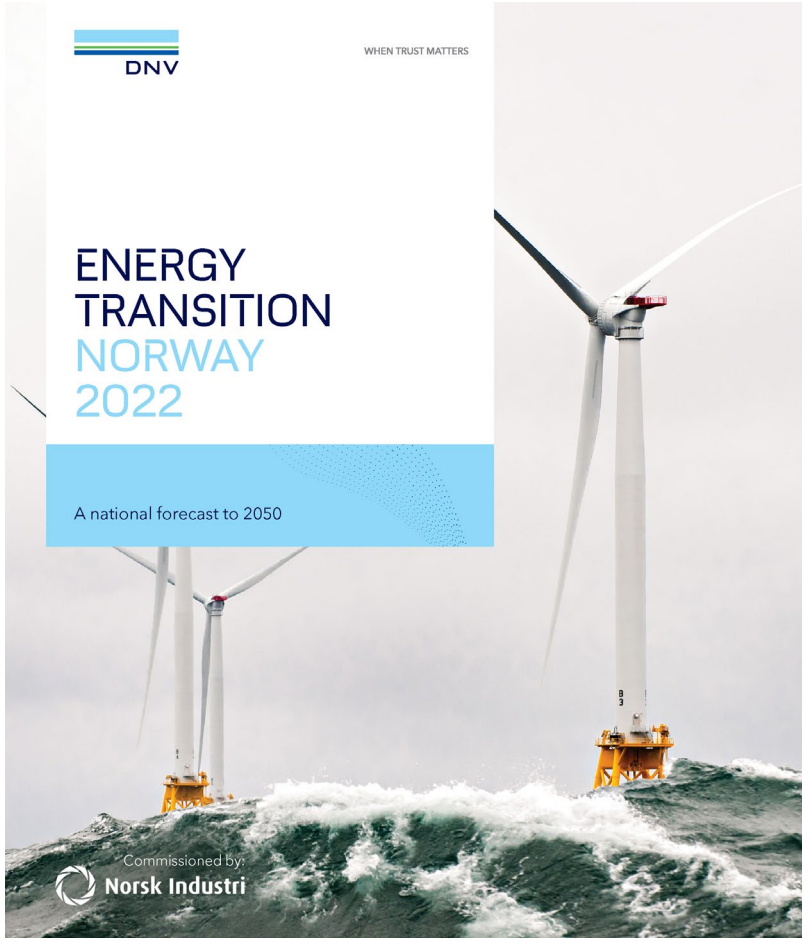

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