



WHEN TRUST MATTERS

Waterstof in Nederland pilot projecten

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DNV

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DNV maakt nieuwe energie betrouwbaar, duurzaam en veilig

DNV - an independent assurance and risk management company

157
years

~12,000
employees

100,000
customers

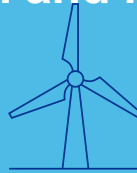
100+
countries

5% R&D
of annual revenue

**Ship and offshore
classification and advisory**



**Energy advisory,
certification, verification,
inspection and monitoring**



**Management system
certification, supply chain and
product assurance**



Software, platforms and digital solutions



De energietransitie



The energy system will change dramatically in the upcoming decades

Energy System Framework – connecting sources with end users

Energy carriers from source to end-use





**The future
energy system...**

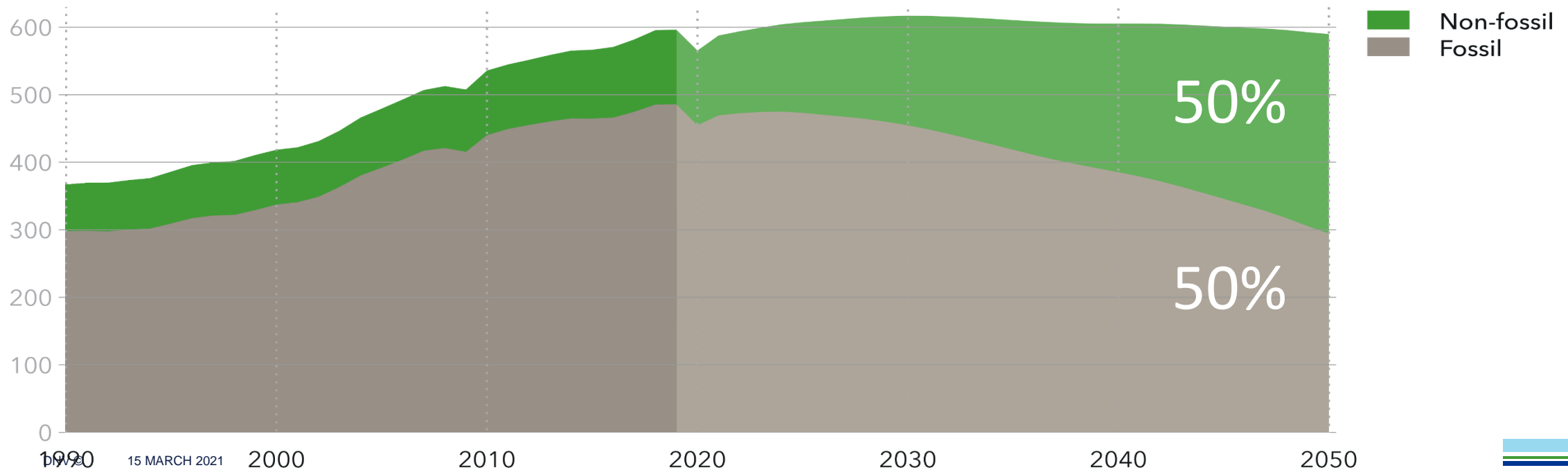
**....towards
carbon neutrality
by mid-century?**

Equal split between fossil and non-fossil energy in 2050

1. **Rapid electrification** - The share of electricity in final global energy demand doubles from 19% to 38% of energy mix in 2050
2. For the oil and gas industry decarbonising the gas is an important solution to stay as «part of the solutions». But the **decarbonisation come to late and too slow** compared to the decarbonisation needs the world is facing.

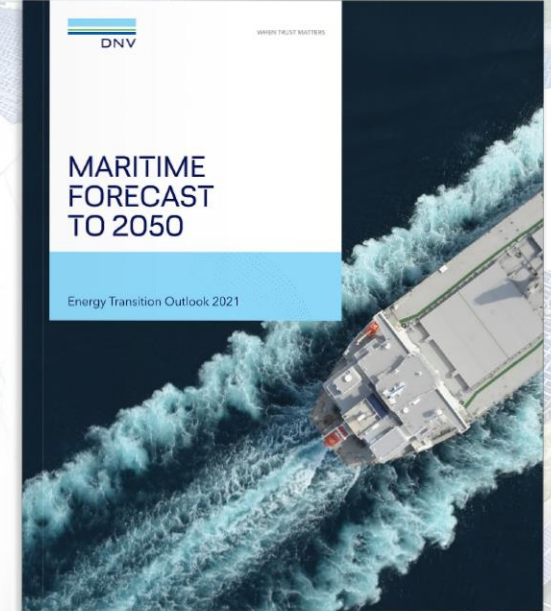
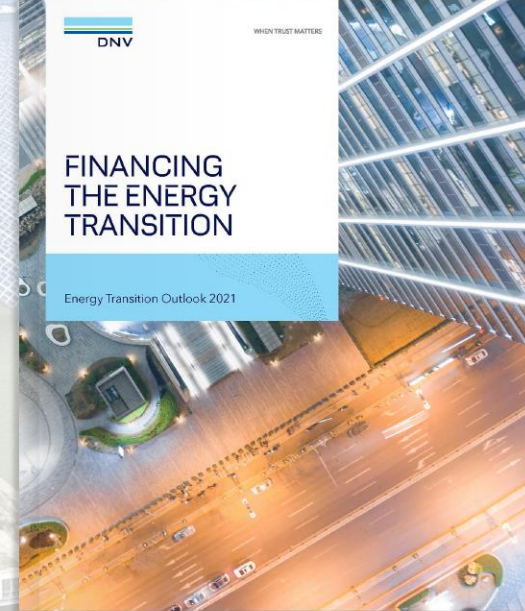
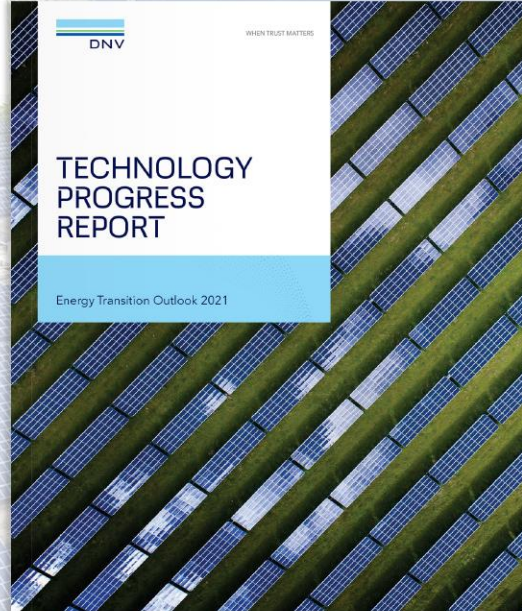
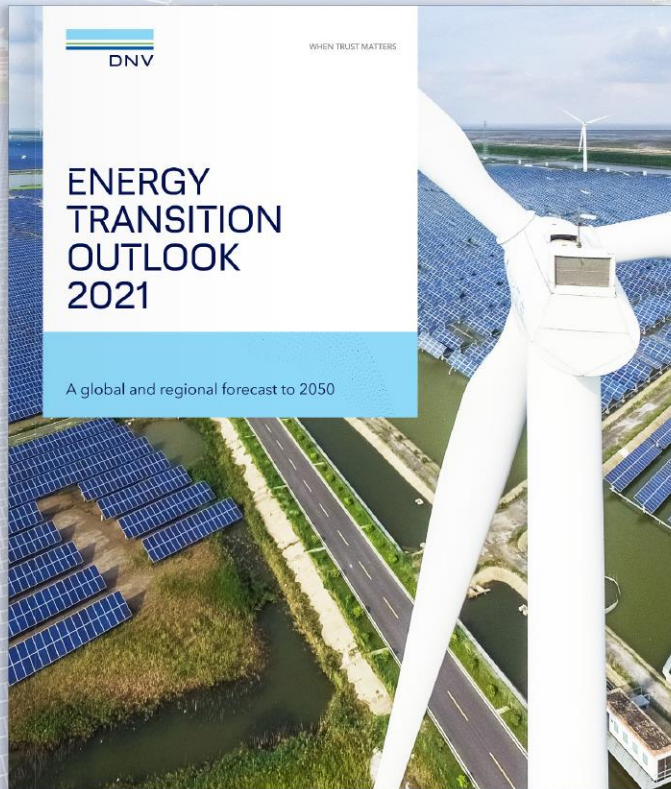
World primary energy supply by source

Units: EJ/yr



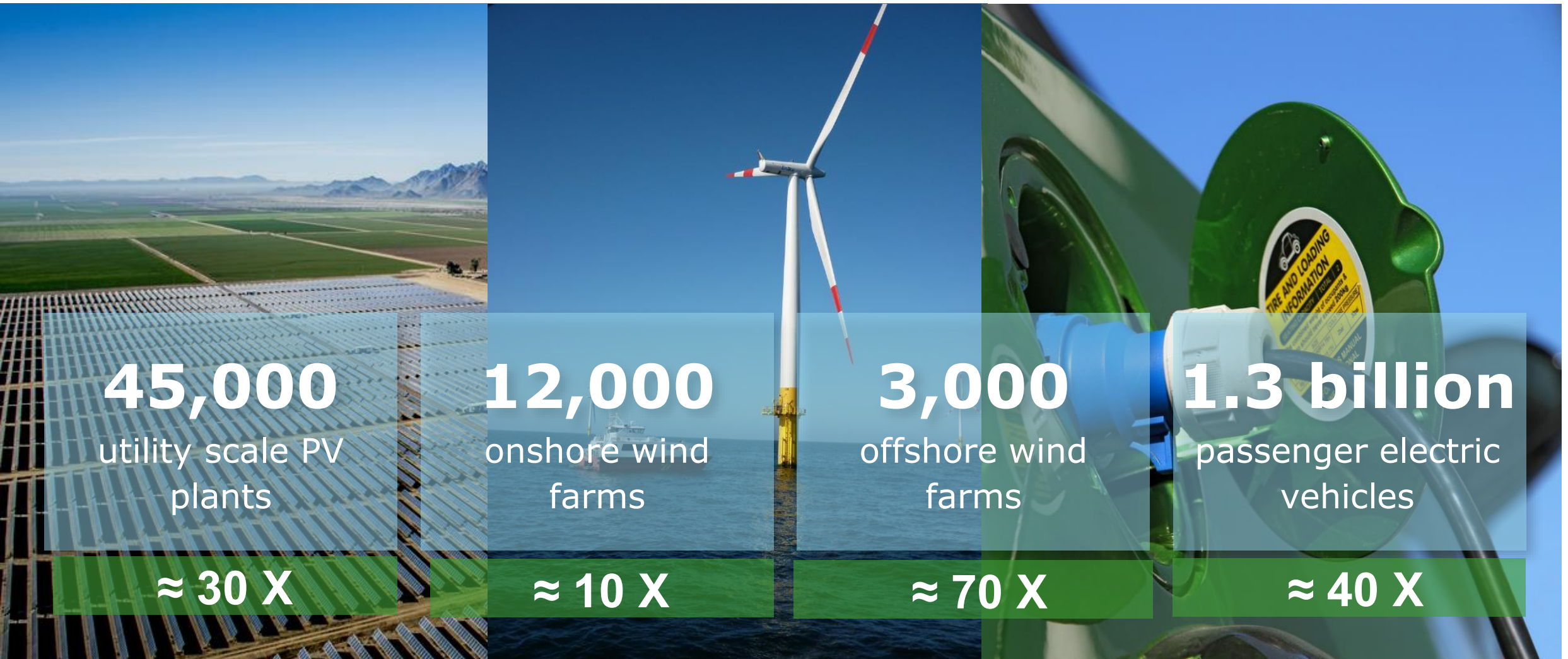
Historical data source: IEA WEB (2020)

DNV's yearly Energy Transition Outlook



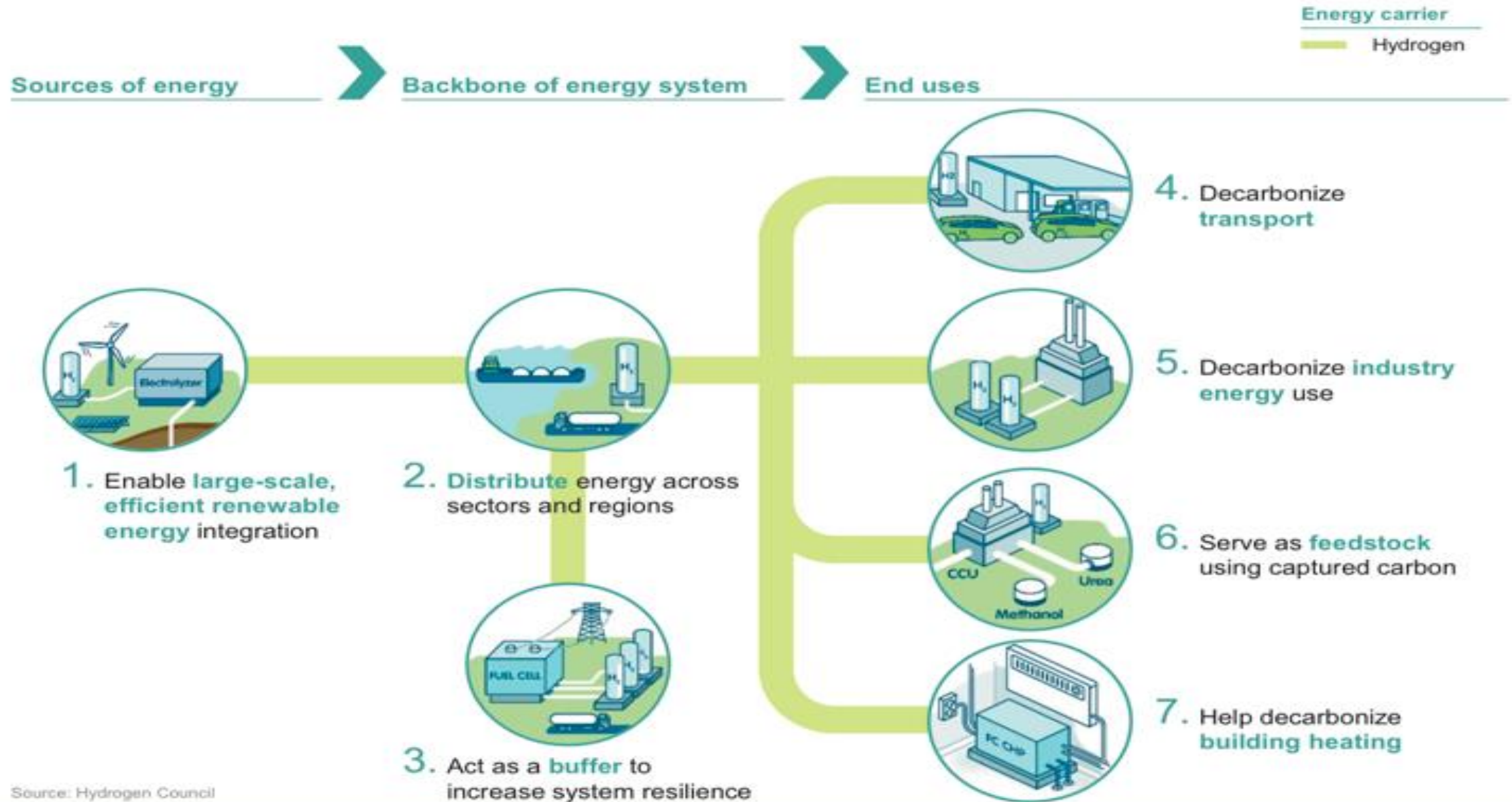
Suite of publications available on
eto.dnv.com

In 2050, the electricity system will be dramatically different than today



Hydrogen

Hydrogen has seven roles in decarbonizing the energy system



Energy Transition is moving at pace.....

(examples of ambitious projects in the Netherlands)

1



PosHYdon

Re-use of existing O&G platforms for green hydrogen production

2



Porthos / H-Vision

Blue hydrogen and CO2 capture, transport & offshore storage

3



Magnum-H2

Convert CCGT to run on blue hydrogen – transfer and storage of CO2 to Norway

4



NorthH₂

Production and transport of green hydrogen from a GW windfarm in North Sea

.....and many more projects (from idea to realisation)



TKI NIEUW GAS
Topsector Energie

Overview of Hydrogen Projects in the Netherlands

Peter de Laat for TKI Nieuw Gas

> 100!

Summer 2020

<https://www.topsectorenergie.nl/nieuws/tki-nieuw-gas-presenteert-update-van-waterstofprojecten-nederland>



Groene waterstof productie

gasunie



Zuidwending – 1 MW electrolyser - Van duurzame elektriciteit naar groene waterstof



torrgas



**Pilot plant
van hout naar gas**

Wereldprimeur in Rozenburg: Waterstofketel verwarmt appartementencomplex



Gemeente Rotterdam



2 MW furnace to heat oil will be fuelled using NG/H₂ (0-100% H₂): planning Q3-2021



Hydrogen pilot Veendam



[DNV designed a hydrogen burning torch for the Dutch Olympic athletes on their way to Tokyo](#)

DNV

Thanks you for your attention

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