

New Energy Outlook 2021

Roads to Carbon Neutrality: COP26 Nordic Pavilion

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Head of Analysis

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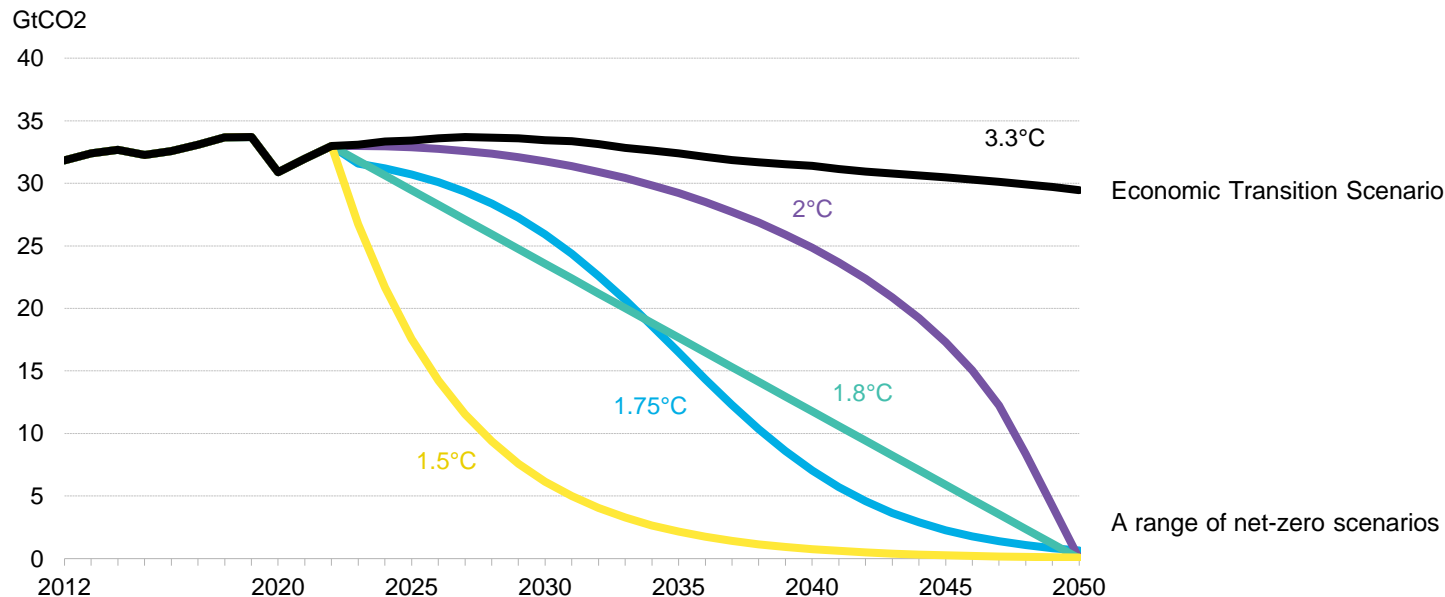
BloombergNEF

Carbon budget



Net-zero scenarios come in different shapes

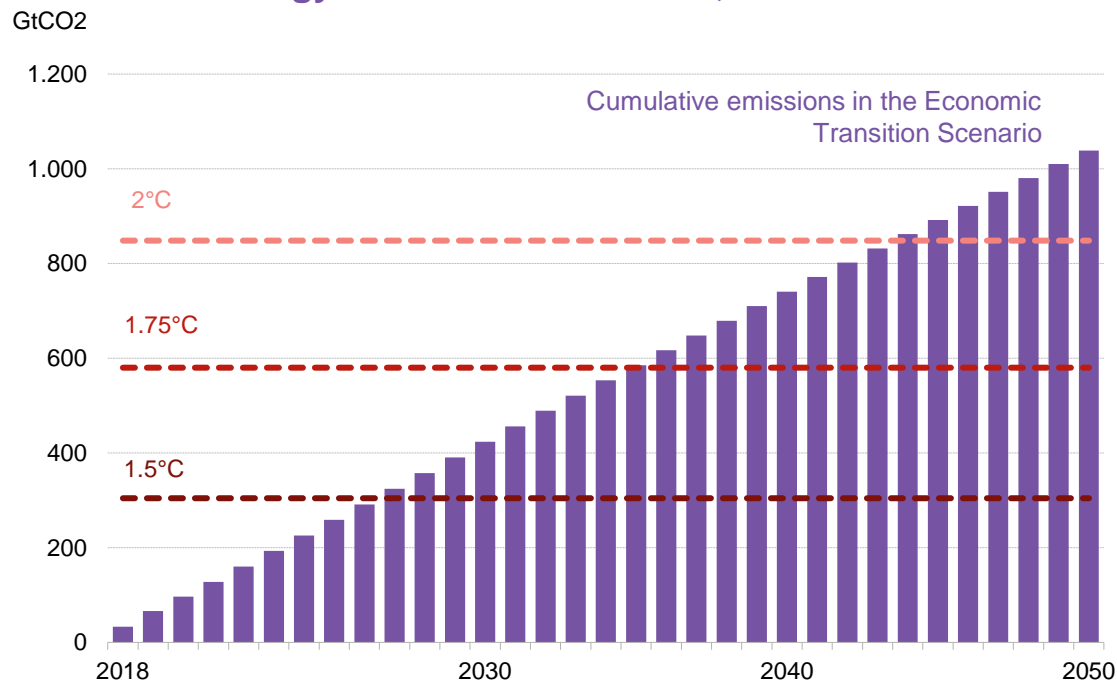
Climate impact of different pathways to net zero



Source: BloombergNEF, IPCC Note: The Economic Transition Scenario is BloombergNEF's baseline economics-led scenario last published in the New Energy Outlook 2020.

The Economic Transition Scenario breaches a 1.5° budget by 2027

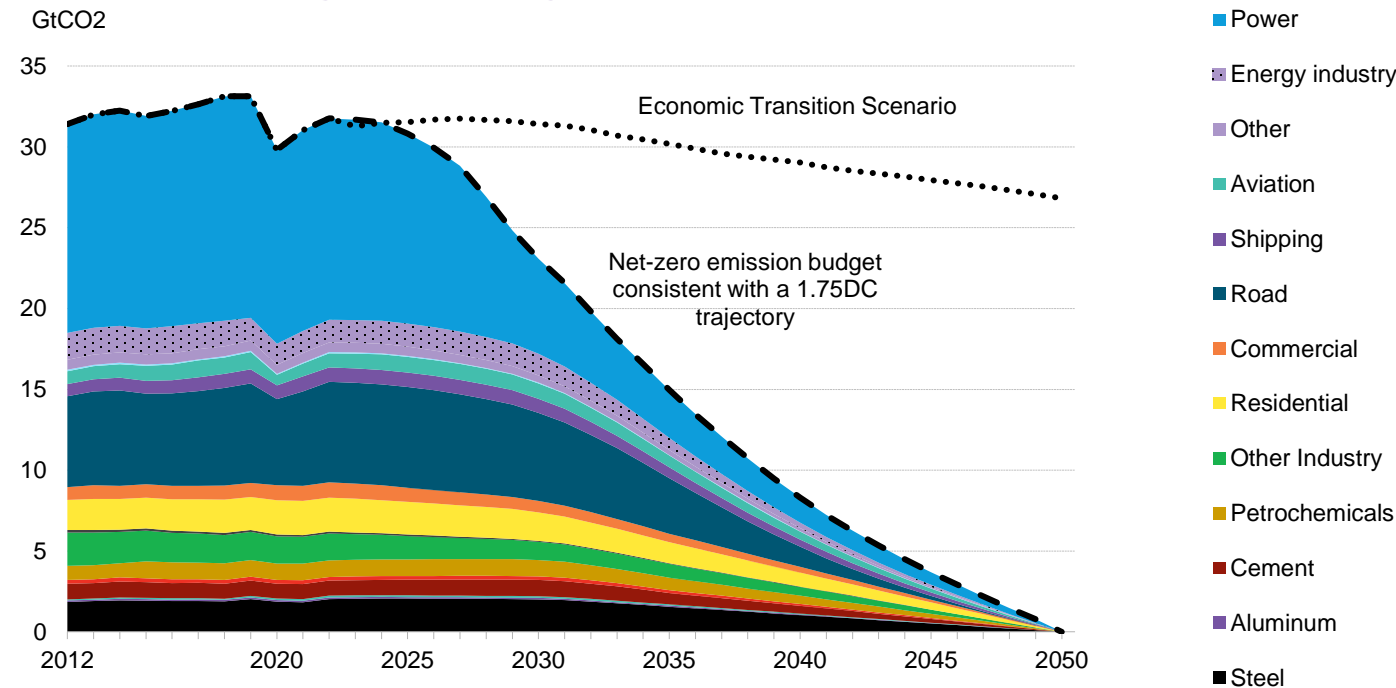
Cumulative energy emissions 2018-2050, and climate outcomes



Source: BloombergNEF, IPCC

NEO 2021: a Paris-aligned, sector-based trajectory

Global carbon budget by sector, to meet zero emissions in 2050 and keep warming to ~1.75 degrees C

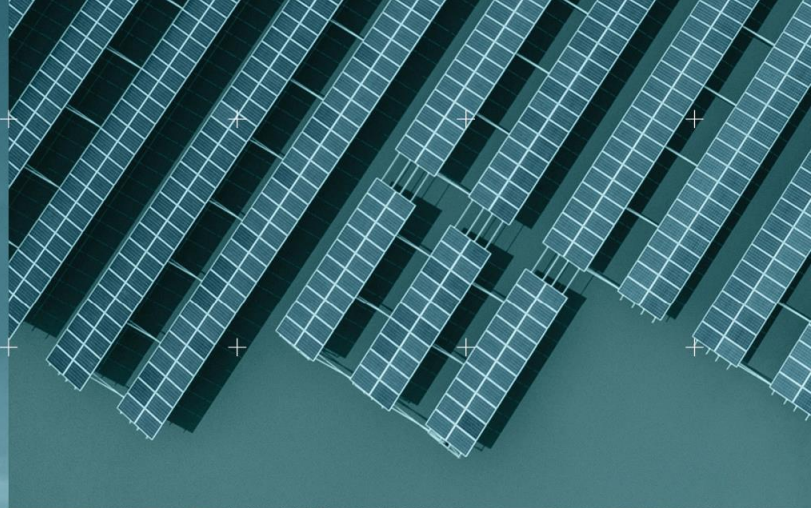


Principles behind sectoral emissions budgets

- No free riders
- Net zero in 2050
- Paris Agreement
- Current emissions trends
- Current abatement options
- “Orderly transition”

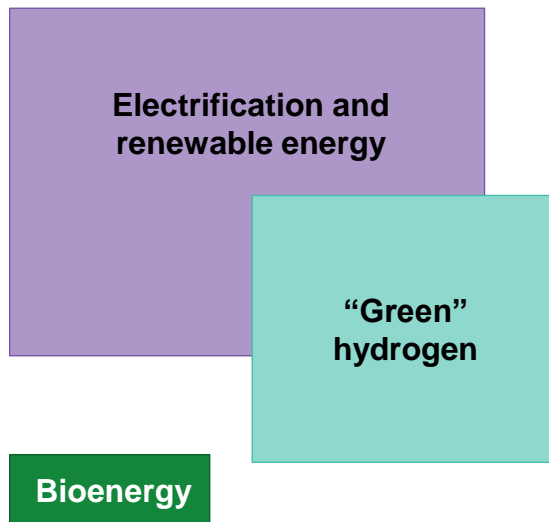
Source: BloombergNEF

Net zero scenarios

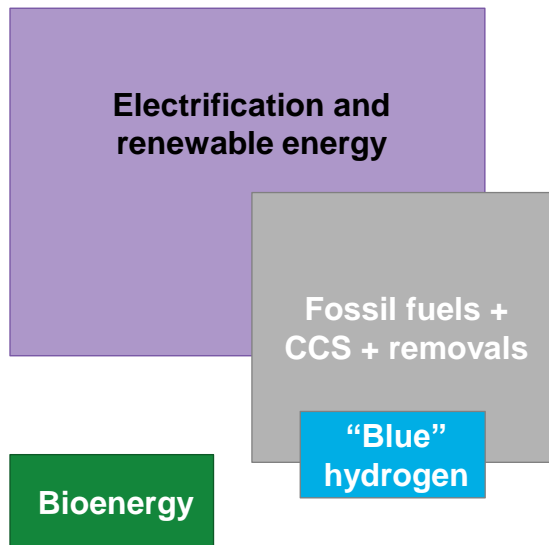


Three pathways to meet the carbon budget

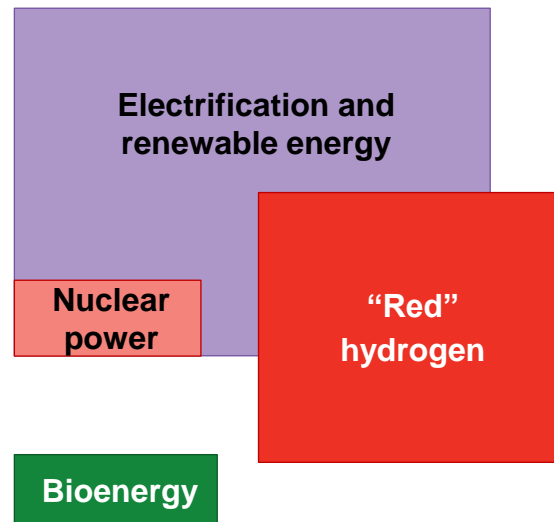
Green Scenario



Gray Scenario



Red Scenario

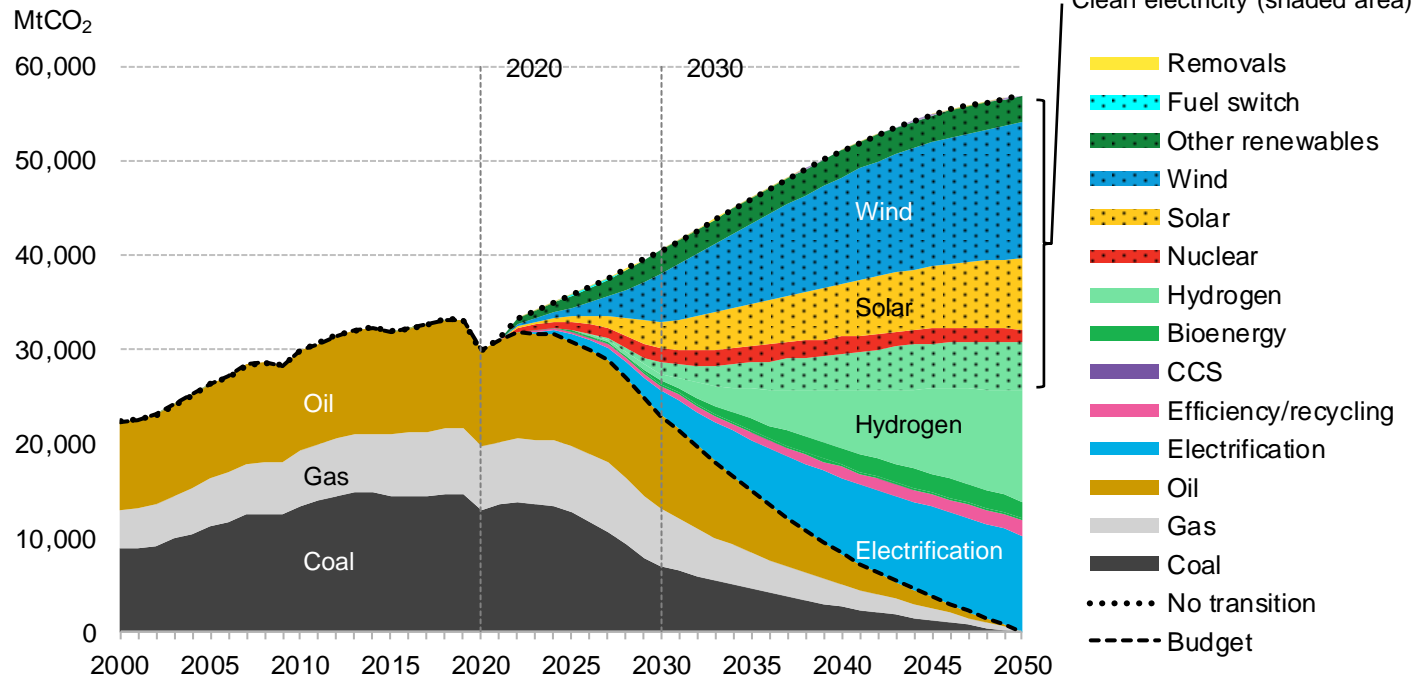


Recycling

Demand-side efficiency

Green Scenario: clean power, electrification and hydrogen drive abatement

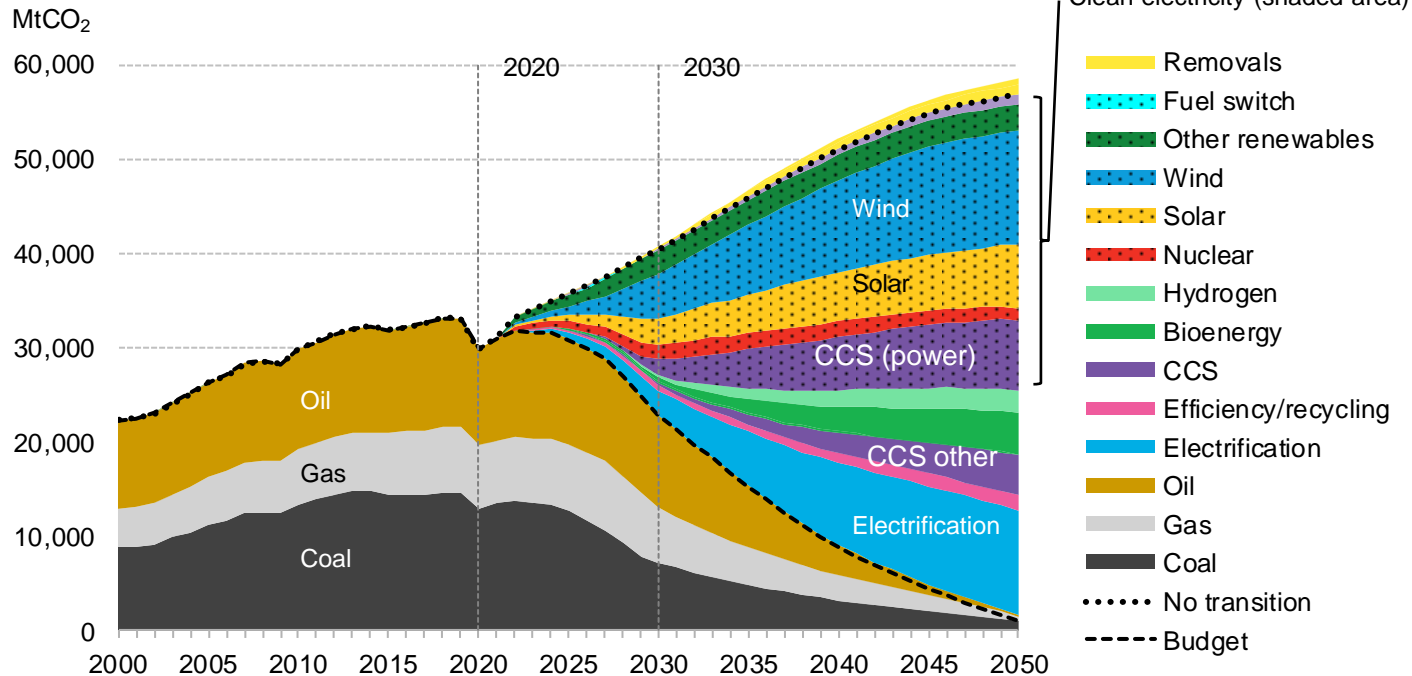
Emissions and abatement in the Green Scenario



Source: BloombergNEF

Gray Scenario: CCS makes up 15% of total abatement, clean power still critical

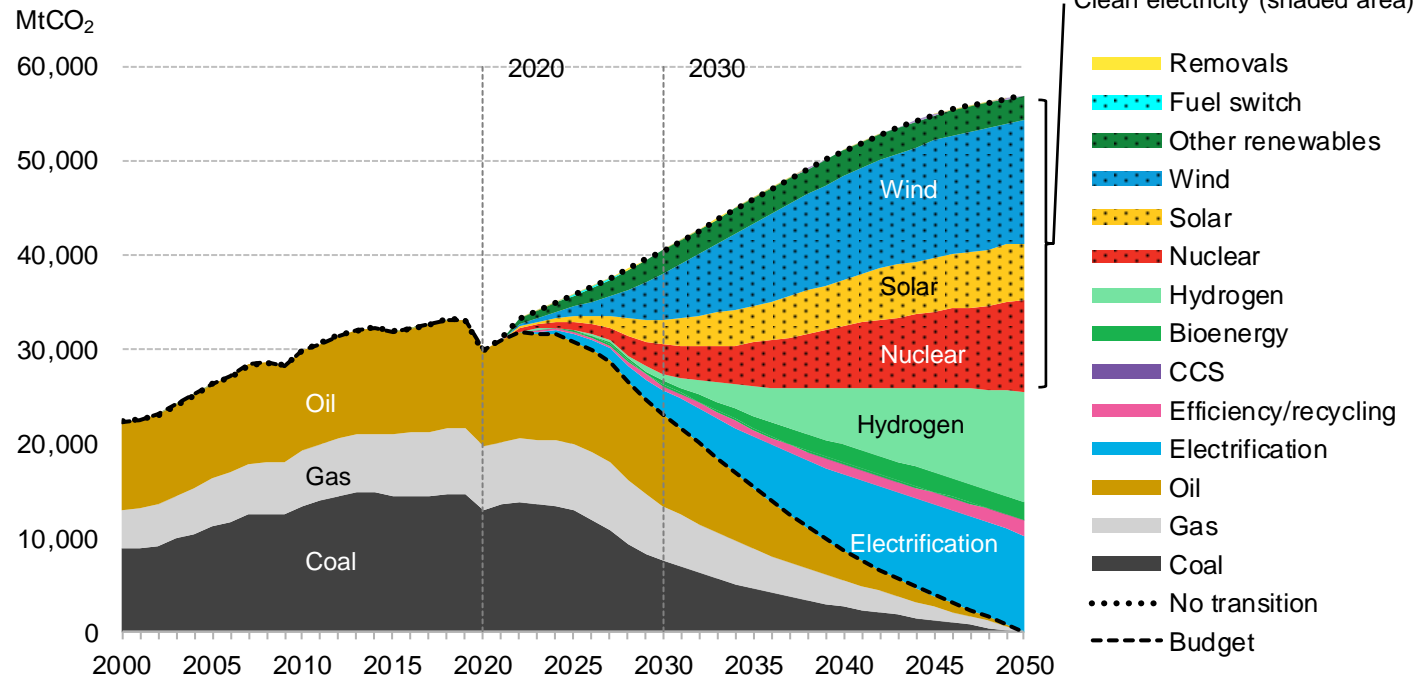
Emissions and abatement in the Gray Scenario



Source: BloombergNEF

Red Scenario: nuclear partially displaces renewables to meet power demand and produce hydrogen

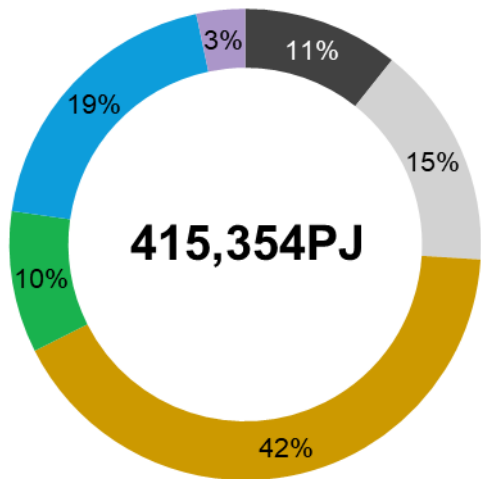
Emissions and abatement in the red scenario



Source: BloombergNEF

Final energy consumption: electricity approaches 50% share

2019



■ Coal

■ Gas

■ Oil

■ Bioenergy

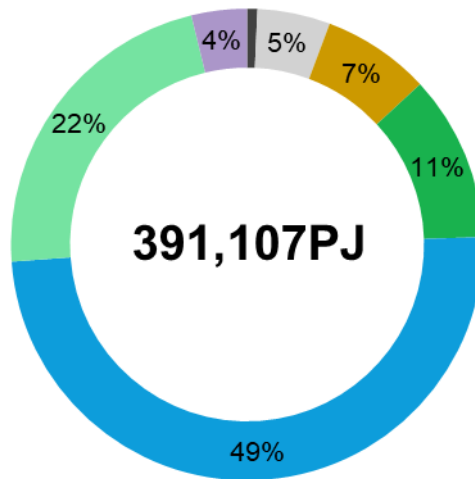
■ Electricity

■ Hydrogen

■ Other

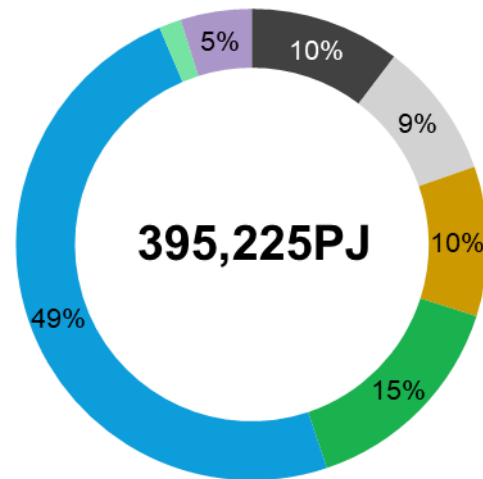
Source: BloombergNEF

2050: Green & Red Scenario



Source: BloombergNEF

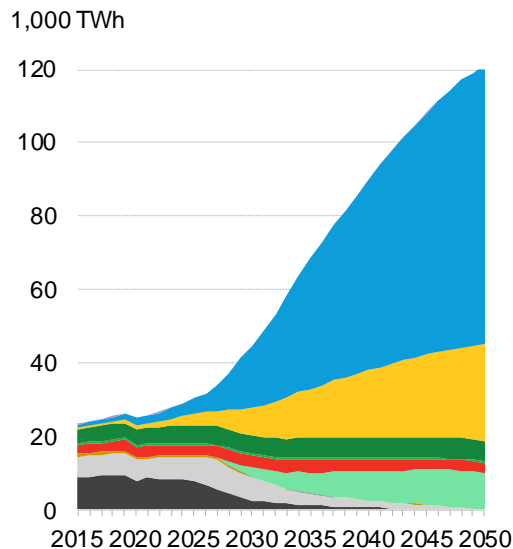
2050: Gray Scenario



Source: BloombergNEF

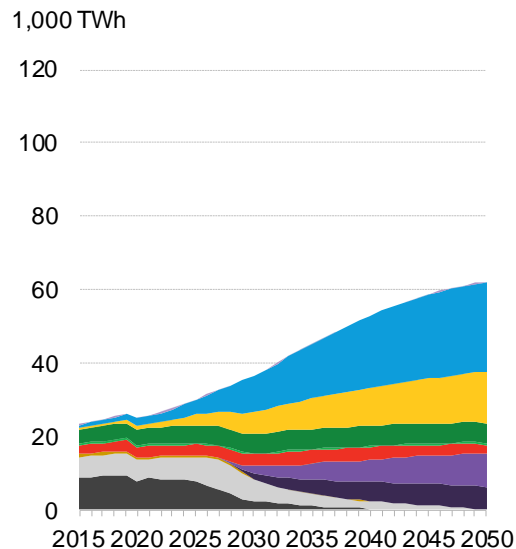
Electricity generation: varying degrees of upside

Green Scenario



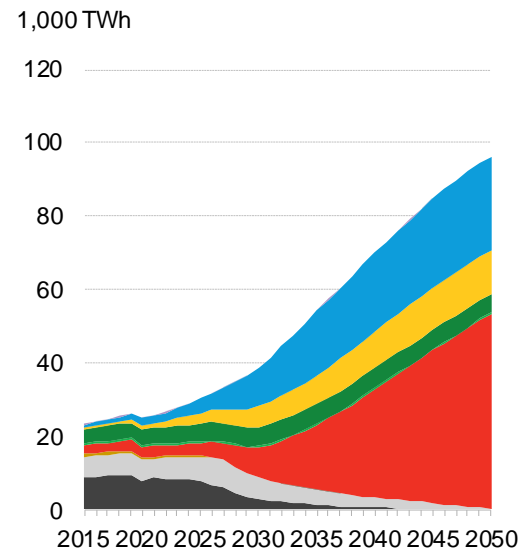
■ Coal
■ Gas
■ Nuclear
■ Bioenergy

Gray Scenario



■ Oil
■ Coal with CCS
■ Gas with CCS
■ Other renewables
■ Solar
■ Wind

Red Scenario



■ Oil with CCS
■ Hydrogen
■ Other

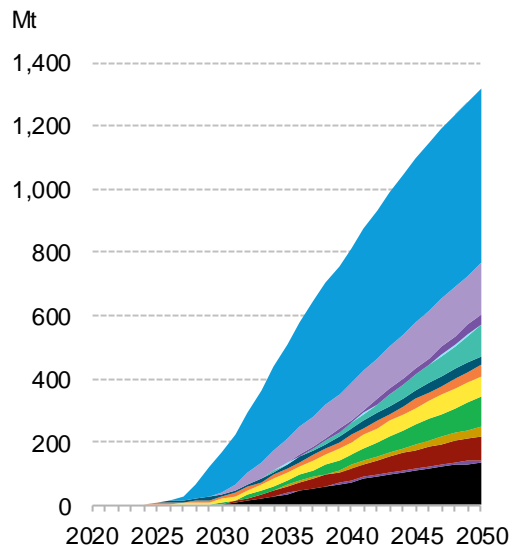
Source: BloombergNEF. Note: includes generation for end-use demand & hydrogen production.

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Hydrogen demand varies widely by scenario

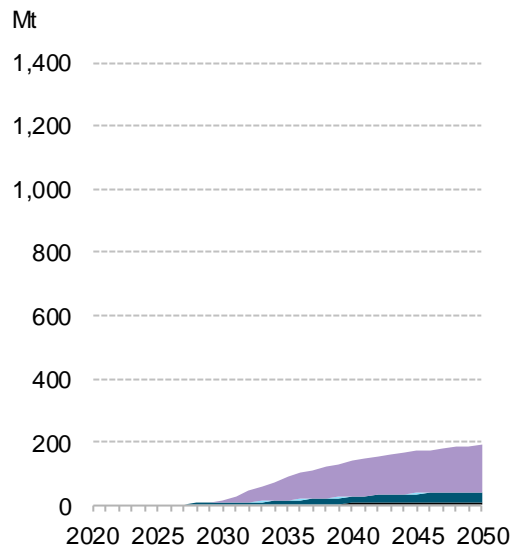
Green Scenario



■ Power
■ Non-energy use
■ Other
■ Shipping
■ Rail
■ Commercial
■ Residential
■ Other industry
■ Petrochemicals
■ Cement

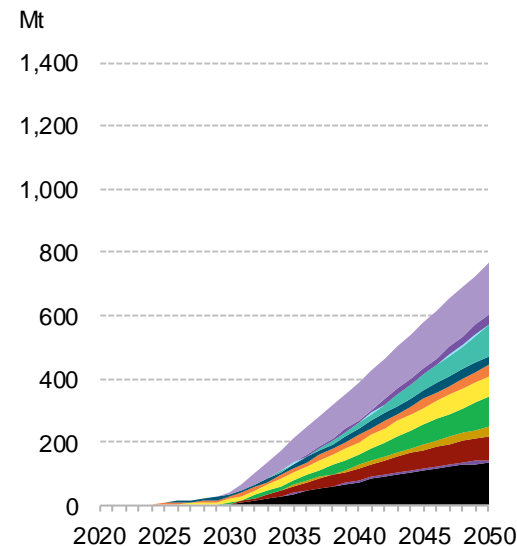
Source: BloombergNEF

Gray Scenario



Source: BloombergNEF

Red Scenario



■ Aviation
■ Road
■ Aluminum
■ Steel

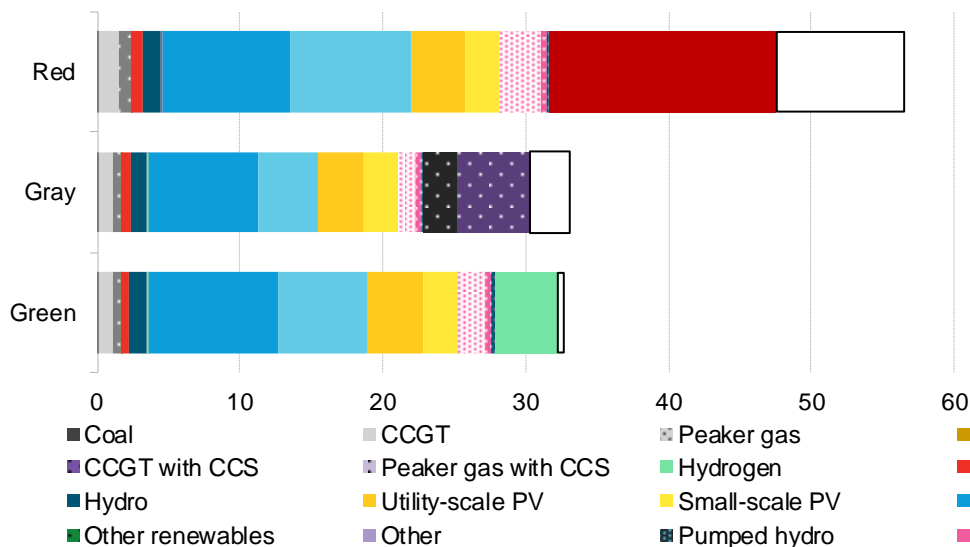
Source: BloombergNEF

Clean power investment at \$1.1-1.7 trillion per year to 2050

Cumulative power plant capacity investment, 2020-2050...

For end-use electricity demand

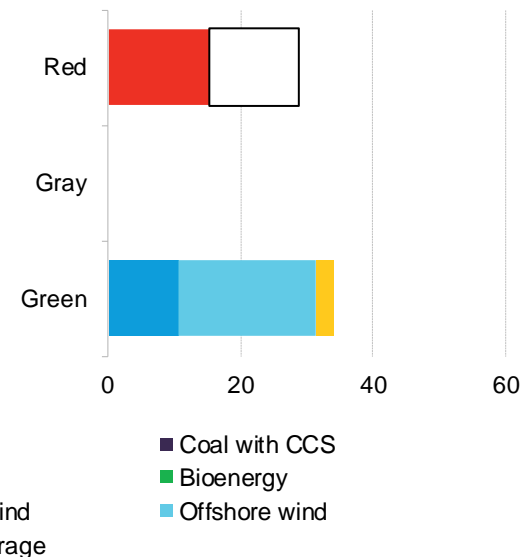
\$ trillion (2020 real)



Source: BloombergNEF. Bordered series shows investment range.

For hydrogen production

\$ trillion (2020 real)



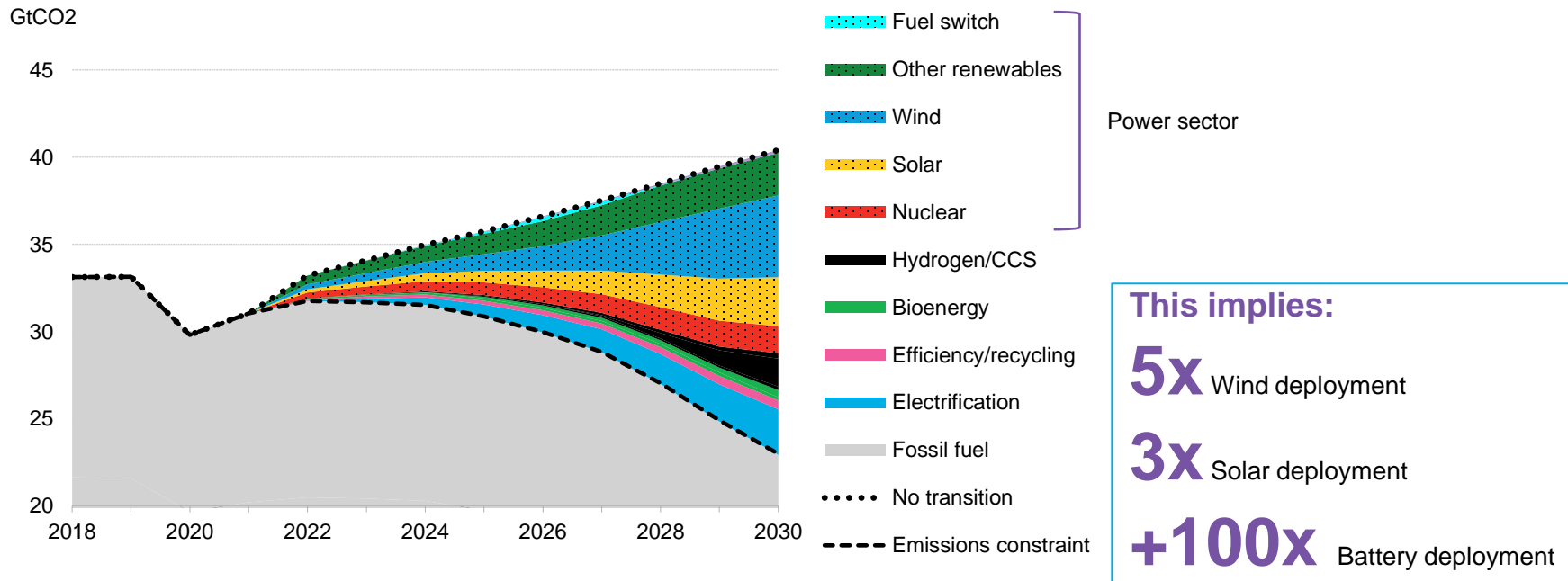
Source: BloombergNEF. Bordered series shows investment range.

Next
10 years



Getting on track: ~30% emissions reductions to 2030 from 2019 levels, or -3.2% yoy

Total energy-sector emissions and abatement to 2030, by activity, All Scenarios

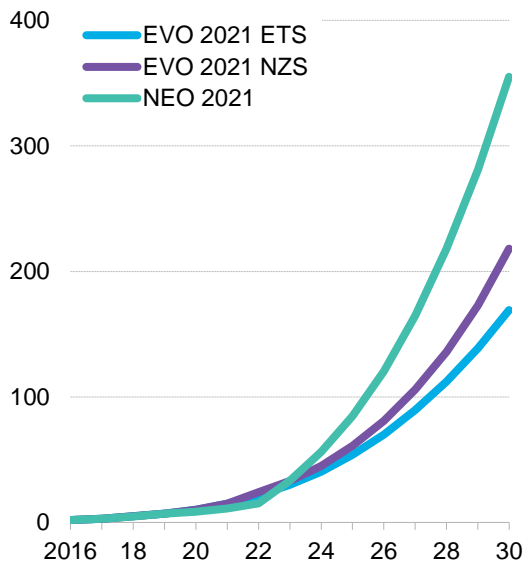


Source: BloombergNEF

Getting on track to 2030: demand-side transformation

Passenger EV fleet

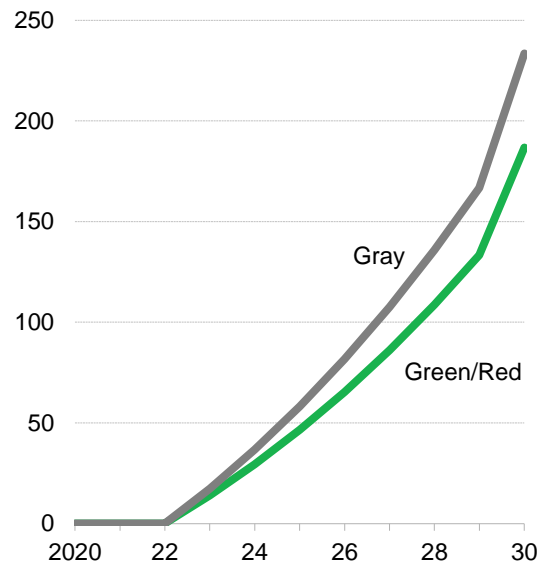
million vehicles



Source: BloombergNEF

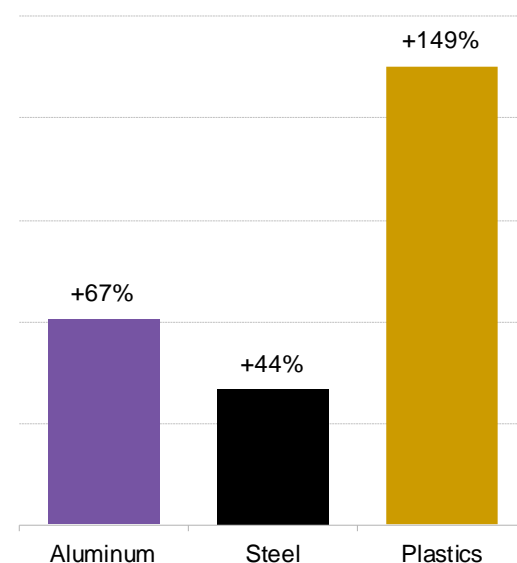
Heat pump deployment

Million units



Source: BloombergNEF

Recycled materials

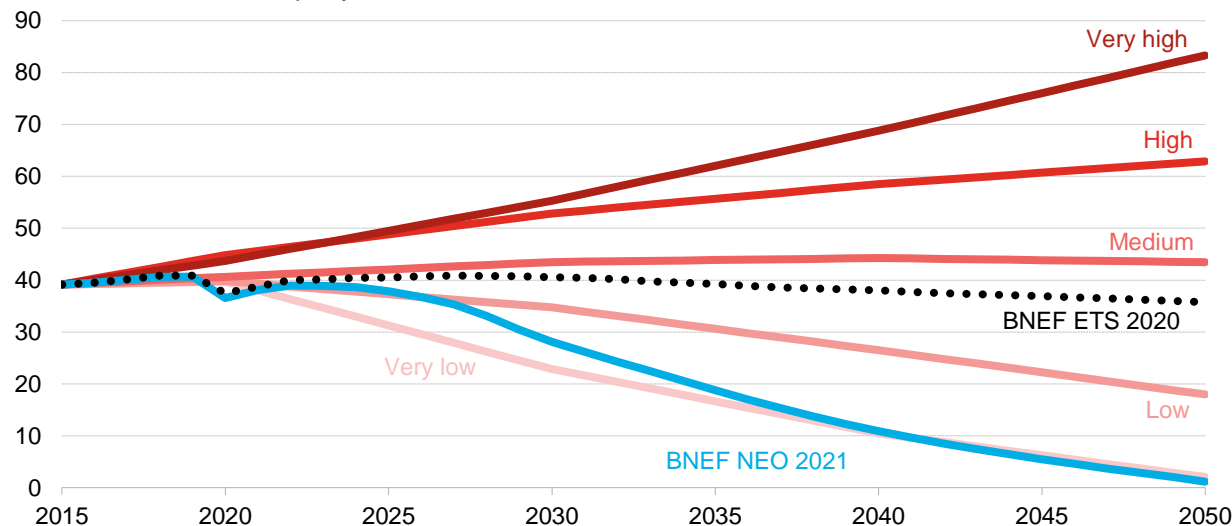


Source: BloombergNEF

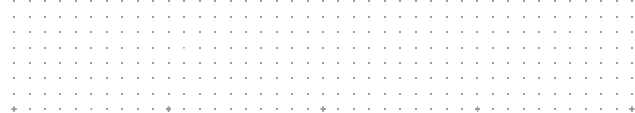
BNEF's scenarios sit at the lower range of IPCC emissions outcomes

Annual CO2 emissions in IPCC and BNEF scenarios

billon metric tons of CO2 per year



Source: BloombergNEF, IPCC, Summary for Policymakers. NERC EDS Centre for Environmental Data Analysis, 2021. Note: NEO ETS = Economic Transition Scenario of NEO 2020. NEO 2021 = emissions trajectory from the Green, Gray and Red Scenarios of NEO 2021. As the New Energy Outlook only captures CO2 emissions from fuel combustion – some 72.5% of global CO2 emissions – historical and future emission trajectories are aligned upwards to match those of the IPCC's scenario.



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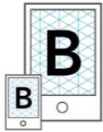
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