New Energy Outlook 2021

Roads to Carbon Neutrality: COP26 Nordic Pavilion

Albert Cheung

Head of Analysis

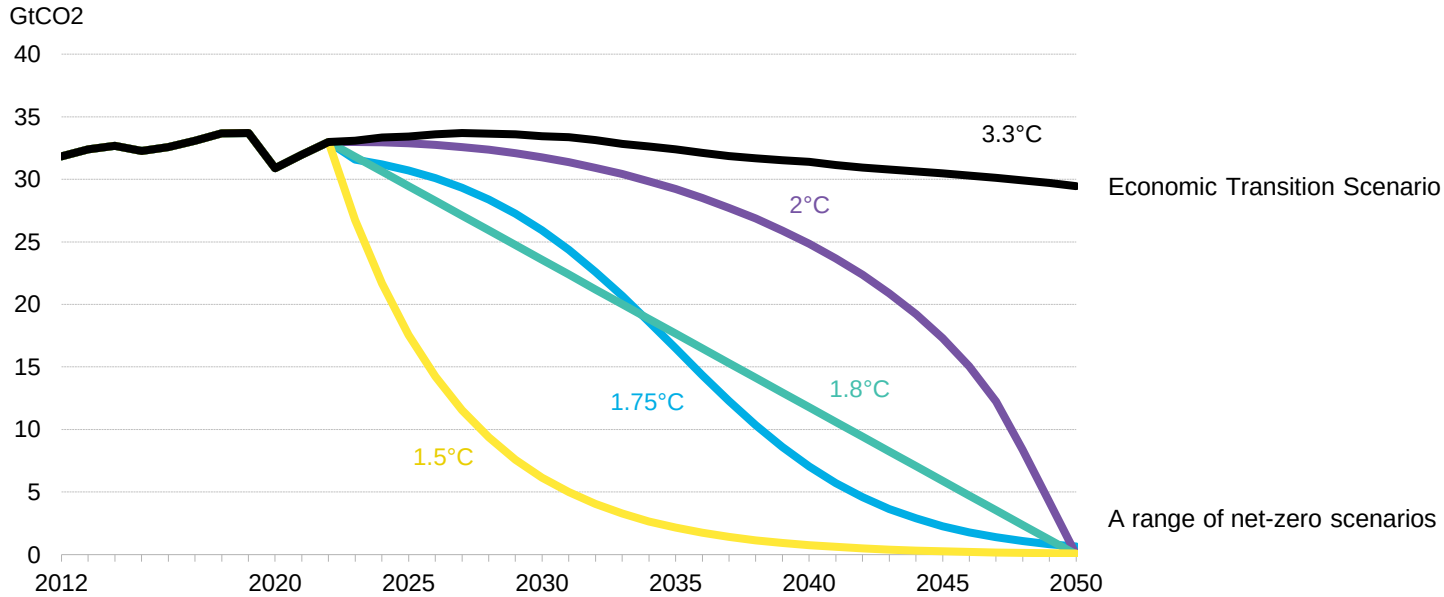
November 8, 2021

BloombergNEF

Carbon budget

Net-zero scenarios come in different shapes

Climate impact of different pathways to net zero

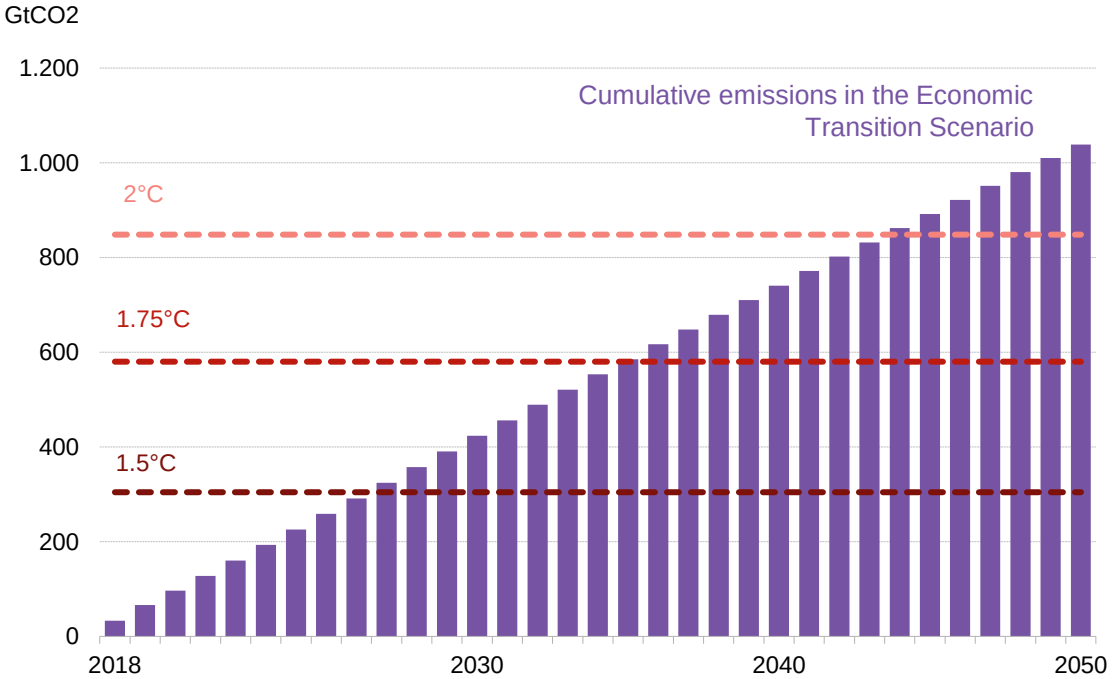


Source: BloombergNEF, IPCC Note: The Economic Transition Scenario is BloombergNEF's baseline economics-led scenario last published in the New Energy Outlook 2020.

BloombergNEF

The Economic Transition Scenario breaches a 1.5º budget by 2027

Cumulative energy emissions 2018-2050, and climate outcomes

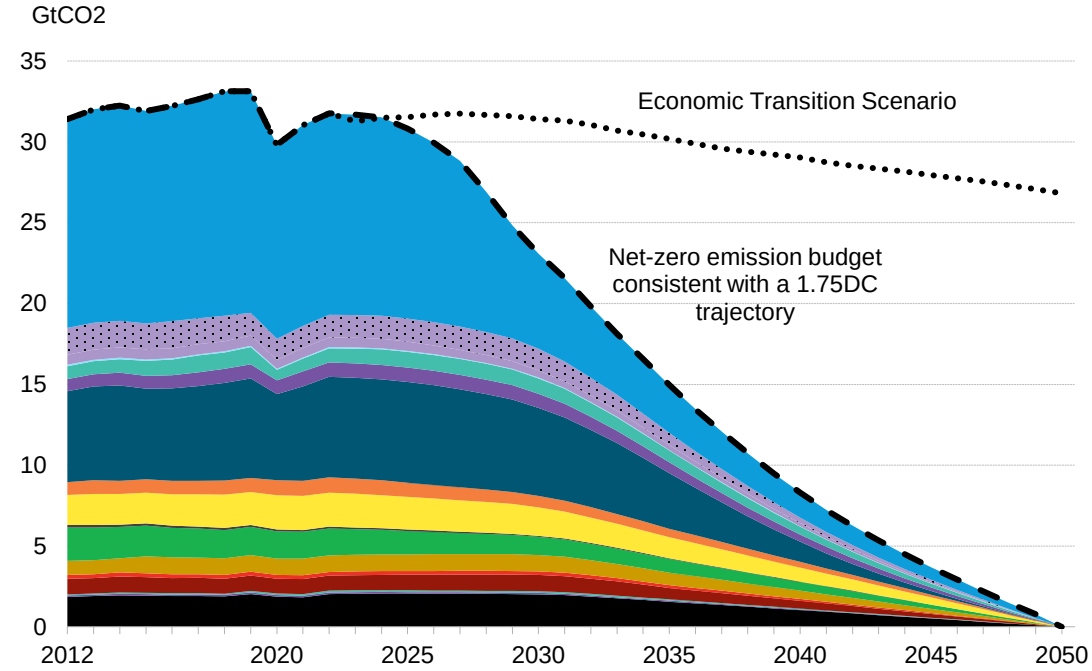


Source: BloombergNEF, IPCC

BloombergNEF

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



- Power
- Energy industry
- Other
- Aviation
- Shipping
- Road
- Commercial
- Residential
- Other Industry
- Petrochemicals
- Cement
- Aluminum
- Steel

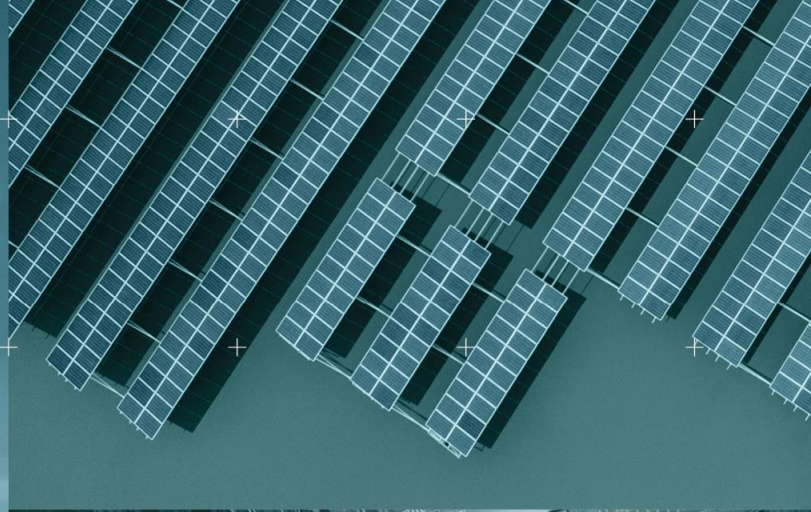
Principles behind sectoral emissions budgets

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

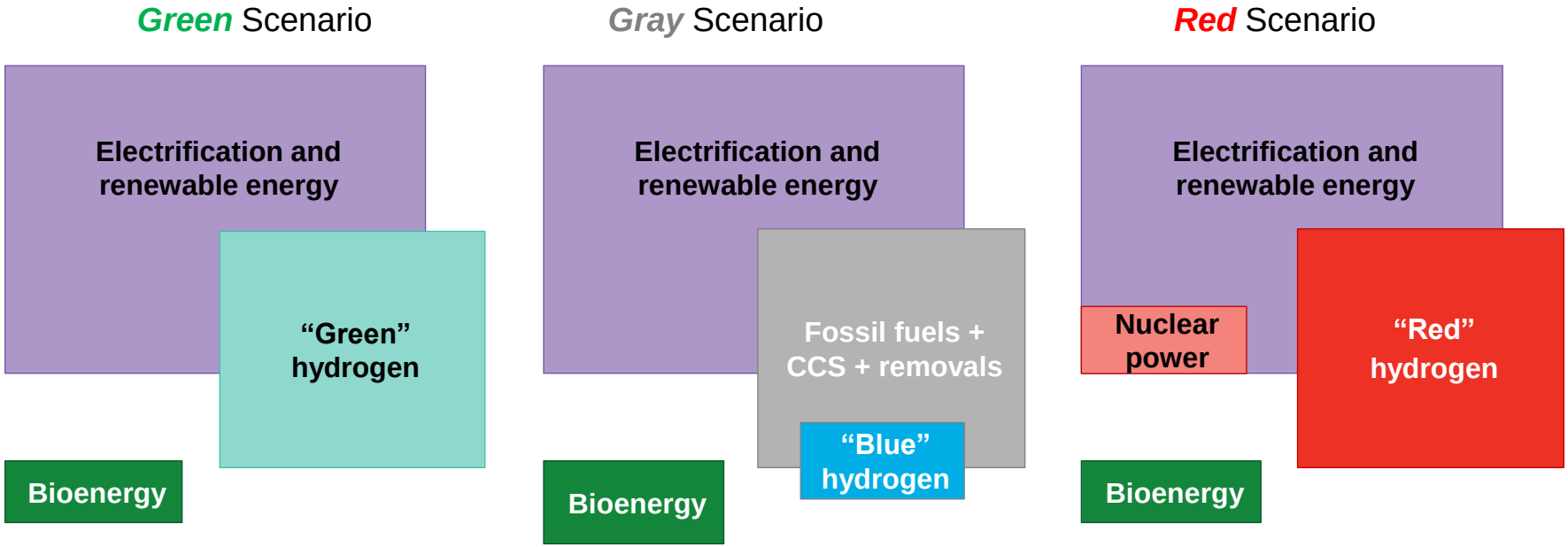
Source: BloombergNEF

BloombergNEF

Net zero scenarios



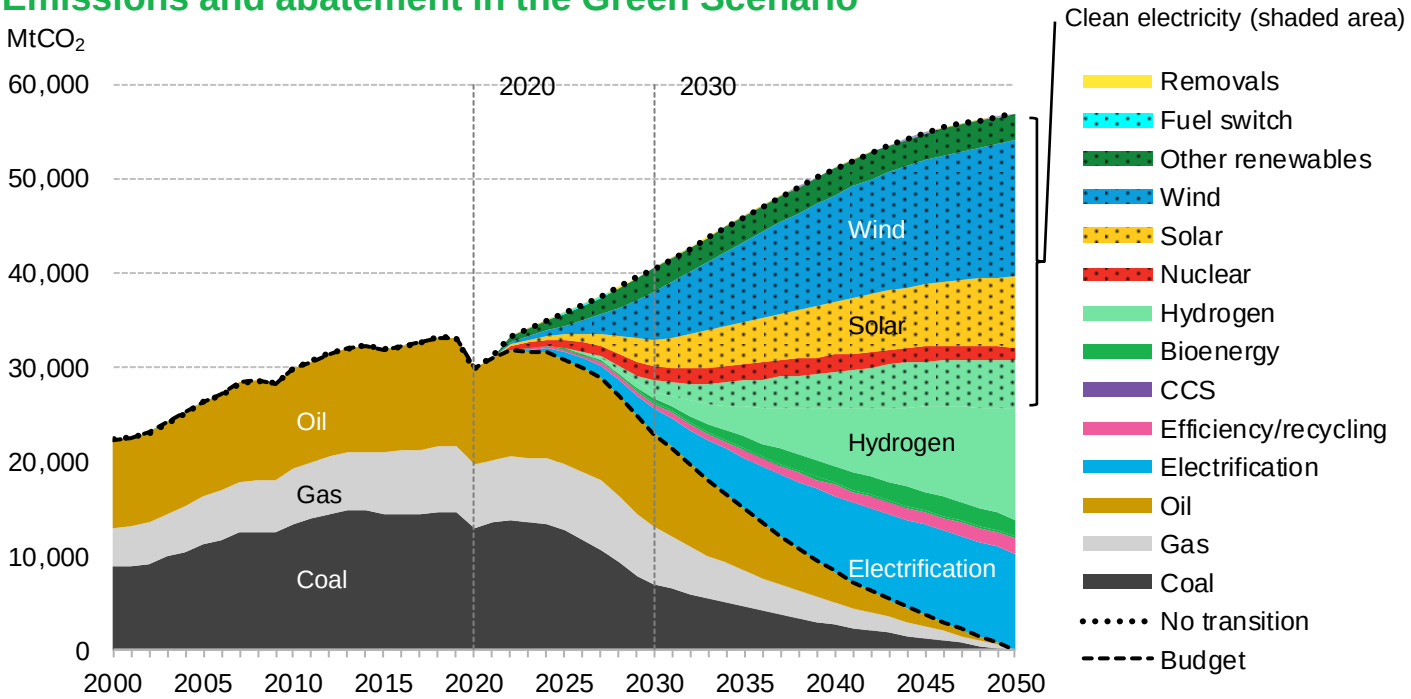
Three pathways to meet the carbon budget



BloombergNEF

Green Scenario: clean power, electrification and hydrogen drive abatement

Emissions and abatement in the Green Scenario

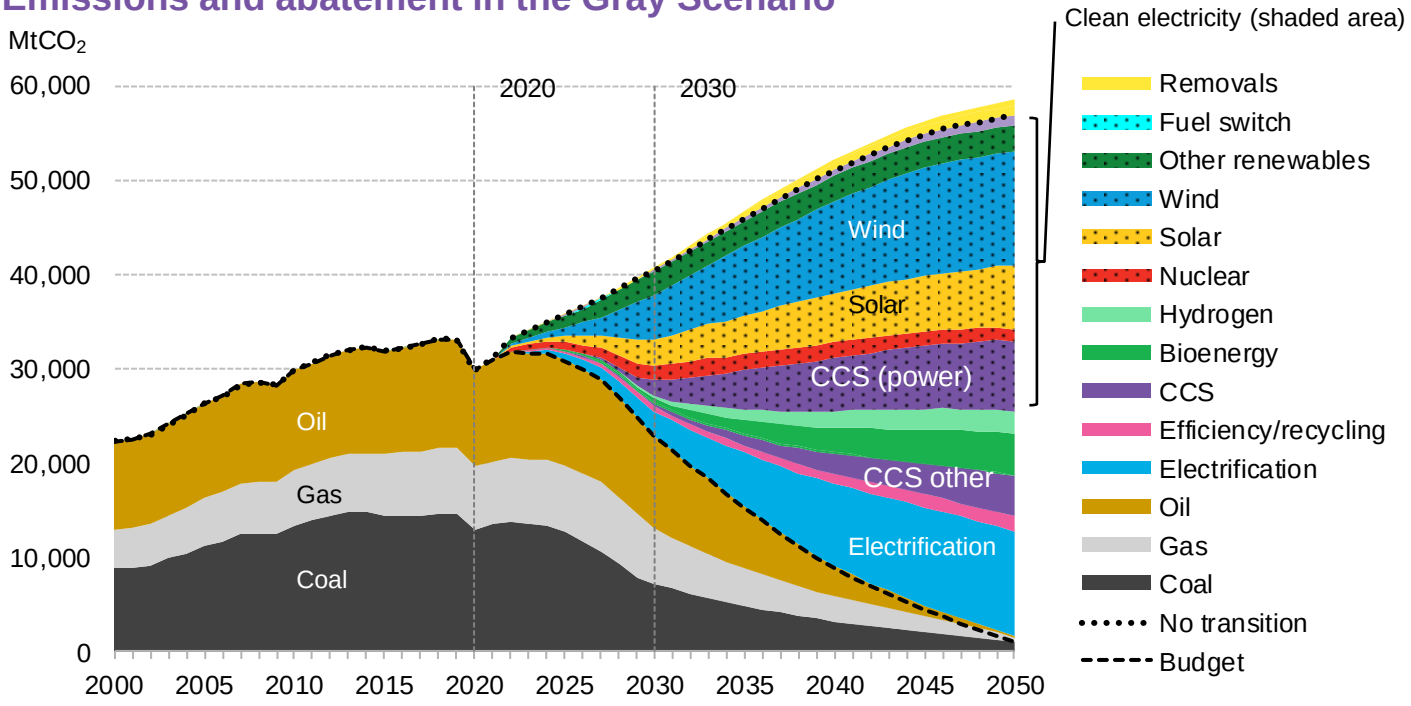


Source: BloombergNEF

BloombergNEF

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

Emissions and abatement in the Gray Scenario

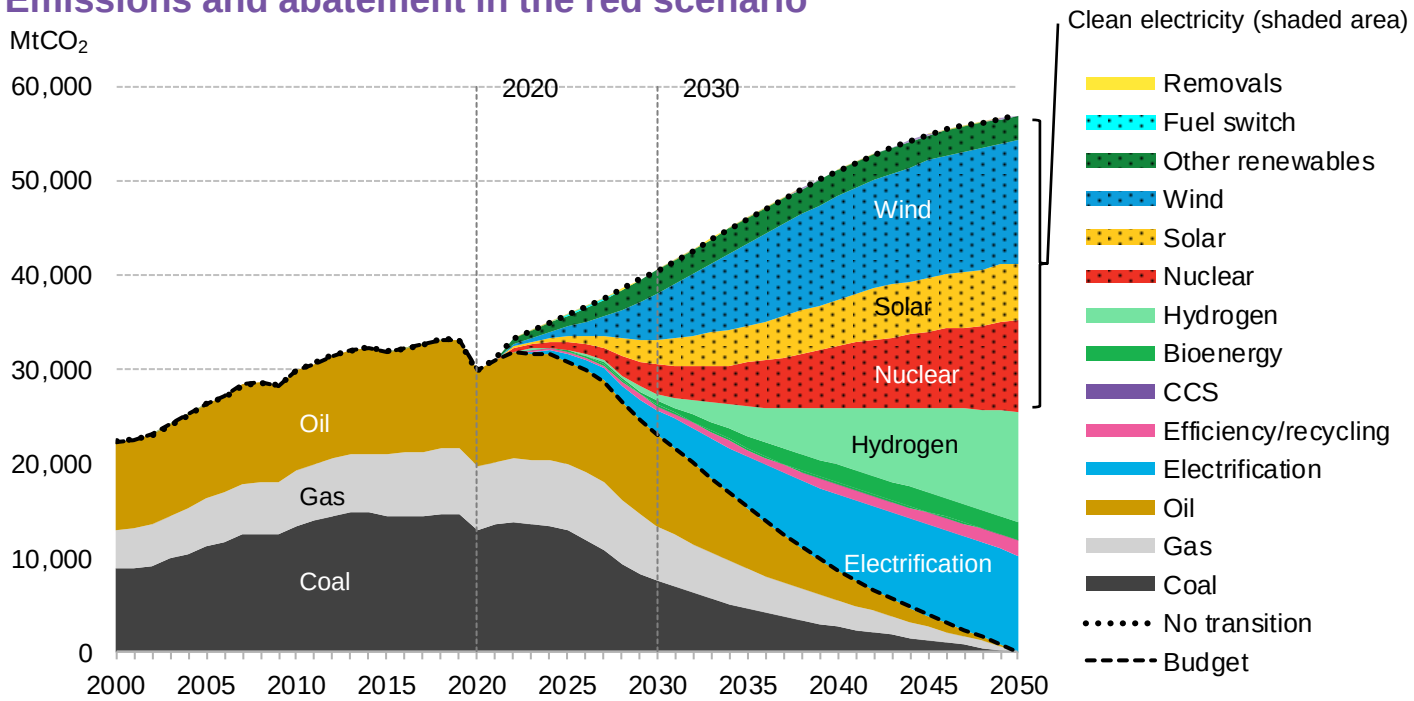


Source: BloombergNEF

BloombergNEF

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

Emissions and abatement in the red scenario

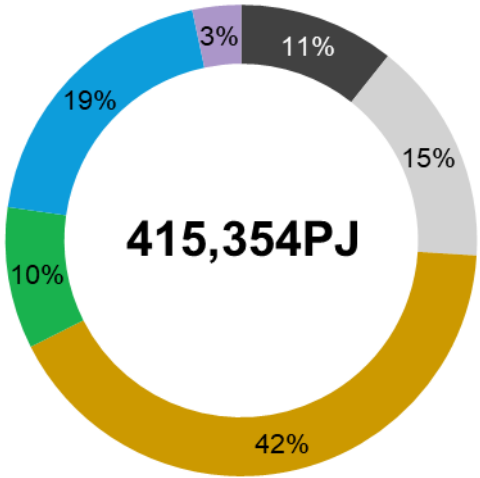


Source: BloombergNEF

BloombergNEF

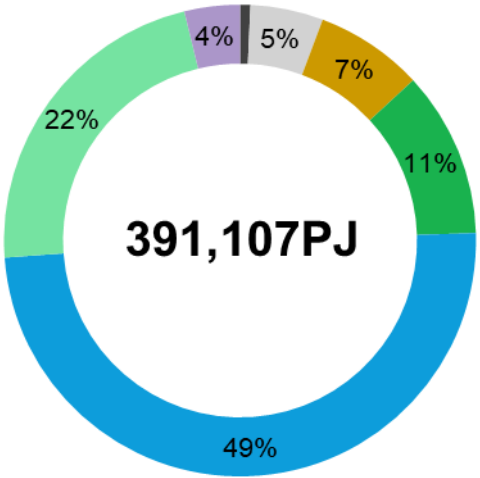
Final energy consumption: electricity approaches 50% share

2019



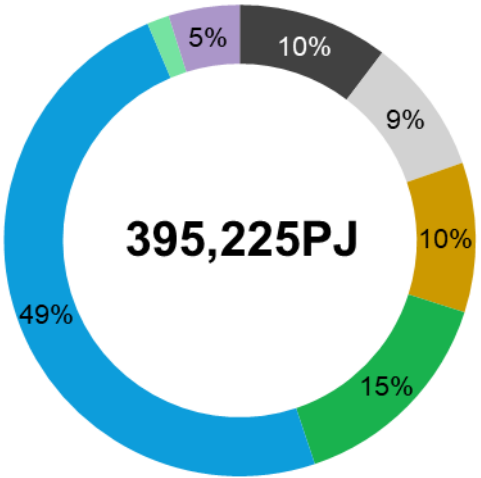
Source: BloombergNEF

2050: Green & Red Scenario



Source: BloombergNEF

2050: Gray Scenario

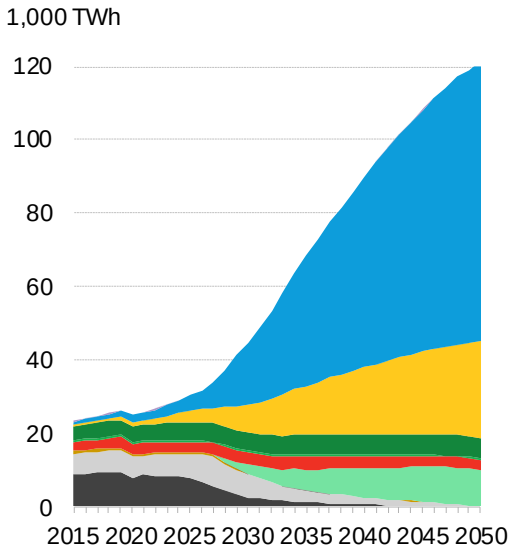


Source: BloombergNEF

BloombergNEF

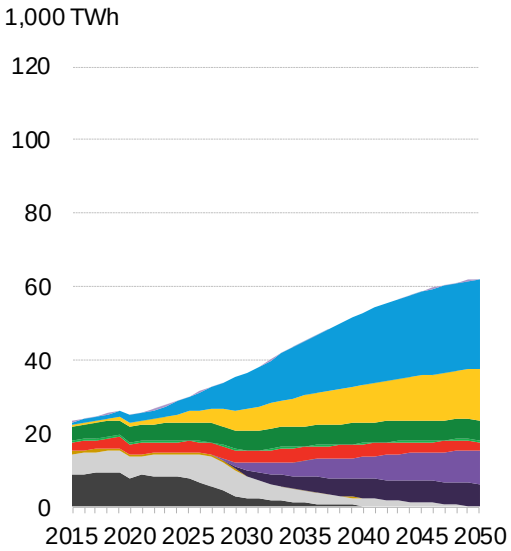
Electricity generation: varying degrees of upside

Green Scenario



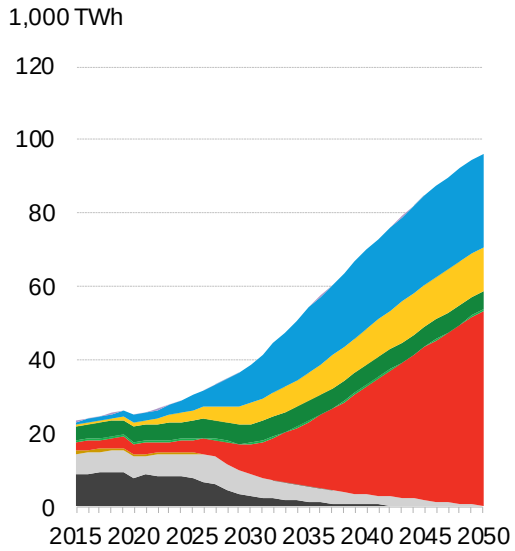
Source: BloombergNEF. Note: includes generation for end-use demand & hydrogen production.

Gray Scenario

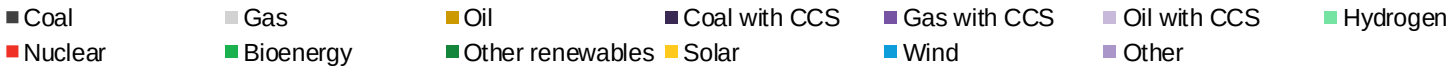


Source: BloombergNEF. Note: includes generation for end-use demand & hydrogen production.

Red Scenario



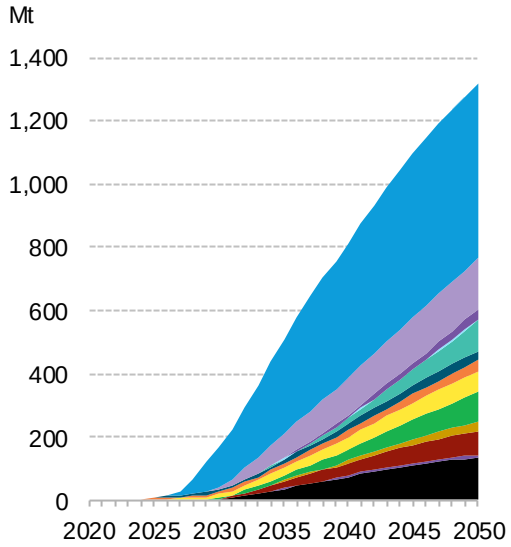
Source: BloombergNEF. Note: includes generation for end-use demand & hydrogen production.



BloombergNEF

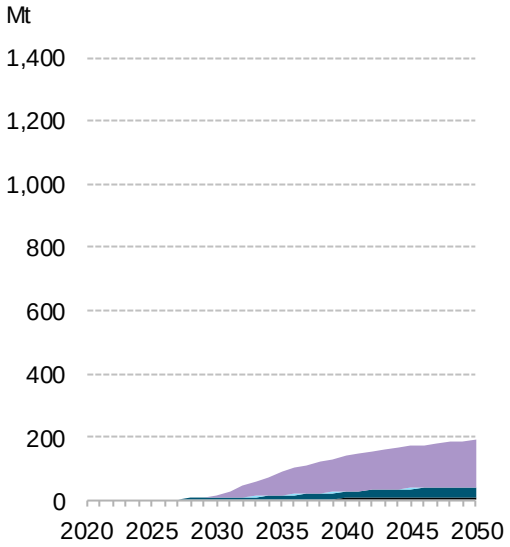
Hydrogen demand varies widely by scenario

Green Scenario



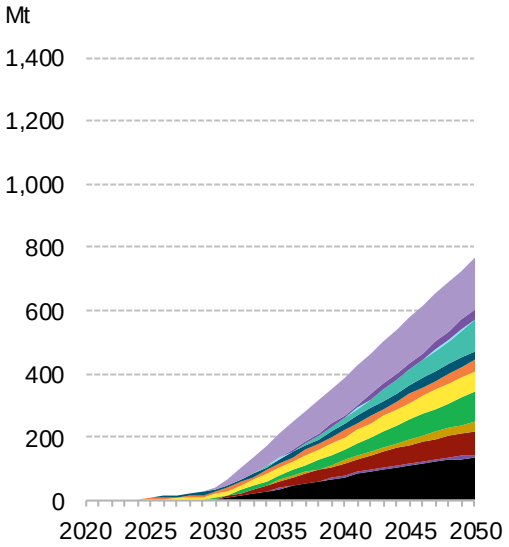
Source: BloombergNEF

Gray Scenario



Source: BloombergNEF

Red Scenario



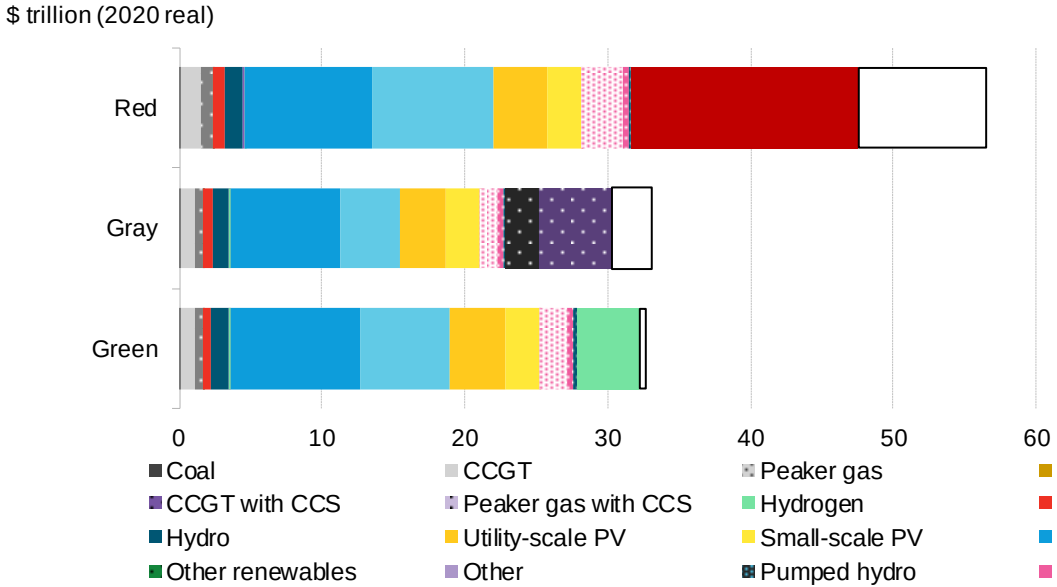
Source: BloombergNEF

BloombergNEF

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

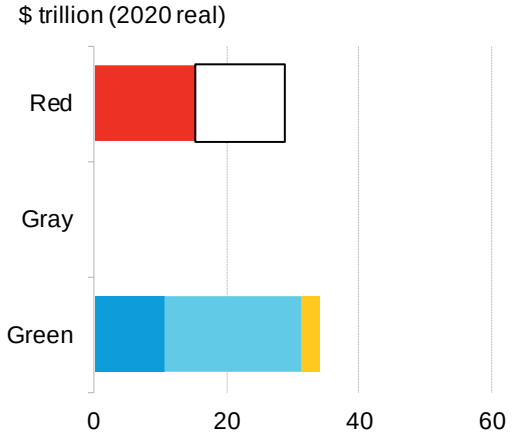
Cumulative power plant capacity investment, 2020-2050...

For end-use electricity demand



Source: BloombergNEF. Bordered series shows investment range.

For hydrogen production



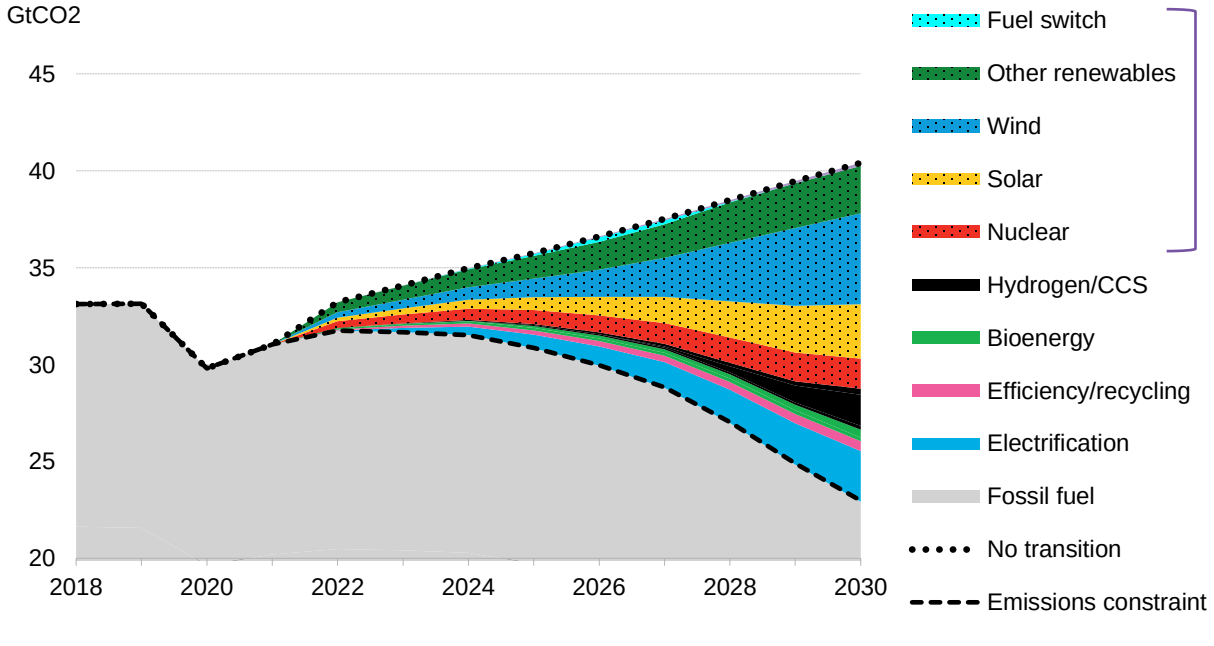
Source: BloombergNEF. Bordered series shows investment range.

BloombergNEF

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



This implies:

5x Wind deployment

3x Solar deployment

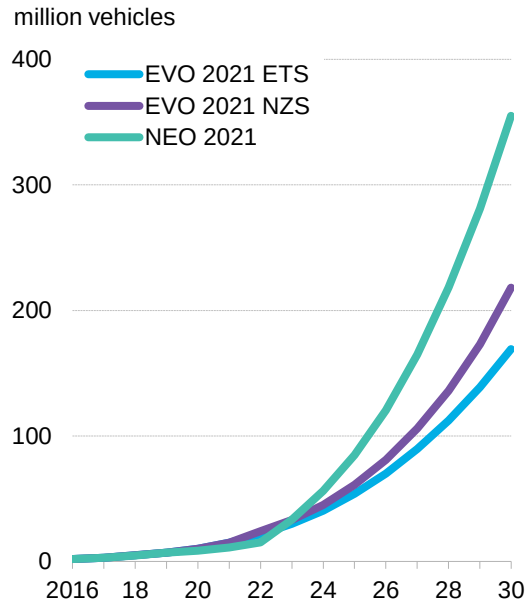
+100x Battery deployment

Source: BloombergNEF

BloombergNEF

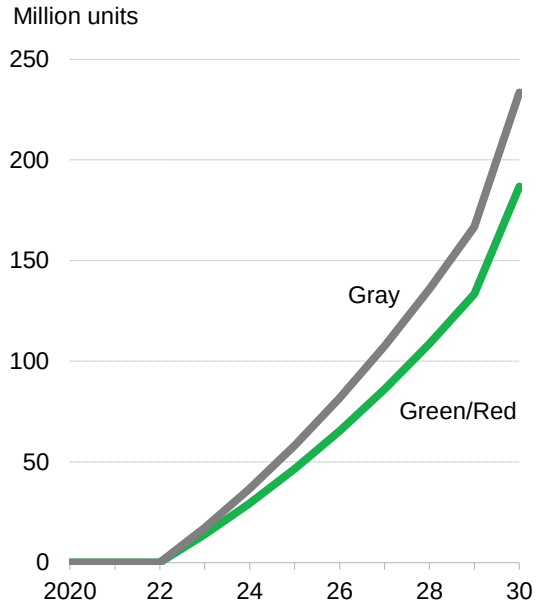
Getting on track to 2030: demand-side transformation

Passenger EV fleet



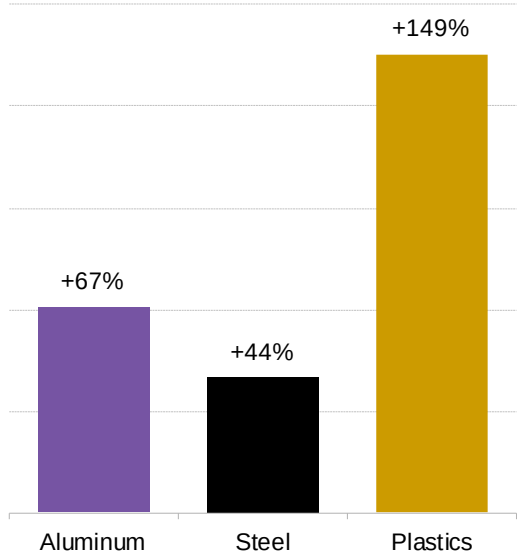
Source: BloombergNEF

Heat pump deployment



Source: BloombergNEF

Recycled materials



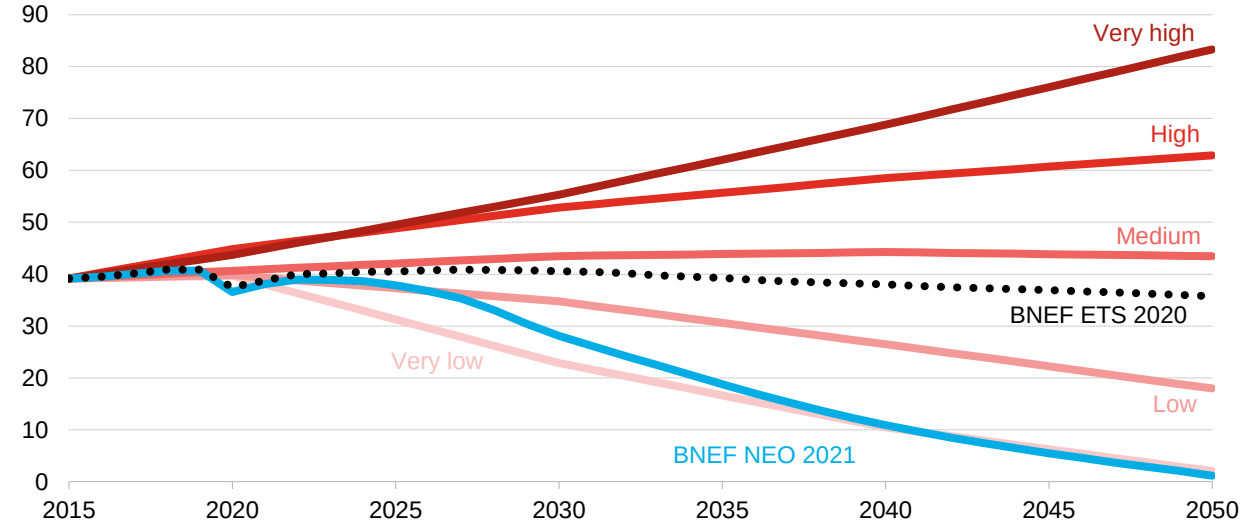
Source: BloombergNEF

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.

BloombergNEF

BloombergNEF (BNEF) is a strategic research provider covering global commodity markets and the disruptive technologies driving the transition to a low-carbon economy.

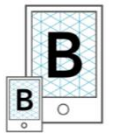
Our expert coverage assesses pathways for the power, transport, industry, buildings and agriculture sectors to adapt to the energy transition.

We help commodity trading, corporate strategy, finance and policy professionals navigate change and generate opportunities.

BloombergNEF

Albert Cheung

Get the app



On IOS + Android
about.bnef.com/mobile

Client enquiries:

Bloomberg Terminal: press <Help> key twice
Email: support.bnef@bloomberg.net

Learn more:

about.bnef.com | @BloombergNEF