SNC·LAVALIN

JUNE 2022

Decarbonising the UK power system: The Build Rate to 2035

Engineering Net Zero

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Build Rate required to meet BEIS 2035 Net Zero scenarios

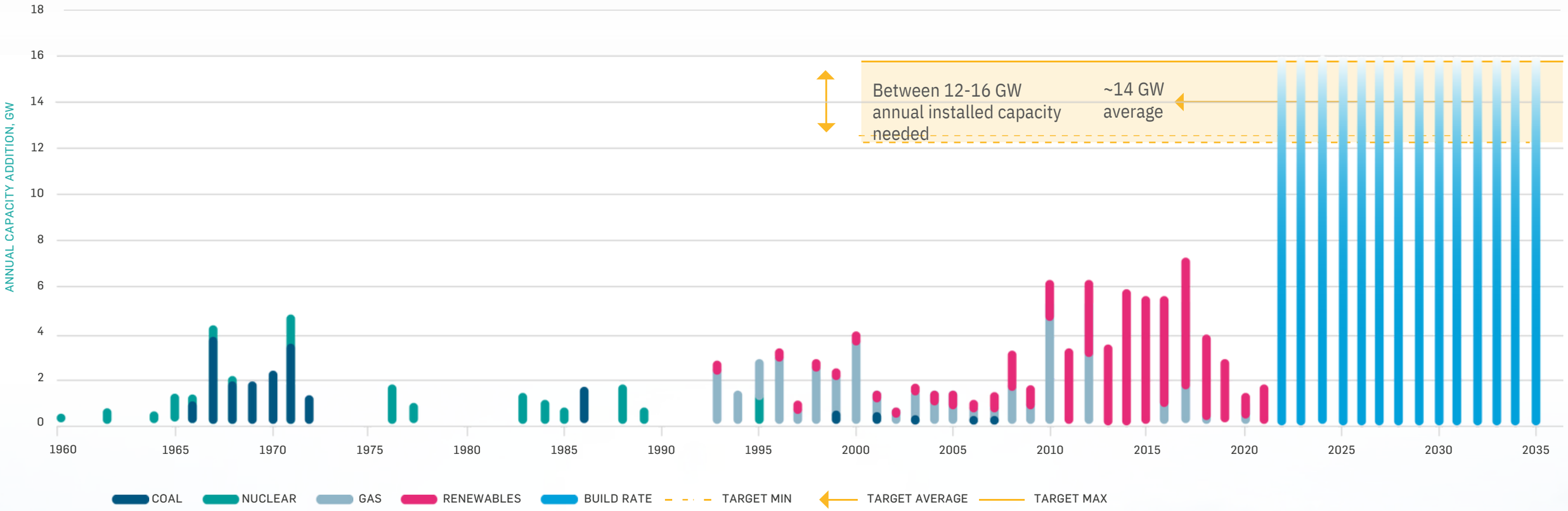


FIGURE 1 UK BUILD RATE REQUIRED TO MEET UK GOVERNMENT 2035 DECARBONISATION TARGETS FOR POWER, BASED ON BEIS SCENARIOS

Atkins' analysis of required build rate to achieve average 14GW of generating capacity onto the UK electricity grid and achieve 2035 power system decarbonisation target.

Data Sources

Historical Build rates recovered from:

» Mapped: How the UK generates its electricity - Carbon Brief, October 2015

» Nuclear Development in the United Kingdom | UK Nuclear Energy Development, October 2016

» Table 5.7, main chapters and annexes A to D dataset from Digest of United Kingdom Energy Statistics (DUKES) - BEIS, July 2021

» Renewable electricity capacity and generation (ET6.1 quarterly) from Energy Trends: UK Renewables - BEIS, March 2022

Future build rate calculated:

» as per Annex O supplementary data: Total electricity generating capacity from Energy and Emissions Projections: Energy and emissions projections: Net Zero Strategy baseline (partial interim update December 2021) - BEIS, March 2022

» Further information available in Sources and Assumptions Table 1

2020 Build Rate analysis: Decarbonising the power system by 2050

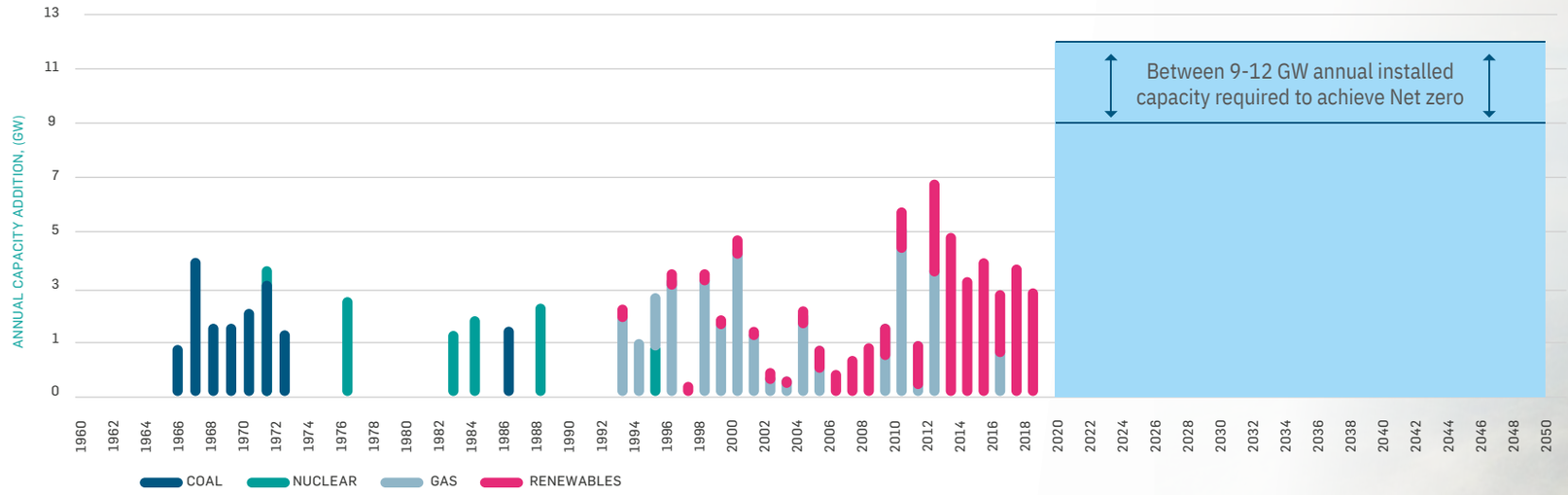


FIGURE 2 2020 BUILD RATE ANALYSIS: DECARBONISING THE POWER SYSTEM BY 2050

Previous build rate chart published by Atkins in July 2020, demonstrating the change in energy demand due to targets being brought forwards and minimal capacity brought online since its publication.

Data Sources

» Historical Build rates recovered from Mapped: How the UK generates its electricity - Carbon Brief, October 2015

» Build rate estimation (9-12 GW) recovered from the Further Ambition scenario of Net Zero - The UK's contribution to stopping global warming - Climate Change Committee (theccc.org.uk), May 2019

» More discussion on the Atkins 2020 Build rate estimation – The Race to Net Zero report - SNC-Lavalin, July 2020

Sources & Assumptions

GW	CAPACITY, GW	NECESSARY TO BUILD BETWEEN 2022 AND 2035, GW	BUILD RATE, GW/YEAR
End of 2021: existing 2035	108	N/A	N/A
predictions: low to high scenarios	218-262	159-203 (including expected loss of 49.04 to decommissioning between 2022 and 2035)	12.2-15.6

The current power system is composed of circa 108 GW of generating capacity. In a stark comparison, the 2035 system, as modelled by the Government in the recent Net Zero Scenarios, requires more than twice the installed generation capacity - between 218-262 GW. This is intended to meet an increase in electrical demand, corresponding to Government lower and higher demand scenarios. Taking into account decommissioning of circa 49 GW of assets between now and 2035, the result is between 159-203 GW new build capacity required, or 12.2-15.6 GW/year.

Data Sources

» Existing capacity from table 5.7 in DUKES 2021: main chapters and annexes A to D dataset from Digest of United Kingdom Energy Statistics BEIS, July 2021
» 2035 required capacity – Annex O supplementary data: Total electricity generating capacity from Energy and Emissions Projections: Net Zero Strategy baseline (partial interim update December 2021) - BEIS, March 2022
» Decommissioned capacity – estimated between Annex K and Annex L from Energy and Emissions Projections: Net Zero Strategy baseline (partial interim update December 2021) - BEIS, March 2022

Predicted energy capacity required per energy source by 2035, based on BEIS Net Zero scenarios

	2035
GW	RANGE FROM NET ZERO LOWER DEMAND TO NET ZERO HIGHER DEMAND
Coal	0
Nuclear	8-11
Gas	44-52
Renewables	127-171
CCUS	8-13
Hydrogen	0-6
Storage	21-24
Min and max 2035 values	218-262
Average 2035 value	240

Notes:

» Data from Annex O supplementary data: Total electricity generating capacity from Energy and Emissions Projections: Net Zero Strategy baseline (partial interim update December 2021) - BEIS, March 2022

» Historical data (1960-2020) collated from Carbon Brief and first reported in Race to Net Zero report, July 2020

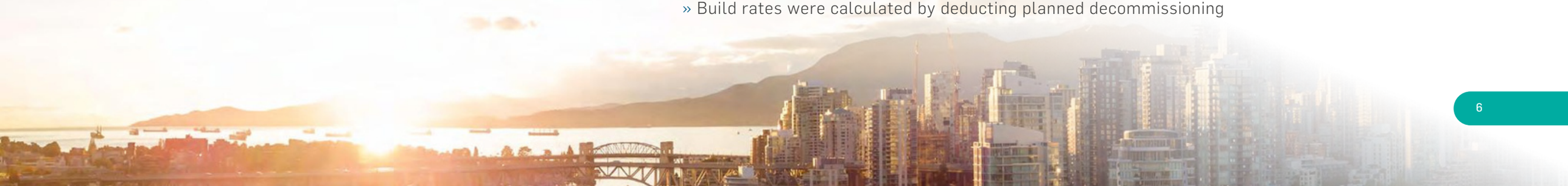
» 2020 build rate numbers recovered from table 5.7 in DUKES 2021: main chapters and annexes A.to D dataset from DUKES 2021 - BEIS, July 2021

» 2021 build rate numbers recovered from Renewable electricity capacity and generation (ET6.1 quarterly) from Energy Trends: UK Renewables - BEIS, March 2022

» Decommissioning rate between now and 2035 was calculated using Energy and Emissions Projections (EEP) latest issue baseline scenario. This is based on existing government policies, offering a reliable estimation of decommissioning works in the next 13 years.

» 2035/2050 installed capacity targets were averaged across the EEP 2022 four scenarios: 1. low demand without hydrogen, 2. low demand with hydrogen, 3. high demand without hydrogen and 4. high demand with hydrogen.

» Build rates were calculated by deducting planned decommissioning

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