



# The Ten Point Plan for a Green Industrial Revolution

19<sup>th</sup> November 2020

# Summary of Aurora insights from the Ten Point Plan

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- The CO<sub>2</sub> emissions reductions targeted in the plan could reduce UK emissions by 5% for 2023-2032 compared with existing policies
- However, this will not be enough to stop the UK exceeding its 4<sup>th</sup> and 5<sup>th</sup> carbon budgets
- Commissioning enough offshore wind to reach 40GW by 2030 remains a challenging target, and will require 4GW of deployment a year in the late 2020s, 4 times the historical average
- Hydrogen is likely to be a necessary part of a net zero emissions system
  - We agree with the government's estimate that their target of 5GW by 2030 will need about £4bn of private investment
  - We think the government's estimated saving of 41MtCO<sub>2</sub> between 2023 and 2032 is plausible if mostly 'blue' hydrogen (from methane reformation) is produced
  - Blue hydrogen production capacity is likely to see higher utilisation (and hence more emissions savings per GW) than 'green' hydrogen from electrolysis
- The government has yet to confirm a funding approach for new large-scale nuclear, but bringing online the two next most likely projects (Sizewell C and Wylfa) would add 6GW of capacity and could displace 14MtCO<sub>2</sub> a year, a third of 2019 power sector emissions
- We estimate that bringing forward the ban on sales of petrol and diesel cars to 2030 could lead to an extra 9m cars going electric and save over 90MtCO<sub>2</sub> over their lifetimes

# The PM's Ten Point Plan promises a “Green Industrial Revolution” to cut emissions and boost growth

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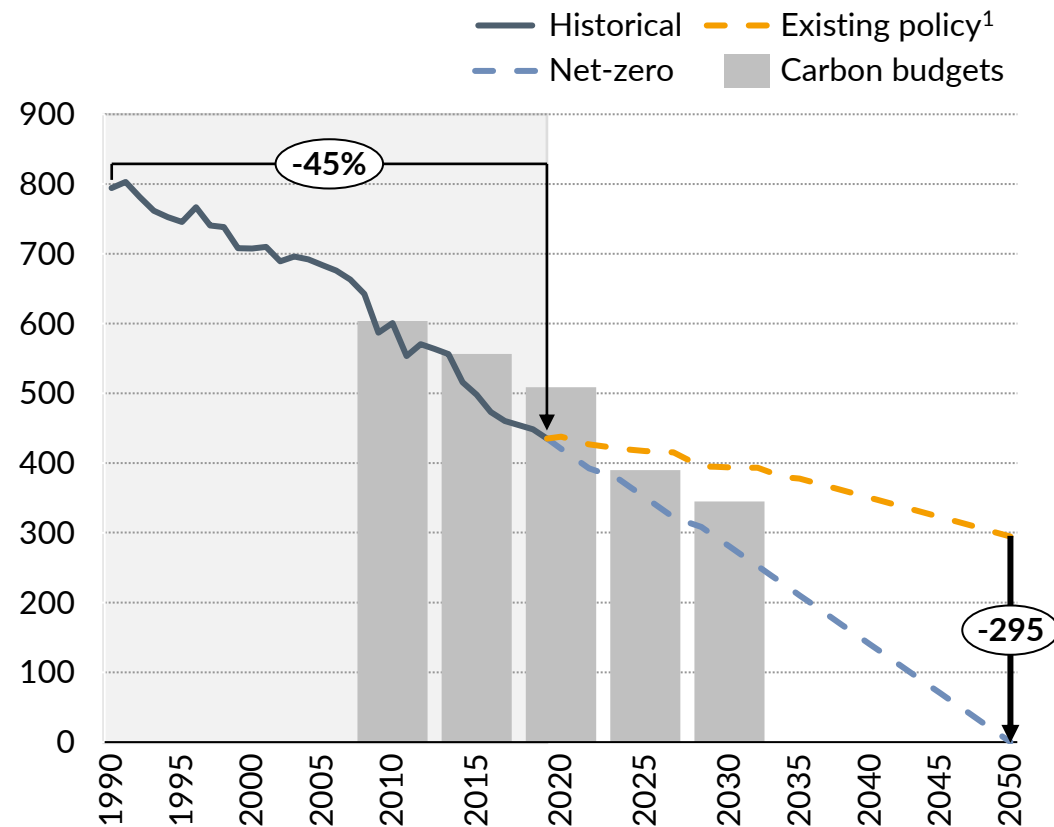
- The Ten Point Plan provides a taste of the upcoming White Paper, which will set out the government's policies for the energy sector
- We expect the main objectives of the White Paper to be:
  - **Decarbonisation:** reducing carbon emissions to hit the “net zero” target by 2050
  - **Energy security:** ensuring a reliable energy system and keeping the lights on
  - **Energy affordability:** providing the future system at reasonable costs to consumers
  - **Green industrial growth:** providing jobs and growth across the UK
- The first three of these (the so-called “Energy Trilemma”) have been central to energy policy for many years; the fourth has seen its importance increase in the context of the pandemic and the government's “levelling up” agenda

# The UK has decarbonised fast so far, but existing policy would see it miss its net zero target by 295 MtCO<sub>2</sub>e

## Total Greenhouse Gas Emissions

Excluding aviation and shipping











MtCO<sub>2</sub>e



- The UK has seen a 45% decline in emissions since 1990
- It has beaten all of its carbon budgets to date
- This has been driven by a switch from coal to gas in power generation
- Further abatement efforts will be increasingly challenging
- Under existing policy, the Committee on Climate Change expects the UK to miss its 4<sup>th</sup> and 5<sup>th</sup> Carbon budgets, and to miss its Net Zero target by 295 MtCO<sub>2</sub>e per year<sup>1</sup>
- The new Ten Point Plan seeks to improve this outlook

1: Extrapolated from BEIS projections which end in 2035, using estimated net carbon account as published in CCC's 2020 Progress Report; not accounting for announcements in Ten Point Plan

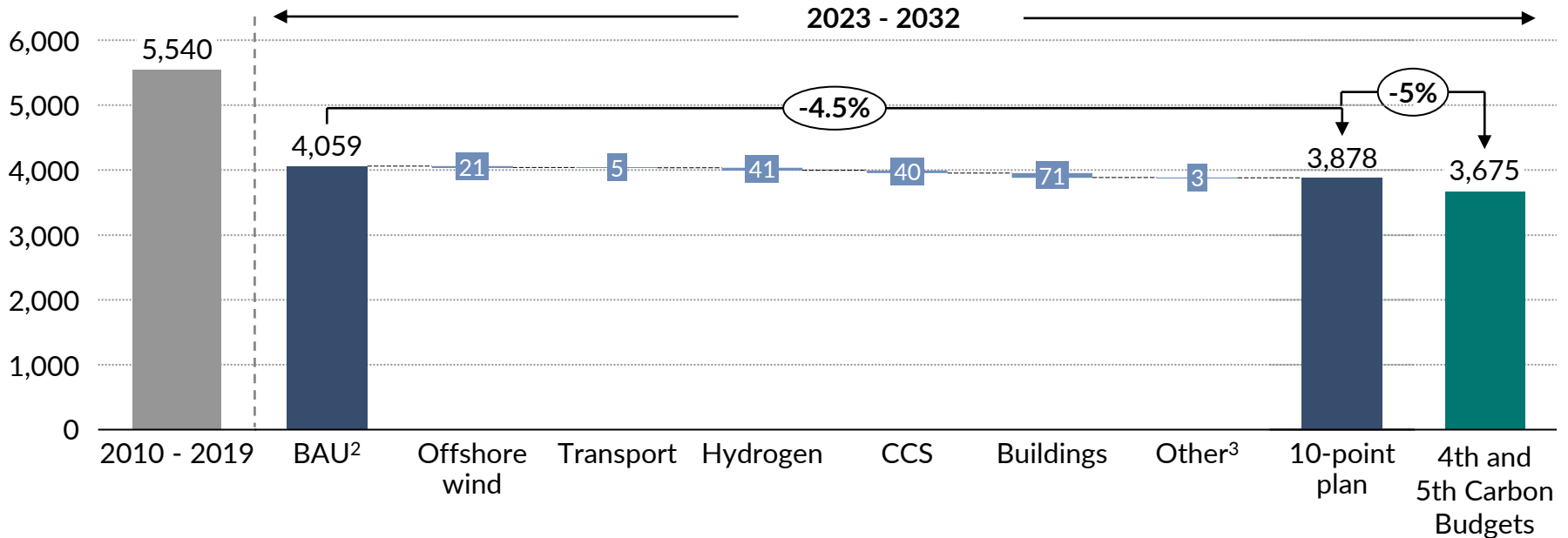
# The 10-Point Plan details targets for different sectors and aims to create and support up to 250,000 jobs

	Ten-Point Plan	Previously announced
 Offshore wind	40 GW of Offshore Wind by 2030, supporting up to <b>60,000 jobs</b>	Queen's speech/Conservative Manifesto: same target
 Hydrogen	Develop 5 GW of low carbon hydrogen production by 2030 alongside other targets, backing up to <b>8,000 jobs</b>	Innovation fund: £70m for low-carbon hydrogen production announced
 Nuclear	Up to <b>£215m</b> to Small Modular Reactors and <b>£170m</b> to Advanced Modular Reactors, backing <b>10,000 jobs</b>	£40m to develop AMR projects and smaller nuclear technologies
 Electric vehicles	<b>Ban new petrol</b> and diesel vehicles by 2030, and <b>£1.3bn</b> to rollout charging infrastructure	Ban of new petrol and diesel vehicles from 2040 onwards
 Public transport	<b>£5bn</b> towards cycling, walking and buses, and invest <b>£120m</b> this year to introduce at least <b>4,000</b> more zero emission buses	£5bn for buses, cycling and walking improvements
 Jet Zero and maritime	<b>£20m</b> to Clean Maritime Demonstration Programme and <b>£15m</b> to FlyZero for development of clean technology	£400m to support development of low emission aviation
 Homes & buildings	<b>£1bn</b> for schemes aimed to increase energy efficiency, install 600,000 heat pumps every year by 2028, all which are expected to create <b>50,000 jobs by 2030</b>	Summer statement: £1bn towards energy efficiency in buildings and £2bn towards Green Homes Grant
 Carbon capture	<b>£1bn</b> to create <b>2 industrial clusters by mid 2020s</b> and 4 by 2030 to remove <b>10 MT of CO<sub>2</sub></b> by 2030	UK government has invested over £130m since 2011 in R&D for CCS
 Nature	<b>£40m</b> for second round of Green Recovery Challenge fund and <b>£5.2bn</b> for flood and coastal defences	March budget meeting: Plant 30,000 hectares over the next five years
 Innovation and Finance	<b>£1bn</b> to the Net Zero Innovation Portfolio and making London the global centre of green finance	Not Applicable

# The 10-point plan should reduce emissions 5% from BAU, but does not get UK to meet its 4<sup>th</sup> & 5<sup>th</sup> Carbon Budgets

Estimated reduction in annual GHG emissions from quantifiable policies announced in the 10-Point Plan<sup>1</sup>

MtCO<sub>2</sub>e



Sector	Offshore wind	Transport	Hydrogen	CCS	Buildings	Nature
Announced policy in 10-Point Plan	40 GW by 2030	Ban on combustion engines from 2030, hybrids from 2035	5 GW 'low-carbon' H <sub>2</sub> production capacity by 2030	Removal of 10MtCO <sub>2</sub> e per year by 2030	600,000 heat pumps annually from 2028	30,000 hectares of trees each year

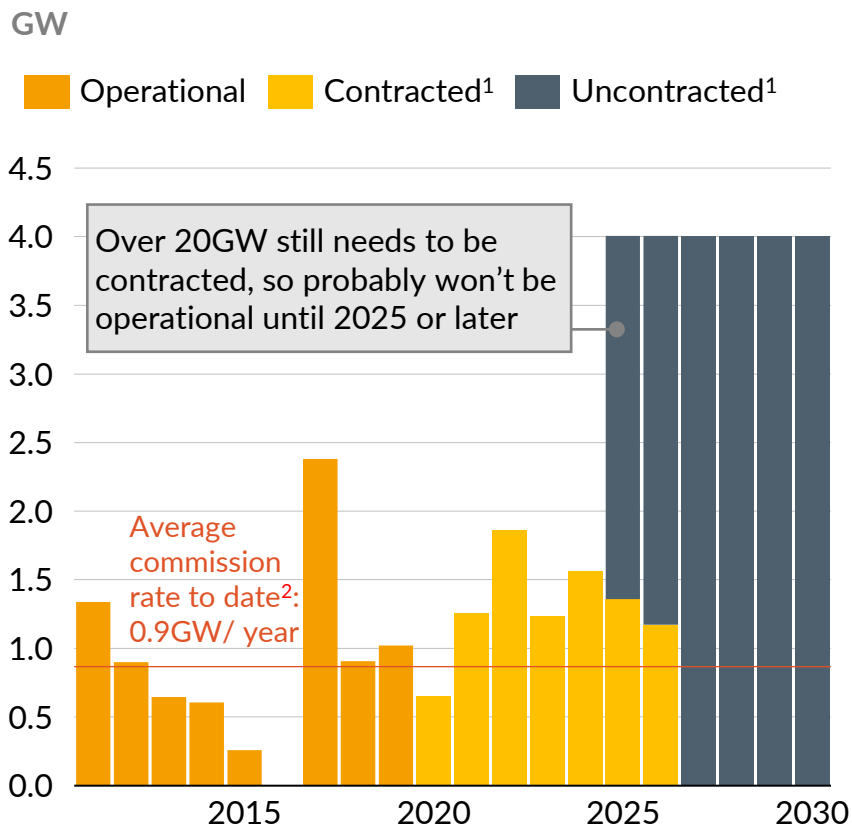
1: As laid out in The Ten Point Plan for a Green Industrial Revolution. Cumulative numbers shown.

2: Emissions under existing policies, based on estimated net carbon account as published in CCC's 2020 Progress Report.

3: Includes Nature, Green Public Transport, Cycling and Walking, Jet Zero and Green Ships.

# Reaching 40GW of offshore wind by 2030 will need much faster deployment and about £50bn investment

## Offshore wind commissioned per year



## Implications of offshore wind policy

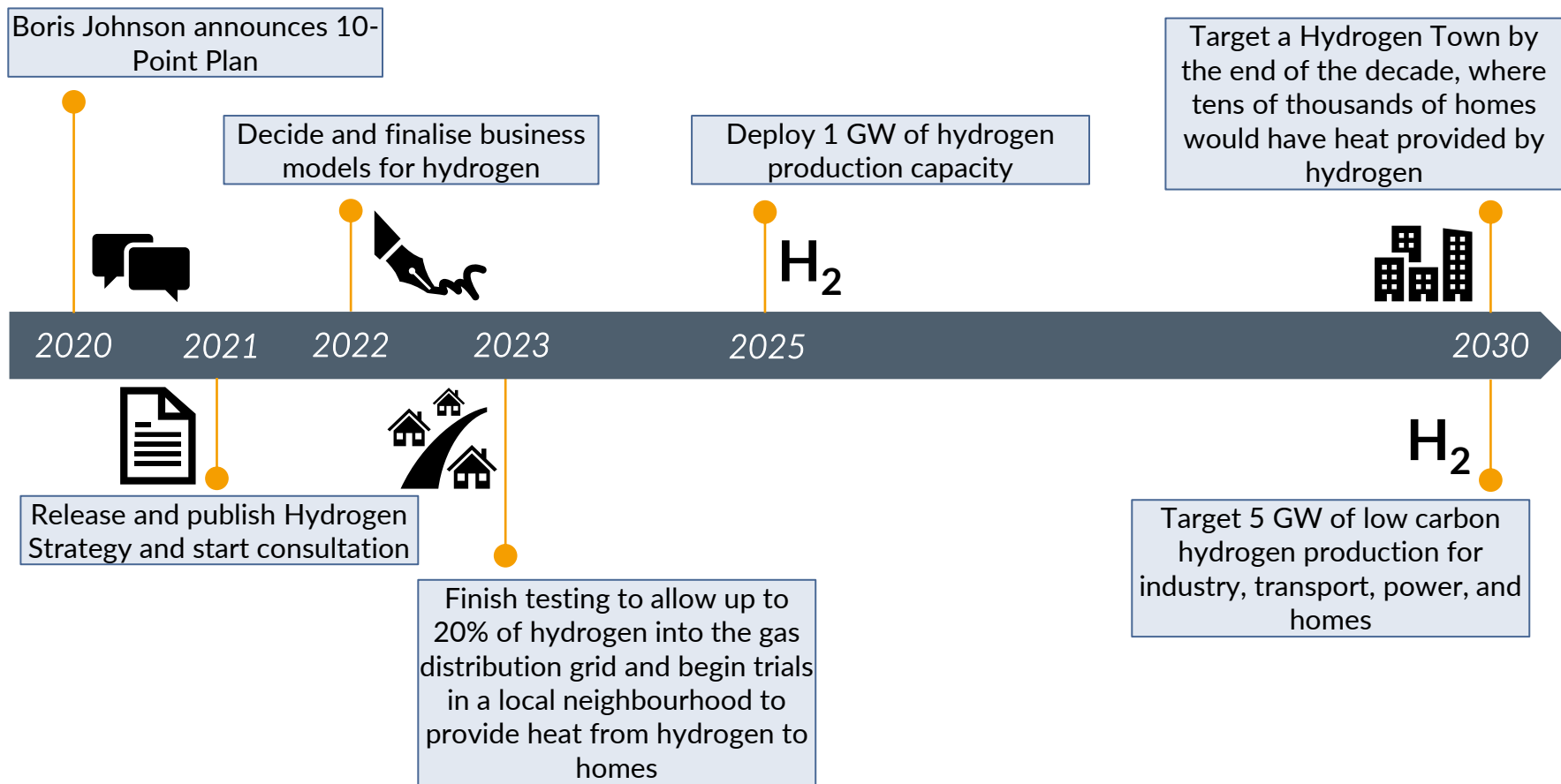
- To raise financing and begin construction, offshore wind farms usually need support in the form of a Contract for Difference (CfD)
- To reach 40GW by 2030, over 20GW still needs to be contracted
- Including sites with and without contracts, a total investment of about £50bn will be needed
- Contracting to commissioning can take over 5 years, so more than 4GW a year will need to be commissioned from 2025 onwards
- That would mean installing more than six 12MW turbines every week for 6 years
- Very large volumes of offshore wind will tend to push down wholesale prices but push up subsidy costs: we expect the net effect to be a small saving for consumers

1: "Contracted" means the wind farm has a contract like a CfD and "uncontracted" means it does not.

2: Rate from 2011 to 2019.

# A roadmap has been laid out to develop hydrogen infrastructure and production over the next decade

*£240m will be dedicated towards developing new hydrogen production facilities, with an aim of achieving 5 GW of low carbon hydrogen production by 2030.*

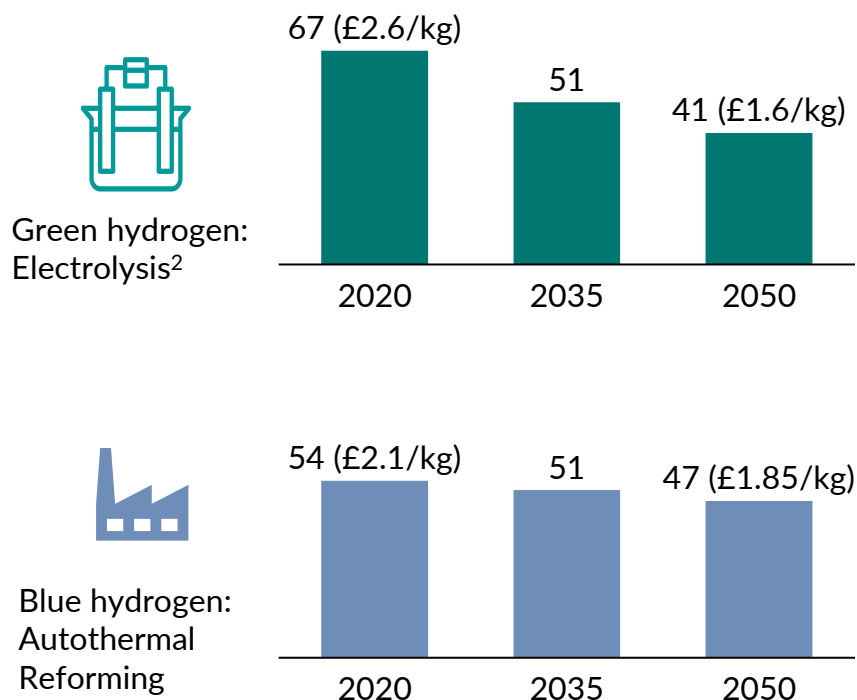




# The target of 5GW of hydrogen production by 2030 could require around £4bn of capital investment

## Levelised cost of British H<sub>2</sub> production<sup>1</sup>

£/MWh H<sub>2</sub> HHV, real 2019



1: Does not include costs for transportation and storage

2: Alkaline electrolyzers, assuming 50% power from curtailment and rest from grid

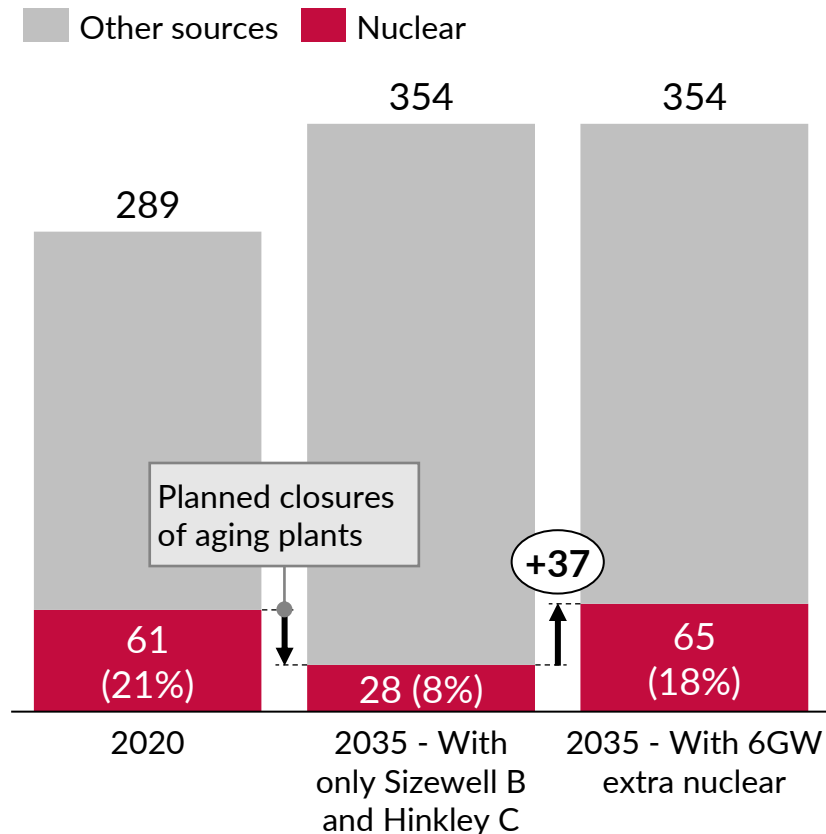
## Implications of hydrogen policy

- The Ten Point Plan targets a hydrogen production capacity of 5GW by 2030
- Hydrogen will be vital for getting to net zero:
  - It can provide a clean fuel for sectors that are difficult to electrify (e.g. heavy industry or freight transport)
  - It allows for long-term storage of energy from intermittent renewables (like wind power)
- We expect similar proportions of this hydrogen could be 'blue' (from natural gas, with carbon capture) and 'green' (from electrolysis using low-carbon electricity)
- This implies a capital investment need of around £4bn over the next decade
- We expect this capacity could produce 15TWh of hydrogen a year in 2030, which could displace 5.5MtCO<sub>2</sub> a year from burning gas
- We expect the hydrogen to be used mainly for industrial demand until the late 2030s

# Two new large nuclear plants could displace emissions equivalent to 1/3 of the 2019 power sector total

## Nuclear as a share of power generation

Annual power generated in Great Britain, TWh



1: In 2012 prices

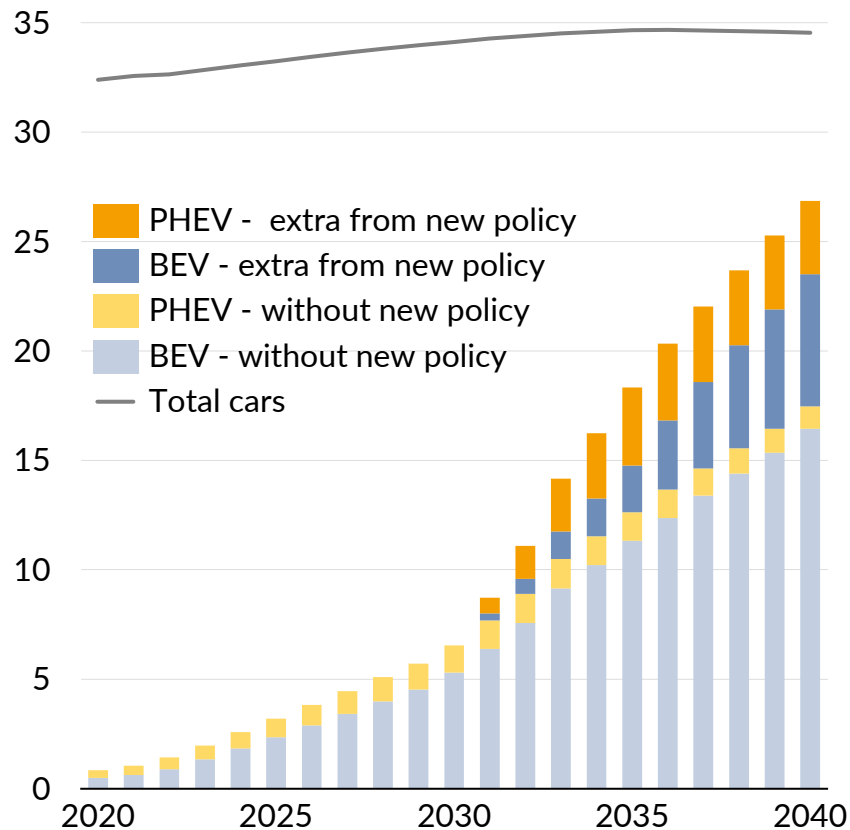
## Implications of nuclear policy

- Government is pursuing large-scale nuclear, whilst also making early investments in modular reactors
- The most likely new large-scale projects under discussion currently are Sizewell C (EDF) and Wylfa (Bechtel consortium)
- These two projects would have about 6GW of low-emission generation capacity
- Assuming this displaces gas-fired power, it would reduce emissions by 14MtCO<sub>2</sub> per year, about 1/3 of 2019 power sector emissions
- The latest new nuclear plant, Hinkley C, will receive a fixed price of £92.5/MWh<sup>1</sup> under a government Contract for Difference
- By contrast, offshore wind prices for similar contracts have fallen to around £40/MWh<sup>1</sup>
- However, nuclear is able to generate at any time, not just when it is windy, so the difference in cost of supporting the two technologies is smaller than these figures suggest

# Bringing forward the ban on sales of petrol and diesel cars to 2030 could lead to an extra 9m cars going electric

## Electric cars in GB

Millions of cars on the road



## Implications of EV policy

- With a ban on petrol and diesel car sales in 2040, we would expect there to be 17m electric vehicles in GB by that year
- The earlier ban in 2030 could lead an extra 9m cars to go electric over the decade
- Of these, 6m would be Battery Electric Vehicles (BEVs)
- We estimate lifetime exhaust emissions displaced by these BEVs at 130MtCO<sub>2</sub>
- We estimate emissions from the BEVs in battery manufacture and power generation at just over 30MtCO<sub>2</sub>
- That would lead to an emissions saving of over 90MtCO<sub>2</sub>, more than twice the 2019 GB power sector emissions of 40MtCO<sub>2</sub>

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