

Automotive Transformation

A UK Opportunity & Imperative

Ian Constance – Chief Executive Officer

Julian Hetherington - Director, Automotive Transformation

Introduction to the APC

Ian Constance- Chief Executive Officer

The current situation...



The UK has a significant automotive supply chain which needs to continue to pivot into greener technology if we are to maintain and grow skilled jobs in the UK



Meeting the UK's 2050 commitments will require continued effort to reduce the emissions of the UK transport sector



Today, transport offers the most significant opportunity to reduce UK emissions



transport as a whole accounts for 28% of UK GHG emissions



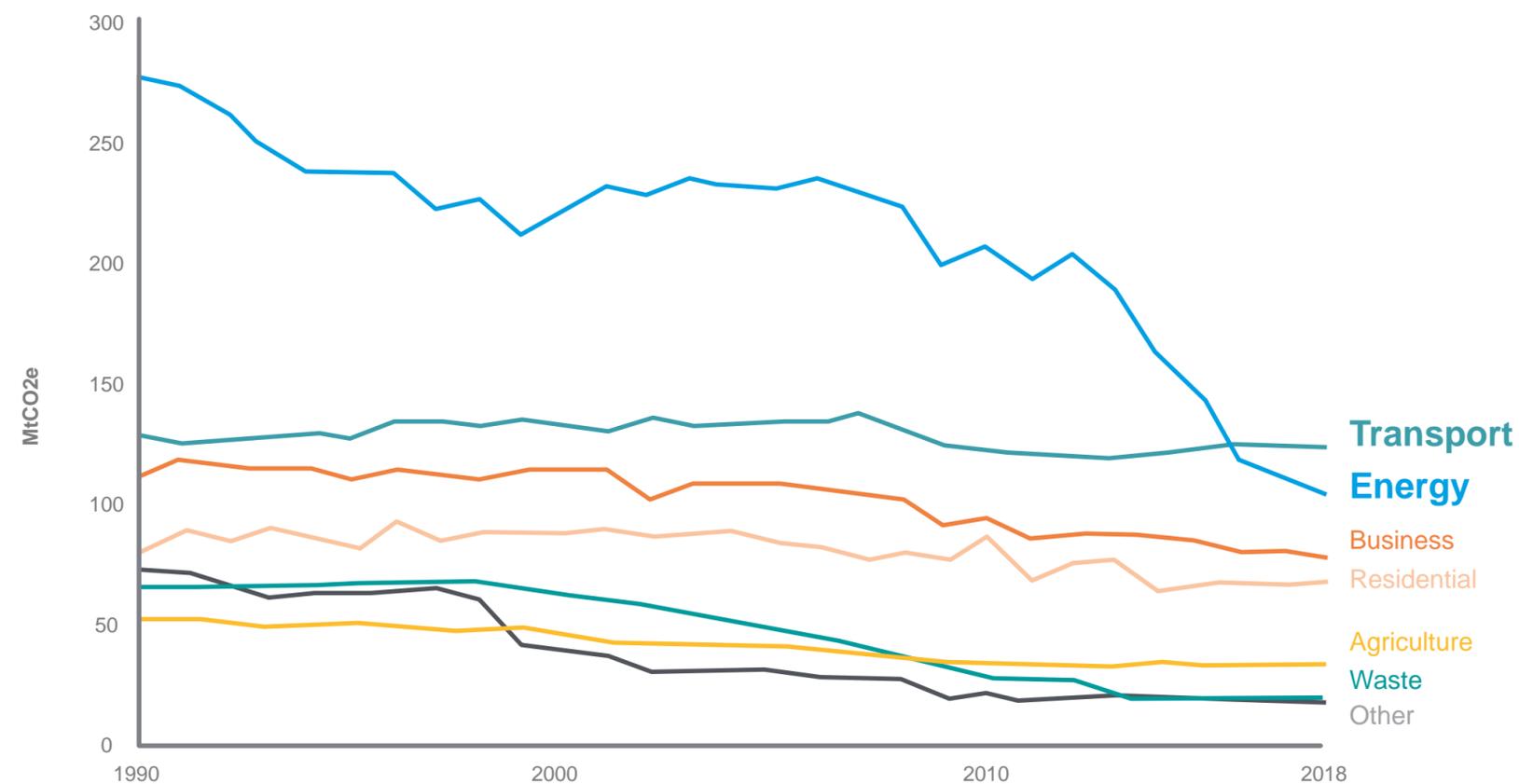
almost double the amount produced by UK homes



2034

The vehicle development cycle in the next 10 years will affect our emissions output for a nearly a quarter of a century

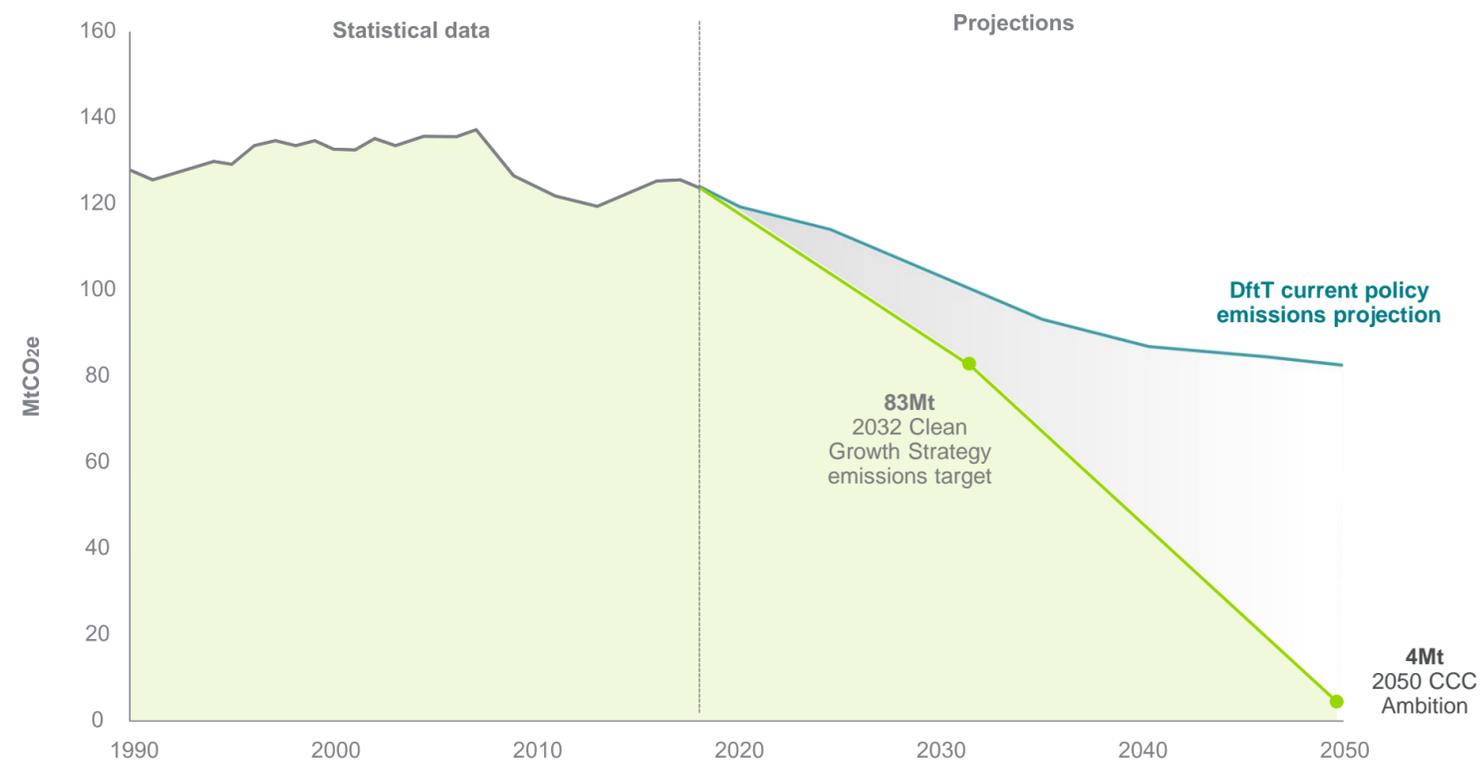
We need to act to keep up



Over the last 30 years transport has lagged behind in reducing CO2 emissions compared to energy production

The work supported through Blyth on offshore wind has helped the energy sector significantly

The pace of change required to achieve net zero is huge



If we are to achieve net zero we need to support the transition to low carbon automotive technology

SINCE 2013 THE APC HAS PLAYED A UNIQUE ROLE



Offering expertise and cutting edge knowledge

With industry experience over many years



Identifying where investment will be most effective

Mapping the future development opportunities in low carbon technologies



Creating a national network to leverage University expertise

6 Technology Spokes giving industry access to leading University facilities and academics



Building project consortia

To accelerate the development of the next generation of low carbon technologies



Ensuring match-funding support is well spent

Using a comprehensive and competitive process to identify the strongest prospects



Supporting key low carbon initiatives

Accelerating additional development in battery and autonomous vehicle technology



DELIVERING SUBSTANTIAL IMPACT



110+
low carbon
projects

290+
project partners

40,000+
Jobs created /
safeguarded

225 million+
tonnes of
CO₂ savings

1 million+
vehicles use
APC-funded technology



Automotive Transformation Fund

Julian Hetherington- Automotive
Transformation Director

Automotive is a strategically important industry in the UK



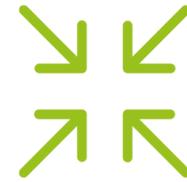
People

59,000+

Engineering and
manufacturing apprentices

823,000+

People employed in the UK
automotive industry



UK exports

1.2m

Vehicles made in the UK

80%

Of cars made in the UK
are exported

160

Export destination
countries

~1.2m

UK-made engines exported
each year



Manufacturers

£3.75 billion

Spent annually on research
and development

8 Major premium and sports car manufacturers

6 Mainstream car manufacturers

4 Commercial vehicle manufacturers

8 Bus and coach manufacturers

60+ Specialist vehicle manufacturers

9 Engine manufacturers



Automotive Transformation Fund

Launched in July 2020

- ▶ Secure the transformation to electrification of the UK automotive sector at pace
- ▶ Capital investment support for factory equipment, land, buildings and set-up costs
- ▶ Support for economic & technical compatibility feasibility studies leading to industrial investment
- ▶ Complements ongoing R&D project support programmes through regular APC competitions



Automotive Transformation Fund

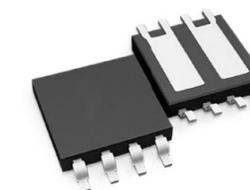
Supporting industrialisation and scale-up of:



Batteries



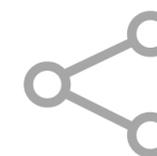
Motors &
Drives



Power Electronics



Fuel Cells



Supply Chain

How we can help – a customised package of support



Understanding the opportunity



Building partnerships and
finding customers



Building your project proposal



Securing facilities and finance



Building the team



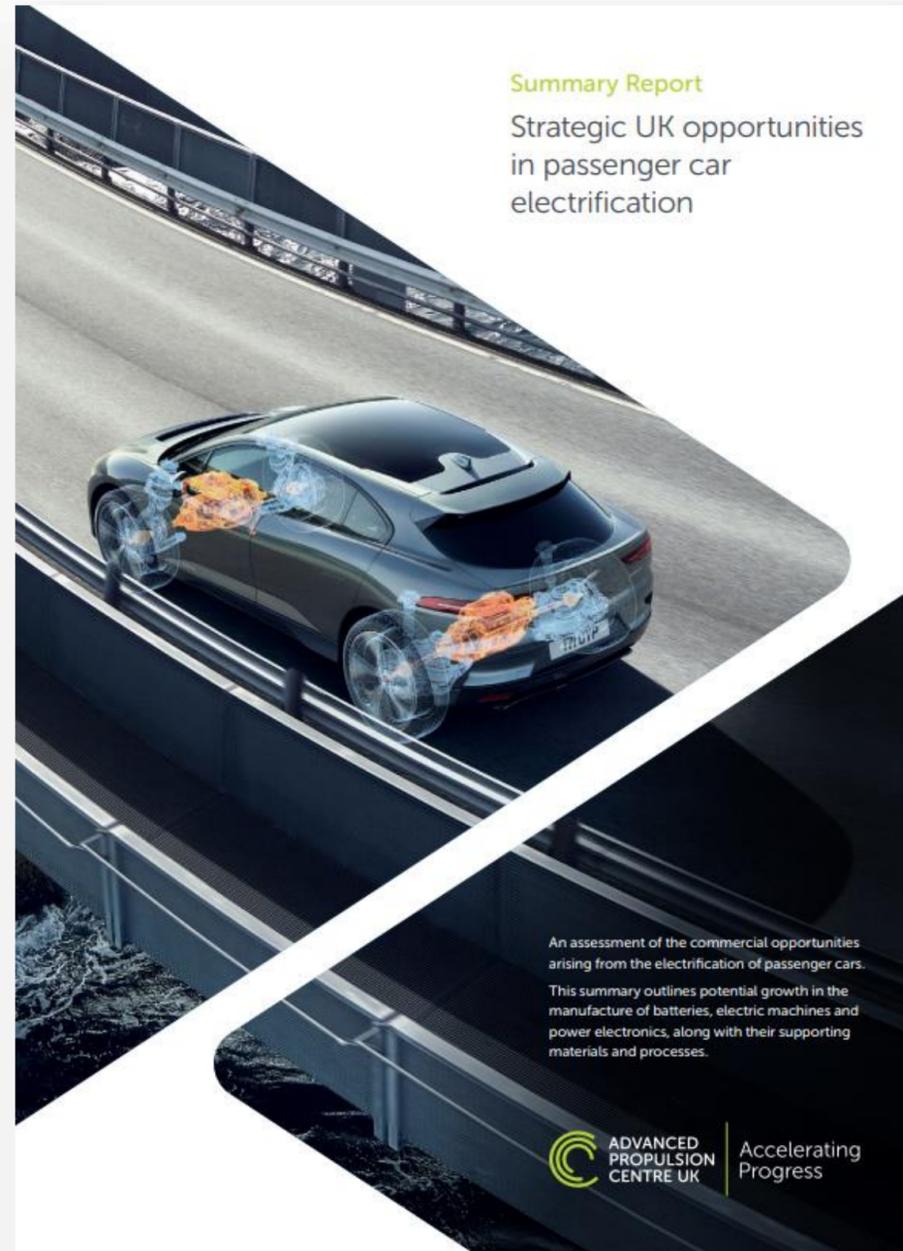
Innovating for the future



Succeeding for the long term

Why are Gigafactories important?

Passenger car report



Area
of focus

UK opportunity for
electrification of
passenger cars

Report
timeframe

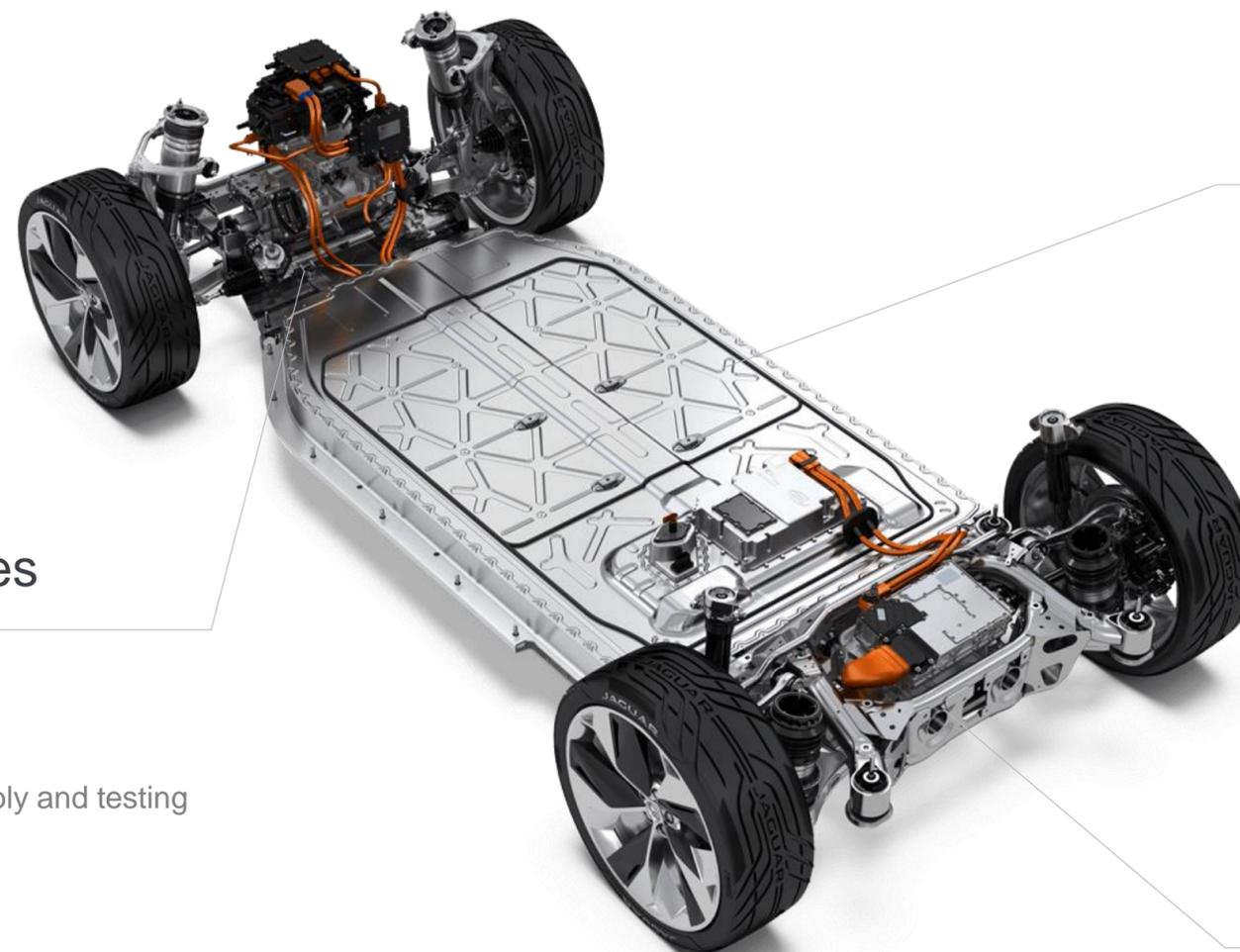
5 years

Value of
opportunity

£24bn

£24 billion represents the serviceable available market across 12 opportunities considering geographic access for UK-based manufacturers

Split into three key technology areas



£2bn

Electric machines

- Magnet manufacturing
- Electrical steel
- Electrical machine assembly and testing

£12bn
Batteries



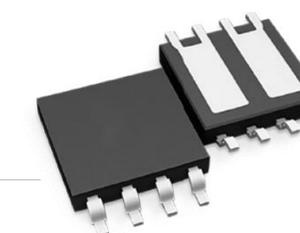
- Cathode materials refining
- Cathode manufacturing
- Anode manufacturing
- Electrolyte manufacturing
- Cell assembly
- Battery pack components



£10bn

Power electronics

- Semiconductors
- Sensors
- High-performance passive components



Automotive Sector and the UK-EU Trade & Cooperation Agreement

On December 24th the UK and the EU reached an agreement relating to trade and other matters of cooperation

“The UK-EU Trade and Cooperation Agreement”

It set out the terms for free trade and some other areas of cooperation

- The TCA contains some specific criteria for qualification of goods as ‘originating’ for EVs and their supply chains
- Bilateral cumulation for input materials (UK-EU) is allowed, but there are no trilateral cumulation provisions



To export vehicles from the UK to the EU27 tariff-free they must contain a certain level of local content

- That content may be from the UK or the EU27
- The requirements get tougher over two transitional steps in 2024 and 2027
- Localised batteries for EVs become prescribed content



Batteries represent 30-40% of the value of an EV - more than twice the value of a conventional engine

- Engines, gearbox and driveline manufacturing employ around 160,000 people in the UK – we must replace these jobs in the EV component space

Rules of Origin summary

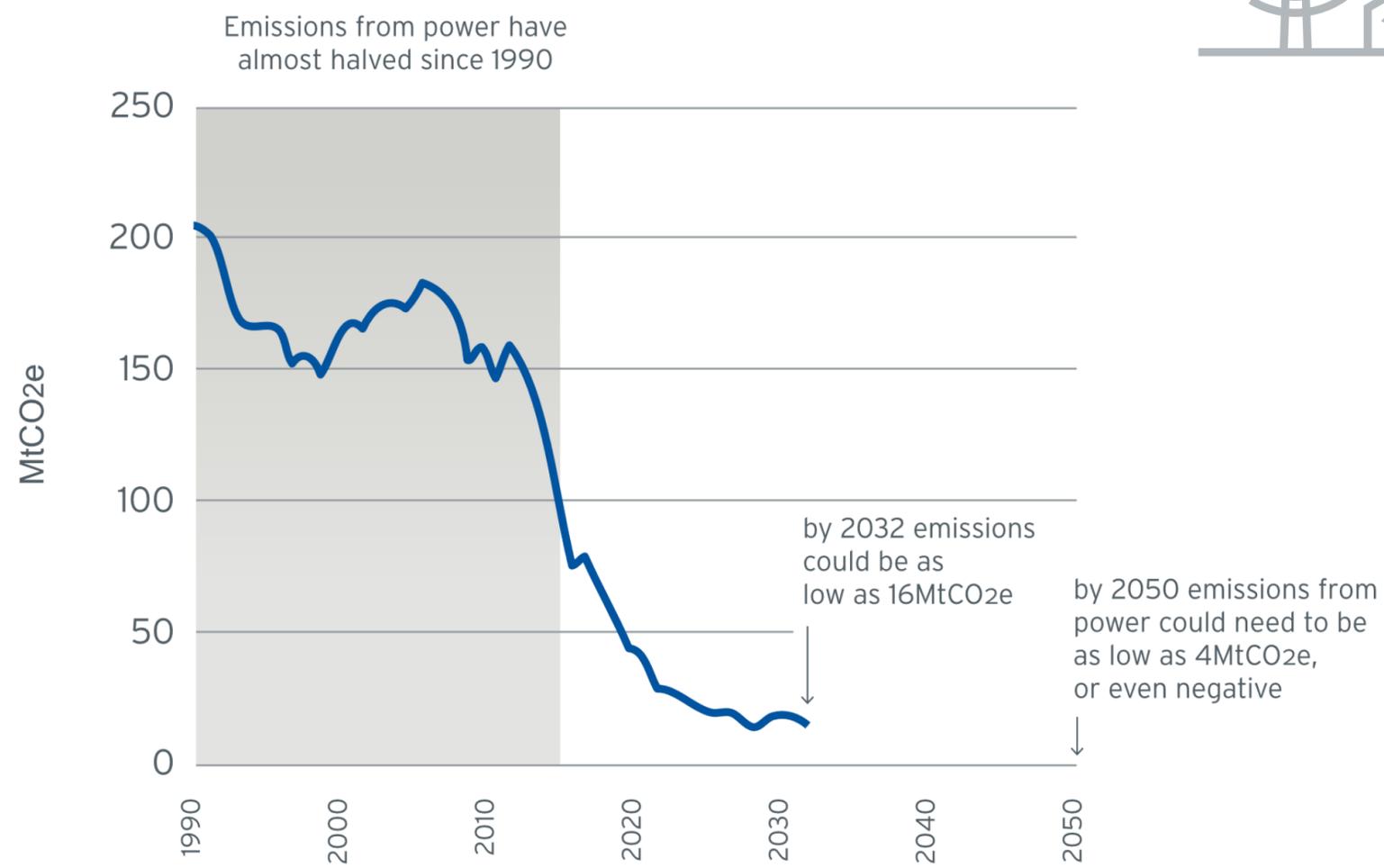
- ▶ To export BEV/PHEV vehicles to the EU tariff-free after 2026 the batteries must be produced in the UK/EU27
- ▶ To export BEV/PHEV vehicles tariff-free after 2023 to **achieve the local content threshold, in practical terms** the batteries must be produced in the UK/EU27
- ▶ The UK supply chain for battery chemicals will need to be developed

	1 st January 2021 – 31 st December 2023	1 st January 2024 – 31 st December 2026	1 st January 2027 onwards
Electric battery cells	70% maximum non-originating material allowance Or Change in tariff heading	50% maximum non-originating material allowance Or Change in tariff heading except from non-originating active cathode materials	35% maximum non-originating material allowance Or Change in tariff heading except from non-originating active cathode materials
Electric battery packs	70% maximum non-originating material allowance Or Change in tariff sub-heading Or Assembly from non-originating cells or battery modules	40% maximum non-originating material allowance Or Change in tariff heading except from non-originating active cathode materials	30% maximum non-originating material allowance Or Change in tariff heading except from non-originating active cathode materials
Electric vehicles (HEVs, PHEVs, BEVs)	60% maximum non-originating material allowance	55% maximum non-originating material allowance	45% maximum non-originating material allowance + originating battery for PHEVs and BEVs

Source: BEIS ROO Public Explainer, Jan 2021

The UK leads the G20 for long-term low carbon transition

Projected power sector emissions (MtCO₂e)

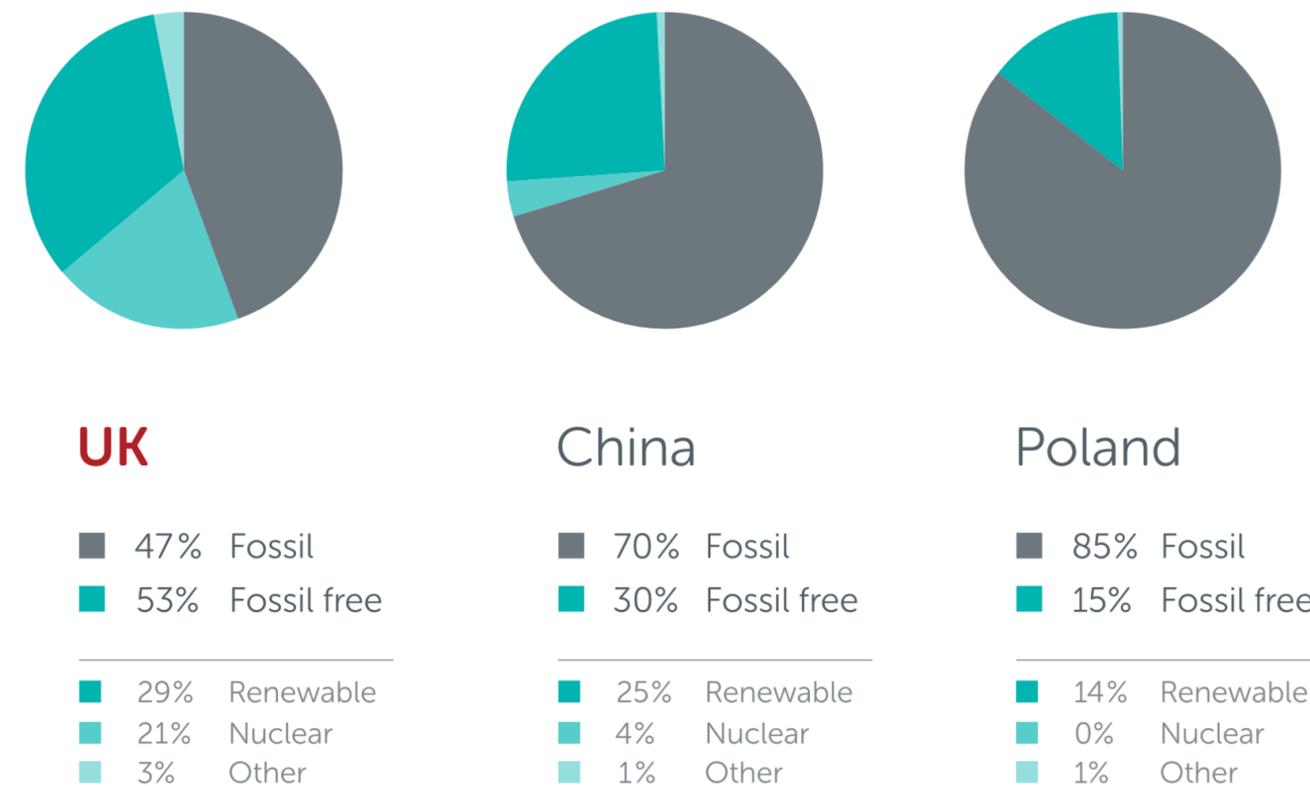


Source: PWC Low Carbon Economy Index 2018

Source: UK Gov. Clean Growth Strategy



Projected power sector emissions 2019

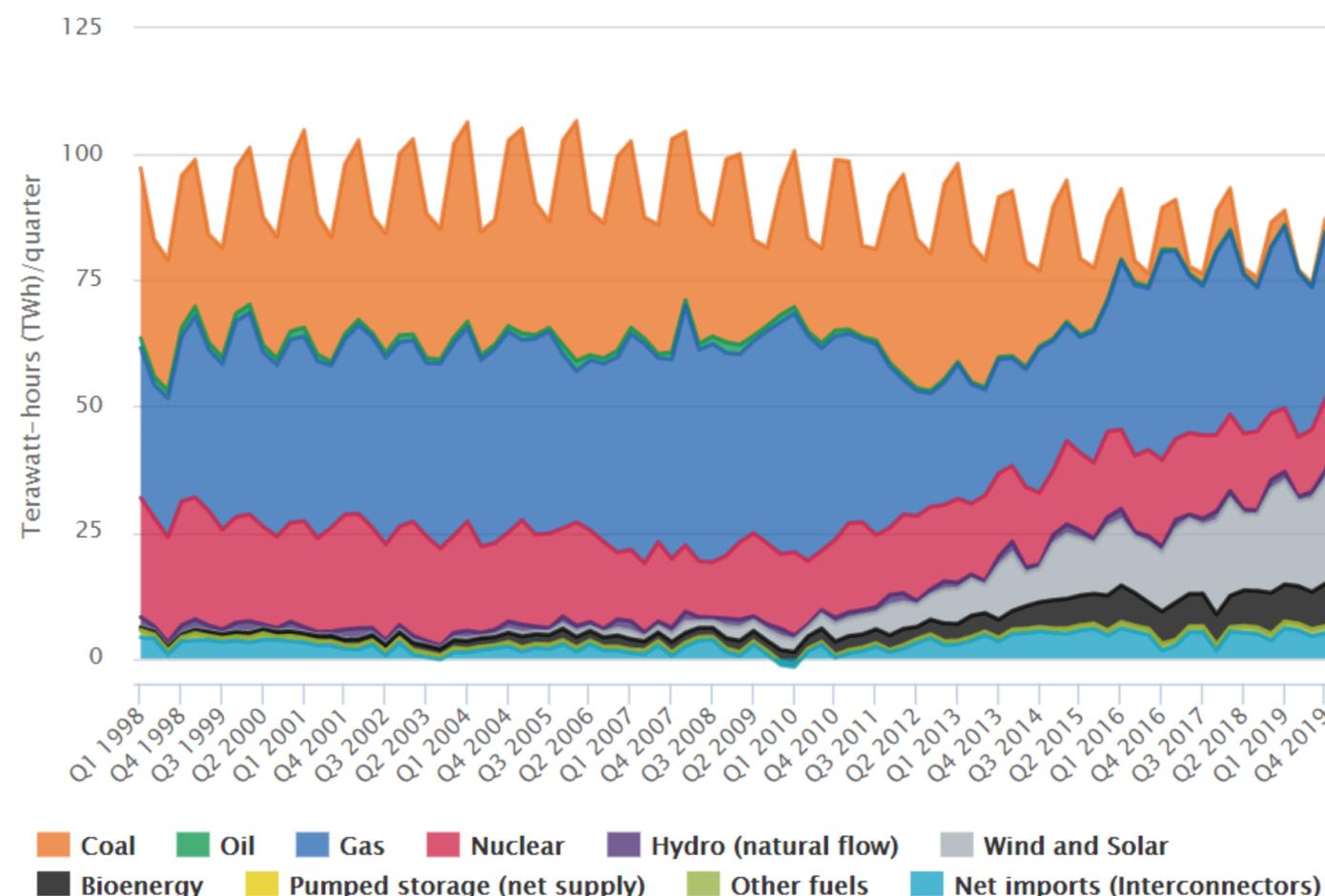


Source: Global Energy Storage and Electric Vehicles, 2019, Bernstein Research

Electricity mix and renewables

- The UK has a robust distribution grid which is rapidly decarbonising
- Blyth, for example, can offer connection capacities of up to 480MVA
- We have significant onshore and offshore wind generation capacity, and growing
- As of 2021, coal has now virtually been phased out as a means of generation (<1%)
- ~75-80% low carbon generation (March 2021)
- Interconnectors (including with Norway in 2021 to utilise pumped hydro) guarantee stable supply into an increasingly renewable grid

Electricity generation mix by quarter and fuel source (GB)



Source: BEIS Energy trends section 5: Electricity (ET 5.1).
Information correct as of: October 2020

This chart shows quarterly totals of electricity generation by technology type for the GB National Electricity Transmission System, as well as net imports.

Cost needs to be addressed for this industry



A standard Distribution Network Operator (DNO) supply and industrial tariff sets the UK at a disadvantage



Sites such as Blyth offer the opportunity for grid-connected 'Private DNO' arrangements for high energy use industry clusters with connected renewable generation & storage

- Wind energy
- Solar PV (e.g. on large factory roof)
- Battery connected storage

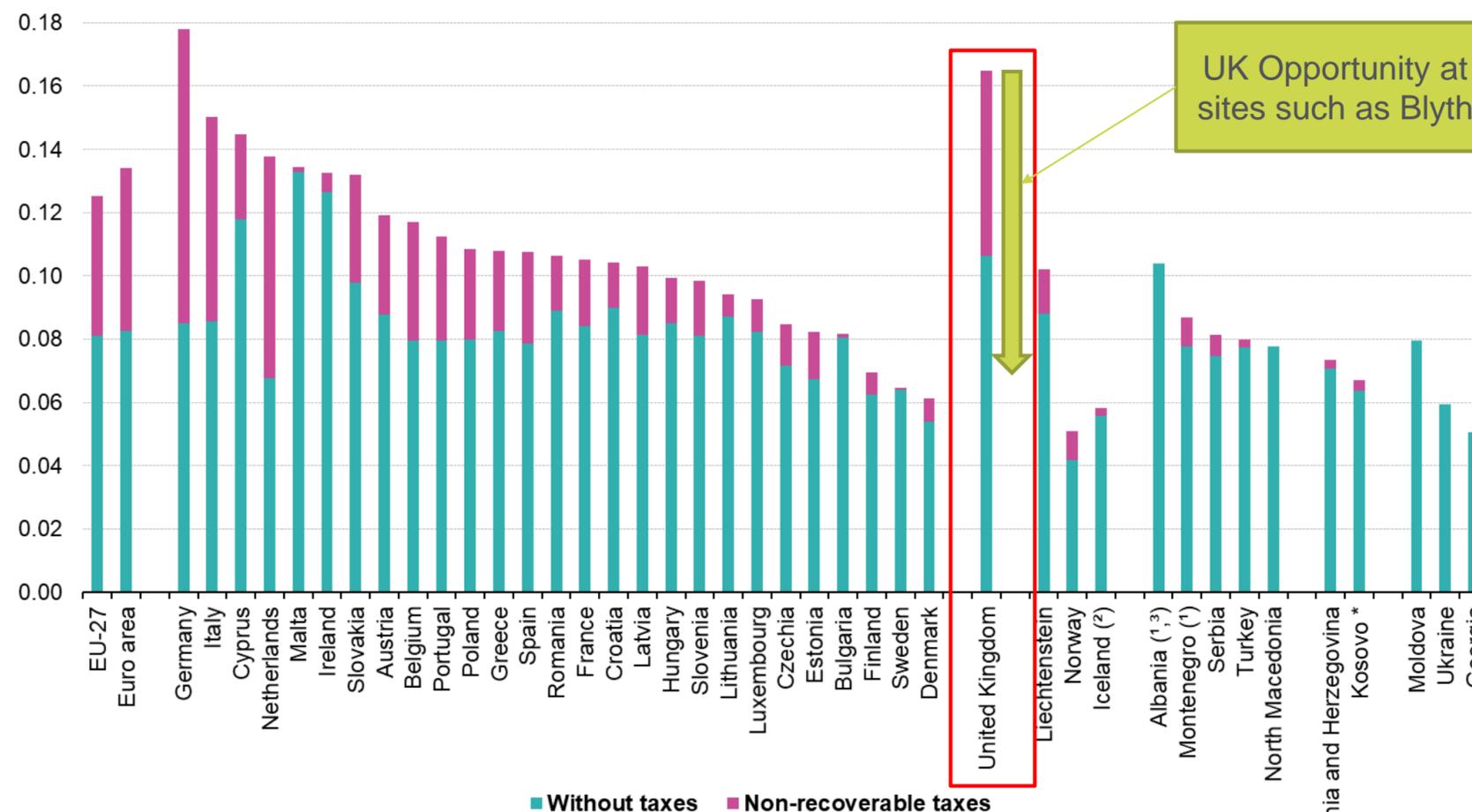


This can substantially reduce the cost of energy to more competitive levels



This is needed to avoid 'carbon leakage' – effectively exporting pollution to dirtier but cheaper countries

Electricity prices for non-household consumers, first half 2020
(EUR per kWh)



(1) 2019 Semester 1 data.

(2) 2019 Semester 2 data.

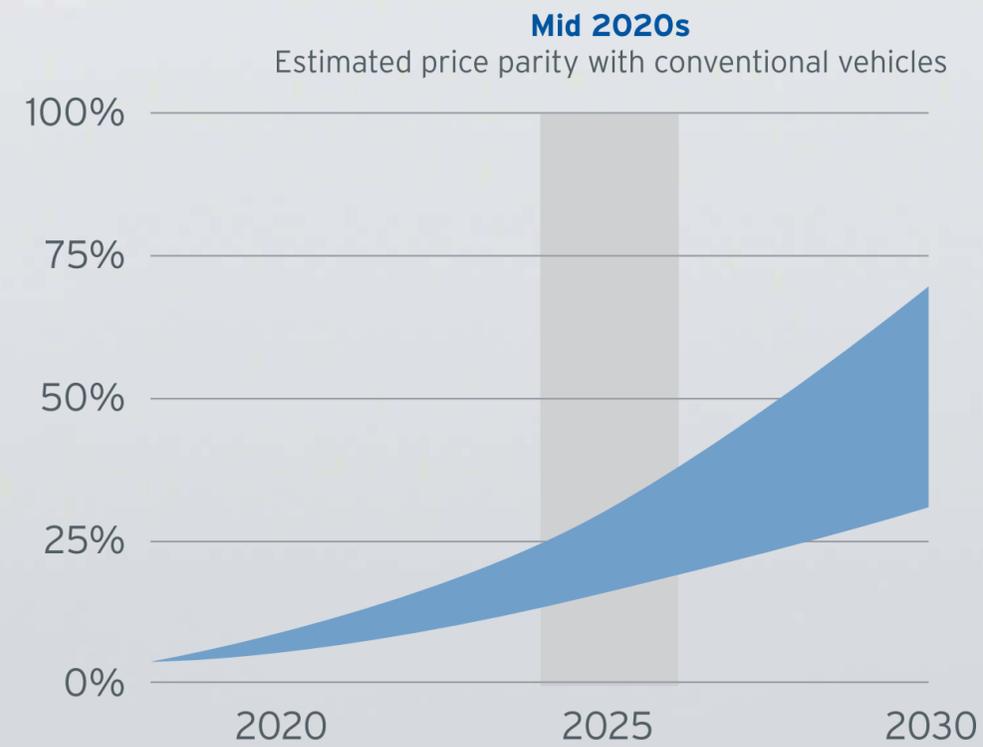
(3) estimation.

* This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo Declaration of Independence.

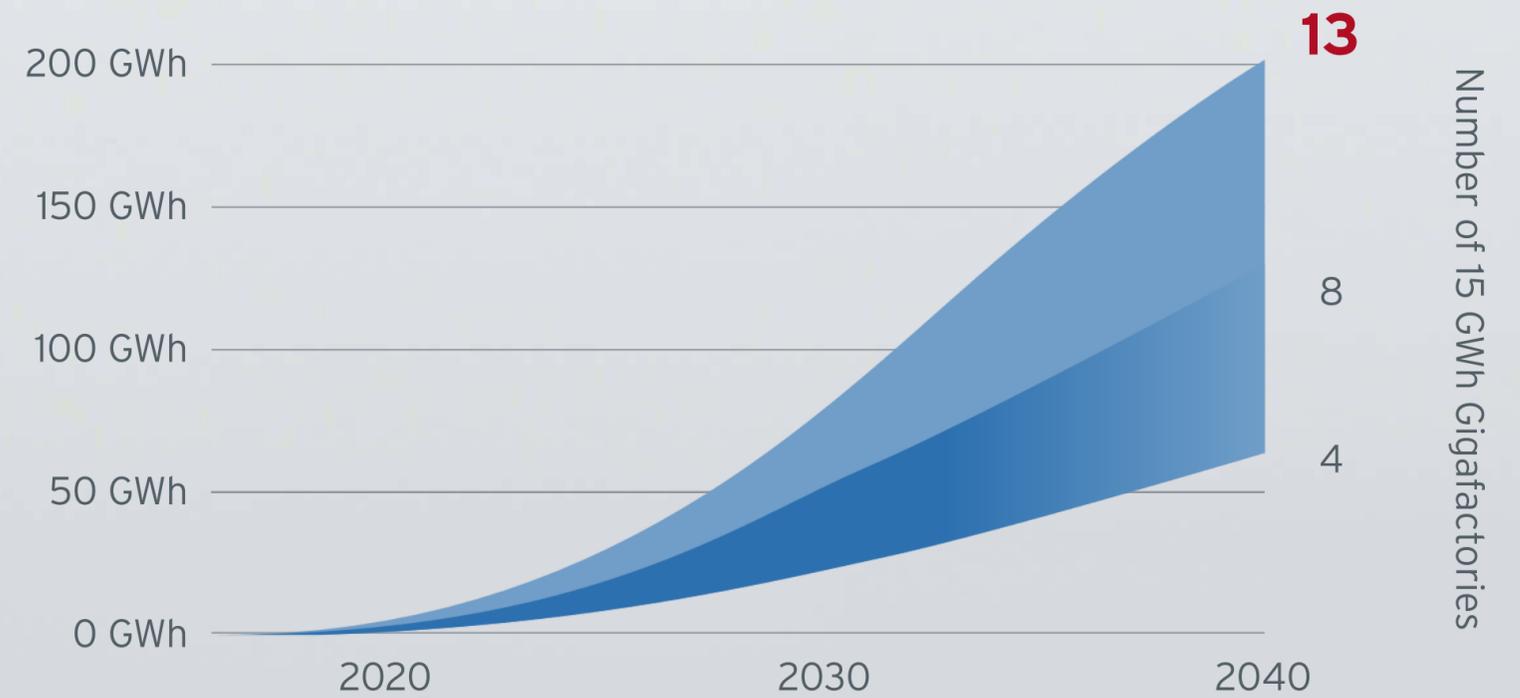
Source: Eurostat (online data codes: nrg_pc_205)

We are decarbonising and electrifying

EV demand curve from *Road to Zero*



Demand for batteries in the UK

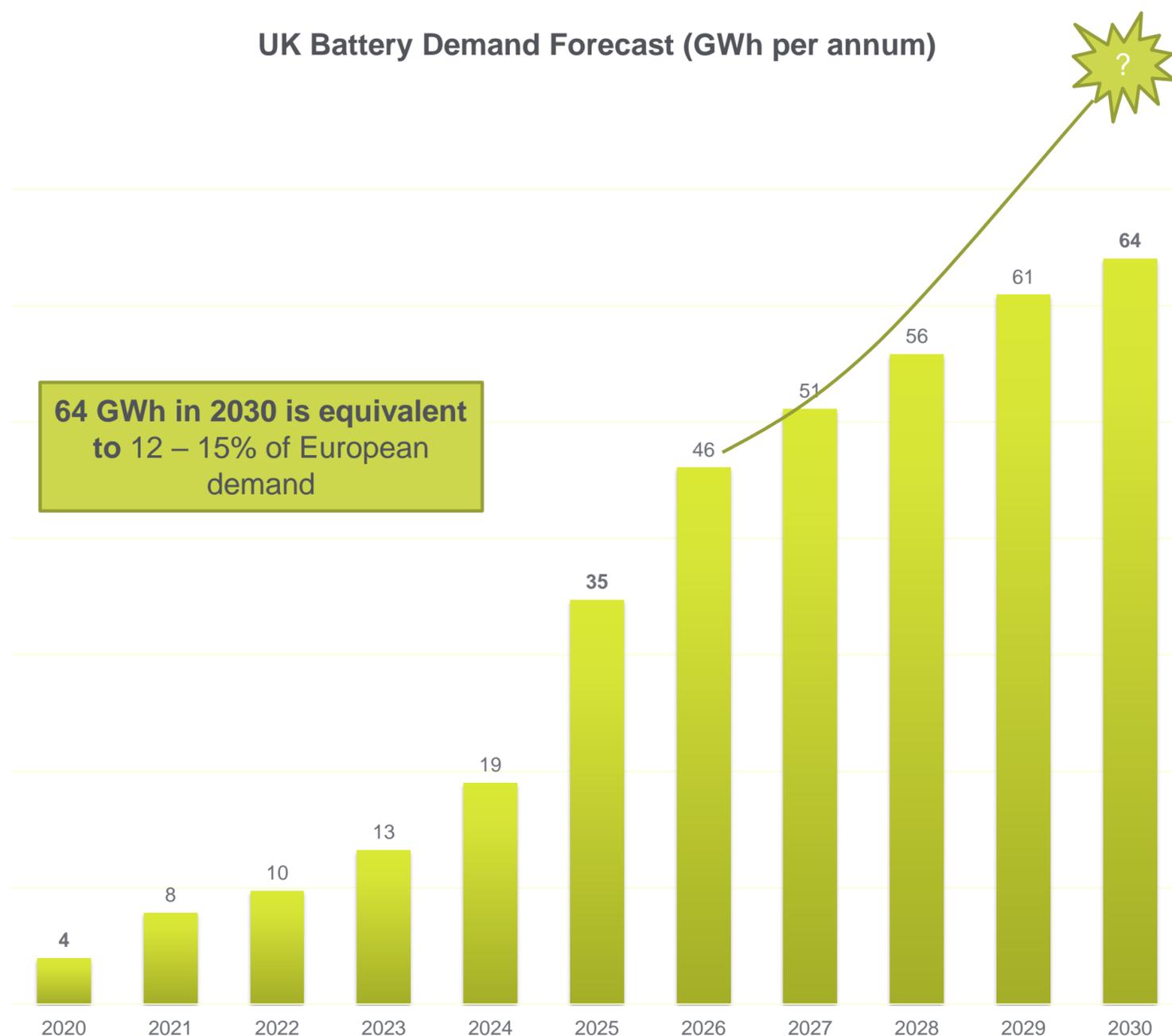


Source: UK Electric Vehicle and Battery Production Potential to 2040, Executive Summary March 2019, The Faraday Institution. Data compiled by McKinsey Energy Insights based on IHS forecasts

UK Battery Demand Forecast

With the introduction of dedicated BEV platforms, UK car manufacturers will accelerate domestic battery demand.

UK Battery Demand Forecast (GWh per annum)



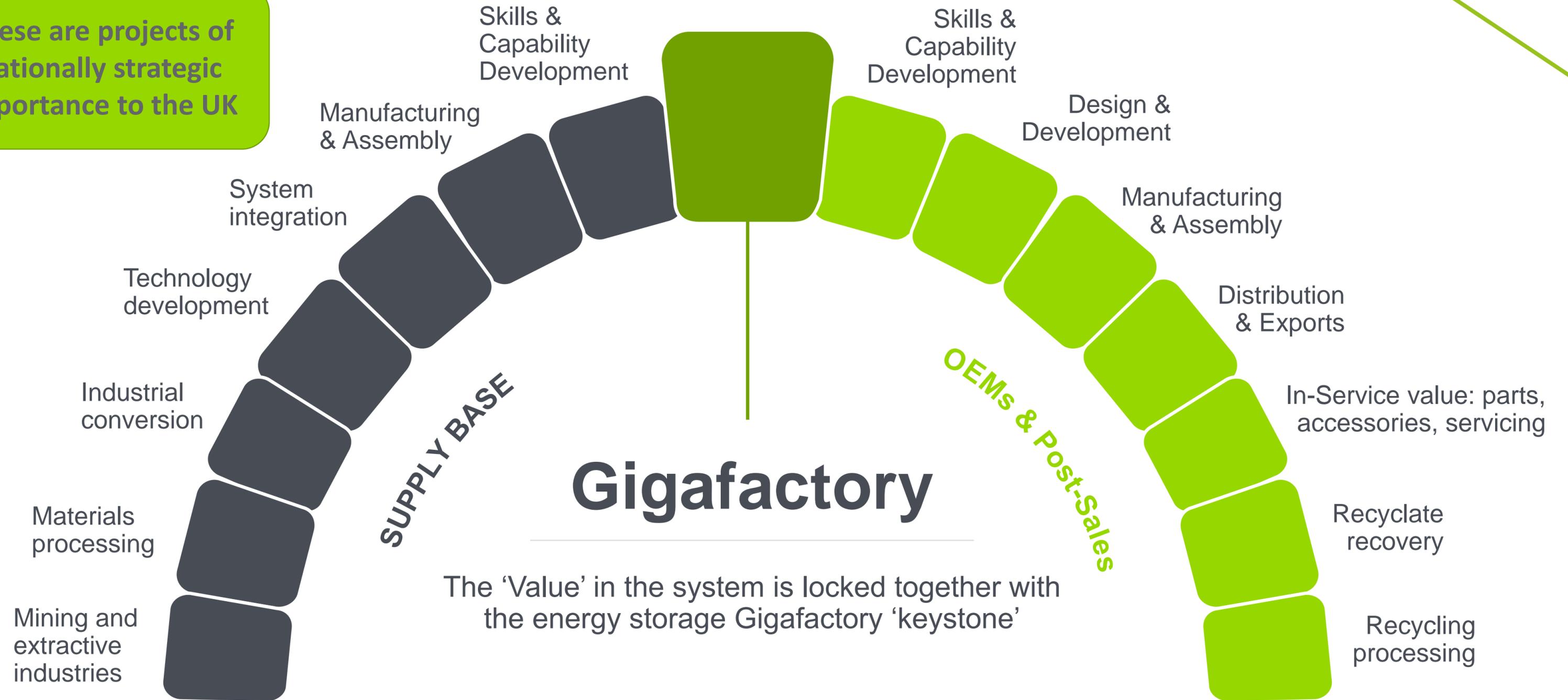
64 GWh in 2030 is equivalent to 12 – 15% of European demand

Forecasts based on analysis of OEM data & IHS vehicle production forecasts

- Due to recent significant strategy reviews by several UK-based OEMs, this analysis is 'conservative' and we expect the final analysis to indicate higher volumes from 2025
- **Expected 'most likely outcome' demand by 2030 is indicated to be closer to 80GWh for passenger car/light van automotive use**
- Static storage and off-highway sector demand sits on top of these profiles
- Bentley, Aston Martin and JLR have all made strategic decisions to accelerate electrification in advance of 2030

Gigafactory value to the UK

These are projects of nationally strategic importance to the UK



Gigafactory

The 'Value' in the system is locked together with the energy storage Gigafactory 'keystone'

How do we attract Gigafactory investments?

Scale and certainty of customer demand is necessary, but not sufficient.

Robust
demand

- Secure new vehicle investment by OEMs
- Support export competitiveness with future trading arrangements
- Deliver 'anchor' investors to start demand creation in the supply chain

Ease of
delivery

- Make large sites available in the right places
- Expedite/support planning and permitting
- Complementary plans to reduce long term cost inputs e.g. clean energy
- Support process R&D

Competitive
landscape

- Support competitive supply chain development in tandem
- Tip the scales in favour of the UK with investment support
- Focus on long term cost factors, e.g. energy, co-location, tax, financing, business rates etc.
- 'Do the right things in the right places' and ease trading arrangements where it makes sense



We need your
help to do this

How do companies get involved?



Supported will be provided by delivery partners and government agencies through the application process