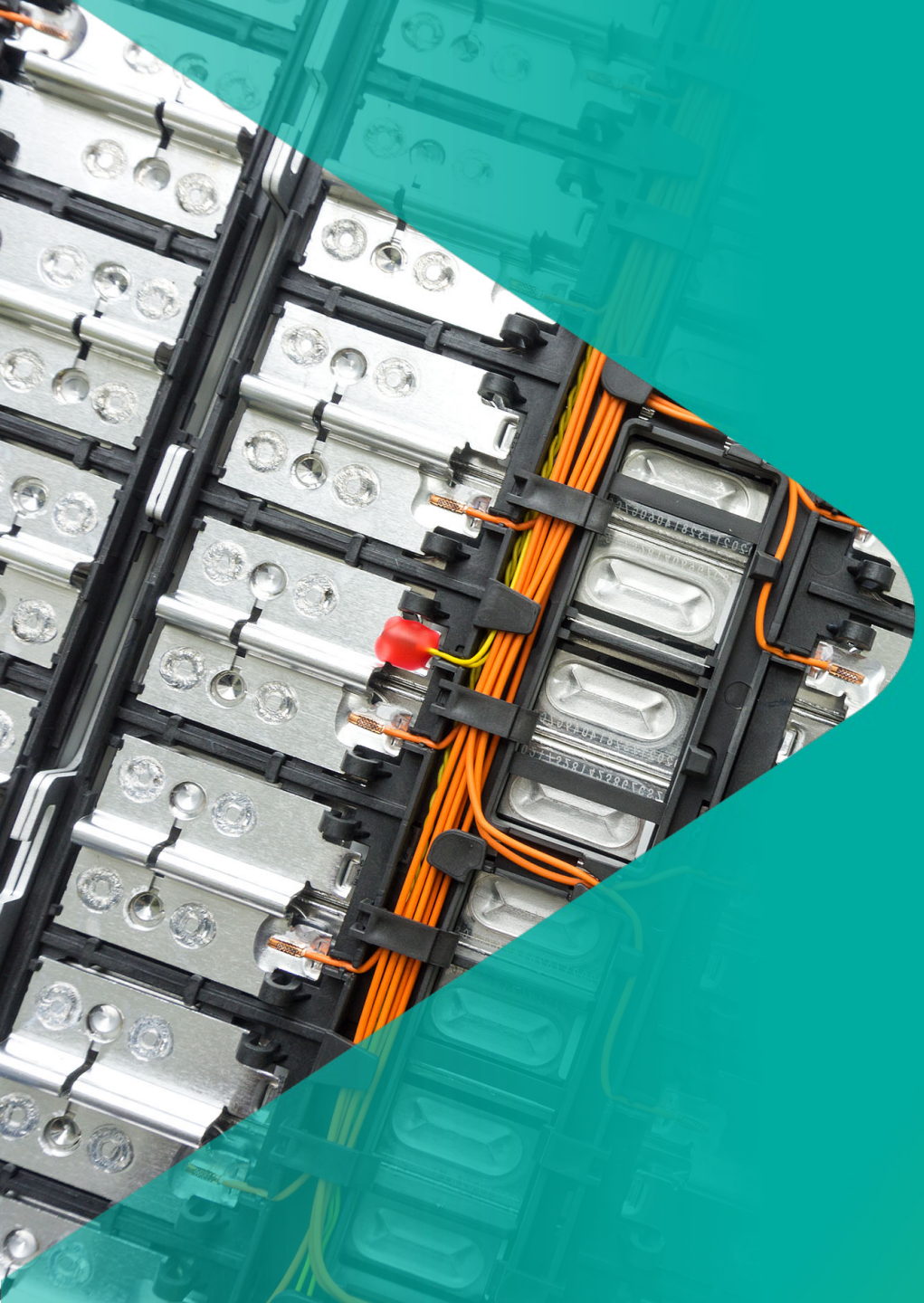


ADVANCED PROPULSION CENTRE UK

Battery Tech Expo 2023
APC: 2023 Update & Opportunities

Dan Bunting
Head of Business Development
Advanced Propulsion Centre

The UK is leading the charge towards a net - zero future

- The UK is the first major economy to commit to a net-zero target.
- As part of the 10 Point Plan for a Green Industrial Revolution, the UK will invest £12bn by 2030.
- The UK is ending sales of new petrol and diesel engine vehicles in 2030. All new cars and vans will be zero emission by 2035.
- The UK is accelerating electrification, investing over £6bn across infrastructure, manufacturing and R&D.

APC: Playing a unique role since 2013

ADVANCED PROPULSION CENTRE UK

Offering expertise and cutting-edge knowledge

With a combined experience over many years

Identifying where investment will be most effective

Mapping the future development opportunities in low-carbon technologies

Leverage expertise

Bringing together government, industry and academia to deliver game changing research and insight

Building project consortia

Combining the knowledge and innovation of manufacturers, SMEs and academia

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

ADVANCED PROPULSION CENTRE UK

188+
low-carbon projects

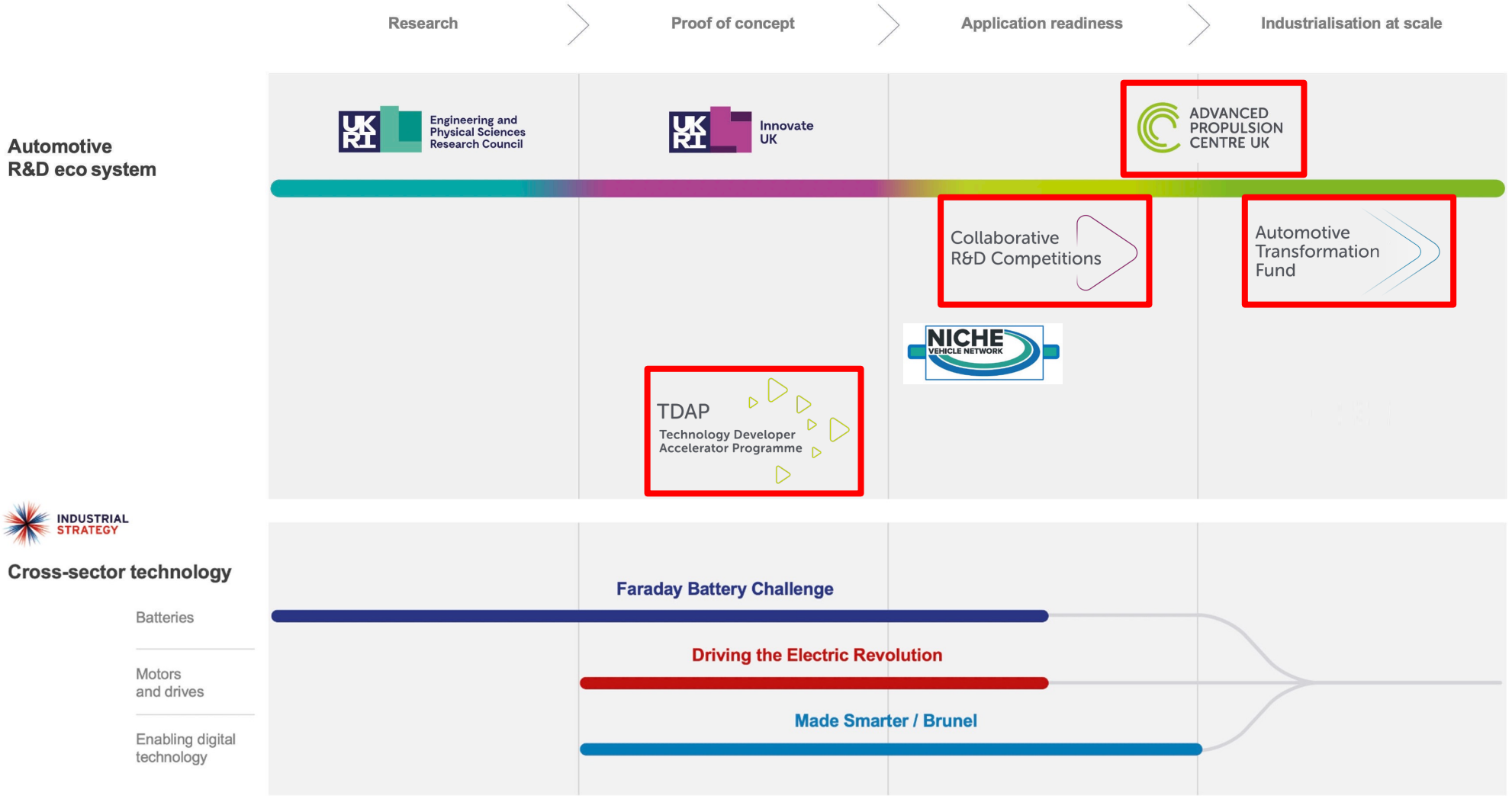
400+
project partners

50,000+
Jobs created / safeguarded

312 million+
tonnes of CO_2 savings

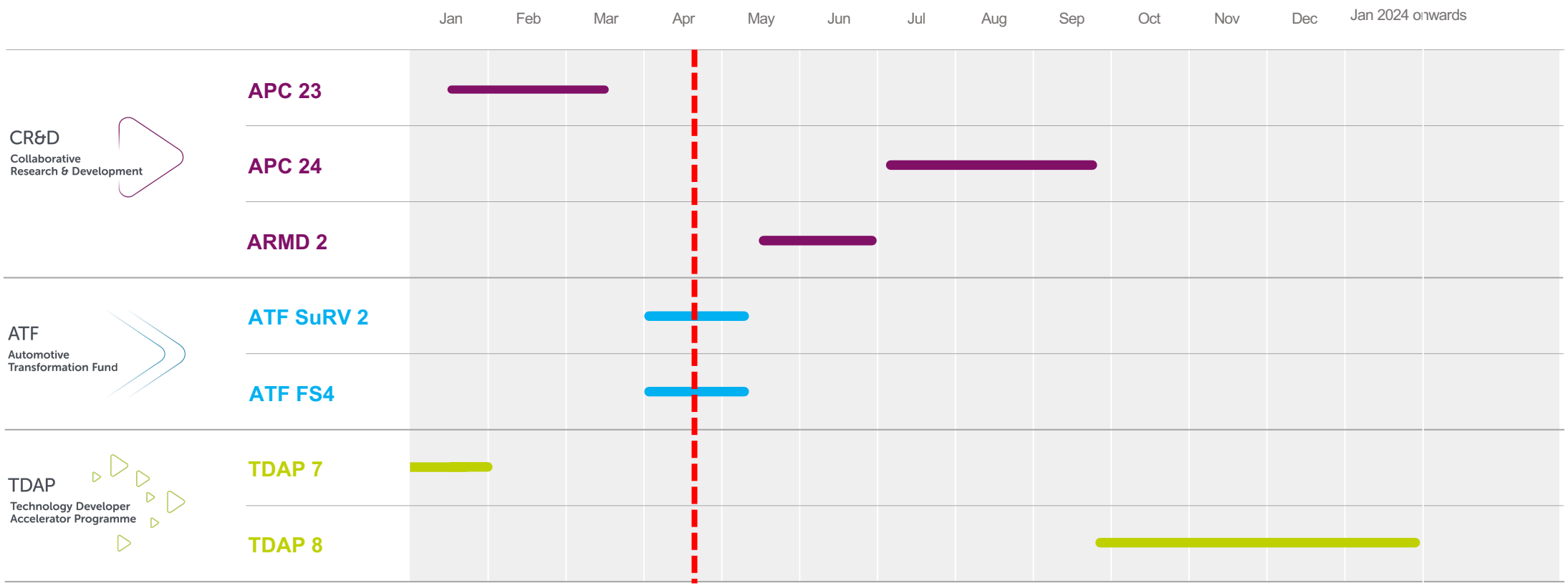
1 million+
vehicles use APC-funded technology

UK Automotive Funding landscape

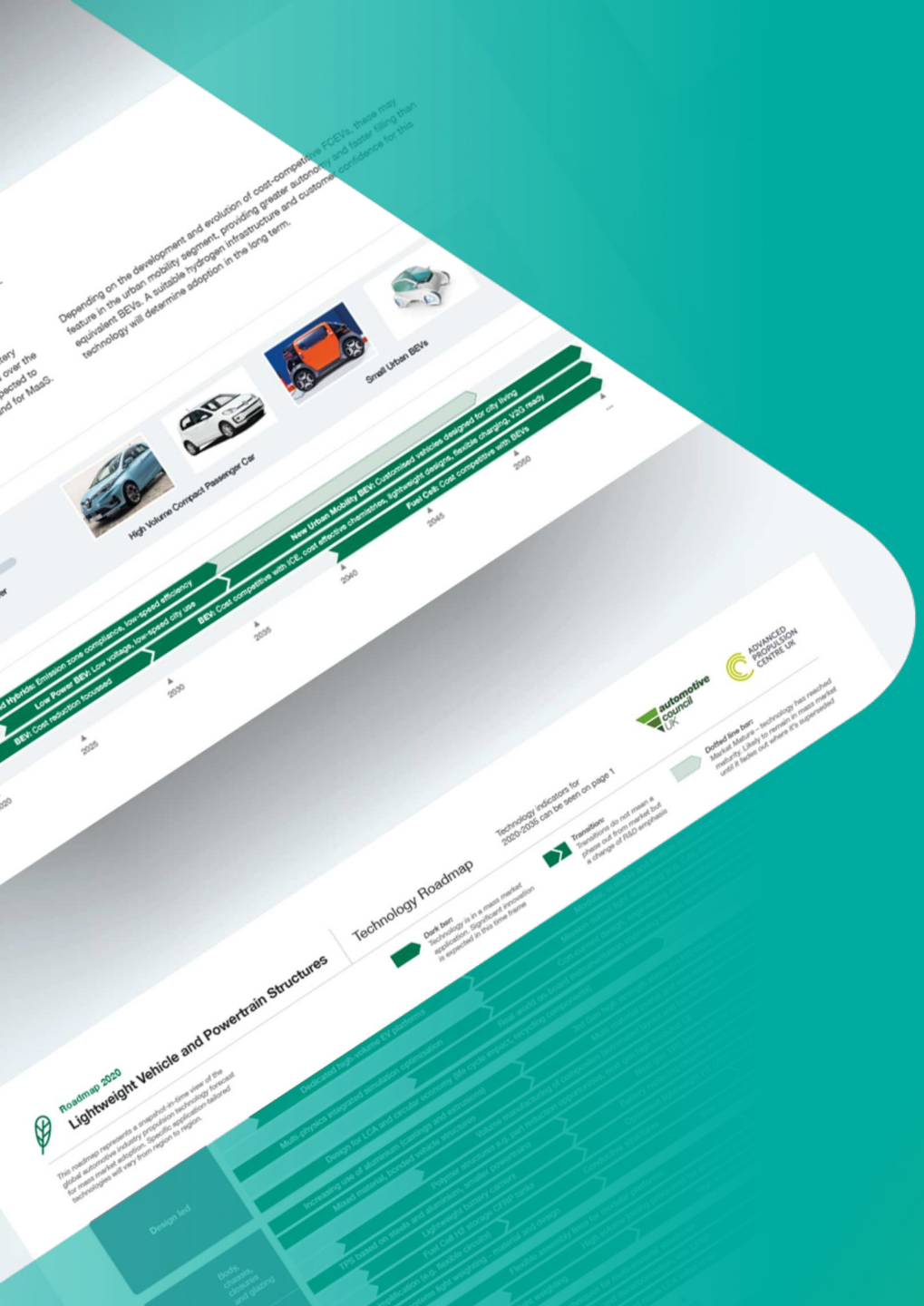


APC 2023 Funding timeline

Key dates for funding competitions



ADVANCED PROPULSION CENTRE UK



Technology Trends

Insights, Foresights, Impacts

Roadmaps covering key areas on the road to net zero – 2023 Refresh!

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Product Roadmaps

Light Duty vehicles < 3.5t

Heavy Goods >3.5t
and Off-highway vehicles

Bus and Coach

Mapping the road ahead

- Providing a global view of the key technology trajectories in low-carbon propulsion and low emissions.
- Guiding technology developers and provide confidence to their investors regarding industry trajectory.
- Kick-starting conversations around opportunities and threats on the road to net zero transport.
- Created by the APC on behalf of the Automotive Council.

Technology Roadmaps

Electrical energy storage

Electric machines

Power electronics

Fuel cells

Lightweight vehicle
and powertrain structures

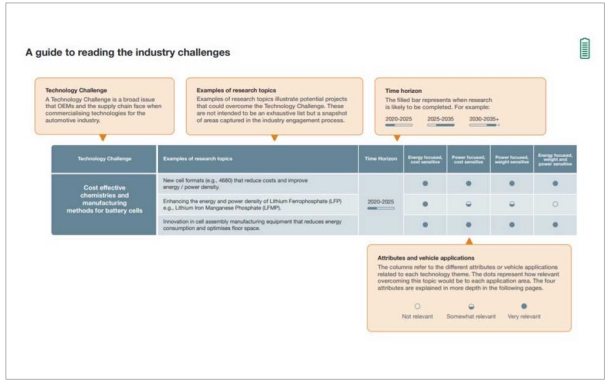
Thermal propulsion systems

Delivering strategic insights

Industry Challenges Reports

Developed by a consensus process, the Industry Challenges present the technical barriers to commercialising automotive powertrain technology in the short, medium and long term.

- Recommendations are provided on how this content can be taken forward by industry, academia and government



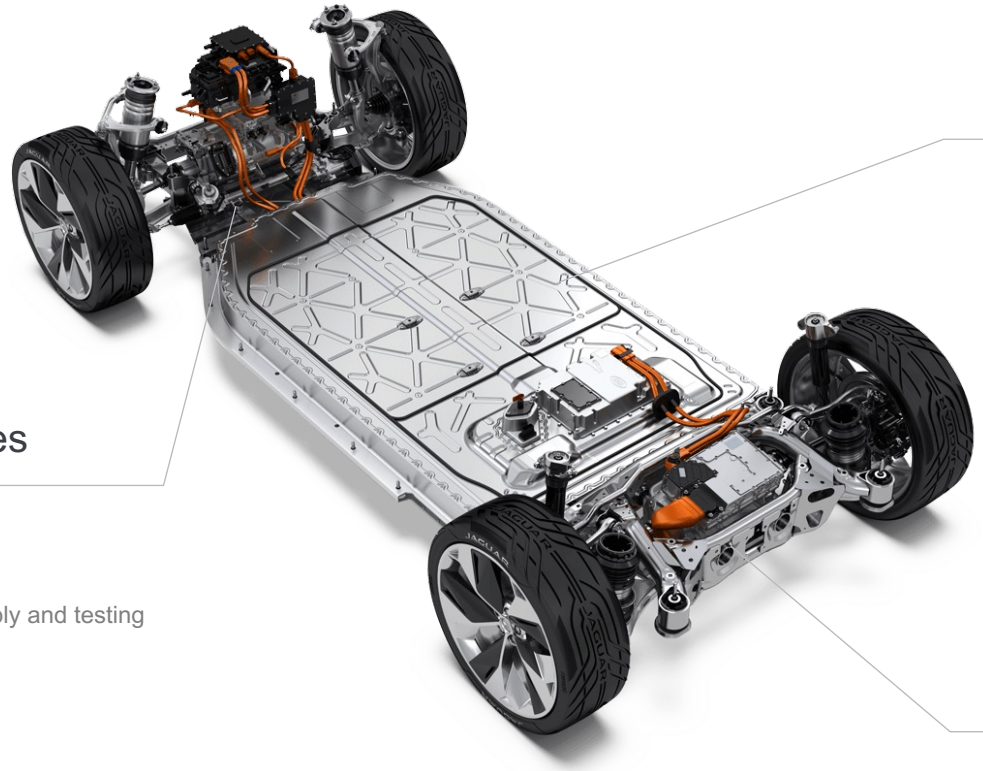
UK supply chain opportunities

APC has published numerous supply chain opportunity reports for the UK.

- Strategic UK opportunities in passenger car electrification
- Building a robust magnet supply chain for the UK
- Automotive batteries – UK supply chain opportunities

£24 billion+ of electrification opportunity in the UK

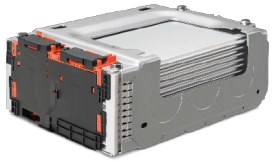
ADVANCED PROPULSION CENTRE UK



£2bn
Electric machines

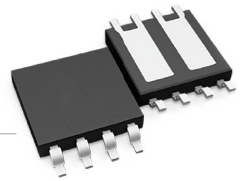
Magnet manufacturing
Electrical steel
Electrical machine assembly and testing

£12bn
Batteries

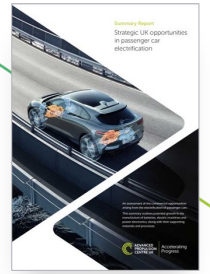


Cathode materials refining
Cathode manufacturing
Anode manufacturing
Electrolyte manufacturing
Cell assembly
Battery pack components

£10bn
Power electronics



Semiconductors
Sensors
High-performance passive components



Strategic UK opportunities in passenger car electrification published by the APC

Download report

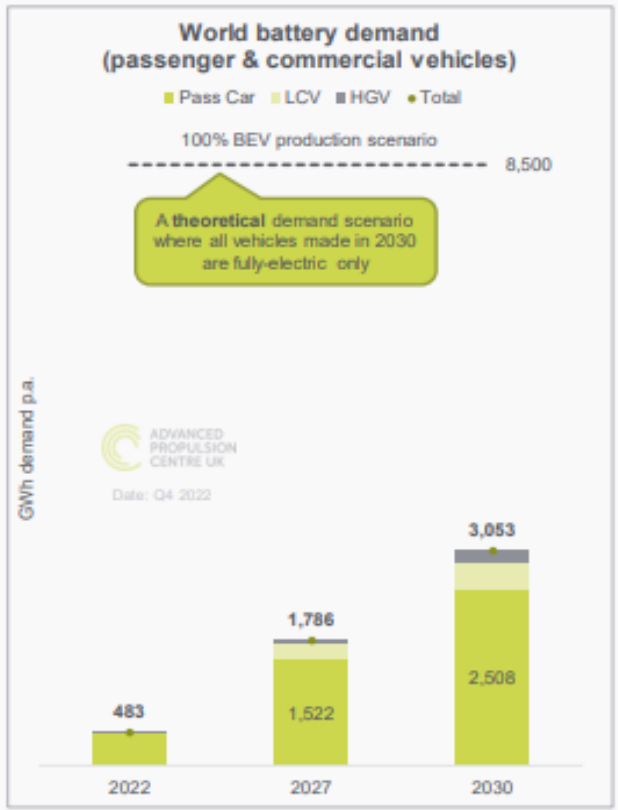
Battery demand forecast

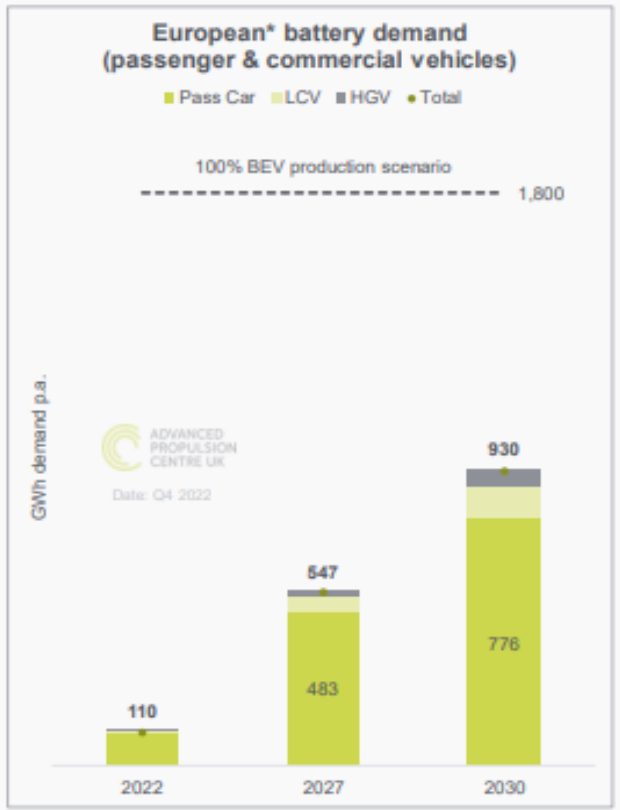
LDVs and HGVs

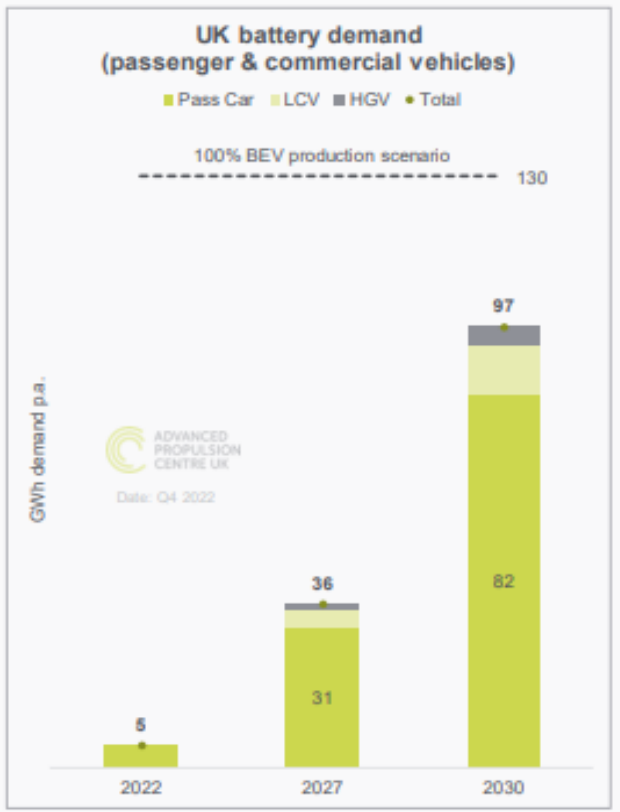
Q4 2022 notes

- HGV demand reworked in this forecast and increases the battery demand in UK
- Global battery demand in 2030 boosted by stronger demand in the US and Europe

ADVANCED PROPULSION CENTRE UK







Source: APC Demand Databases using S&P Global AutoTechInsight (Mar, 2023), Rho Motion data (Mar, 2023), BNEF (Mar, 2023), LMC (Mar, 2023)
*Note: LCV = Light Commercial Vehicles < 3.5t, buses not included. *European forecast includes non-EU countries such as Turkey*

Q4-2022-Automotive-industry-demand-forecast-report.pdf (apcuk.co.uk)

CR&D
Collaborative
Research & Development

ADVANCED
PROPULSION
CENTRE UK

Collaborative Research & Development (CR&D)

Significantly boost the success of your next R&D project

CR&D Collaborative Research & Development

ADVANCED PROPULSION CENTRE UK

Our CR&D programme aims to:

- Fund late-stage R&D projects to support growth in advanced low-carbon propulsion technologies.
- Support the UK to create long-term jobs, skills and reduce CO_2.
- Build connections with specialist partners to add new expertise and collaboration to your project team.
- Support and guidance provided during the funding application process through to the end of your project.
- Access to the latest industry insights.
- Raise the external profile of the project to wider stakeholders.

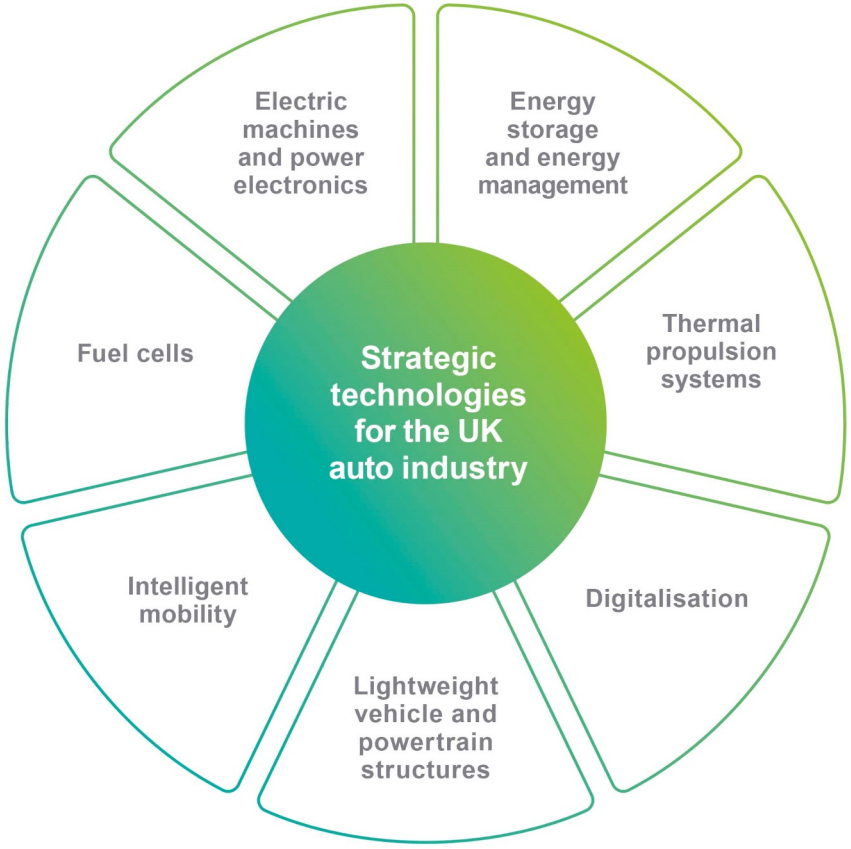
£2.5 – 20 million
grant funding

50% minimum match-funded
18 - 42 months duration

On vehicle for
On and Off-Highway

OEM or Tier1 lead
and involving SMEs

Technologies we're investing in



	Grant support
Electric machines and power electronics	£183m
Energy storage and energy management	**£134m**
Thermal propulsion systems	£89m
Digitalisation	£82m
Lightweight vehicles and powertrain structures	£82m
Fuel Cells	£46m

CR&D Funding timeline

Key 2023 dates for R&D funding competitions

CR&D Collaborative Research & Development

ADVANCED PROPULSION CENTRE UK

Applications open: 17 May 2023

Applications close: 28 June 2023

Applications open: 03 July 2023

Applications close: 20 Sept 2023

Collaborative R&D – Battery Project Case Study

ADVANCED PROPULSION CENTRE UK

BMW – HP-LiSD

- Development of high-power lithium-ion storage device.
- Batteries developed with a lightweight module design.
- Aims to improve power-to-weight ratio in current hybrid lithium-ion batteries.
- Technology will be utilised in future luxury and high-performance vehicles.
- £23.9 million total project value, receiving £12.1 million funding through the APC.

Project consortium

BMW Motorsport Ltd (lead partner)
McLaren Automotive Ltd
Delta COSWORTH
University of Warwick

BMW Motorsport

McLaren AUTOMOTIVE

WMG THE UNIVERSITY OF WARWICK

ADVANCED PROPULSION CENTRE UK

Automotive Transformation Fund (ATF)

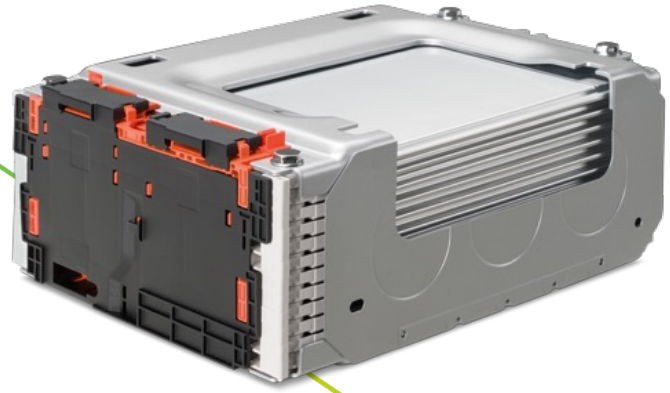
Scale-up production with the Automotive Transformation Fund

ADVANCED PROPULSION CENTRE UK

Launched in June 2020, ATF aims to:

- Secure the transformation to electrification of the UK automotive sector at pace
- Ensure that the UK retains its technological leadership position
  through this transformation
- Support the sector’s strong export performance

Building up the UK supply chain by supporting a wide range of technologies



Batteries

- Electric machines
- Power electronics
- Fuel cells
- Upstream supply chains

Scale-up production with the Automotive Transformation Fund

ADVANCED PROPULSION CENTRE UK

Feasibility studies (FS4)

providing funding to assess viability for UK projects

- Economic and technical compatibility
- Feasibility studies leading to industrial investment

Capital investment (EOI)

supporting industrialisation at scale

- Factory equipment
- Land and buildings
- Set-up costs

R&D (SuRV2)

leading to product or process scale-up

Complements ongoing R&D project support programmes through regular APC competitions

Enquiries to: atf@apcuk.co.uk

ATF Funding Highlights

Feasibility studies

- 69 studies supported
- £35.8 million funding for studies into areas such as **battery anode and cathode production**, fuel cell stack assembly and UK-sourced critical materials.

Capital investment

- **Gigafactories: Envision AESC**
- Motors & Drives: Ford e-drive facility & Pensana rare earth refinery.
- Fuel Cells: Johnson Matthey gigafactory for hydrogen fuel cell components.

R&D – SuRV (Scale-up Readiness Validation)

- 22 projects from 35 UK-based companies
- £25 million funding for projects covering **batteries**, critical materials, recycling, fuel cells, motors & drives and power electronics.

Open Now: Scale up Readiness Validation 2 (SuRV2) competition

ADVANCED PROPULSION CENTRE UK

Need help scaling up your manufacturing process?

- Support to validate readiness for scale up of processes and pilot manufacturing in the UK.
- Opportunity for UK registered businesses with existing R&D projects to apply for a grant from £750k to £2m
- Accelerates project progress and helps businesses take a key step in the industrialisation phase.

Key dates

Competition open: 3 April 2023
Virtual briefing event: 5 April 2023
Application deadline: 11 May 2023

Find out more

apcuk.co.uk/automotive-transformation-fund/

Open Now: Feasibility Studies (FS4) Competition

ADVANCED PROPULSION CENTRE UK

Need help to progress your R&D project?

- Funding support to produce decision-ready business cases for projects developing large-scale UK manufacturing facilities.
- Apply for a grant up to the value of £350,000.
- Support to aid future investment decisions in technologies including batteries and cells, electric motors and drives, power electronics, fuel cells, on-vehicle hydrogen storage and their upstream supply chains.

Key dates

Competition open: 3 April 2023
Virtual briefing event: 5 April 2023
Application deadline: 11 May 2023

Find out more

apcuk.co.uk/automotive-transformation-fund/

ADVANCED PROPULSION CENTRE UK

Technology Developer Accelerator Programme (TDAP)

TDAP: Accelerating early-stage technology developers

ADVANCED PROPULSION CENTRE UK

TDAP is a unique, tailored package of support for clean-mobility start-ups and SMEs

- Structured early-stage, cohort-based accelerator
- £170k grant support – APC do not take equity stake
- Independent expert automotive industry consultancy, mentoring and support
- Automotive industry networking

UK-based start-ups / SMEs

Funding for Tech Development

Expert Auto Business Support

- Improved TRL -
- Accelerated route to market -
- Partner/customer engagement -
- Investment ready -

Programme traction and impact

ADVANCED PROPULSION CENTRE UK

Pilot + 6 cohorts supported with £9 million grant

91 companies engaged
40 completed and 21 live

23 academic spinouts supported

Received highest ever interest for 2022 intake: 136 EOIs for 13 places

Businesses **rate the programme 8.9/10** and report a credibility boost through APC process

Businesses report acceleration of route to market by average **19 months**

Over **£220 million** private investment raised post TDAP

Businesses increase headcount by average **50% during TDAP** and forecast over **1000 new FTE** in 5 years

Sept 2022

TDAP focus areas

Participants work with the APC's delivery partners to:

- Understand the best application fit for their technology
- Identify their target market and develop their route to market strategy
- Understand and articulate their value proposition
- Develop their IP strategy
- Understand their potential business model
- Develop a financial and investor plan
- Develop their leadership and new venture-building skills
- Develop their PR & communications strategy
- Undertake a validation project to test their product and their business assumptions

ADVANCED PROPULSION CENTRE UK

Questions?

Enquiries to: info@apcuk.co.uk