

## BATTERIES FOR ELECTRIC VEHICLE MANUFACTURING – BEIS SELECT COMMITTEE INQUIRY

### NISSAN UK RESPONSE

#### 1. Introduction

2. Nissan is the largest car manufacturer in the UK. The real strength of our UK presence is our full vehicle concept-to-delivery capability, starting from our European design and R&D headquarters in London and Bedfordshire; to production at our major manufacturing plant in Sunderland; and finally, to our network of sales, marketing and dealership locations across the country. The US and Japan are the only other markets which can offer this capability. The business supports over 7,000 direct roles across the UK, and 29,000 across our supply chain. Nissan is also a major exporter, with nearly 11 million vehicles produced in Sunderland, including the Qashqai, labelled a 'British success story', having been designed in Paddington, engineered in Cranfield, built in Sunderland and named the UK's bestselling car last year.
3. Nissan is a pioneer in electric vehicle (EV) manufacturing, launching the world's first mass market electric vehicle, the LEAF, in 2011. We continue to lead the way, announcing a £1bn investment in 2021 alongside Envision AESC, which will see the UK's first gigafactory and production of our LEAF successor model in an industry leading UK EV ecosystem. Construction of the gigafactory has already begun and it will have a capacity of 11GWh operational by 2024 (18% of what is required for the UK automotive sector by 2030, but there is reserved space for AESC to expand that site to 35GWh).<sup>1</sup>
4. Our plan for building on this ecosystem is titled EV36Zero NEXT and it seeks to develop the full length of the EV supply chain in the UK, taking in not only manufacturing but also addressing skills development, recycling, and wider battery applications to help secure the UK's net zero future.

#### 5. Summary

- a) Across the UK and Europe, the automotive industry is transitioning to EVs, with government policies to phase out internal combustion engine (ICE) vehicles by 2030-35. Nissan is on track towards our 2030 goals for a full EV line-up at our Sunderland plant and to achieving a production capacity of 500,000+ vehicles, supported by the UK's first gigafactory directly opposite our plant, with an initial capacity of 11GWh and the potential to achieve 35GWh through its modular design. The trajectory has been set but it is not yet assured.
- b) Nearby access to EV batteries, their components, and the critical raw materials to produce them, will be a fundamental requirement for a thriving UK EV manufacturing industry. This will require considerable inward investment to achieve the necessary gigafactory capacity.
- c) To ensure gigafactory production capacity in the UK, model allocation to manufacture EVs in UK plants like Nissan's in Sunderland is essential. There is a vital need to fulfil rules of origin requirements for UK battery content required to export EVs, not just to Europe but also to the rest of the world, and to create the supply-side demand that is necessary to justify the establishment of an EV battery supply chain and battery manufacturing presence in the UK.
- d) To attract new EV manufacturing contracts to UK plants, the UK government must continue to work closely with the UK automotive industry and its suppliers, to position the UK as a competitive player in global car production. This requires a supportive policy environment that helps to provide competitive energy costs, skilled workers, global export opportunities and the

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<sup>1</sup> [Faraday Institution: UK Gigafactory Outlook \(June 2022\)](#)

uninterrupted movement of the necessary parts and components, to compete with other vehicle production facilities across the globe.

- e) Nissan's 'EV36Zero' project is creating a world-leading EV manufacturing hub in Sunderland, including the UK's first ever gigafactory, currently being constructed with our EV battery partners Envision AESC, who will supply batteries from a modular designed gigafactory located next to Nissan's Sunderland plant for a new British-made EV crossover model from 2025. This was achieved in close collaboration with the UK government, creating a strong business case to manufacture EVs in Sunderland in the years to come, with all the regional economic benefit and global export potential this will bring.
- f) The demand for a successful EV industry in the UK certainly exists, but there are challenges and headwinds – access to raw material, supply chain localisation, trading arrangements, energy costs – which mean that it is not guaranteed. These challenges need to be addressed in order to create the competitive conditions and ensure that a successful EV manufacturing industry can exist in the UK.

**6. Is there enough UK vehicle manufacturing demand in the UK to support gigafactories?**

- g) Nissan believes there is enough UK vehicle manufacturing demand to support gigafactories. The company has already committed to manufacturing its LEAF successor model in the UK. This will secure 5,000 jobs at the plant and in the supply chain. With the upcoming ban on the sale of ICE vehicles in 2030, along with the introduction of a ZEV Mandate, it is vital that the investment conditions exist for new electric models to be allocated to the UK to replace them.
  - i. However, progress towards meeting this demand and achieving government gigafactory objectives is being hampered by under-developed supply chains and other headwinds. Most notably this includes high energy costs for auto-manufacturers.
  - ii. Government should ensure the continuation of a favourable environment for investments in EV manufacturing and the necessary supply chain by providing incentives and reliefs for investors, particularly to attract investment to areas of the UK that the government has identified for levelling up.
- h) NMUK in Sunderland has a peak capacity of over 500,000 vehicles a year. From 2028 onwards, we expect the vast majority of these to be full Battery EV, thereby significantly increasing battery demand. EV batteries are highly calibrated pieces of equipment, with battery chemistry precisely aligned to each vehicle. The optimum means of meeting these needs, as well as avoiding the significant transit costs of moving one of the heaviest parts of an EV, is to co-locate battery production with vehicle assembly, as Nissan has with Envision AESC in Sunderland.

**7. Will the UK have sufficient battery production supplies by 2025 and 2030 respectively to meet the government phase-out plans for petrol and diesel vehicles?**

- i) Currently Envision AESC are installing 11GWh in Sunderland, to supply the LEAF successor vehicle that will enter production in 2026. This gigafactory is built on a modular design, meaning that capacity can be expanded along with demand.
- j) The UK government has set ambitious targets for OEMs and consumers to switch to EVs with the ZEV Mandate. The policy aligns with Nissan's global strategy to rapidly increase our global EV manufacturing capabilities. This creates an opportunity for significant investment in UK EV manufacturing, to develop a home-grown sustainable industry of the future here, with all of the local economic benefits that brings, and not being dependant on EVs or batteries imported from other major global players in this field, such as China and the U.S.
- k) Nissan has a global electrification strategy in place to prepare for the ICE phase out date:

## Written evidence from Nissan Motors UK (BEV0045)

- iii. Nissan was the first manufacturer to embrace the shift to electric cars for the mass-market, with the world's first ever mass market Nissan LEAF model, launched in 2011 and manufactured in Sunderland for the UK/EU market. Nissan's EV36Zero NEXT project will build on this legacy and develop our sustainability ambition even further in the UK.
  - iv. As 2030 approaches, we expect the vast majority of our Sunderland capacity to shift to EV manufacturing, driving demand for further expansion of gigafactory capacity in the UK.
    - l) However, battery production alone is not the only supply chain element necessary to meet the Government's phase out plans. Battery manufacturers require access to anode and cathode materials. Vehicle manufacturers must be able to access the wider supply chain that differs from ICE vehicles, such as powertrain manufacture. It is vital that the Government continue to support the full length of the supply chain if the UK's EV manufacturing future is to be properly realised.
    - m) The UK Government's ZEV Mandate is likely to enhance the current positive trajectory of EV up-take in the UK. For the UK to reap the economic and social benefits of a thriving domestic EV battery manufacturing industry – and not to become reliant on foreign imports of EVs/EV batteries – UK gigafactory capacity will need to rapidly increase. To increase gigafactory capacity, EV model allocations to UK vehicle manufacturing plants are fundamental to secure the necessary demand for manufacturing EV batteries in the UK. This was demonstrated in July 2021, with Nissan's EV36Zero announcement, committing to build a new EV crossover model in Sunderland from 2025, which secured investment from Envision AESC into the UK's first ever gigafactory, which is currently being constructed.
    - n) To achieve new EV model allocations, the UK government must work very closely with UK automotive manufacturers to attract new allocations and continually demonstrate the UK's international competitiveness as a place to manufacture EVs. Nissan's Japanese HQ is currently deciding on the manufacturing location of two new EV models and close collaboration with the UK government to position the UK as a suitable and competitive destination to produce these models will be vital to securing this major investment, which will create the critical mass of battery demand to justify the creation of a further two UK gigafactories.
- 8. Is UK-based battery production necessary to support the manufacture of electric vehicles in the UK?**
- o) Nearby battery production has a number of significant benefits for EV manufacturing.
    - v. Batteries are the heaviest component of an electric vehicle. In the face of rising logistical costs, removing the need to import them takes out a major cost contributor.
    - vi. There are many other benefits to producing batteries in the UK, notably that EV batteries are the most valuable EV component and attracting a UK-based manufacturing capability retains the economic value of manufacturing batteries in the UK, for example provision of skilled jobs, increased tax revenues, new opportunities for inward investment.
  - vii. The lead-time involved in importing batteries would significantly increase the cost of inventory on the water.
    - p) As the terms of the TCA enter force, manufacturers must consider RVC requirements to benefit from tariff free trade with the EU. This is an important consideration when 80% of all vehicles manufactured in the UK are exported, predominantly to the EU market. By 2027, 55% of the value of a car must be from the EU and/or the UK or cathode active material from the EU or UK. In addition to this, 65% of the value of the content of a cell or 75% of the battery pack must be from the EU and/or the UK.
    - q) Manufacturers could import batteries from the EU, to still meet the terms of the TCA. However, this would mean missing out on the wider economic benefits of having battery

production in the UK. This is a driving consideration behind Nissan's partnership with Envision to build the gigafactory in Sunderland.

- r) In addition, government support to secure UK-based R&D in connected and autonomous mobility (CAM) will help UK OEMs to include UK-produced CAM infrastructure to UK-manufactured vehicles, which will help to reach regional value content (RVC) requirements as part of future free trade agreements and boost export opportunities.

**9. What are the risks to the UK automotive industry of not establishing sufficient battery manufacturing capacity in the UK?**

- s) The UK has strong promise as an EV battery production location due to strong demand, a skilled workforce, and attractive manufacturing sites.
- t) However, the automotive industry is finding it increasingly difficult to be globally competitive and the UK's supply chains are not yet robust enough to support the take-off of a UK-based battery manufacturing ecosystem. This has been demonstrated by the decision by other manufacturers to take EV manufacturing out of the UK and by the recent news of British Volt going into administration. These points have already been established by other Parliamentary inquiries, including the EAC. Committee Chair Philip Dunne said that greater Government action was required in three key areas to kick-start a 'domino effect', namely: the need for a greater industrial strategy, appropriate support for R&D, and responsible sourcing of critical raw materials.
- u) The UK needs to keep up with its international competitors. As outlined by the SMMT, auto manufacturing in the UK has fallen to its lowest level in 66 years<sup>2</sup>. The global competitiveness of the UK industry has been undermined by global economic headwinds, notably high energy costs, parts shortages and supply chain bottlenecks. Energy costs have been particularly impactful on the UK's international competitiveness for automotive manufacturing, especially with regard to electricity prices. For example, the UK had the third highest electricity costs for businesses between 1 January to 30 June 2022 among the EU-14 (member states prior to 2004)<sup>3</sup>.
- v) Given the vital importance of batteries as a component in electric vehicles, few manufacturers will choose to build EVs in a separate location to their batteries, and Nissan sees this as an important factor in its partnership with Envision AESC, co-located on the Sunderland site.
- w) Automotive manufacturing is a highly competitive, global market. Decisions are made at a global level based on competitiveness between markets. The UK must, therefore, continually prove that it is a strong destination for both vehicle and battery manufacturing. Government can support this with a competitive business environment, a clear industrial strategy, continued investment in R&D and facilitating access to critical raw materials.

**10. What other domestic end uses for batteries would provide a market for UK battery production?**

- x) EV batteries have unique chemistry, differing not only within vehicles but also between models. Greater battery manufacturing capacity is not necessarily applicable to other uses such as grid balancing. However, attracting R&D projects to the UK by, for example, connecting companies like Nissan to the UK's excellent research universities, will develop new battery technologies to further demand and diversity of choice in the UK's battery market. For

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<sup>2</sup> [SMMT: UK Commercial Vehicle Manufacturing Report](#)

<sup>3</sup> [Quarterly Energy Prices, December 2022 \(publishing.service.gov.uk\)](#)

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example, Nissan is developing vehicle-to-everything (V2X) technologies from our European R&D hub, 'Nissan Technical Centre Europe', based in Bedfordshire. Attracting battery tech development to pilot and roll-out in the UK will create a broader market for battery production than just for mobility, as well as helping to establish the necessary component supply chains required for EV and other battery use cases.

- y) However, Nissan recognises the key role that the circular economy should play in the sector. Our subsidiary, 4R Corporation, has spent many years developing second life applications for EV batteries, many of which return more than 80% charging capacity after 10 years of use.
- viii. 4R has demonstrated applications ranging from using recovered LEAF batteries to power industrial vehicles like forklift trucks through to performing a grid balancing function.
- ix. Nissan is exploring how to bring this expertise to the UK.
- z) Nissan's Ambition 2030 vision places electrification at the core of the company's long-term strategy and sets out our aim to invest over £13 billion globally over the next five years to accelerate the transition.
- x. This includes establishing our first battery refurbishing facilities in Europe and the U.S. by 2025. Nissan's refurbishing infrastructure will support a circular economy in energy management, and the company aims to fully commercialise its vehicle-to-everything and home battery systems in the mid-2020s.
- xi. As part of EV36Zero NEXT, we are exploring the potential for a circular economy centre of excellence in battery recycling and component second life, creating a brand-new UK industry and ensuring everything we make comes full-circle.

### **11. Does the UK have a sufficient supply of critical materials to support vehicle battery production?**

- aa) Access to necessary raw materials is crucial to the viability of a sustainable UK automotive supply chain.
- bb) The publication of the Critical Mineral Strategy is a welcome first step. However, for businesses to have the confidence to invest in the UK, it is crucial that ongoing access to supplies is secure. Positive market signals will be important in maximising the investment attractiveness of the UK and government support to establish raw materials supply chains and explore domestic exploration will attract investment in this field, which we are starting to see with the creation of Green Lithium, Cornish Lithium etc. Localising critical raw materials exploration in the UK will support UK battery manufacturers to reach the necessary levels of regional battery content in future free trade agreements, unlocking export opportunities.
- cc) The Strategy will also allow the Government to assess the status of all critical raw materials required in the UK industry—including the likelihood of supply disruption and the potential for re-use and recycling—and act accordingly to provide security and reassurance to industry.
- dd) It must be recognised that securing certain critical materials within the UK or EU (to comply with RVC requirements) will come at greater cost than doing so from established suppliers from China. For this reason, it is vital that other, unnecessary surpluses to the cost of CRM exploration, such as high non-tariff costs on energy, are avoided wherever possible.

**12. Do we have the skills in the workforce required for the production of batteries? If not what needs to be done?**

- ee) For electrification, manufacturers need a workforce capable of working with high voltage and hydrogen systems, as well as with lightweight materials, and to transition high skill engineers who are specialised in areas which will face technology change. Currently, the UK possess a few hundred battery specialists. The Faraday Institution estimates this will need to increase to at least 3,000-4,000 by 2025 and 7,500-10,000 by 2030, if the UK wishes to become a competitive location for battery production.
- ff) Around 60% of the workforce in battery production facilities is made up of production staff, maintenance and engineering technicians. Production roles typically require level 2 or level 3 qualifications, with maintenance and engineering technicians typically being developed to Level 4/5. The remaining positions within the gigafactory are highly skilled and require degree qualifications, such as systems engineer, database development engineer and thermal management engineer, which would require a very high level of skill and qualifications.
- gg) The development and operation of battery production requires a diverse and highly skilled workforce. The Faraday Institution has indicated that by 2040 a thriving industry could provide employment opportunities for 170,000 people in EV manufacturing, 35,000 people in gigafactories, and 65,000 people in the battery supply chain.
- hh) The key skills requirements in battery production and the associated supply chain include engineering, manufacturing, logistics, and management:
  - xii. Essential skills in engineering – processing, chemical, mechanical, electrical and automation.
  - xiii. Critical skills in manufacturing – process technicians, engineers, quality control, and maintenance technicians.
  - xiv. Logistics skills requirements – logistics planning, supply chain management, inventory management and transportation management.
  - xv. Essential management skills – project management, risk management, financial management and general management.
  - xvi. Additional skills requirements – safety specialists, environmental management, recycling and data analysis.
- ii) To help meet the skills demand, substantial work has been done to create a strategy and clear roadmap for re-skilling and up-skilling the workforce to enable battery production, as evidenced in the National Electrification Skills Framework and Forum, a project which will be continued in 2023 by the Faraday Battery Challenge. The implementation of this strategy will require coordinated support from central government, local government, training providers, and industry, ensuring collaboration and alignment as well as a well-sequenced STEM curriculum in schools to meet the demand for a future workforce. A skilled workforce will be a significant advantage over European competitors in the race to attract inward investment from global battery manufacturing companies.

**13. What impact will the European Union’s proposed Carbon Border Adjustment Mechanism have on UK production?**

- jj) The EU’s proposed CBAM is not due to impact finished goods such as cars yet, but it will apply to electricity used within the supply chain. Battery manufacturing is extremely energy intensive, therefore there is a risk that this could impose an additional cost on UK battery manufacturers if EU-equivalent embedded carbon emissions levies on producers have not been paid on the electricity used in UK battery manufacturing. Any additional costs are likely to

## Written evidence from Nissan Motors UK (BEV0045)

- be passed on to customers which will undermine the incentive to purchase EVs and other battery technologies.
- kk) The UK Government's consultation on CBAM in the Spring should ensure increased operating costs are not placed on automotive manufacturers, who are already facing significant headwinds. This is especially crucial given their complex supply chains, and the burden a CBAM would place on the sector.
  - xvii. Addressing this is vital to secure the future of the UK automotive industry, with some manufacturers already reconsidering the investment attractiveness of the UK as the base for their European operations.
    - ll) It should also be noted that the complex supply chains might make participation of a CBAM administratively burdensome for the sector. Government should do what it can to avoid this.
    - mm) The UK has a number of options for responding to the EU CBAM – it could establish its own CBAM; it could link its ETS with the EU ETS; or it could hope that the UK's existing carbon pricing regime is deemed sufficient to avoid additional CBAM compliance costs. The option chosen should be taken with a view to providing business certainty and preserving the UK's investment attractiveness.
    - nn) Support for the UK battery manufacturing industry with the recent inclusion in the energy intensive industries (EII) scheme is welcome and will help UK battery factories to manage costs. Further relief that government can offer to UK battery/automotive manufacturers will continue to support investment and grow UK battery and EV supply chains, with all the economic value that will bring.