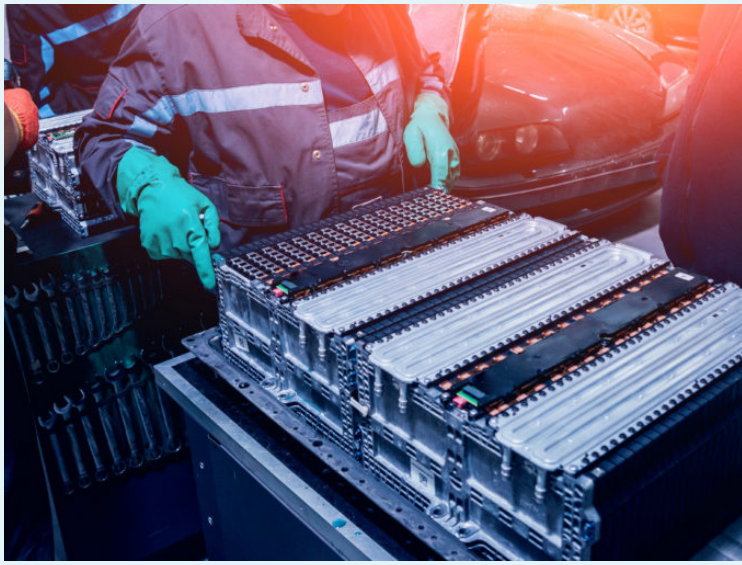
SELECTING THE STRATEGIC LOCATION FOR YOUR BATTERY BUSINESS

Why Brainport Eindhoven offers strategic advantages for expanding your business

BRAINPORT EINDHOVEN

BATTERY INDUSTRY IN EUROPE

Becoming the first climate neutral continent; it is an ambition that would grant Europe a pioneering role in the energy transition. In order to achieve this, electrifying transport is of paramount importance. The sector is a large source of greenhouse gas emissions, emitting about 20% of the total emissions of the EU (European Commission, 2017). Currently, batteries are the most viable solution to make the first steps towards zero emission transport and will therefore play an important role in the energy transition of Europe.



The market of Lithium-ion batteries will grow by 56% annually for the EMEA region, whilst the Asian markets become more and more saturated (Interact Analysis, 2019). Whereas over 90% of all Li-ion batteries are produced in Asia currently, Europe could facilitate up to 30% within 10 years. Several large firms are investing in Europe at the moment. For instance Tesla and Northvolt, who announced in Q4 2019 their plans to build gigafactories in Germany. The price of batteries, in addition, will drop by 30% by 2023 (Interact Analysis, 2019). Therefore, forecasts estimate that from 2025 onwards, Europe could grow a battery market of up to EUR 250 billion a year, which is the equivalent of 20 gigafactories. This offers supply chain benefits in an improving European battery chain and growth opportunities to battery companies in Europe, thus boosting the manufacturing of, and demand and research in battery systems.

On top of that, the European Commission is promoting a cross-border and integrated European approach covering the whole value chain of the battery ecosystem. It focuses on sustainability, covering the extraction and processing of raw materials, the design and manufacturing of battery cells and packs, and their subsequent use, reuse, recycling and disposal in a circular economy context. In order to achieve this, the European Commission launched the 'European Battery Alliance' cooperation platform in October 2017 with interested member states, the European Investment Bank and key industrial stakeholders. Two years later, in December 2019, it was announced that the European Commission had approved a €3,2 billion state aid for an intergovernmental project that addresses all parts of the battery value chain.

Hence, there is a huge opportunity at hand for companies to grow their battery business in Europe. Expanding a battery business into the EU enables profiting from the surge in the market. A major factor that influences decision making, besides this market of buyers, is a proximate supply chain. But there are other factors in specific countries in Europe one could benefit from even more. These include OEM-neutrality and buyer power, co-development between OEM and supplier, and societal factors like infrastructure, taxes and fiscal climate and innovation. Thus, how to decide where to strategically locate a battery business?

NORTH-WESTERN EUROPE

Especially the North-western part of Europe is developing its green mobility industry rapidly. Norway, The Netherlands, the UK, France, Germany and Sweden are the most rapidly developing countries with regards to electric vehicles (EV) (Ding et al., 2019). This region produces over nine million combustion and electric cars every year; 12% of all cars worldwide. More importantly, many of the world's most reputable and innovative manufacturers like Volkswagen Group, PSA Group, BMW Group, Volvo Group, Jaguar-Land Rover, and Daimler develop their cars in countries like France and Germany. Those OEMs have announced ambitions to electrify by 2025, such as Volvo who wants to sell 50% fully electric vehicles by 2025, the other half being hybrid.

In North-western Europe, Scandinavia is one of the leaders concerning battery cell production and is rich in raw materials for batteries. They also have some battery recycling companies. There is lithium-ion and cathode production in Sweden and automotive production by Volvo and Scania. In addition, research is pioneering in Denmark, especially with regards to mining and recycling.

Based on the report by McKinsey, who mapped all automotive EV production, lithium-ion production, and cathode production in Europe, Northern-Germany and Western-Poland are also interesting. It will be close to both cathode providers and OEMs.

Such a solid, proximate European supply chain is of great essence for three reasons. First of all, battery technology is a fast evolving technology and the battery market goes through quick changes. In addition, battery technology as a core component of vehicles, is a complex, multidisciplinary system and is dependent on vehicle and environment specific requirements. This requires swift reaction of the supply chain and co-development between OEM and suppliers, which a tightly linked supply chain would enable. Lastly, the high costs and safety requirements associated with transport of lithium-ion batteries. With costs of the transport of battery cells being between €550 and €1650 per battery pack, companies can significantly cut down expenses by having a proximate supply chain. North-western Europe has this, as OEM production is already quite centralized. Therefore, this region is particularly suited to establish a battery business.

THE NETHERLANDS

The importance of the battery industry is also acknowledged by the Netherlands and it provides a strategically beneficial location. The Netherlands features the best infrastructure of Europe, including the largest seaport in Rotterdam and the third largest airport in Amsterdam (World Economic Forum, 2018). This provides logistical opportunities given the fact that the developing European supply chain will rely on imported Asian battery cells for the time being. In order to access the European market, a decent infrastructure is required to import the cells, store them and move them to value-adding facilities and afterwards to OEMs that are either present in the Netherlands, or the surrounding countries, like Germany. It is no rocket science that this provides great market opportunities for companies looking to develop their market in Europe.

Looking at the situation from a technological development perspective, the Netherlands differentiates itself from surrounding countries by being relatively OEM-independent. The German and French OEMs highlighted earlier are extremely large and powerful, creating high buyer power and limited development freedom for suppliers. This poses significant risks in a market with such high growth potential and high competitiveness. The Netherlands is much less dependent on OEMs in the automotive industry, especially when compared to Germany.

This less contract-based environment is less focused on high volume efficiency. This allows small businesses to have their impact on the industry of electrical vehicles, improving the potential for innovation. Regarding OEMs, the Netherlands has both global and niche players. For instance, VDL Bus & Coach & DAF Trucks (a Paccar company), who respectively supply buses and coaches, and trucks to the world, or Lightyear, a manufacturer of the first commercial solar car. Not to forget the large maritime industry that is present in the Netherlands with OEMs as Damen Shipyards and Portliner, who are both already involved with manufacturing electric ferry's and vessels.

In these niche markets as heavy duty vehicles and boats, accessibility and proximity between OEM and supplier is of extreme importance for co-development reasons. Light duty electric vehicle batteries are becoming more and more a commodity since this market is growing excessively and technological development is at a peak high (Albrahim, Zahrani, Arora, Dua, Fattouh, Sieminski, 2019). Nonetheless, battery packs for other applications such as buses, trucks, and boats are still not readily available on the market. Therefore, there are huge market opportunities at hand in this segment. Given the unique specifications and needs for the battery packs for different applications (i.e. short range trucks vs. long range trucks),

co-development between supplier and OEM is of significant essence to create a beneficial business case for the different markets. The proximity of heavy duty OEMs, both in the Netherlands and in Europe, offers opportunities for crucial co-development. An example of this is DAF. In collaboration with supermarket chain Jumbo, DAF developed an eTruck for medium & heavy duty city transport, as well as a hybrid truck for longer ranges. In order to do so, they used electric powertrain technology developed by VDL. This shows the country's ability to be a frontrunner in implementing and developing new use cases that can be exploited throughout Europe by collaborating in the supply chain.

Additionally, batteries are highly complex products with an incredibly high technological development pace. Highly educated staff and high levels of innovation are therefore crucial. Universities and industrial-academic collaborations are a source for skilled personnel, whilst R&D spending indicates the level of innovation. The Netherlands differentiates itself by the amount of private R&D investments, highly educated technological talent and an environment for open innovation and collaboration. A culture of open innovation is significantly linked to innovation performance (Cheng & Huizingh, 2014). You can find these competences in the Brainport Eindhoven region, which is one of the most innovative regions in Europe where high tech and design are combined with an advanced high-end manufacturing industry and entrepreneurship. This region spent €2.5 billion on R&D in 2015, and has the highest number of patents per capita in Europe in 2019.

Conclusively, the Netherlands is a perfect location for a battery business. The time to act on this window of opportunity is now. But what is the ideal location in the Netherlands?

BRAINPORT EINDHOVEN

Brainport is the top technology region of Europe, with 1300 patents. Eindhoven is at its heart, where internationally renowned companies as Philips, ASML, and NXP are founded. In 2015, the Brainport Eindhoven region was ranked by Forbes as the Nr. 1 Innovation hotspot in the world. More than half of the Dutch automotive OEMs are located in, or in close distance of, the Brainport region. Moreover, the Brainport Eindhoven region is known for its high-tech industry and its open innovation culture. The Eindhoven University of Technology has the highest collaboration rate with the industry of all universities in the world.

This gives companies access to the latest research and bright tech and IT students. In Brainport Eindhoven technology and networks are clustered on campuses in order to create economic value and facilitate business development. Each of these campuses houses an ideal mix of companies, talents and knowledge institutes with a specific expertise. The campuses are located in a relatively compact area and together they form a value chain that covers all technology readiness levels. The open research platforms, open supply chains and campuses make it possible for companies to benefit from knowledge sharing, strengthening each other's core competences, making use of R&D budgets on roadmaps, taking shared risks and to develop and test ground-breaking technologies at competitive costs with a short time to market. It makes Brainport Eindhoven the growth accelerator of the Dutch economy.

The region is home of large manufacturers in mobility and especially in heavy duty transportation. VDL produces 200.000 cars a year and has a decent market share in electric buses. This market share is co-developed with DAF, a large truck producer. The Citea Electric is an electric bus developed by a consortium led by VDL. Eindhoven was the first city to provide large scale electric public transportation: the pilot and use-case of VDL, Heliox, and the city of Eindhoven shows that electric public transport in urban environments is possible on large scale. At the moment, it is the largest fast charging network in Europe, from 2016-2018 it also was the largest electric public transport fleet in Europe.

Some other promising organizations in green mobility:

By optimizing aerodynamics and lightweight materials Lightyear develops an electric car that is charging itself from solar cells built into the roof of the car. This unique quality allows it to drive for months without charging.

NXP, a global leader in connectivity solutions for, for instance, automotive industry. They supply battery management systems.

For all kinds of Li-ion battery applications, DSM manufacturers specialty materials. DSM is a science-based company that offers sustainable and innovative solutions in Nutrition, Health, and Sustainable Living.

The research centre Imec engineered a new solid electrolyte, paving the way for a whole new generation of batteries for applications covering the spectrum from small portable electronics to electric vehicles and stationary grid storage.

With a headquarters in Eindhoven, Prodrive Technologies produces automotive products and technologies for all future powertrains, such as DC/DC converters, charging solutions, inverters and electronic control units and is supplier of for example BMW, Volkswagen and Audi.

TNO, the Dutch Agency for Applied Scientific Research, announced in December 2019 that is plans to establish an international research centre for sustainable powertrains at the Automotive Campus in the Brainport Region: Innovation Centre for Sustainable Powertrains (ICSP).

AUTOMOTIVE CAMPUS

The Automotive Campus in Helmond is one of five campuses in Brainport. The former Volvo Nedcar development centre has transformed into an international automotive and mobility hotspot where industry, start-ups, education, knowledge institutes, and government come together in an open innovation, OEM-independent, and neutral setting where all kinds of systems can be tested. It offers an attractive learning and working environment, flexible accommodation concepts and state-of-the-art technological (test) facilities for green mobility, including simulations, labs, control rooms, and a public road test site. The facilities provide assistance in homologations to international standards and certifications. To experience the benefits of the Automotive Campus and get acquainted with the Dutch automotive and mobility ecosystem the campus offers a special partnership for foreign companies. The campus hosts around 600 events that improves network and community building.

NETWORKS

The Netherlands is home to many network organizations, each covering a specific theme to improve involvement with relevant companies, international markets, and technology partners. For instance, RAI Automotive Industry NL, DOET (the Dutch Organisation for Electric Transport), and ElaadNL (the knowledge and innovation centre for charging infrastructure). High Tech NL is the cluster organization for power electronics. They describe themselves as the gateway to innovation with the Dutch industry. This network connects to industries that use batteries for applications other than automotive, with partners such as Bosch and ASML. Hence, these networks provide great business development opportunities.
RAI Automotive Industry NL is the cluster organization for the Dutch automotive industry and education, and is located at the Automotive Campus. It has over 170 members, including major players such as DAF, VDL and NXP, as well a vast amount of interesting SME's and innovative start-ups. The organization can be of great value for starting a battery business in the Netherlands by, e.g., developing a roadmap for deploying green mobility, connecting the right parties to collaborate, and pursuing targeted promotional activities.

The organisation helps businesses capitalize on economic opportunities by organizing business outreach activities, such as trade missions, articipation at trade fairs, networking events, and links to international initiatives such as Horizon2020. This is essential in generating system solutions, rather than separate innovations. Information about the membership of RAI Automotive Industry NL can be found on their website.

SUPPORT BY BRAINPORT DEVELOPMENT

Brainport Development is the economic development agency of the Brainport Eindhoven region. This organization cooperates with many partners on strengthening the high-tech business environment of the region. Brainport Development offers international companies and organizations that want to do business in Brainport Eindhoven with information and practical assistance free of charge. It helps international companies and investors to set up a business in a fast, flexible and transparent manner, by providing them with all the information they need about the regional business climate, by connecting and introducing newly based companies to a transparent network of reliable service providers and by introducing them to a large and valuable network for the development of green mobility solutions.

Contact our business developer Rutger van Poppel for more information and support on setting up your business in Brainport by sending an email to invest@brainportdevelopment.nl.

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MORE INFORMATION

For more information on Brainport Eindhoven visit the website: www.brainporteindhoven.com