



## Baden-Württemberg connects stakeholders for e-mobility innovation

**Government:** Baden-Württemberg, Germany

**Region:** Europe

**Sector:** Clean transportation

**Date of publication:** February 2019

### Summary

Over the past 130 years, Baden-Württemberg has gone from being the cradle of the automobile industry to a major automotive ecosystem. Today, the technological shift towards sustainable and smart mobility is challenging the conventional value creation chains of the automotive industry. In response to this, an innovation alliance called the Cluster Electric Mobility South-West was established to connect stakeholders from industry and research. It was an important element of the cluster strategy of the regional government of Baden-Württemberg.

The cluster aims to hone new technologies and develop innovative mobility solutions by bringing together industry players with science and politics. By connecting the different stakeholders involved in the mobility ecosystem, Baden-Württemberg offers the cluster members the opportunity to exchange ideas with partners outside of their specific industry or field of technology. Ultimately, the goal is to develop capabilities for new products and services, generating new potential for value creation in Baden-Württemberg and a cleaner automotive future to help reduce emissions.

Founded in 2007, the Cluster Electric Mobility South-West now has more than 140 partners from industry, research institutes and the public sector. About half of the industry partners are global players, with the other half being small and medium enterprises. It is one of the largest research and cooperation networks working on the mobility of the future. The cluster is managed by e-mobil BW, Baden-Württemberg's agency for New Mobility Solutions and Automotive.

The cluster's work focuses on four fields of innovation: vehicle, energy, information and communications technology (ICT), and production. The partners work together on technological projects and in thematic working groups, but also cooperate on cross-sectoral topics, such as knowledge transfer and public relations.



### The Cluster Electric Mobility South-West focuses on four fields of innovation

**Vehicle:** Working on optimising vehicle electrification and overall system architecture including repair capability of electric vehicles, thermal management, power steering and brake booster design, and automated driving functions.

**Production:** Working on efficiency increase in manufacturing through the speeding up of processes and reduction of manufacturing costs.

**Energy:** Working on energy transfer and utilisation in the vehicle, smart grid integration, and the connection between a decentralised, renewable energy supply, charging infrastructure and the vehicle.


**ICT:** Preparing for smart mobility through communication between vehicles (Car2Car communication) and infrastructure components such as traffic management and charging infrastructure (Car2X communication).

## Results

Key successes of the cluster include:

- **The development of a joint strategy that embraces the entire system of electric mobility.** This was brought to life with interdisciplinary and mutually supportive research projects. The strategy consists of three development targets: Market and Costs (generating competitive life-cycle costs), Handling and Comfort (satisfying customer expectations of e-cars) and Connected Mobility (increase of availability of modes of transport).
- **Funding.** In 2012, the cluster successfully participated in the Leading-edge Cluster Competition organized by the Federal Ministry of Education and Research and secured additional funding for research projects on the development of large-scale electric vehicle production, their production itself, charging technologies, and IT solutions. The Leading-edge Cluster had a total funding of 40 million euros for research efforts, and industry partners have invested a similar amount. The state of Baden-Württemberg also supported the cluster with another five million euros to strengthen cluster management and to foster key measures for cross-sectoral collaboration.
- **Cooperation to achieve results.** Cooperation within the cluster has given companies in the region a significant economic boost: new charging systems, manufacturing plants and production methods for batteries and electric motors, innovative vehicle components, fleet management and charging strategies as well as ICT for smart electric vehicle have been developed.
- **Increased international collaboration.** The cluster links companies with partners in Europe, Asia and North America. By joining forces with similar networks in other countries, the cluster identifies best opportunities for collaboration around technological innovation. An example of this is the German-French Alliance for Innovative Mobility Solutions (AllFraTech), linking up the R&D efforts of two of Europe's large automobile industry regions: Auvergne-Rhone-Alpes and Baden-Württemberg. As a result of this alliance, two cross-border R&D projects became reality:
  - InnoTherMS which deals with innovative Predictive High Efficient Thermal Management Systems
  - EMC2 which aims at building up and testing an efficient modular convenient charging system.
- **Recognition as a successful cluster.** The Cluster Electric Mobility South-West was labelled several times with the Gold Label of the European Cluster Excellence Initiative (ECWI).

As of 2019, 28 highly innovative and collaborative projects have been facilitated through the cluster. The cluster continues to initiate new projects at the regional, federal and EU level. One of the latest projects is Smart Load which started in October 2018 and will be in progress until September 2021. The cluster management has also set up a strategic process with cluster members.



Examples of successfully completed projects in the four fields of innovation are provided below.

## Vehicle

### **DiNA – EV diagnosis and repair (2012–2015)**

With fewer mechanical components, electric vehicles require less maintenance. DiNA is a diagnostic system for the modularized maintenance of the entire power train, from the high voltage battery to the inverter, engine and charging system. It can reliably identify worn components before they fail, which lowers operating costs.

## Production

### **OptiFeLio – Optimized design and production concepts for the manufacture of battery casings (2014–2017)**

OptiFeLio optimizes batteries with:

- Improved procedures for shaping aluminum compound foil into battery casing for pouch and prismatic cells
- Temperature sensors built directly into the casing
- An emergency cooling system.

## ICT

### **eFlotte – EV fleet and charging management (2012–2015)**

Operating conventional and electric vehicles as part of the same fleet can be a challenge. eFlotte has devised solutions which help fleet managers optimise EV integration into their existing fleets, thus successively replacing their conventional vehicles. In fleets comprising petrol and diesel vehicles, it is also important to take account of their pros and cons to facilitate economic and resource-efficient integration.

## Energy

### **AUTOPLES – Automated parking and electric vehicle charging (2013–2015)**

With varying spatial arrangements, a mix of cars and pedestrians and unreliable GPS signal, navigating parking facilities is an underestimated challenge, especially for driverless cars. AUTOPLES experimented with the future of parking, which will involve alighting before entering the car park and leaving the vehicle to park, charge and pay virtually all by itself.

## Cross-sectoral collaboration

### **SystEM und LieSE – Electric mobility supply companies**

High-tech heating fabrics for innovative thermal management in the vehicle interior, deep-drawing presses for battery casings or stamps for fuel cell stacks – some SMEs remain unaware of how their product portfolio could contribute to the development of electric mobility. Focusing on opportunities and risks for small and medium-sized automotive industry suppliers, SystEM categorized upcoming changes in e-mobility products and production processes. LieSE then transferred the results of this analysis to a consulting system that will inform companies about the electric mobility production system, both online and at global events.



## Key lessons learned

- **An interdisciplinarity network is beneficial.** The interaction between partners from different industry branches and various science disciplines, as well as the public sector, is very worthwhile in bringing forward innovative and complex topics like electric mobility and new mobility solutions.
- **The value of professional management.** It is a big asset to have an independent and professional cluster management in order to generate value for all stakeholders involved.
- **A comprehensive strategy is important.** The whole activities of a cluster initiative should have a strategy, which comes along with the needs of the members and supports the objectives of the regional government. The strategy needs to be regularly revised and adapted. In the case of Cluster Electric Mobility South-West, the objective is to promote the industrialization of electric mobility in Germany and to position Baden-Württemberg as a leading supplier of sustainable and smart mobility solutions. As an important and traditional automotive region Baden-Württemberg is aware of the profound effects on the mobility and the automotive sector which come along with electrification, digitalization and automatization. The Cluster Electric Mobility South-West as well as the Strategic Dialogue for the Automotive Sector Baden-Württemberg (SDA) are important parts of the regional strategic approach to successfully manage this transformation process.

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More information: [Brochure on the Cluster](#)

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This case study was developed as part of the [Under2 Zero Emission Vehicle \(ZEV\) Project](#), which supports state and regional governments to increase the number of zero emission vehicles on their roads. The Under2 ZEV Project is implemented by The Climate Group, as part of the Under2 Coalition, with the support of the Scottish Government.

