



**AirportCity**  
STOCKHOLM



**TRAFIKVERKET**  
SWEDISH TRANSPORT ADMINISTRATION

## Welcome to the 2<sup>nd</sup> International Conference on Electric Road Systems (ERS) June 13th and 14th 2018!

June 13th	Programme (subject to changes)
10:00	Registration opens at First Hotel Arlanda Airport
11:00	Lunch buffet at First Hotel Arlanda Airport
	<i>Walk to conference venue Training Partner</i>
13:00	Welcome + Key notes Jan Pettersson - Trafikverket <i>The Swedish national roadmap for ERS</i> and Gina Ytteborg - Statens Vegvesen <i>ERS in Norway</i>
13:45	<b>Presentation session 1: Decision processes and stakeholders</b>
14:45	Swedish Fika
15:15	Key note Takamitsu Tajima - <i>Development of Ultra-high Power and High Speed ERS (450 kW charge at 150 km/h)</i>
15:45	<b>Presentation session 2: Energy and environment</b>
17:15	Poster session + mingle
17:45	Key note Michael Lüken - <i>Status quo and Prospects for ERS in Germany</i>
18:15	Poster session + mingle
19:30	Dinner at First Hotel Arlanda Airport

June 14th	Programme
09:00	<b>Presentation session 3: Tests and demonstrations</b>
10:00	Key note Stefan Tongur – <i>Preparing for take-off: Analysing ERS from a business model perspective</i>
10:30	Swedish Fika
11:00	<b>Presentation session 4: Network and large scale deployment</b>
12:15	Panel discussion and conclusion
12:45	Lunch buffet at First Hotel Arlanda Airport
14:00	Introduction e-Road Hans Säll and Stefan Hörnefeldt – <i>Installation work eRoad Arlanda</i>
14:30	Site visit e-road Arlanda
16:30	End of conference

## **Presentation session 1: Decision processes and stakeholders**

User perspectives on electric roads

Martin Gustavsson and Conny Börjesson - RISE Viktoria, Sweden

Industrial dynamics and path dependency – the case of implementing ERS-systems in Sweden

Björn Hasselgren - Swedish Transport Administration and Lund University, Sweden

Architecture of Electric Road System - A first step toward standardization

Håkan Sundelin – RISE Viktoria, Sweden

Stakeholder Assessment Tool from the ERS Engineering Toolbox; The Case of eRoadArlanda

Qiuchen Wang and Daniel Berlin – KTH Royal Institute of Technology, Sweden

Logistical Constraints on Commercial Applications for ERS

Julius Jöhrens, Julius Rücker and Hinrich Helms – Institute for Energy and Environmental Research, Heidelberg, Germany

## **Presentation session 2: Energy and environment**

What is the hourly electricity demand when implementing ERS?

Darijan Jelica, Maria Taljegard, Ludwig Thorson and Filip Johnsson – RISE Viktoria and Chalmers University of Technology, Sweden

Impact of electric road systems on the Swedish-German electricity mix

Maria Taljegard, Lisa Göransson, Mikael Odenberger and Filip Johnsson – Chalmers University of Technology, Sweden

The potential market diffusion of hybrid electric trolley trucks and their impact on the energy system in Germany

Till Gnann, Patrick Plötz, Martin Wietschel - Fraunhofer Institute for Systems and Innovation Research ISI and Karlsruhe Institute of Technology, Germany

Energy system model for electric roads

Anders Malmquist and Joseph Adhemar Araoz Ramos – KTH Royal Institute of Technology, Sweden

Infrastructural aspect of electrified road systems Long-term performance prediction by Finite Elements integrated into a Life Cycle Assessment

Romain Balieu, Feng Chen and Nicole Kringos – KTH Royal Institute of Technology, Sweden

Chassis potential measurement and limitation in conductive ERS supplied vehicles

Mats Alaküla, Sönke Schuch, Francisco J. Márquez-Fernández and Lars Lindgren - Lund University & AB Volvo, Sweden and RWTH Aachen University, Germany

### **Presentation session 3: Tests and demonstrations**

Evaluation of in-road conductive electric vehicle charging

Mikael Hellgren and Nicholas Honeth – KTH Royal Institute of Technology, Sweden

ELISA / eHighway Hessen: The way from vision to reality

Gerd Riegelhuth, Achim Reusswig and Igor Rudgartser – Hessen Mobil, Germany

Ground-level feeding system: from rail to road transport

Patrick Duprat, Jean-Luc Hourtane, Ove Hjortsberg, Anna Lindholm and Mats Alaküla – Alstom Group, France and AB Volvo, Sweden

Accompanying research for the eHighway field trial in Schleswig-Holstein

Markus Staub – Technische Universität Dresden, Germany

Experiences from two years of operation at the E16 electric highway - From vision to reality

Jan Nylander and Magnus Ernström – Me and Region Gävleborg, Sweden

## **Presentation session 4: Network and large scale deployment**

Preliminary Findings from a US Department of Energy ARPA-E Funded Feasibility Analysis of Electric Roadways in Los Angeles County

David Christensen - SELECT Center/Utah State University, USA

Development of a core network for the use of overhead line heavy duty vehicles on the German motorway network

Tobias Bernecker, Jens Boysen, Markus Schubert and Gregor Nebauer, Heilbronn University of Applied Sciences and Intraplan Consult GmbH, Germany

Electric road systems in the European Union- Potential and assessment of uncertainties based on Swedish case study

Georgia Savvidou and Björn Nykvist - Stockholm Environment Institute, Sweden

Automated Assessment of Highway Track Elements Regarding Their Capability to be Equipped with Catenaries

Manfred Boltze and Kevin Rolko - Technische Universität Darmstadt, Germany

Benefits and system design of ERS in the context of falling battery costs

Sven Kühnel and Florian Hacker - Oeko-Institut, Berlin, Germany

Identification of economically viable ERS routes in Germany

Julius Jöhrens, Julius Rücker, Hinrich Helms and Volker Waßmuth - Institute for Energy and Environmental Research and PTV Transport Consult GmbH, Germany

## Poster session

- ELONROAD A charging infrastructure for cities  
Dan Zetraeus – ELONROAD, Sweden
- “E-Way Corridor” General Description and Project Framing  
Jacques van Wittenberghe – Association ELECTRIC-ROAD, France
- Thermal modeling of fast static charging from an ERS  
Philip Abrahamsson and Mats Alaküla – Lund University, Sweden
- A Blueprint for Interoperable Static & In-Motion Wireless Charging for Commercial Heavy-Duty Vehicles  
Michael Masquelier – WAVE / USU, USA
- Algret Innovations LTD  
Yannick Algret – Algret Innovations LTD, United Kingdom
- Evaluation Concept for the ELISA eHighway System Field Trial  
Manfred Boltze and Danny Wauri – Technische Universität Darmstadt, Germany
- ERS- A step towards Smart Transportation in India  
Rajendra Sahu, Anam Pandoh, Mannat Pandoh and Suyash Singh - Atal Bihari Vajpayee – Indian Institute of Information Technology and Management, India

## Panel session

- Tom Nørbech, Senior advisor, Norwegian Public Roads Administration
- Michael Lüken, Research associate, VDI/VDE Innovation + Technik GmbH
- Jan Pettersson, Head of Electric Road Program, Swedish Transport Administration
- Hans Säll, Senior Vice President and Head of Business development, NCC Infra
- Anna Lindholm, Manager Electromobility, AB Volvo.
- Nils-Gunnar Vågstedt, Chief Engineer Emobility, Powertrain Development, Scania

## Key note speakers

**Name: Jan Pettersson, Head of Electric Road Program, Swedish Transport Administration**

**Title: The Swedish national roadmap for ERS**



### Abstract:

Heavy goods vehicles are responsible for almost 89% of product volumes transported domestically, while cars are responsible for over 90% of traffic work. Heavy goods vehicles travelling by road are responsible for around 25% of the road transport system's energy utilisation, and more or less the same percentage of carbon dioxide emissions. The Riksdag (Swedish Parliament) has made a decision on a climate law which will involve a compulsion to reduce carbon dioxide emissions from the transport sector by at least 70% by 2030, before reaching a zero level in 2045.

The main idea with electric road systems is to reduce the dependency of heavy vehicles on fossil fuels, to reduce carbon dioxide emissions and also to ensure good provision of transport for commercial purposes in the fossil-free society of the future. Good provision of transport of this kind must not involve impairment of safety or the cultural or natural environment.

The national roadmap consist of four main parts

- Market and funding
- Promote, contribute to and pave the way for a broadened market and greater competition between the transmission systems
- Prepare and implement a major electric road system pilot
- Create a long-term plan for the construction and development of electric road systems

### Biography:

Jan Pettersson works as a Director at the Department for Strategic Development at the Swedish Transport Administration. Jan Pettersson is the Head of the Swedish national program for electrified roads in Sweden. He coordinates the Swedish – German partnership on behalf of the Swedish ministry.

Mr. Jan Pettersson has a long experience as Executive Director for both roads and railways regarding maintenance and operations. He is also active and responsible for European benchmarking projects within PRIME (Platform for Railway Infrastructure Managers across Europe) and CEDR (Conference of European Directors of Roads).

**Name: Gina Ytteborg, Head of R&D and innovation, Norwegian Public Roads Administration**

**Title: Future transport and climate challenges: the Norwegian National Transport Plan**



**Abstract:**

Norway has high ambitions when it comes to cutting greenhouse gases and is a leading country in the introduction of electric cars in the private market. The concept of the world's first fully electric ferry Ampere, demonstrates the possibilities for industrial and technology development towards the future, it demonstrates that zero emission is possible and that it is possible for public customers to go ahead as demanding customers. This is however, not enough to reach the important goals stated in the National Transport Plan. A mix of energy sources, innovation, entrepreneurship, technology development in small and large companies and public-private partnership is essential to solve the future transport and climate challenges

**Biography:**

Gina Ytteborg is Head of R&D and innovation in the Norwegian Public Roads Administration. Gina has 20 years of experience from various positions in the energy industry within HSE and environmental management, R&D and technology development including for instance offshore water cleaning systems and carbon capture and storage technology. She was for several years heading up the Arctic R&D and technology development section in a Norwegian oil and gas company. The last three years she has been leading the coordination and further development of the research and innovation efforts in the Norwegian road and transport sector, including preparations for the transportation system of the future. She holds a Master in Chemistry.

**Name: Takamitsu Tajima, Chief Engineer, Honda R&D, Japan**

**Title: Development of Ultra-high Power and High Speed ERS  
(450 kW charge at 150 km/h)**



**Abstract:**

Reducing the amount of CO<sub>2</sub> emissions to zero while driving is considered an important goal for the mobility sector in order to achieve a zero CO<sub>2</sub> society. With that the background, this research sought to develop an Electric Road System (Dynamic Charge System) from a road line, achieving an unlimited EV cruising range by charging the EV at Ultrahigh power during cruising. This system would help make it possible to finish battery charging in a short time by contact with the EV while cruising and enable drivers to freely cruise their intended routes after charging. This report discusses the study results of a method of building the infrastructure, as well as looking at the actual cruising test results and future outlook. In particular, the research clarified the conditions for achieving an unlimited vehicle cruising range with a 450-kW electric road system. It also demonstrated that this system would allow battery capacities to be greatly reduced and make it possible to secure the battery supply volume and resources. It furthermore showed that even heavy duty trucks can be electrified, something considered challenging up to now.

**Biography:**

Takamitsu Tajima is project leader in the development of ERS at Honda. And Takamitsu is also an organizer of JSAE (Society of Automotive Engineers of Japan)'s ERS technology. Takamitsu is an experienced project leader for Vehicle module structure, EV system, Chassis system, and Formula-1 car technology. He joined Honda R&D in 2001. Prior to joining Honda, he lectured on Mechatronics at Japanese University, and prior to this worked for Nissan.



**Name: Dr. Michael Lüken, VDI/VDE Innovation + Technik GmbH**

**Title: Status quo and Prospects for ERS in Germany**



**Abstract:**

Three demonstration projects with a catenary-based electric road system (ERS) on public roads constitute a major task in Germany's current activities for decarbonizing the transport sector. These ERS demonstration projects (approx. 10 km length each) are intended to lay the foundations for a decision on a rollout of ERS by generating real-life experiences. On the background of stringent national climate targets (reducing CO<sub>2</sub> emissions in the transport sector by 40 to 42% until 2030, and to almost zero by 2050), realistic measures for a fast electrification of road freight transport have priority over testing further technology alternatives. Further activities in Germany aim at designing strategies for a network extension and suitable business models. International cooperation and exchange of experiences, as within the German-Swedish partnership, is highly desirable to enhance future prospects for ERS on a European scale.

**Biography:**

Michael Lüken coordinates the national ERS partnership with Sweden on behalf of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. As a technical consultant at the project management agency VDI/VDE Innovation + Technik GmbH, Michael Lüken supervises several ERS funding projects in Germany. Before joining VDI/VDE Innovation + Technik, he coordinated a digital scientific education project at Deutsches Klima-Konsortium. Prior to that, Michael Lüken contributed to the model-based analysis of global climate change mitigation strategies at the Potsdam-Institute for Climate Impact Research. He holds a Master in Physics and a PhD in Economics.

**Title: Preparing for take-off: Analysing ERS from a business model perspective**

**Name: Stefan Tongur**



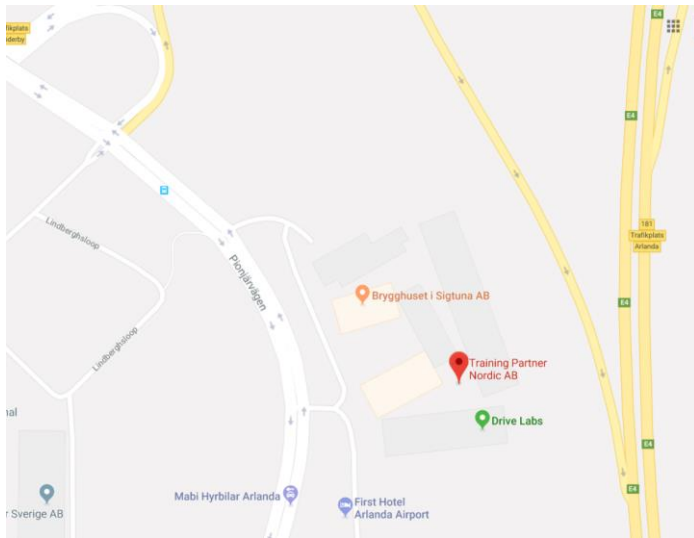
**Abstract:**

Electric road systems (ERS) are road transportation systems based on technologies that support electric power transfer from roads to vehicles in motion. Transition toward alternative technologies, such as ERS, is necessary in order to achieve the sustainability goals in road transportation. While several studies have emphasized that new business models are necessary in order to commercialize such technologies, they tend to neglect the fact that many of these technologies require socio-technical change, such as investments in alternative infrastructure. Therefore, in his PhD thesis, Stefan examined the relationship between business models and socio-technical change by investigating the development of ERS in Sweden and in Los Angeles, USA. The findings suggest different roles that business models can have in different types of projects when preparing ERS for commercial takeoff: first, new business models were not part of the pilot projects which focused on radical innovation; second, business models were developed in demonstration projects with user interactions; and, third, business models were evaluated, and in this case rejected, in a deployment project aiming to transform the existing socio-technical system. Additionally, the thesis discusses whether or not ERS is likely to take off. Thereby, this research nuances our view of predevelopment processes of a niche innovation before it has actually taken off and improves our understanding of what hinders and enables sustainable transitions.

**Biography:**

Stefan Tongur has studied the evolution of electric road systems (ERS) through case studies in Sweden and LA, and defined the concept of ERS early in 2010. His work on ERS has been published in academic journals and conferences such as Technovation, Environmental innovation and societal transition, and IEEE conference on Energy, power, and transportation. He holds a MSc in Mechanical Engineering and he defended his PhD thesis in April at the department of Industrial economics and management at KTH Royal Institute of Technology. Currently Stefan is a Senior Researcher at RISE Viktoria and will further explore business models aspects in relation to ERS.

## The venue and how to get there



The conference will take place at Training Partner Nordic AB in Arlandastad. For the conference registration, please go to First Hotel Arlanda Airport. Lunches and dinner will be served at First Hotel Arlanda Airport as well.

NB: The official programme will start at Training Partner Nordic AB at 13:00. Follow the signs to the ERS Conference.

**Adress for registration and First Hotel Arlanda Airport:** Pionjärvägen 81, 195 61 Arlandastad

**Conference venue:** Training Partner Nordic AB 195 61 Arlandastad (next to First Hotel)

**GPS Coordinates:** Latitude: 59.610566 | Longitude: 17.895267

### By car

#### **From Uppsala:**

E4 south towards Stockholm, exit 181 (Trafikplats Arlanda)

#### **From Stockholm:**

E4 north towards Uppsala, exit 180 (Trafikplats Märsta)

### By train

#### **From Uppsala/Stockholm:**

Coming from Uppsala or Stockholm, you can take the train to Märsta. From Märsta, you can take bus 571 or 571X towards Eurostop (get off at the bus stop Pionjärvägen). The trip takes approximately 10-15 minutes and buses depart 3 times per hour during off-peak hours ('29, '44 and '59). From there, it is a five minute walk to the venue.

For public transport itineraries within Stockholm region, please check the website of SL: [www.sl.se](http://www.sl.se). For long-distance train information, please check [www.sj.se](http://www.sj.se).

**By bus from Stockholm Arlanda:**

Coming from Stockholm Arlanda, you can take the yellow shuttle buses between the terminal and First Hotel. The buses depart every 40 minutes and the trip takes approximately 10 minutes.

Terminal 5:	Terminal 4:	Terminal 2&3
<b>09:37</b>	<b>09:39</b>	<b>09:41</b>
<b>10:17</b>	<b>10:19</b>	<b>10:21</b>
<b>10:57</b>	<b>10:59</b>	<b>11:01</b>
<b>11:37</b>	<b>11:39</b>	<b>11:41</b>
<b>12:17</b>	<b>12:19</b>	<b>12:21</b>
<b>12:57</b>	<b>12:59</b>	<b>13:01</b>

etc.

The buses depart from *Bus Stop 11* at Terminal 4 and 5.

The buses depart from *Bus Stop 7-8* at Terminal 2.

**Please note that after the conference on June 14<sup>th</sup>, buses will depart from the conference venue going to the Arlanda test track for a field study after which the buses will continue to Terminal 5 at Arlanda International Airport.**