Electric vehicles can not only reduce the mismatch between the intermittent supply pattern of renewable energy and electricity demand. They can also become truly zero-emission vehicles.
RETRANS PROJECT SCOPE AND OBJECTIVE

THE RETRANS PROJECT PROVIDES AN OVERVIEW OF OPTIONS AND A POLICY FRAMEWORK NEEDED FOR THE TRANSFORMATION OF THE ROAD TRANSPORT SECTOR IN ORDER TO REDUCE GHG EMISSIONS AND DEPENDENCE ON OIL. THIS CAN BE ACHIEVED BY COMBINING TRANSPORT WITH SUSTAINABLE AND EFFECTIVE RENEWABLE ENERGY TECHNOLOGIES.

THE RETRANS PROJECT FOCUSES ON COMBINING ELECTRIC VEHICLES WITH RENEWABLE ELECTRICITY.
Electric and plug-in vehicles market penetration is gaining momentum. Simultaneously, the share of renewable energy production is increasing. Combining the two is likely to be the first opportunity to harvest the synergies emerging from a co-evolution of vehicles and energy system.

**Opportunities for transport and electricity through co-evolution**

Electric vehicles can bridge the gap between electricity demand patterns and the variable supply patterns of renewables like wind and photovoltaics.

Use of electric cars as grid-connected buffering capacity would save grid operators and energy suppliers money, and by connecting the vehicles to a renewable electricity supply, they can become truly zero-emission-vehicles.

By balancing the feed-in and use of renewable electricity, manufacturers can reduce fleet emissions, provide marketing incentives for early-adopting customers and further increase the demand for renewable energy.
The co-evolution of energy and transport through the large scale penetration of electric vehicles and moving towards so called ‘smart grids’ can be phased as shown here.

The evolution starts at the centre of the graph and moves outwards, with the concentric bands showing required level of integration between electric vehicles and the grid.

**CO-EVOLUTION OF EVS AND RENEWABLE ELECTRICITY CAN LEAD TO SIGNIFICANT SYNERGIES**

RES: Renewable Energy Sources
PHEV: Plug-in Hybrid Electric Vehicles
EV: Electric Vehicles

Source: IFHT, RWTH Aachen
ELECTRIC VEHICLES CAN LEAD THE WAY TO SUSTAINABLE MOBILITY

ELECTRIC VEHICLES NEED RENEWABLE ENERGY TO REALISE THEIR FULL POTENTIAL WITH RESPECT TO THE TRANSITION TOWARDS A SUSTAINABLE TRANSPORT SECTOR.

STIMULATED BY PROPER POLICIES AND NEW MARKET DRIVERS, ELECTRIC VEHICLES CAN ALSO SERVE TO SPEED UP THE TRANSITION TOWARDS SUSTAINABILITY IN THE ENERGY SYSTEM.
TO REALIZE A CO-EVOLUTION OF THE ENERGY AND TRANSPORT SYSTEMS, A COORDINATED APPROACH FOR ENERGY AND TRANSPORT POLICY AS WELL AS TECHNICAL SYSTEM INTEGRATION IS URGENTLY REQUIRED.

POLICY OPTIONS TO PROMOTE ADDITIONAL RENEWABLE ELECTRICITY THROUGH EVs
Policy measures need to be targeted at the various stakeholders involved

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<th></th>
<th>Energy fund investing in new RES-E</th>
<th>System stabilizing bonus</th>
<th>RES-E tax exemptions</th>
<th>Hard coupling EV electricity and absolute RES-E targets</th>
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</thead>
<tbody>
<tr>
<td><strong>Utilities</strong></td>
<td>Invest (part of) energy revenues in new RES-E</td>
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<td><strong>Consumers</strong></td>
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<td><strong>Grid operators</strong></td>
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<td><strong>OEM</strong></td>
<td>Allow count EVs as ZEV in return for RES-E investments</td>
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<tr>
<td><strong>Governments</strong></td>
<td>Invest (part of) energy tax in new RES-E</td>
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</table>
The integrated strategy should include:

- **Coordination** between actors like policy makers, car manufacturers and grid operators;

- Early action in **standardization**, definition of grid services (V2G), design of grid codes and system architecture;

- **Pilot projects** that work on different aspects within the overall strategy including powering EVs with **renewable energy** and integration with **smart grid developments**;

- Focus on **niches** in the first phase while preparing necessary pre-conditions for a **large-scale roll out** of electric vehicles in the second phase of market development;

- An **integrated policy framework** that provides **investment security** and an advantageous **level playing field** for electric vehicles.
Additional information on the RETRANS project including the final report can be found on the RETD website at www.iea-retd.org. The RETRANS project was carried out by the Netherlands organisation for applied scientific research TNO, the Energy research Centre of the Netherlands ECN and the RWTH Aachen University.

The RETD is comprised of ten countries: Canada, Denmark, France, Germany, Ireland, Italy, Japan, the Netherlands, Norway, and the United Kingdom.

Hans Jørgen Koch, Deputy State Secretary, Danish Energy Agency, Ministry of Climate and Energy serves as Chair of the RETD. The RETD Implementing Agreement is one of a number of Implementing Agreements on renewable energy under the framework of the International Energy Agency (IEA). The creation of the RETD Implementing Agreement was announced at the International Renewable Energy Conference in Bonn, 2004.


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