



## **THE IEA IMPLEMENTING AGREEMENT FOR HYBRID AND ELECTRIC VEHICLE TECHNOLOGIES AND PROGRAMMES**

The IEA Implementing Agreement for Co-operation on Hybrid and Electric Vehicle Technologies and Programmes (IA-HEV) was undertaken in 1993 with the goal of producing and disseminating balanced, objective information about advanced technologies relating to electric, hybrid and fuel cell vehicles. It is a working group of Governments and research organizations now including thirteen countries (Austria, Belgium Canada, Denmark, Finland, France, Italy, the Netherlands, Sweden, Switzerland, Turkey, the United Kingdom and the United States). Within the broader agreement, task forces – so-called Annexes – are formed to investigate actual topics in-depth, of which examples include plug-in hybrid vehicles, advanced electrochemical storage systems, fuel cells in vehicle applications, and market deployment strategies of clean vehicles. A major part of the exchange of information and experience is informal, received directly from sources and as such not available elsewhere. The opportunity to share experiences – both positive and negative – in direct communication and to receive immediate comments, suggestions and new ideas from an international group of experts is a major benefit of this structure.

Participating organizations and target groups gain the following benefits from their collaboration in the Agreement:

- share objective information on international technical development of hybrid, electric, and fuel cell vehicles (knowledge transfer);
- exchange objective information on Government programmes and experiences with the market introduction of advanced vehicles (transition towards sustainable mobility);
- sharing of the costs of collecting and analyzing information advantages resulting from having a network of contacts in the major „hybrid and electric vehicle countries“, including the possibility of working on joint projects, and of obtaining information on a personal basis not available in published reports;
- direct and early access to the research on vehicular technologies undertaken by the leading research institutes in the world.

## **CLEAN VEHICLES AWARD**

To put a technology on the market and to make it a market breakthrough is a very ambitious goal. The quickly changing society expects market breakthroughs within a very short time. With complex technologies – like cars – this often is not possible; so the attention of public and mass media turns to disappointment, and they start looking for the next “promising technology.” But continuous progress takes place, driven by committed persons, teams, and manufacturers. The IA-HEV instituted an annual award to honour outstanding commitments to the advancement of clean vehicles and since 2005 has presented awards in each of the following three categories.

The award is presented in three categories:

- The “Clean Vehicle Award” is given to manufacturers with outstanding sales figures (surpassing thresholds of 25'000, 50'000, 100'000, or more than 250'000 clean vehicles sold).
- The “Best Practice Award” is given to the organizers of an outstanding promotion project
- The “Personal Award” is given to a person that has dedicated her/his work to the development or promotion of clean vehicles in an outstanding way.

## THE 2009 AWARD: THE WINNERS ARE....

### 1. THE CLEAN VEHICLES AWARD: HONDA Motors Co. Ltd for outstanding sales figures of Civic hybrid

HONDA has a long tradition in the development of clean vehicle technologies. As a precondition for a successful series production of hybrid vehicles, HONDA developed the “Integrated Motor Assist (IMA)” system which applies a brushless 10 kW electric motor with a nickel-metal-hydride battery to assist propulsion and acceleration from a 52 kW I-4 engine. The electric motor acts as a generator: up to 100 A can be generated from the batteries, and much of the energy of braking may thus be recaptured for recharging the propulsion batteries (so-called “regenerative braking”). The IMA-system was first offered in the “Insight” introduced into the market in 1999. Although boasting very great efficiency, this model enjoyed only around 18’000 unit sales, the main reason being the fact that it was a 2-seater. In 2002, the 4-seater Civic hybrid followed, again using the IMA system. From both models based on the seventh and eighth generation of the gasoline version Civic, this hybrid has achieved more than 250’000 in unit sales worldwide between 2003 and February 2009. Adding in sales of the “mild” hybrid Accord, Honda has sold more than 300’000 hybrid vehicles worldwide.



*Honda Civic hybrid*

Honda is continuing its way to market clean vehicle technologies. A new generation “Insight” with improved design is already available in Japan and in the USA, and sales figures of 200’000 items per year worldwide are expected for this model. Other hybrid models are in development, and every year until 2011, Honda is planning to put a new hybrid electric vehicle on the market. An increase of the annual sales figure to 500’000 hybrid models is expected by the Honda management by the next decade.

## 2. THE BEST PRACTICE AWARD: The Energy Saving Trust (U.K.)



The Energy Saving Trust was founded in 1993 following the 1992 Earth Summit in Rio de Janeiro as a governmental-private partnership with the goal of elaborating and spreading independent information on energy efficiency, renewable energies, transport, water and waste. Its sphere of interest fields compasses, in detail, home improvement and home power generation and technical guidance for energy-efficient and low-carbon construction and transportation. For this purpose, beginning in 1996, a network of local advice centres has been set up across the United Kingdom. In addition, the Trust acts as consultant for the Government, the Parliament, the European Commission and other decision groups.

Within the transportation division, the implementation of the subsidy programme “PowerShift” constituted the most important step toward increasing the number of clean vehicles on the road. As a result, the Trust has been nominated as the organization to define the car technologies that are to be exempted from the London Congestion Charging Scheme. The PowerShift register listing these cars now provides essential information to Londoners wishing to avoid this congestion charge which can reach 1’300 £ annually, and by that has contributed to the increased sales of hybrid cars.

Today’s Trust activities emphasize achieving the objectives of the Powering Future Vehicles Strategy of the Government published in 2002. The target of this strategy is the development of small cars that emit less 100 g/km CO<sub>2</sub> maximum in a well-to-wheel calculation – a rather ambitious goal. To push such clean vehicle technologies the UK Department for Transport funded a promotion programme that subsidizes the development of low carbon vehicle technologies covering on the one hand industrial research and on the other vehicle projects in a pre-competitive development stage. The Energy Saving Trust is in charge of carrying out this programme. This is a shift from supporting existing technologies in the PowerShift programme to enabling the development of advanced technologies. Current projects cover the system integration of a lithium iron phosphate battery into a Modec or Zytec car (project “Develop & Scarlet” by Axelon), the development of a parallel hybrid diesel vehicle with integrated starter-alternator and a li-ion battery (project CV-ISA by Zytec), developing electronic management devices for a hybrid vehicle (project ADDZEV by Cranfield University) and the development of a fuel cell hybrid vehicle (project “Red Lion” by Ricardo and QinetiQ).

In addition, the Energy Saving Trust runs information campaigns for energy efficient fleets, smart driving and cleaner taxis.

Last but not least, the Energy Saving Trust is the “mother” of many subsequent initiatives that have arisen to work for a reduction of CO<sub>2</sub> emissions in transportation, e.g. the Sustainable Transport Solutions Network (founded 2004), or the Low Carbon Vehicle Partnership each of which fosters close partnership with the industry.

### 3. THE PERSONAL AWARD: Steen V. Jensen (Denmark)



Mr. Steen V. Jensen is the developer of the most successful series production electric vehicle model to appear in the late 80ies and early 90ies, the “CityEl”. The story of the “CityEl” began after the first oil crisis in 1973 when Steen V. Jensen started to think about mobility. Starting in 1982, when he worked as a product development manager with the Dronningborg Maskinfabrik which produced machines for farming, he transformed his mobility ideas into an actual vehicle. Mobility in Denmark meant an average distance to work of 11 km; and 92% of these commuters sat alone in their cars. Consequently Jensen developed a small lightweight electric vehicle with one seat. The first appearance of this vehicle has been in 1985 in a magazine under its project name U36, but shortly thereafter it acquired the name “Ellert”, a combination of “electric” and the Danish word for moped, “knallert”. As the Dronningborg Maskinfabrik had no interest to produce this vehicle, Jensen collected money from 3’000 private investors, and in 1987 he started the series production of the vehicle in Randers.

Several “teething problems” were experienced, such as wrongly fixed electrical relays and melting fuses that in one case overheated the waste gas hose of the batteries causing a hydrogen-off-gas flameout and requiring an expensive call-back campaign. The press published several negative reports, users claimed because of the bad manufacturing. Although the electronic devices and cabling have since been improved and the motor was replaced by a more powerful one, the now so-called “MiniEl” has suffered from the bad reputation of its predecessor, and the repair costs for first generation “Ellerts” were high. Jensen had to sell the production to German investors in 1991; and since 1996 CityEl has been produced in Aub / Germany.

None of this detracts from Jensen’s achievements. His concept to design a vehicle by starting with an analysis of specific mobility needs was fundamentally new at that time. He understood that the electric drive demanded maximum efficiency of the overall system and light materials for the body. As a pioneer, he had to deal with technical imperfection, problems of series production and market demands at the same time, not well in a time when components for electric propulsion systems had to be developed in parallel with complete vehicles. His lifetime achievement – the CityEl - is still on the road, and his firm conviction that his signal contributions were the appropriate answer to the problems caused by individual mobility needs, and his will to realize his idea remain a shining example for emerging developers of clean vehicles.