



**A word from the Chair—The better solution will win – join the group and be part of it!**

Imagine you found a technical solution two to three times superior to the traditional established technology. You would cry: “Eureka,” and then all would observe how this superior solution disseminates across society at a growth rate like mushrooms in a humid forest. Well, such a solution does now exist in transport: the electric drive vehicle is 2-3 times more efficient than all internal combustion engine technologies.

Unlike mushrooms in the forest, however, electric drive finds its conditions for growth not so favourable. Production facilities for components are not ready. There is a lack of specialists. The automotive industry has still to learn how to produce this new technology efficiently (and profitably) and how best to introduce it into a broader marketplace. The electric power companies and the utilities must still come to realize how important this technology will be for them. Governmental institutions have to adapt their regulations to accommodate widespread use of electric drive vehicles. Car dealers have to learn how to sell electric vehicles and to offer maintenance and service for this new technology. The consumer has to learn its specific uses and how to adapt them to his/her mobility needs.

Indeed, the difference among technologies (battery electric vehicles, hybrid vehicles, plug-in-hybrid vehicles, small electric solutions like e-bikes and e-scooters) is very important – it defines not only the technology itself but also the best directions for its development. The Implementing Agreement “Hybrid and Electric Vehicles” is working with all these technologies and their linkages. We have entered final discussion for defining and inaugurating the 4th five years work phase that will start in November 2009. Our membership has grown over the past few years, with our most recent addition the re-joining of

former member Finland, yet we still lack direct participation by countries whose industries and public policies are among the leading entities moving forward to enhance the electric drive (e.g., Germany, the United Kingdom, Japan, and South Korea; all were former participants in our Implementing Agreement. As other countries also step forward (e.g., Russia, China, India, Australia, New Zealand, Israel), they should come under this umbrella of the Implementing Agreement, for as member “Hybrid Electric Vehicles” countries, they too can proudly say: “Our solution is 2-3 times better!”

...And a key component of this solution just may involve revisiting a technology that some may view as “ancient” (as one of the earliest electric drive applications), but holds great promise for the future. I speak, of course, of the venerable trolley bus, for which a conference on the latest developments in technology and applications has been organized in Zurich, Switzerland. Called “New horizons in city traffic,” the meeting will be conducted 18- 19 November 2008. More details are available at [www.trolley-motion.com](http://www.trolley-motion.com)!

*Urs Muntwyler, Chair IA-HEV*

**In this issue**

A word from the Chair	1
Nine country delegates and five annex Operating Agents attend, present reports at spring 2008 ExCo meeting	2
New Annexes meet, develop work plans and positions	3
The hybrid drive experience—a personal perspective of the former Secretary on the benefits of a crossover HEV	4
Draft ExCo plan for IA Phase IV and draft report for Phase III near completion	5
Operating agents/Country experts	5
Events calendar	6

---

## **Nine country delegates and five annex Operating Agents attend, present reports at Spring 2008 ExCo Meeting**

At the semi-annual Executive Committee meeting of IA-HEV, conducted in March 2008 at Geneva, Switzerland in conjunction with the International Advanced Mobility Forum and EET-2008, representatives of several organisations representing both nations and trade groups described their objectives over a planning horizon of approximately five to ten years. These organisations included AVERE (European Association for Battery, Hybrid and Fuel Cell Electric Vehicles); NEDO (New Energy and Industrial Technology Development Organisation) of Japan--Fuel Cell and Hydrogen Technology Development Department; the Innovation Fund of the National Research Foundation of South Africa; Optimal Energy Company (also of South Africa); Kabus Oy (bus manufacturing) Company of Finland; Protoscar Company; and the IEA Implementing Agreement on Advanced Motor Fuels (IA-AMF). All presenters were generally in agreement that electric propulsion will continue to have a bright future, the battery-electric vehicle will be resurgent in many applications, and advanced technologies such as fuel cell propulsion can evolve into synergistic application with stored (battery) energy propulsion systems.

Representatives from organisations in two current non-member (but prospective member) countries presented illustrated talks on cogent developments in their respective homelands. The Fraunhofer Institute for Solar Energy Systems (ISE) in Freiburg, Germany is exploring all options to capture solar energy (e.g., photovoltaic cells, direct solar hydrogen generation, and biomass) as Solar Cells is the biggest business unit in ISE. Sustainable transport is the 'missing link' in the Solar Region Freiburg, so ISE is to start a business unit on transport, since PHEVs and BEVs can help solve electricity storage problems in grids with intermittent renewable power sources. From India there was a further presentation on the Clean Air Island project in Mumbai, India (originally introduced to the attendees at the IA-HEV Annex I expert meeting in Brussels, May 2007), but despite solicitation to the ExCo for direct participation in this project by its manager, such involvement does not appear to be feasible without an official and credible expression of interest in IA-HEV country membership from India.



Nine member nations' delegates presented information about recent developments and strategic objectives in their home countries.

The United States representative identified that country's three most important reasons for participating in IA-HEV to be:

- 1) International information exchange on (a) topics relating to the status of HEVs, PHEVs, and EVs, and (b) on policies, regulations and laws in other countries; this exchange is to be accomplished through meetings, website dissemination, and the Annual Report;
- 2) Participation in Annexes; and
- 3) Personal international contacts.

The representative from Turkey presented an overview of Tübitak's participation in IA-HEV, its vision on transportation and its plans for the near future. Turkey's three most important reasons for participating in IA-HEV are:

- 1) To exchange information in the international research community;
- 2) To provide international insight to support R&D programs on hybrid and electric vehicle technologies; and
- 3) To exchange information on latest developments in member countries by sharing experiences based on ongoing and completed programme results.

Switzerland's representative indicated that the two most important points for Swiss participating in IA-HEV are:

- 1) International information exchange, so Switzerland does not miss an opportunity; and

2) Enhancement of growth opportunities for the domestic small EV industry.

The vision of Sweden as articulated by its delegate also includes continued participation in IA-HEV for purposes of

- 1) Informal exchange of information;
- 2) Establishing worldwide contacts; and,
- 3) Giving their national scientists the opportunity to participate in international groups.

Similarly, the Netherlands delegate articulated the three most important points for Dutch institutional participation in IA-HEV as:

- 1) Being part of the worldwide international field of automotive research.
- 2) Learning from other governments regarding policies for automotive technologies.
- 3) Participating in research topics on HEVs and PHEVs.

The three most important points for Italy's continued participation in IA-HEV are:

- 1) Sharing of knowledge about the orientation of RD&D programmes at national and international level that can inform future directions of such programmes in Italy;
- 2) Levelling efforts in various technology development areas; and
- 3) Identifying common practices and successful applications whose lessons can be analysed and extended for national and European transport systems.

Denmark recently re-joined IA-HEV, primarily for the following reasons:

- 1) Participate in exchange of information on an international level; and
- 2) Share information and experiences about the role that PHEVs and EVs can play in an electricity grid with a high share of renewable intermittent power (vehicle-to-grid issues).

Canada is a new member of IA-HEV, and the key reasons for its decision to participate were given by its delegate as:

- 1) Identification of the most important R&D issues to be addressed by member countries.
- 2) Opportunities for collaborative R&D efforts leveraging each member's own initiatives.
- 3) Reports, technical information and other documentation and data stating the importance and necessity of addressing the technology issues being tackled by various Annexes.

Austria's delegate indicated that in the near future Austrian governmental budgets might shift from research to demonstration projects. For this and other reasons, Austria has identified its three principal objectives in IA-HEV participation:

1) Ministries increasingly need neutral technical advice, in short statements, and the information exchange within IA-HEV contributes to fulfilling this need.

2) The government values international collaboration on technology enforcement and assessment; and

3) IA-HEV represents a broad spectrum of stakeholders, enabling a member to address and exchange information for and from industrial activities, research groups, environmental NGOs (non-governmental organisations), as well as other governments.

### ***New Annexes meet, develop work plans and positions***

Annex XIV (lessons learned) convened a workshop on Monday, March 10, 2008, in Geneva as a follow-up to its specialty meetings (for EV/HEV stakeholders) held in Gothenburg and Stockholm, Sweden in fall 2008. A group of 12 participated, representing a broad spread of backgrounds and responsibilities. Again, lessons learned from different perspectives/stakeholders were discussed. The Operating Agent (Mr. T. Turrentine) has committed to write a draft report of the proceedings before the next scheduled workshop, to be held mid May, 2008 in Japan.

On February 8, 2008, the IA's newest working group, Annex XV (Plug-in hybrid vehicles) conducted a workshop in Vancouver, Canada. Based on the results of that workshop, the Operating Agent, Mr. Charles Thibodeau of Natural Resources Canada, has updated and finalised the work plan for this Annex. The idea is to follow up on the work on plug-in hybrid electric vehicles (PHEVs) that had begun under Annex VII. The work is to be organised as a task-shared Annex, with no participation fee. Collaboration could be fruitful with the IEA Implementing Agreements on 'electricity networks' and 'demand side management'. Belgium, Canada, France, the Netherlands, Switzerland and the USA announced plans to join this Annex. Austria, Denmark, Italy, Sweden and Turkey were also considering participation.

As a follow-up, on July 24, 2008, Mr. Thibodeau welcomed participants to a meeting of this Annex in Palo Alto, California, USA in order to mark the beginning of its Operational Phase. The membership has agreed to concentrate on LDVs and to coordinate on heavy-duty vehicle (HDV) issues with the HDHEV group, Annex XII; special attention will be paid to issues related to electricity grid charge rates, time of use, location

---

of charge stations, compatibility with existing grids and plugs, and the capabilities of PHEVs at potential charging locations to provide electricity back to the grid. It was agreed that PHEVs should be as reliable and convenient as conventional vehicles, but that end users, customers, society, governments will need to be defined as stakeholder groups and addressed differently. Marketability and Policy Issues need to be addressed together.

Five key subtasks for the Annex were defined and discussed:

1. Advanced Battery Technologies
2. PHEV Components
3. Policy Issues and Marketability of: (a) Vehicles, and (b) Infrastructure.
4. Utilities and the Grid (e.g., time of day use, charging permissions and billing, and assumptions of rational consumer behaviour).
5. Group Administration and Communication.

IEA HEV member countries still indicating plans to join Annex XV were: Belgium, Canada, France, Netherlands, Switzerland, and the USA.

On the meeting's second day, additional discussion refined the meaning and purpose of the annex: to identify and address the R&D needs as well as issues centred on the manufacturing, introduction and use of PHEVs as they relate to the identified Subtasks of this group. The extent to which these needs and issues will be addressed will be dependent on the level of participation to this Annex. As a minimum, the sharing of information from the international members will be conducted and recorded deliverables will include yearly subtask reports including project updates. Other documents (presentations, member updates, etc.) will be accessible to members through the annex website. Ad-hoc Papers summarizing subtasks, projects or highlighting certain aspects, as well as publications in international journals and presentations at conferences are also encouraged. Subtask Leaders presented preliminary work plans that may be further developed and presented at the next meeting. A tentative Future activity schedule is shown below.

Feb/Mar 2009 – 2nd Meeting (TBD)  
September 2009 – 3rd Meeting (TBD)  
Feb/Mar 2010 – 4th Meeting (TBD)  
September 2010 – 5th Meeting (TBD)  
Feb/Mar 2011 – 6th and Last Meeting of Phase I (TBD)

Periodic conference calls may also be conducted.

## ***The hybrid drive experience—a personal perspective of the former ExCo Secretary on the benefits of a crossover HEV***

by Frans Koch, Former Secretary – IEA HEV

Our summer cottage is on a lake surrounded by hills, and there is only one public spot where you can launch a boat or take it out of the water. The ground is soft there, and muddy after it rains. Pulling our boat out of the water every autumn with our Ford Escort often meant spinning wheels and flying mud. My wife didn't trust her driving skills in this situation, and our not so chivalrous way of doing the job was for her to push the car and for me to drive. All this changed shortly after her 63rd birthday, when we bought a Toyota Highlander "crossover" hybrid car with "intelligent 4 wheel drive." The car has a front wheel drive, but also an electric motor on the rear axle, and whenever one of the front wheels starts spinning this electric motor starts driving the rear wheels. So now we can take the boat out of the water with little effort and our dignity intact. In addition, the driveway to the cottage itself is very steep and we had to park the car at the top of the hill and carry everything down to the cottage. With the 4 wheel drive this chore has been eliminated. Finally, in Canadian winters, it is definitely useful to have 4 wheel drive when there is deep snow. So, like many other car buyers, we bought a car that can accomplish the most demanding driving mission, even if it only occurs once a year. In terms of size, the most demanding occasion is when my daughter, her husband, and her 4 children come to visit for 2 or 3 weeks every year and all 7 seats are needed.

The hybrid drive train reduces fuel consumption only when compared to other crossover vehicles. The information display tells me that over the life of the car my average fuel consumption has been 9.5 litres / 100 km (24.7 miles/US gallon, 29.7 miles/Imp. Gallon). Depending on your outlook, you can consider this quite poor compared to a Prius or even a conventional light car, or quite good compared to other crossover cars.

When we got the car, there were three nice surprises. The first was how sophisticated the computer is when deciding between electric motor and thermal engine (or both at once). It doesn't just turn off the thermal engine whenever you lift your foot off the gas pedal, it also constantly monitors the torque demanded and even if you are going 60 km/hr but on a gentle downward slope, it

will turn off the thermal engine and you drive on the battery only. If you touch the gas pedal very lightly, you can go from a stop up to 40 km/hr on the battery alone. When I'm returning home I play a game on the last three streets and try to touch the accelerator so lightly that the thermal engine stays off. It is DAPIMBY (don't air pollute in my back yard), a modern variant of NIMBY. This brings me to the second surprise, the car is so quiet that sometimes my neighbours out in the street don't hear me coming and I have to drive extra carefully. In general city driving, the car is so quiet that a good sound system actually makes a difference. At highway speeds, the engine, wind, and tire noises are like other cars, and only by turning up the volume can the sound system compete to be heard.

The third nice surprise is the power of the drive train not only when starting but also in mid-range speeds. If you are going 90 or 100 km/hr and want to pass, both the thermal engine and the electric motor kick in, and you are up to 140 km/hr in a very short time.

The hybrid drive is most noticeable when the thermal engine is turned off at stoplights or when the car is coasting. The power steering and brakes are electric, and in the summer the air conditioning runs off the traction battery. In stop and go traffic the thermal engine can stay off for 15 to 20 minutes while you are creeping along, until the battery runs down. The regenerative braking has changed my driving style. I start to brake sooner so that more energy goes back into the battery, and mechanical brakes are used less.

In summary, although the car only makes sense twice a year when the grandchildren are visiting and when pulling the boat out of the water, it is a pleasure.

### ***Draft ExCo plan for IA Phase IV and draft report for Phase III near completion***

The IA-HEV Secretary, in coordination with members of the Executive Committee, has been preparing the close-out report for Phase 3 of the Agreement (2004 - 2009) together with the strategy paper outlining the activities and objectives that will highlight Phase 4 (2009 - 2014). Numerous accomplishments (publications/meetings/conference papers) characterized the experiences of the Agreement during Phase 3, together with growth in both country membership and task group Annexes. In Phase 4, the Agreement expects to maintain its activities fully consistent with the new regime of worldwide

commercialisation of HEVs and the ever-increasing applications of that propulsion technology. Interactions among cognizant governmental, industrial, and research organisations will be broadened and strengthened. The IA will track the re-emergence of interest in pure electric drive applications and provide technical support and coordination among interested national parties. The various potential new and emerging sources of electric power in the expansion of battery/electric propulsion—many of them renewable in nature—could be a key element on which the Agreement focuses given its emphasis on long-term energy sustainability. Additional new collaborations will be pursued, as well as continued expansion of both country membership and topical Annexes. Information dissemination will be enhanced in a manner that reflects the broader goals and objectives of the International Energy Agency.

Both the Phase 3 close-out report and Phase 4 Strategic Plan should be released in 2009.

## ***Operating Agents and Annex I Country Experts for 2008***

### **OPERATING AGENTS**

#### *Annex I: Information Exchange*

##### **Chris Saricks**

Argonne National Laboratory  
9700 S. Cass Avenue  
Argonne, IL 60439 USA

#### *Annex X: Electrochemical Systems*

##### **James A. Barnes**

U.S. Department of Energy  
FreedomCAR and Vehicle Technologies  
1000 Independence Avenue, SW  
Washington, D.C. 20585 USA

#### *Annex XI: Electric Cycles*

##### **Frédéric Vergels**

European Electric Road Vehicle Association  
(Association Européenne des Véhicules  
Électriques Routiers - AVERE)  
VUB-TW-ETEC  
Boulevard de la Plaine 2  
B-1050 Brussels, Belgium

#### *Annex XII: Heavy-Duty Hybrid Vehicles*

##### **Dirk De Keukeleere**

VITO - Flemish Institute for  
Technological Research  
Expert Energy Technology  
Boeretang 200  
B-2400 Mol, Belgium

*Annex XIII: Fuel Cells for Vehicles*

**Andreas Dorda**  
Austrian Agency for  
Alternative Propulsion Systems (A3PS)  
Donau-City-Straße 1  
A-1220 Vienna, Austria

*Annex XIV: Lessons Learned*

**Thomas Turrentine**  
Institute of Transportation Studies  
University of California, Davis  
One Shields Avenue  
Davis, CA 95616

*Annex XV: Plug-in Hybrid Vehicles*

**Charles Thibodeau**  
Natural Resources Canada  
Office of Energy R&D (OERD)  
580 Booth Street, 14<sup>th</sup> Floor  
Ottawa, Ontario, Canada K1A 0E4

**ANNEX I COUNTRY EXPERTS**

*(Principal/Alternate)*

**Austria:** *Andreas Dorda*, BMVIT  
**Belgium:** *Dirk De Keukeleere*, VITO  
**Canada:** *Carol Burrell/Charles Thibodeau*,  
Natural Resources Canada  
**Denmark:** *Jørgen Horstman*, Technical  
University of Denmark - Ørsted  
**Finland:** *Heikki Kotila/ Dr. Jussi Suomela*  
*(Teemu Lehmuspelto, alt.)*, Finnish Funding  
Agency for Technology and Innovation  
(Tekes) and Helsinki University of Technology  
**France:** *Stéphane Biscaglia*, ADEME  
**Italy:** *Mario Conte*, ENEA  
**Netherlands:** *Arie Brouwer*, SenterNovem  
**Sweden:** *Peter Kasche*, STEM  
**Switzerland:** *Sigrid Kleindienst*, Engineering  
Office Muntwyler  
**Turkey:** *Hamdi Ucaroll/Eren Öszu*, Scientific and  
Technological Research Council of Turkey  
(Tübitak)  
**United States:** *Danilo Santini*, Argonne National  
Laboratory; *James Barnes, David Howell*,  
USDOE/EERE/OFCVT

**Relevant Activities Agenda — 3<sup>rd</sup>  
and 4th quarter 2008**

October 23-24	IA-HEV ExCo Meeting, Vienna, Austria
October 22	Annex I Expert Mtg., Vienna, Austria
October 21	Conference: Hybrid and Electric Vehicles, Energy Storage Technologies and Control Systems, Vienna, Austria
October 8-10	Batteries 2008 Conf., Nice, France
October 2-3	Annex XII Expert Meeting, Denver, Colorado, USA
September 18-19	Annex XIII Expert Mtg., NREL, USA
September 15-17	1st International Conference on Advanced Lithium Batteries for Automobile Applications, Argonne National Laboratory, Argonne, Illinois, USA
July 24-25	Annex XV Expert Meeting, Palo Alto, California, USA
July 22-24	Plug-in 2008, San Jose, California, USA

**Colophon**

This electronic Newsletter is produced by the IA-HEV, also known as the Implementing Agreement for Cooperation on Hybrid and Electric Vehicle Technologies and Programmes, which functions within a framework created by the International Energy Agency (IEA). Views, findings and publications of IA-HEV do not necessarily represent the views or policies of the IEA Secretariat or of all its individual member countries. For submission of contributions to this Newsletter, please contact the Operating Agent of IA-HEV's Annex I, Mr. Chris Saricks, at: [csaricks@anl.gov](mailto:csaricks@anl.gov). For information about the Agreement and enquiries about its publicity materials including this Newsletter, please contact the IA-HEV secretary, Mr. Martijn van Walwijk, at: [secretariat.ieahev@wanadoo.fr](mailto:secretariat.ieahev@wanadoo.fr).