

60th EXECUTIVE COMMITTEE Meeting
IEA Hydrogen Implementing Agreement
Hyatt Fisherman's Wharf
27-29 May, 2009
San Francisco, CA USA

1.0 General Business

1.1 Chairman Welcome, Acknowledgment of Hosts and Overview of Meeting

Chairman Antonio G. García-Conde welcomed Executive Committee (ExCo) members, hosts and observers to the 60th Executive Committee (ExCo) Meeting of the International Energy Agency Hydrogen Implementing Agreement (IEA HIA) in San Francisco, California. **He acknowledged the U.S. Department of Energy, the American Representative Dr. Carole Read and the local organizer Dr. Jay Keller for sponsoring and hosting the meeting.** The Chairman then summarized the meeting schedule and related activities, including the ExCo's Thursday, 28 May participation as honored guests at the California Fuel Cell Partnership dedication of the SFO Fueling Station.

1.2 Welcome Remarks by Host

Dr. Carole Read then greeted the group, emphasizing that the recent U.S. budget challenge had not dampened the DOE's pleasure in hosting the IEA HIA. She introduced her colleague, Dr. Jay Keller of Sandia National Laboratories, disclosing that he had recently received a prestigious DOE Program Service Award. She also acknowledged his Office Management Assistant team, Ms. Lynde Farhat and Ms. Jennifer Rodriguez who were to be present for much of the meeting to help as needed. Dr. Keller outlined the agenda for the Dedication of the SFO Fueling Station, thanking Mr. Jamie Levin of Alameda-Contra Costa Transit District (AC Transit) for providing round-trip transportation to the event in a fuel cell bus.

1.3 Introductions

Chairman García-Conde welcomed Dr. Nikos Lymberopoulos who was in attendance as an observer for UNIDO ICHET. The Chairman then introduced Dr. Jan-Erik Hanssen of 1-Tech, Co-Operating Agent for Task 27, who was attending for the first time. He also welcomed three Alternate Members: Dr. Vesna Scepanovic of Natural Resources Canada, who had last attended an ExCo meeting in 2004 in London; Dr. Marco Brocco of Italy's ENEA, who had last attended an ExCo meeting in 2007 in Montecatini; and Dr. Andreas Luzzi, who appeared in the capacity of Swiss Alternate and had last attended an ExCo meeting in Brisbane in 2008. Finally, he introduced Mr. Atilla Ersöz from the Marmara Research Center Energy Institute in Turkey. Mr. Ersöz was attending on behalf of Dr. Alper Sarioglan and Task 27 Co-Operating Agent Ms. Elif Caglayan, who was unable to make the trip.

1.4 Agenda Approval

The agenda was approved **without comment**. Acknowledging that all items on the 59th ExCo Meeting Action Item list had been addressed, the Chairman suggested that the **Action Item list be included on the agenda for the next meeting.**

1.5 Approval of Minutes from Fourth Quarter Meeting in Athens

The Minutes from the Fourth Quarter Meeting in Athens were approved after Dr. Marco Brocco noted that WHEC 18 will be held in Calgary, Canada in 2012.

1.6 Brief Update by Members

For **Canada**, Dr. Scepanovic reminded the ExCo of the upcoming Hydrogen and Fuel Cell Conference to be held 31May-3 June in Vancouver, immediately following the ExCo meeting.

Mr. Jan Jensen reported that the upcoming December **Conference of the Parties (COP15)** in Copenhagen had inspired global interest, so there were a lot of ongoing activities in **Denmark**. Many “greentech” demo-projects – including hydrogen and FC - have to be ready for December. A political agreement on agriculture and energy from biomass is poised for implementation. Electric vehicles are on the top of the agenda and support for the technology in the form of reduced taxation is expected.

Mr. Ray Eaton said the overall picture in the **UK** was uncertain and that there would be a general election next year. There was likely to be additional funding soon for renewable energy but not necessarily hydrogen and fuel cells. There is renewed interest in electric vehicles as well.

Dr. Steve Pearce reported that a new government was elected in **New Zealand** in Nov 2008. The Emissions Trading Scheme (ETS) legislated by the previous government remains in effect. The current Government is reviewing both the ETS and New Zealand’s climate change policies in general. The EnergyScape project’s “Transitioning to a Hydrogen Economy” document was completed. It includes: Issues Identification, Options available, Preferred Hydrogen Supply Chains and A Suggested National Hydrogen Research Strategy. There is also renewed interest in the potential of electric vehicles for near term GHG emissions reduction.

For **Sweden**, Dr. Lars Vallander reported an expansion of wind power. Transport, including electric and hybrid vehicles, is receiving increased attention. There will be a new plan for the period 2011-2014. Sweden holds the EU Chairmanship for the second half of 2009. There is an intense interest in climate change in Sweden and the EU.

Dr. Vallander then announced his resignation as **Sweden**’s Representative to the ExCo, effective as soon as the new Representative could be named. He thanked everyone for a rewarding experience, naming the Chairmen under whom he had served and Ms. de Valladares.

Dr. John Wright reported on policy and government support in **Australia**. In the policy arena, launch of the emissions trading scheme was postponed from 2010 to 2011. The first year carbon price was fixed at \$10/tonne and will be subject to market conditions thereafter. Greenhouse gas reduction (GHG) targets must be 5% less than 2000 levels by 2010, and may be increased up to 25% if the world agrees to 450 ppm stabilization. The Australian government is committed to ensuring that 20% of Australia’s electricity comes from renewable sources by 2020. A\$2.425 Billion Carbon Capture and Sequestration (CCS) Flagship Program was created to fund construction and demonstration of large-scale integrated carbon capture and storage projects (the target is 1000 MW of low emission fossil fuel generation) over nine (9) years. A \$500M Renewable Energy Fund has been created to support development and demonstration of renewable energy technologies; Renewables Australia will apply \$465M in a commercial investment approach for a new body to promote the development, commercialization and deployment of renewable technologies. A \$150M Energy Innovation Fund will provide \$100 M for solar research (PV and solar thermal – through formation of the Australian Solar Institute). A \$500M National Clean Coal Initiative will generate \$1.5 B in new private sector investment. The Global Carbon Capture and Storage Institute has been formed to accelerate demonstration and commercialisation of CCS technologies around the world.

Swiss Alternate Dr. Andreas Luzzi announced that funding for hydrogen and fuel cells increased 10% in **Switzerland**. A hydrogen conference with international outreach is planned. Switzerland has increased its EU participation and is looking forward to cooperation with Swatch, the large industrial entity, as well as to participation in small to medium scale projects.

Dr. Ágústa Loftsdóttir reported that **Iceland** has recently experienced a couple changes of government. The emphasis on fuels for energy survived the changes. All possible CO₂ reduction measures will be reviewed and cost implications will be taken into account. Dr. Loftsdóttir anticipates that hydrogen will be ranked as expensive but with long term potential. The hydrogen demonstration project is doing well. A fuel cell is being used for auxiliary power on a whale watching ship.

Mr. Jürgen Friedrich-Hake reported that **Germany** will hold general elections in the fall and is bracing for change. It is anticipated that a new government may propose a new energy R&D program. Meanwhile, the National Innovation Program (NIP) begun in 2006 is underway.

For **Greece**, the Secretariat reported in Dr. Vakaraki's absence: The Minister of Development launched a new project on rendering the island of Agios Eustratios (Ai-Stratis) completely "Green", with all electricity based on renewable energies, heating based on solar thermal and geothermal energy and hydrogen used for transport and for energy storage, together with batteries. The island of Agios Eustratios lies in the middle of the Aegean Sea with a population of around 200. The feasibility study was completed in June, but the project is now "on the waiting list," following the government change of October 5th, 2009.

Dr. Marco Brocco reported that **Italy** is switching to CNG for all public transportation. Some regions are funding a few projects, trying to install a hydrogen mix. A strategy for 2020 is now being developed. The Ministry of Industry has created a 30M € initiative to be split between co-generation and transportation. In addition, Italy is renewing its nuclear efforts. Last year the country signed an agreement with CEA. Site feasibility studies are underway at this time.

Chairman García-Conde reported that on the political side, the Spanish Government decided to set up the Spanish Centre for H₂ and FC Technology Experimentation. It is expected that the centre will gather some 200 graduates within a 2-3 years time. Relative to the H₂ and FC projects, two new electric vehicles have been built and demonstrated during the last 4-5 months. Some Autonomous Communities in **Spain** announced the purchase of urban buses. In the Aragón region, the filling station and three H₂ buses that started operation during the Expo last summer will continue operating for 8 years. Finally, CIEMAT (the Spanish Centre for Energy Technology Research) set up a pilot plant to produce H₂ via high temperature solar processes.

For the **United States**, Dr. Read summarized the budget situation, explaining both process and status of the budget request. With the election of a new American President and the installation of a new Secretary of Energy, the fiscal year (FY) 2010 budget request for hydrogen R, D&D in the Office of Energy Efficiency and Renewable Energy in the U.S. Department of Energy was reduced drastically from the FY 2009 level of \$200.6 M to \$68.2 M for EERE. Across all DOE programs (Fossil Energy, Nuclear Energy and Science as well as EERE), the proposed funding level went from \$266 M to \$121.1 M. Dr. Read explained that the budget must be approved by the Congress in a lengthy process that would not be finalized until 1 October at the earliest. In other news, an Advanced Research Projects Agency – Energy (ARPA-Energy), based on the DARPA model, was created to award grants that focus exclusively on energy challenges. Eight Energy Innovation Hubs were to be funded at the \$280M level to encourage collaboration and team science, connecting the research lab to the industrial world.

2.0 Chairman/Secretariat Report

2.1 Membership Recruiting (Ms. de Valladares)

2.1.1 Membership Pending (Russian Federation, UNIDO)

As reported to the ExCo in an 18 May e-mail, the ExCo **voted unanimously to invite UNIDO** to join the IEA HIA. All IEA required documentation had been submitted to the Legal Office and the IEA Secretariat. The **IEA Secretariat now has CERT approval of UNIDO accession to the IEA HIA as an action item**. While the IEA Secretariat is unable to consider the matter at the upcoming CERT meeting in June, there is hope that the CERT may consider the question in a mail vote prior to its regularly scheduled November meeting.

Consistent with the terms of the LOI signed by the Russian Federation subsequent to execution of Annex 1 and II of the MOU between the IEA HIA and the IPHE, **Russian Federation membership**

in the IEA HIA is pending. Ms. de Valladares reported that she had followed up in writing with the Russian Federation to inquire as to whether it plans to accede under its own name or via another entity as it is now time to move forward with the accession process. No response had been received as of the time of this ExCo meeting.

Consistent with the terms of the LOI signed by Brazil subsequent to execution of Annex 1 of the MOU between the IEA HIA and the IPHE, **Brazil must also proceed with IEA HIA accession in the near term, pending receipt of a formal invitation to join the IEA HIA.** By unanimous vote, the **ExCo agreed to extend Brazil an IEA HIA membership invitation.**

2.1.2 Countries with IEA HIA Invitations

There has been no substantive contact with Singapore. Mexico has not indicated any change in the position it articulated in May 2008. Hungary was unable to attend but would appreciate the opportunity to be invited to future meetings. Ms. de Valladares has been writing to **The People's Republic of China** contacts identified by the IEA Secretariat to open a dialogue about Chinese participation and accession to the Agreement. In particular, the IEA Secretariat had suggested that Dalian University might be interested in cooperation, but cautioned that formal information exchange was recommended before the IEA HIA extended an invitation for Chinese participation in an ExCo Meeting.

2.1.3 Other Gleneagles 5 and IPHE Countries

Of the Gleneagles 5 countries not previously mentioned, Ms. de Valladares had communications with **India**. Ms. Nuzhath Thomas of the India Oil and Natural Gas Corporation (ONGC) had contacted Ms. de Valladares 26 May to regret India's invitation to the ExCo meeting and ask whether more than one Ministry at a time could be designated as India's Contracting Party. Ms. de Valladares assured her that this was indeed the case, i.e., **more than one Ministry might share the Contracting Party role.** However, India would have only one vote and pay only one set of Common Fund dues. Neither Brazil nor South Africa responded to their invitations to attend the ExCo meeting.

2.1.4 Other Countries

Dr. Isabel Cabrita of **Portugal** had initially accepted the invitation to attend but was subsequently **compelled to regret.** Neither the longstanding **Austrian contacts** nor those keenly interested in Task 27 **were able to make the case for Austrian participation** in the San Francisco ExCo meeting.

2.1.5 Other Potential Members

The Secretariat had contacted Dr. Avner Rothschild of Technion University of **Israel**, who had been identified by Dr. Miller as being interested in Task 26, WaterPhotolysis. Dr. Rothschild agreed to approach his institution to discuss Israel's participation in the Agreement.

In addition, the IEA HIA has **broached the possibility of membership to the International Atomic Energy Agency (IAEA)**, which participated in a March 2008 hydrogen workshop at the IEA Secretariat in Paris that was co-chaired by Dr. Bjorn Hauback, Task 22 Operating Agent. Ms. de Valladares will follow up with the IAEA and consult with the Legal Office in Paris on the prospects and process applicable to the IAEA's accession to the IEA HIA.

2.2 Paris Secretariat (Ms. de Valladares)

2.2.1 NEET

The IEA Network of Expertise in Energy Technology (NEET) has confirmed that it will hold a **workshop the week of 19 October in India.** It is expected that the IEA HIA will be asked to participate. A possible NEET exploratory meeting with Saudi Arabia has yet to be confirmed. Also pending confirmation are plans for a fall NEET workshop on Rural Energisation at the IEA in Paris.

2.2.2 IAHE, IEA and IEA HIA

The March workshop, Application of Nuclear Methods to Studies for Fuels Cell and Hydrogen Cycle Technologies, was co-sponsored by the IEA, the IEA HIA and the International Atomic Energy Agency (IAEA) and held at the IEA in Paris. The workshop, chaired by Dr. Bjorn Hauback, proved a

great success. Therefore, the IAEA will proceed with the proposed project. This project has the potential to become a Task 22 Project.

2.2.3 Fossil Fuel Workshop Party (WPF)

The IEA HIA was invited to make a **presentation on the Agreement at the 4 June Fossil Fuel Working Party Meeting** in the Czech Republic and to explore possible areas of cooperation. Co Vice-Chair, **Mr. Jan Jensen**, will make the presentation and delineate possible areas of cooperation, such as Analysis and Task 27, Near Market Routes to Hydrogen by co-Utilization of Biomass as a Renewable Energy Source with Fossil Fuels.

2.2.4 CCS – Capture, Transport and Storage Metrics and Experts Group on Science for Energy (EGSE) (Luzzi)

The IEA is formulating **metrics for Carbon capture, transport and storage**. It has also formed an **Experts Group on Science for Energy (EGSE)**. The IEA HIA nominated **the two-person team of Mr. Iacobazzi of Italy and Dr. Oberholzer of Switzerland** to participate in the EGSE meetings and contribute on behalf of the IEA HIA. Dr. Oberholzer was present at the first meeting but was unable to attend the ExCo meeting. His Alternate, Dr. Luzzi, referred to the 5 May EGSE Meeting Minutes, Energy Background Paper and Energy Workshop Summary that were posted on the IEA HIA San Francisco website but did not elaborate further. Dr. Wright, who also attended the meeting, added that the Chair and Vice-Chair positions were open for nominations till 31 May. Mr. Hake suggested that the IEA HIA take an observer position initially and consider greater involvement when the profile of the group is clearer.

2.3 Other Implementing Agreements (Ms. de Valladares)

2.3.1 Advanced Fuel Cell IA

Ms. de Valladares had approached the **AFC IA** to ask for confirmed of their interest in a **joint meeting at WHEC in 2010**, given that both Agreements plan meetings during this period. While the informal response was positive, no formal response had yet been received. The ExCo instructed Ms. de Valladares to **again request a formal response** in order to facilitate WHEC organizer planning.

2.3.2 ENARD IA

At the margin of a Smart Grid conference in Washington, D.C., Ms. de Valladares attended an afternoon session of the Electricity Networks Analysis, Research and Development Implementing Agreement (ENARD IA) meeting in the spring. **ENARD** subsequently invited the IEA HIA to be an observer at its May 2009 Communications and Controls workshop in Sweden. Although we regretted that invitation, ENARD will hold another workshop **20-21 October entitled “Balancing the Variability in Renewable Energy Electricity Supplies.”** We have been invited to present and participate at the workshop. **Presenting on our behalf will be Dr. Luis Correas, Task 24 Operating Agent.** Ms. de Valladares has also been invited to attend as a participant.

2.3.3 Advanced Motor Fuels Implementing Agreement Proposal for an Ammonia Effort

Ms. de Valladares briefly introduced the AMF IA’s proposal for an ammonia task, which was included in the materials distributed for ExCo review. On receipt of the proposal, she had informed the Chairman and then researched the proposal to ensure that was no overlap or related IEA HIA effort. She then referred the proposal to Dr. Hauback for Task 22 review. She explained that this was the typical process for addressing inquiries from other Implementing Agreements. Noting that there were actually a couple issues at play in this case – namely, how the IEA HIA cooperates with other Implementing Agreements in general and how specific requests from other Implementing Agreements are managed – Mr. Hake recommended that the **IEA HIA obtain an statement from Task 22 on its interest in the proposal**, and if interest exists, defer the proposal to a technical group under Dr. Hauback’s leadership. The ExCo agreed with this approach.

Acknowledging that the IEA HIA has a process in place to deal with inquiries from other Implementing Agreements, Mr. Hake also observed that the need to manage interaction with other implementing agreements was a strategic question that suggested the possible need for more structure. Dr. Pearce suggested that it might be appropriate to create subcommittees for particular purposes.

2.4 End of Term Report and Strategic Plan 2010-2014

Chairman García-Conde reported on the **status of the End-of-Term (EOT) Report for 2004-2009 and Strategic Plan for 2009-2014**. He made a **full presentation** to the Renewable Energy Working Party (REWP) during its 24-25 March meeting. **The REWP Secretariat graciously printed attractive hard copies of the EOT/Strategic Plan for review by REWP members. REWP approved the EOT/SP** and sent it on the **Committee on Energy Research Technology (CERT) for final approval at the 9-10 June CERT meeting**. Once approved, the EOT/SP will be published on the IEA HIA website.

2.5 IEA HIA Analysis Group (Mr. Hake, Mr. Linssen, Dr. Schoenung and Ms. de Valladares)

Analysis Group Chair Hake and Ms. de Valladares summarized the **Analysis Group's activities** to date, beginning with the three components (Literature Review, Market Forecast/Demand Survey/Trend Analysis) from the IEA HIA Analysis Committee's March 2008 report. In April, the Analysis Group had **prepared an extensive table on hydrogen production, storage and cross-cutting issues in response to the WEO's 2009 report related inquiries** and in hopes of engaging their interest in including hydrogen in the next WEO edition.

Dr. Susan Schoenung, Operating Agent for Task 18 whose experts had agreed to perform the Literature Review, then made a **presentation on the Hydrogen Resources Study, Literature Search and Bibliography**. She reported that Task 18 experts have provided **bibliographies of 29 study documents** that have been sorted into a database constructed by Emma Stewart, Task 18 expert and former Sandia National Laboratory researcher. Dr. Schoenung and Ms. Stewart are assessing the work to identify trends and gaps. To date, the following trends have been identified: a wide range of time frames and assumptions; focus of analytic studies is regional sources to meet regional demands for (light duty) transportation; European studies motivated by environmental considerations; other studies by energy security. Gaps include: a large part of world not analyzed; carbon calculations (mostly) missing from explicit models; and no global cross talk. She recommended that the new Analysis Task involve other HIA tasks and other Implementing Agreements as well. For new task definition, DOE would like to include a focus on global impacts (components and flows) and scarce resources combined with an emphasis on CO₂ and petroleum reductions. Dr. Schoenung then offered to circulate the 1 March 2009 Task 18 Draft Literature Search and Annotated Bibliography Report by sending it to Secretariat who said she would post on the San Francisco page website. Dr. Scepanovic urged the ExCo to continue its analysis efforts, pointing out that we had not as yet succeeded in making the case for hydrogen. There was a **clear consensus in the ExCo that the Analysis Group should proceed to outline a draft scope of work for the new Analysis task**, for which a **Task Definition meeting** will be held in **Seville**. A **team** consisting of **Analysis Group principals** Dr. Schoenung, Analysis Group Chairman Mr. Hake, Mr. Linssen and Ms. de Valladares will **cooperate on this draft**.

3.0 Special Topics

3.1 Collaboration with IPHE – Task 18

Ms. de Valladares recapitulated the background for the proposed Annex III between the IEA HIA and IPHE on Task 18. The final draft of this Annex did not contain the standard requirement that information be previously approved by the ExCo. The IPHE Secretariat had recently informed Ms. de Valladares that the proposal had received favorable consideration at the last International Partnership for a Hydrogen Economy (IPHE) Implementation Liaison Committee (ILC) meeting and was now in the IPHE concurrence period. **The IEA HIA now awaits official notification of final IPHE acceptance.**

3.2 Approval of Request to Open Euro Denominated Account for Compensation of Jan-Erik Hanssen

Ms. de Valladares reported that, by e-mail vote, the ExCo had approved the resolution to open a Euro Denominated Account for Compensation of Jan-Erik Hanssen with several conditions suggested. The resolution read:

The IEA HIA hereby agrees to the opening of a Euro-denominated personal account by Mary-Rose Szoka de Valladares as custodian for the beneficiary, the IEA HIA. The purpose of the account is to enable Euro-denominated payment for Dr. Jan-Erik Hanssen as part of his compensation as Co-Operating Agent of Task 27, Near-Market Routes to Hydrogen by Co-utilisation of Biomass as a Renewable Source with Fossil Fuels. The account is expected to be opened at the HSBC in Paris, France.

ExCo members had suggested the following conditions:

- a one year time limit on the account
- Chairman approval of all payments
- Stipulation that the account may not be used for any purpose other than the IEA HIA

During the discussion of the conditions, Dr. Luzzi stated his strenuous opposition to the proposal. In light of this objection and the resulting lack of consensus, the ExCo withdrew the proposal.

3.2 Approval of MOU with Dr. Jan Erik-Hanssen

ExCo approval of the IEA HIA MOU with Dr. Jan-Erik Hanssen, Co-Operating Agent for Task 27, was requested. **The Chairman and Secretariat thanked Mr. Frank Denys and SenterNovem of the Netherlands for their generosity in funding the Co-Operating Agent (at the 25,000 €level) for the initial one year period** of the approved task. The Netherlands actually agreed to provide the funding in two payments. The first payment had been received and converted to USD; the second payment was outstanding but expected to be received soon, but not before the MOU with Dr. Hanssen was signed at the ExCo meeting. Therefore, in view of the withdrawal of the Request to Open-Euro Denominated Account for Compensation of Jan-Erik Hanssen, the Secretariat agreed to modify the language in Dr. Hanssen's MOU to reflect the uncertainty associated with the exact sum (in USD) as the second tranche. Once that amount was clarified, after receipt and conversion of the second Dutch payment, the Secretariat would amend Dr. Hanssen's MOU accordingly. The ExCo approved these actions.

3.3 Definition of IEA HIA Sponsor

IEA HIA membership has been growing and industry already makes important and often vital contributions to many IEA tasks. Therefore, the Secretariat introduced the topic of "sponsors" for discussion in anticipation of a future time when the ExCo considers membership expansion beyond the pool of potential "Contracting Parties" to include sponsors. The IEA definition of a sponsor is:

*a participant in an IA which is: an entity of an OECD non-member country that is not designated by the government of a country to participate in a particular IA; or
a non-governmental international entity in which one or more countries (whether or not members of the IEA or of the OECD) participate.*

A short discussion ensued. Mr. Eaton asked what use might be made of additional Common Fund fees. Ms. de Valladares responded that, for example, more IEA HIA reports might be published in hard copy. The ultimate sense of the discussion was that the ExCo believes the situation is not sufficiently mature at this time to take further action. However, the ExCo will resume the discussion once a concrete proposal has been developed and brought to the table for consideration.

3.4 Secretariat Statement of Work

The Chairman presented the draft Statement of Work (SOW) for the Secretariat Management Functions that had been circulated to the ExCo prior to the meeting. The SOW had been developed by the Chair, Co Vice-Chairs and the U.S Representative pursuant to ExCo direction at the 60th meeting in Athens, Greece in order to formalize the ExCo relationship with the Secretariat going forward in the coming five year cycle 2009-2014. The appointment of the Secretariat, Mary-Rose de Valladares of M.R.S. Enterprises, LLC, has been effective since November 2003 and continues through the new term, 2009-2014. There was brief discussion in the ExCo during which it was decided to add Data and Archival Management to the list of Management functions. Mr. Hake observed that the resignation of the current Secretariat should be restricted unless there were severe reasons for early departure. **By consensus, the ExCo agreed to the SOW.**

4.0 Communication and Outreach

4.1 Annual Report

The **Annual Report is now in the editing phase** but numerous contributions remain outstanding. Ms. de Valladares requested that these contributions be submitted as soon as possible. As discussed in Athens, printing is expected to be outsourced to Lithuania through the kind intercession of Dr. Rolandas Urbonas.

4.2 Newsletter

The **next issue of the newsletter will feature Task 23**, Small-Scale Reformers for On-Site Supply of Hydrogen (SSR for Hydrogen). If possible, the newsletter will be published before the summer season; if not, it will be published in the fourth quarter.

4.3 Website

There is now a **“What’s New” button on the IEA HIA website**. Ms. de Valladares showed the ExCo where to find the **News & Views** area with the HIA Angel Gallery (for extraordinary service to the IEA HIA). The next planned website additions are the **RSS feed** (signing up by website will allow users to receive IEA HIA updates in their browsers); and **e-mail sign-up** (which will permit users to receive IEA HIA materials by e-mail. Now under evaluation is whether to modify the existing website Content Management System or use an external service for e-mail delivery of our newsletter and other materials.

Ms. de Valladares emphasized the **website is already archive enabled** so documents can be stored on the site. In addition, task websites such as Task 18 can be mirrored on the IEA HIA website.

4.4 Project Prize

The complete schedule for the **Project Prize selection process will be sent out soon** in order to permit award of the Project Prize in the timeframe of, and ideally during, the 61st ExCo meeting in Seville, Spain. Nominations will be open to the tasks, the Operating Agents and ExCo members. The selection cycle for the **IEA HIA Individual Prize will begin in late 2009** in anticipation of announcement and award at WHEC 2010 in Essen, Germany.

4.5 Public Relations

The **IEA Open Bulletin has been very cooperative** about publishing IEA HIA news. In its 4 June 2009 issue, the Open Bulletin reported on the *Survey of Support Mechanisms for the Development and Demonstration of Hydrogen Systems* by Mary Gillie and Karen Platt, a product of Task 18, Integrated Systems Evaluation. The report underscores the importance of industry and government cooperation, highlighting mechanisms likely to achieve long-term growth in hydrogen. One important and intriguing finding of this report is that the countries that are the most successful are not necessarily the most populous or richest. As part of the **IEA HIA’s reactive public relations strategy**, Ms. de Valladares responded to a 24 April Washington Post editorial entitled “Getting Real on Wind and Solar” with a Letter to the Editor.

4.6 Conference Schedule, including ICHS and the IEA HIA Conference

Ms. de Valladares first gave an update on 2009 (and upcoming 2010-11) conference scorecard.

- Internal IEA** 2 REWP – presentation of EOT/SP
CERT – presentation of ETO/SP
- External IEA** 2 NEET possible fall 2009 - India and Rural Energisation
- Hydrogen** 3 *Hypothesis* – March (abstract accepted but unable to attend)
HFC2009 – CHA – June – poster
WHEC 2010
ICHS – Corsica September
- Renewable/Sustainable** 1 **SAFE (July, Rome)**
- Environmental** **TBD**
- Conventional Energy** **WEC (2011)**
- Transportation** **TBD**
- Utilities/Infrastructure** **TBD**

A JTI stakeholders meeting is scheduled for 27-29 October, but as of this time the IEA HIA has not been asked to play a role in that event.

Relative to WHEC, Mr. Hake reminded the group that the IEA HIA’s original plan for WHEC -- and indeed our request to the WHEC Organizing Committee -- was that there be an IEA HIA track. However, he advised the ExCo that the IEA HIA track might not be feasible and that we might ask for a high level session instead. Ms. de Valladares will investigate further.

Chairman García-Conde then introduced a plan to hold a general IEA HIA conference in Seville during the week of the 61st ExCo meeting. As conceived, the “retrospective” conference would allow the tasks to showcase their activities and findings over the past five year term from 2004-2009. It could also feature a session on international finance. The conference cost would be kept low to encourage participation. It would also receive additional support from the Spanish Hydrogen Association, which holds a conference every two years.

An ExCo discussion then ensued. The timeframe was of concern, with Dr. Luzzi of the opinion that it was too short. Mr. Jensen suggested the short timeline might be addressed by staging an “invitation only” event. Mr. Hake suggested that the IEA HIA might link up with existing conferences and/or events. Dr. Loftsdóttir suggested that we use both strategies. Mr. Lucchese said that awareness of IEA HIA was not high in France, so a conference could raise our profile. **The ExCo very much liked the idea of showcasing the IEA HIA portfolio.** Ultimately, however, **it decided to investigate other conference and workshop pathways and not undertake a general conference alone at this time.**

Mr. William Hoagland then gave a status report on the upcoming third International Conference on Hydrogen Safety (ICHS3) in Corsica. He emphasized the Task 19 effort to engage the conference organizers (led by the International Association for Hydrogen Safety - IA HySafe) in closer collaboration on conference organization. The organizers’ response was very slow in coming but is favorable, acknowledging the stature of the IEA HIA and the valuable Task 19 effort. Ms. de Valladares commented that the organization had for some time been investigating the “conference market” in order to identify an appropriate IEA HIA conference organizer opportunity that would increase the Agreement’s visibility. A high-level cooperation on this conference could yield an important benefit for the Agreement, as it would provide the IEA HIA with an organizer role for an established conference with worldwide recognition in the hydrogen and greater energy communities without the start-up costs and the risks associated with creating a “new conference” and/or undertaking the venture solo.

Mr. Hoagland read aloud the very recent letter from ICHS proposing an MOU between the organizations that would cover joint organization of ICHS. For its part, the IEA HIA was asked to contribute 50,000 € per year to this arrangement. The ExCo reacted very favorably to the potential for a strategic partnership. Mr. Lucchese endorsed a strategic approach that could evolve into a partnership. However, there was a general consensus, cogently expressed by Dr. Vallander, that 50,000 €/year was too much money. The ExCo encouraged Mr. Hoagland to continue discussions with IHCS3 organizers with assistance from the Secretariat as needed.

5.0 Financials

Ms. de Valladares gave the financial report, beginning with the Statement of Cash Flows. Operating and Investment activities for the period January 1 through May 22, 2009 resulted in a cash position of \$115,622.89 at the end of the period, a net cash increase of \$76,194.53 over the \$39,428.36 on hand at the beginning of the period. The Balance Sheet dated May 22, 2009 showed \$115,622.89 in the cash portion (checking account) of the Current Accounts. There was \$105,000 in Accounts Receivable of which \$10,000 was attributable to 2007 Common Fund dues, \$20,000 to 2008 Common Fund dues and the balance to 2009. Of the cash, \$18,913.50 was a special contribution from the Netherlands restricted to use for support of the Task 27 Operating Agent. There was \$4,011.96 in Fixed Assets. For the Profit & Loss Statement, total expenses from January through May 22, 2009 were \$64,959.01 against scheduled revenues of \$205,000 in 2009 Common Fund Dues. (An additional \$10,000 in Common Fund dues 2009 had been received from the Netherlands the previous year, 2008, and recorded at that time.)

The subject of the budget was then raised, with Dr. Luzzi expressing concern about an unbalanced budget. In conclusion, Dr. Read said that **all future budgets should be balanced**, such that expenses not exceed revenues.

6.0 Task Reports (In Definition)

6.1 Hydrogen Infrastructure and Mass Storage

Ms. de Valladares gave an oral report on behalf of Task Organizer, Mr. Frank Denys, who was recovering from an injury and unable to travel. The February Task Definition meeting held in Amsterdam was very productive. However, rather than converging on the proposed topics, more subjects were brought up and the focus shifted from storage to modeling work and the assembly of existing models to capture the entire infrastructure chain. A revised draft has been circulated to meeting participants in anticipation of holding a second Task Definition workshop.

7.0 Task Reports

7.1 Task 21 - BioHydrogen (Dr. Jun Miyake)

Unable to be present at the meeting due to official swine flu restrictions, Dr. Jun Miyake made his presentation very successfully via telephone. The last Task 21 meeting was held in Sweden and the next one is scheduled for Helsinki. Dr. Miyake reported on progress, planned activities for the next six months and ultimate goals in each of the four subtasks.

For Subtask A, BioHydrogen Systems, various thermostable H₂ producing bacteria were obtained. Reactors were examined for bio-waste conversion. Relative to metabolic pathway analysis, a substrate conversion efficiency of 2-4 mol H₂/mo glucose over 6 mol H₂/mol in combination with PSB was obtained. In addition, a solar conversion efficiency of 7% H₂ ΔH H₂/Sol Energy by PSB was achieved. The ultimate goal is reactor-level studies of water treatment, highly efficient metabolic pathway bacteria and practical, economic reactors.

For Subtask B, Basic Studies for Photobiological Hydrogen Production, a mutant with a brand new H₂ase was found with an efficiency of ~1%. During the next six months, molecular studies of photosynthesis protein and genes will be conducted. The ultimate goal is the creation of microorganisms or high efficient water splitting and H₂ production.

For Subtask C, Bio-inspired Systems, various types of microbes and H₂ase were examined. H₂ase related genes are being analyzed actively. There has also been reconstruction of proteins for BioElectrode/Fuel Cell applications. During the next six months there will be work on molecular organization of photosynthetic proteins, H₂ase genetic improvements/reconstruction and bio-fuel cell improvements. The ultimate goal Subtask 3 goals are: 1) oxygen-thermo-tolerant H₂ase creation; 2) BioFuel cells using H₂ase; 3) BioPhoto-electrode for H₂ and O₂ production.

For Subtask D, Overall Analysis, achievements to date include examination of social acceptance based on references and various evaluation frameworks. Social concern on global CO₂ reduction should be the most important subject. H₂ is not well known as a coming energy carrier. During the next six months social factors affecting BioHydrogen will be studied. The ultimate goals are economic and practical system realization, social acceptance and global security and stability.

He reported that Taiwan would very much like to join Task 21 and there are 10 other countries that would like to join the task (China, Hungary, India, Latvia, Portugal, Russia, Singapore, Thailand – all non-member IEA HIA countries); as well as Turkey and New Zealand, which are IEA HIA members.

7.2 Task 25 - High Temperature Production (Mr. Lucchese)

Mr. Lucchese delivered the presentation on Task 25 – High Temperature Processes (HTP) for Hydrogen Production on behalf of the new Operating Agent Sabine Poitou who was unable to attend due to CEA travel restrictions related to swine flu. He began by reviewing the task objectives and the three families of investigated HTP (500°C) processes: thermochemical cycles (including pure and hybrid processes); steam electrolysis; and innovative direct water splitting. He then presented Ms. Poitou's CV to the Executive Committee in fulfillment of the obligation to furnish Operating Agent credentials.

Mr. Lucchese continued with a report on progress for each of the subtasks. In **Subtask A: State of the Art (and Subtask D: Communication)** the following **template has been approved for the communication sheets/flyers**: Page 1 – process principles; page 2 – flowsheets & experimentation on existing prototypes; page 3 – heat source, energy field, materials, H₂ cost evaluation; page 4 – contacts, main initiatives and scientific references. Pages one and four are aimed at the public, while pages two and three are intended for scientists. Fifteen flyers are in some state of the validation process and are expected to be complete at the end of 2009. The synthesis and final report will include an update of the INNOHYP report, which contains a process review and inventory of national projects on hydrogen production.

In **Subtask B: Process Evaluation**, There was a **bibliographic review of recent techno-economic studies**. Five studies two were carried out between 2005 and 2007. Two were so-called interactive studies (MCM UKSHEC in the UK and MCDM in the USA included hydrogen scenarios) and three so-called directive studies (INNOHYP (Europe and Australia), Factor of Merit (UK), and Sustainability General Index (Portugal). Conclusions of these studies illustrate that different visions obtained from different methods can lead to divergent decisions. Interactive methods using a hydrogen scenario do not equate to directive methods. To evaluate HTPs, uniform tools are needed for use a methodology that is unified to the greatest extent possible. CEA has defined four components (distillation column, pump, compressor and heat exchanger). Cost evaluation will be discussed at the next meeting along with a robust techno-economic evaluation methodology.

For **Subtask C, HTP R&D and Future Industrial Development**, no subtask leader has been identified as the HTP's deployment feasibility is insufficiently advanced. Therefore, **this effort is being reshaped toward large scale institutional platform projects** such as DOE-INL: Next Generation Nuclear Plant; Japan's HTTR and the European agreement SUSHYPRO. The aim is to identify industry-appropriate processes and their respective timetables.

Subtask D: Communication, features a large (170 documents) documentation base open to all members. The third official Task Meeting will be held 4-5 June in Cadarache, France and the fourth meeting will be held in Zaragoza, Spain in the last quarter of 2009.

7.3 Task 22 – Fundamental and Applied Hydrogen Storage Materials Development - Progress Report and Request for Extension (Dr. Hauback)

Dr. Bjorn C. Hauback reported that Task 22 participation now includes 18 countries, 53 active official experts and 49 active projects. Up to 2008, 450 publications and 450 presentations were prepared. The fifth task meeting occurred on Jeju Island, Korea, 19-23 April 2009. There were 50 participants who presented 43 out of 49 projects.

In an update on IPHE interaction, Dr. Hauback reported that no IPHE countries were present at the Task 22 meeting in Korea. The Brazilian expert has expressed great interest in Task 22, but Brazil's status relative to Memorandum of Understanding (MOU) and Letter of Intent (LOI) participation has yet to be clarified.

Dr. Hauback gave an overview of the "Application of Nuclear Methods to Material Studies for Fuel Cell and Hydrogen Cycle Technologies" organized by the International Atomic Energy Agency (IAEA) and the IEA 16-20 March in Paris, France. As a result of the workshop, the IAEA will launch a Coordinated Research Project (CRP) to which he and other Task 22 experts have submitted proposals. Moreover, the IAEA has expressed interest in learning more about IEA HIA membership.

Task 22 ends 30 November, 2009. Citing significant progress, Dr. Hauback also explained the need for further R&D work, and presented the Task 22 request for a three year extension, which had been timely distributed to the ExCo. All (100%) of the current Task 22 experts have agreed to the need for work beyond 2009. The Research Council of Norway has agreed to fund Dr. Hauback as Operating Agent during the extension period. There has been progress and achievements in alanates, amides/imides systems; magnesium-based hydrides, multicomponent systems (destabilized systems), nanoporous materials, nano-hydrides and safety. Overall, many promising materials were developed and characterized. There has also been an improved understanding of hydrogenation/ dehydrogenation properties and effect of catalyst. However, the optimal material is still missing and the effect of catalysts is limited. Hydrogen storage system goals, e.g., U.S. DOE goals, have not yet been achieved. Further work is therefore needed.

Dr. Hauback then emphasized the need the collaboration in order to avoid duplication and make maximum use of competence, resources and infrastructure. Nearly every Task 22 project has international collaboration. Three important collaboration efforts are: N-1 "Metal-carbon IEA Collaboration": and the safety related efforts, H-25 "Fundamental safety testing and analysis of hydrogen storage materials and systems" and H-26 "Safety properties of hydrogen storage Materials in the Context of Systems."

Dr. Hauback's presentation generated questions and lively discussion. Dr. Lymberopoulos asked about involvement of companies in such non-IEA HIA member countries as Cypress and Bulgaria. Dr. Hauback's answer was that, to date, there has been no involvement. Dr. Read asked about batteries and was told that batteries were a research topic in other implementing agreements. Mr. Hake asked about a Task 22 marketing document. Mr. Ersöz inquired about hydrogen storage materials or mass storage capabilities for stationary and mobile applications. Dr. Hauback explained that the focus was on system weight goals for transportation rather than stationary applications. Dr. Read interjected that the DOE update on system analysis focuses on system-wide characteristics rather than weight.

In addition to the request for extension of Task 22, a proposal for more applied storage (engineering) is expected to be developed, to focus more on station storage and hydrides for other energy applications.

Relative to the extension, the first two goals for Task 22 will be retained and the third will be amended to include development of hydrogen storage materials and systems in mobile as well as stationary applications,

and also other potential energy related applications, for example in batteries. The present project types and classes of H-storage media will be retained.

The ExCo voted to extend Task 22 for three years from 1 December 2009 thru 30 November 2012 in principle subject to receipt of final details on Project Plans for the new phase. The next task meeting is scheduled take place in April 2010 in Death Valley, U.S.A.

7.4 Task 18 - Evaluation of Integrated Systems (Dr. Schoenung)

Dr. Schoenung reported that Task 18 ends December 31, 2009. The last (eleventh) Task 18 Meeting took place in Oslo, Norway. It was a great success with 17 participants from 14 countries. It included a Joint workshop with Task 23 (SSR for Hydrogen), a tour of HyNor Station at Porsgrunn and a half-day tour of IFE hydrogen and other energy research labs. Major task accomplishments to date include:

- Hydrogen Resource study bibliographies – report in progress
- Subtask A information bases: websites operational; data base continues to grow
- Subtask B demonstration evaluations: analysis underway; working groups working- vehicle fueling & electric power
- Subtask C work underway: trend analysis
- Permitting data base, remote communities survey recently published as “Renewable Based Hydrogen Energy Projects in Remote and Island Communities”
- Case studies: in progress / reviewers
- A great deal of outreach including conference papers, workshops and presentations: HFC2009; NHA 2009; two abstracts for WHEC (one on trend analysis and the other on the literature); an invitation from Hypothesis for Maria Argumosa to submit a paper
- Draft annex to the IEA HIA/IPHE Memorandum of Understanding (MOU) has been prepared to Task 18 to work collaboratively with the IPHE Demonstration and Infrastructure Working Group in the exchange of lessons learned.

On this last point, Ms. de Valladares again reported that the proposal had received favorable consideration at the last International Partnership for a Hydrogen Economy (IPHE) Implementation Liaison Committee (ILC) meeting and was now in the IPHE concurrence period.

Dr. Schoenung queried the group about disposition of the websites on task completion. After Mr. Jean Dube’s departure as Subtask A leader, she has been paying for maintenance of that website. She would like to move the material from the public website to the IEA HIA website; she would also like to move the content of the private site to the IEA HIA website. The website will no longer be interactive so functionality is not an issue. Ms. de Valladares said she would work with Dr. Schoenung to move the content and otherwise archive the site. She will need an estimate of the website size from Dr. Schoenung.

Dr. Schoenung reported that possible successor tasks include: 1) an analysis task, including cross flows across borders, whose foundation is also the business of the Analysis Group; and 2) Independent, Clean Hydrogen Communities. 3) Comparative Studies and a continuation of trend analysis. Dr. Schoenung may also propose a short extension (3-6 months through WHEC in May 2010) for Subtask B in order to complete work still underway. She explained that the **U.S. would support participation in the Analysis task but, as of now, no support was anticipated for an Operating Agent role.**

The ExCo then briefly discussed these possibilities. Mr. Jochen Linssen said that a Subtask B meeting in the WHEC timeframe would not be a problem. There was no objection to adding 3-6 months to Subtask B. Dr. Scepanovic said that Canada was very supportive of a remote community task, especially one with a renewables orientation. Mr. Hake said that the new tasks should not just attempt to fill gaps. They should, instead, focus on clear objectives and expected outcomes. Dr. Lymberopoulos views the proposed

Analysis Task as a global brain trust. Dr. Schoenung said that Task 18 experts from Canada, Norway, Spain, Greece and New Zealand as well as UNIDO observers had expressed interest in the new tasks at the most recent meeting. **Mr. Hake encouraged Dr. Schoenung and her experts to formulate a proposal on its new task for near-term consideration, while the Analysis Group would provide a proposal for the new Analysis Task.** Dr. Schoenung was asked to bring an outline of the new task to the next ExCo meeting. **If formally requested, permission to extend Subtask B will also be considered at that time.**

7.5 Task 19 – Safety (Mr. Hoagland)

Over the past six months, reported Mr. Hoagland, the primary Task 19 activities were: the planning, conducting and documentation of the Experts' meeting in San Francisco, March 21-23, which was concerned in great part with planning for the last 18 months of the task; and development of contributions for the IEA HIA End-of-Term Report.

All National Participation Letters (NPLs) **have not yet been received** so a key question remains regarding commitment to the level of effort foreseen through 2010. The task work plan lays out a scope and schedule that will be modified as necessary after the NPLs are received. Two subtask leaders have had to resign because they did not receive sufficient support to fulfill their subtask leader responsibilities.

All milestones for the first three years of Task 19 have been completed. Specific milestones for the follow-on three year period will be set upon receipt of the NPLs. The following Phase I products have been completed and submitted to Secretariat: **The Risk Assessment Methodologies Survey** (expected to be updated during the follow-on period to include additional information on ignition probabilities; risk criteria; and consequence tools); and Review and Analysis of Risk Assessment Studies.

Apart from the NPLs, the other matter requiring ExCo attention was **support for ICHS3**. As this matter had been previously discussed in conjunction with the Secretariat Report on Conferences, Mr. Hoagland briefly summarized the opportunity and thanked the ExCo for its support.

7.6 Task 23 – Small-scale Reformers for Hydrogen (SSR) (Dr. Schjølberg)

Dr. Schjølberg gave a report on **progress to date and also presented a request for a two year task extension beginning in November 2009**. She began with an overview of progress over the past three years, summarizing major accomplishments.

For Subtask 1, Harmonized Industrialization, the overall objective is to develop a harmonized approach to reformer capacity, for which parameters are crucial. A survey-in-progress that identifies suppliers of reformer technology and components will be completed in December 2009. A set of standards will be developed for each component of on-site small scale reforming units. The set of standards is expected to be especially useful to end-users.

For Subtask 2, Sustainability and Renewable Sources, a list of available small Carbon-capture and Storage (CSS) technology will be generated. It is anticipated that other small-scale reformer emissions, noise and NO_x, can also be handled effectively. There are no small scale reformers for ethanol and biodiesel. All Small scale reformers can be upgraded to run on biogas. Future feedstocks include bioDME, biomethanol and bio FT diesel. Fuel paths and best use of fuels are also topics of discussion in this subtask. Data from the Concawe study, which compares the use of ICE and fuel cell vehicles, have been compiled. This work will be completed in December 2009.

Subtask 3, Market Studies, is performing a market study comparing the Japanese, European and U.S. market development. Task 23 experts will present four sets of data: E3data (HyWays-IPHE project); H2A data (HyWays-IPHE project); Japanese data (JHFC project); and Task 24 expert data.

All three subtasks are expected to continue during the extension. Furthermore, Dr. Schjøberg reported that 15 out of 17 current Task 23 members have confirmed that they will participate in the two year extension. Dr. Schjøberg will continue as Operating Agent and the position will be funded by the RENERGI Program under the Norwegian Research Council.

The ExCo voted to **approve the task subject to Dr. Schjøberg's delivery of a revised Work Plan.**

7.7 Task 24 – Wind and Hydrogen Integration (Mr. Aso)

Mr. Aso began by reviewing the Task 24 objectives and the earlier steps in its evolution, which began in November 2005. Task 24 held its fourth meeting in April 2009 at NREL in the U.S. The task now includes 19 experts from 19 countries. Task 24 has four subtasks:

Subtask A: State of the Art (Aaron Hoskin, Natural Resources Canada)

Subtask B: Needed Improvements & System Integration Technology Development on Main Equipment and System Integration Concepts (National Renewable Energy Laboratory, USA)

Subtask C: Business Concept Development (Planet GbR, Germany)

Subtask D: Applications – Emphasis on Wind Energy Management (Cener, Spain)

The **draft report on Subtask A, State of the Art, is scheduled for 30 June 2009.** This will include the Simulations Tool Report for Wind-hydrogen system layouts. Likewise, the report for Subtask C, Business Concept Development, is scheduled for completion 30 June 2009. This report will deal with small, medium and large systems relative to fuel production, electricity and the mini-grid.

The Subtask B Technical Report on Needed Improvements and System Integration entitled “The Wind-to-Hydrogen Project: Operational Experience, Performance Testing Systems Integration was published by NREL in March 2009.

Mr. Aso also gave an overview of wind/hydrogen demonstration projects in North America, Spain (ITHER in Huesca, Sotavento in Lugo, Tahivilla in Cadiz and RES2H2 in the Canarias.) Wind energy is of great interest in Spain, which has abundant wind resources.

Mr. Aso reported that New Zealand is poised to join Task 24. Gamesa, which was originally expected to undertake the Operating Agent role for the second half of Task 24's term, has not officially moved forward to assume this role. Therefore, **it is anticipated that the Aragon Hydrogen Foundation will continue to serve in this role.** Finally, Mr. Aso encouraged all ExCo members to propose new experts, especially industry experts, for Task 24.

7.8 Task 26 – WaterPhotolysis (Dr. Miller)

Dr. Miller reviewed the fundamentals of photoelectrochemical cells (PEC), reminding the ExCo that “the primary objective is to develop practical solar hydrogen production technology, using innovative semiconductor materials and devices R&D to foster the needed scientific breakthroughs for meeting goals consist the US DOE Hydrogen Program.” The 2018 target for chemical conversion process efficiency is 12%. The R&D approach consists of state-of-the art theory, synthesis and analysis techniques. Seven Task 26 member countries contribute 17 experts. An International Task Force consisting of experts from Task 26 participating nations supports the Task. This Task Force is being organized according to the US DOE PEC Working Group Task Force Structures.

He then reported on results of 17-19 April 2009 Experts meeting, a joint meeting of the IEA HIA Task 26 PEC experts and the PEC Working Group, where there were over 50 participants. Task 26 experts also participated in the 2009 MRS spring meeting 13-17 April in San Francisco.

Activities and results in 2008 include the following accomplishments and progress:

Subtask A – Materials Theory: the New Theory Task Force has been assembled, led by scientists at the U.S. National Renewable Energy Laboratory and the Lawrence Livermore National Laboratory.

Subtask B – Materials Synthesis and Subtask D-PEC Information Coordination: International Task Forces have been assembled to study different focus materials classes. For each material class under investigation, a “White Paper” has been drafted. A living document, it concisely summarizes the benefits, barriers, research status and approaches for addressing the barriers, all closely tied to the latest advancements in theory, synthesis. The White Papers also maintain a record of active research participants as well as a database of references documenting past achievements. To date, White Papers have been drafted for a number of key focus materials classes including: Tungsten-dioxide and related modified compounds; Iron-oxide and related modified compounds; Amorphous silicon compounds, including silicon carbides and nitrides; Copper chalcopyrite compounds; Tungsten- and molybdenum-sulfide nano-structures; and III-V semiconductor classes.

Subtask C – Materials/Interface Characterizations: Advanced characterization techniques to enhance understanding of PEC materials and interfaces and promote breakthrough discoveries continue to be developed. The materials characterization efforts employ the most advanced microstructural, optoelectronic, and electrochemical characterization techniques available to paint a comprehensive picture of the materials properties in relation to PEC performance. Techniques include X-ray photoelectron spectroscopy (XPS), ultraviolet photoelectron spectroscopy (UPS), Auger, Inverse photoemission spectroscopy (IPES), in *ex-situ* as well as new, advanced *in-situ* arrangements.

Critical progress has been made in the development of standardized testing and reporting protocols for evaluating candidate PEC materials systems on a level playing-field. To date, the *Standardized Testing Task Force*, which is being coordinated jointly between the US and Australia, has made significant initial progress, recently drafting eighteen extremely-detailed testing protocol documents under continued refinement for near term publication. Dr. Miller highlighted the “Standard PEC Characterization,” a successful international collaboration led by Huyen Dinh. This international joint effort subscribes to the US-DOE/IEA HIA goals to develop standardized testing and reporting protocols for PEC material/ interfaces evaluation; and to publish the standardized PEC characterization techniques in a peer-reviewed journal.

In terms of general progress in the field, Dr. Hanssen reported that European Commission had awarded funding to the NANOPEC project, a major European PEC project.

Future plans in standardized testing include the following document topics: Task 26 Experts’ Review Process; Standard Documents for Particulate Colloidal Systems; Tandem/Multi-Junction Cell Systems; and Strategic for Material Design and Synthesis.

7.9 Task 27 – Near-Term Market Routes to Hydrogen via Co-Gasification with Biomass (Dr. Hanssen)

Dr. Jan-Erik Hanssen, Co-Operating Agent for Task 27, made his first presentation to the ExCo. The Chairman introduced him, explaining that he shares the Operating Agent responsibility with Ms. Elif Caglayan, who was unable to travel to the meeting due to her advanced stage of pregnancy.

Dr. Hanssen began with the overall objective of Task 27, which is to advance the development of hydrogen production based on renewable sources in the market place, focusing on biomass and on opportunities of interest for industrial application. The specific objectives are to:

- Identify and evaluate the most attractive and realistic process pathways towards a large-scale demonstration of biomass co-gasification with fossil fuels;

- Quantify the potential for a renewable-based H₂ supply chain based on upgrading biomass waste near source into a tradable intermediate (a “biomass carrier”), its commercial transport and use in centralised gasification plants;
- Evaluate the most attractive way of utilising stand-alone biomass gasification technology in near-to-medium term H₂ markets;
- Develop and verify a Roadmap for the market introduction of biomass-based routes to H₂

There are four Task 27 subtasks:

Subtask A: Co-gasification of biomass with fossil fuels (subtask leader Claudio Zeppi ENEL)

Subtask B: Hydrogen market facilitation based on distributed processing of biomass to new tradable intermediates (subtask leader Bert van de Beld, BTG)

Subtask C: Near term, stand-alone biomass gasification (subtask leader Esa Kurkela, VTT)

Subtask D: Roadmap-development and verification – a business-oriented roadmap for hydrogen produced with biomass as a renewable source (subtask leader Jan-Erik Hanssen, 1-Tech)

Current deliverables in progress consist of: Co-gasification-Technology basis and biomass/coal compatibility (ENEL); Logistics-Mapping gasifier locations vs. transport for pyrolysis oil (BTG); Dedicated biomass gasification – Review of processes and projects (VTT). Completion of the first three is expected in 2009. The fourth, Key coordinates for roadmapping the co-gasification of biomass with fossil fuels for production of hydrogen and related products (1-Tech), is expected in 2010.

The participants are experts from industry, technology institutes and academia and come from Italy, The Netherlands, Norway, Finland, Turkey, USA, and Spain. The Task is collaborating *i.a* with the IEA Bioenergy IA, to avoid duplication of efforts and achieve synergies.

The ExCo discussed the scope of the task; there was some sentiment that the scope should be narrowed to be more manageable. Dr. Hanssen and his Co-Operating Agent will take this view into consideration. Noting industry participants, Mr. Lucchese suggested that Air Liquide may want to participate.

8.0 Closing and Adjournment

8.1 Unfinished Business

Dr. Jay Keller, head of the local team hosting the U.S. DOE, **informed the ExCo** (on behalf of the U.S. Representative, Dr. Carole Read, who was obliged to leave the meeting early) that the **U.S. wished to make a one-time supplemental contribution to Common Fund Dues. This money was intended for use as determined by the ExCo.**

The ExCo unanimously expressed its gratitude for this generous and unexpected gift.

In view of this news, Mr. Hoagland again raised the possibility of cooperation with the organization of ICHS3. The ExCo reacted very favorably to the potential for a strategic partnership. Mr. Lucchese endorsed a strategic approach that could evolve into a partnership. However, there remained a general consensus, that 50,000 €/year was too much money. Mr. Hake encouraged the ExCo to seek guidance on the financial situation from the Secretariat

Given the earlier discussion about the possible IEA HIA organizer role in the upcoming ICHS3 conference, the **ExCo instructed Chairman García-Conde and Ms. de Valladares to work with Mr. Hoagland to realize this opportunity, recognizing that a written agreement would be necessary and that the only supplementary funds currently available to support this alliance were the \$50,000 from the U.S. DOE.**

8.2 Executive Committee Schedule

8.2.1 4th quarter 2009 61st ExCo Meeting

Chairman Antonio García-Conde confirmed Seville, Spain as the location for the 61st meeting. The meeting will be held during week 46, **18-20 November.**

8.2.2 2nd quarter 2010 – Essen, Germany, June 2010

Mr. Hake again confirmed that the **timeframe for the IEA HIA ExCo meeting has been fixed by WHEC organizers and will take place Thursday and Friday, 20 and 21 May, in Essen Germany** immediately following WHEC. Chairman García-Conde and Ms. de Valladares will confer with IEA Advanced Fuel Cells Chairman Lars Sjunnesson to confirm Thursday, 20 May, following the WHEC closing, as the time for the joint session of the two agreements.

8.3 Closing Comments

Dr. Luzzi offered brief remarks on the need to make the case for hydrogen in view of the current situation in California and the U.S. Mr. Lucchese reinforced his comment, stating that the same need exists in France. **The Chairman concluded that he and the Secretariat would follow up** on these important observations.

On behalf of the entire ExCo, **the Chairman then thanked the sponsor, the U.S. Department of Energy and its Representative, Dr. Carole Read**, in absentia and the **local host, Dr. Jay Keller**, for their gracious hospitality in organizing a memorable meeting and orchestrating IEA HIA participation as honored guests at the dedication of the SFO Refueling Station.

8.4 Adjournment

Chairman García-Conde thanked the entire ExCo for their participation and Secretariat for its support.

60th EXECUTIVE COMMITTEE Meeting
IEA Hydrogen Implementing Agreement
27-29 May, 2009 San Francisco, CA USA

IEA Hydrogen Annex XVIII - Task 18 Integrated Systems Evaluation
Dr. Susan M. Schoenung

International Energy Agency Hydrogen Implementing Agreement - Executive Committee Meeting
San Francisco, May 29, 2009 Task 19 –Hydrogen Safety
Mr. William Hoagland

Task 21 BioHydrogen – 60th Executive Committee Meeting, November 5-7, 2008, Athens, Greece
Dr. Jun Miyake

Addition to Task 21 BioHydrogen – 60th Executive Committee Meeting, November 5-7, 2008,
Athens, Greece
Dr. Jun Miyake

Semi-Annual Progress Report Task 22: Fundamental and Applied Hydrogen Storage Materials
Development, 58th Executive Committee Meeting, 27-29 May, 2009 San Francisco, USA
Dr. Bjørn C. Hauback

IEA HIA Task 23 Small-scale Reformers for Onsite Hydrogen Supply, ExCo Meeting 29 May, 2009
Dr. Ingrid Schjøberg

IEA HIA Task 24 - Wind Energy and Hydrogen Integration– 60th Executive Committee Meeting, May
2009, San Francisco, CA, USA.
Mr. Ismael Aso

Task n° 25 - High Temperature Processes (HTP) for Hydrogen Production, 60th Executive
Committee Meeting, May 27-29, 2009 – San Francisco, CA, USA
Mr. Paul Lucchese

Advanced Materials for Hydrogen from Water-Photolysis IEA-HIA Task 26, 29 May 2009
Dr. Eric Miller

Task 27 - Near-Market Routes to Hydrogen, 60th HIA Executive Committee Meeting, San
Francisco, California, US, May 27 – 29, 2009
Dr. Jan-Eric Hanssen

Chairman/Secretariat Report – 27 May, 2009
Chair Antonio Garcia-Conde and Ms. Mary-Rose de Valladares, IEA HIA

Communication and Outreach – 29 May, 2009
Ms. Mary-Rose de Valladares, IEA HIA

Special Topics – 27 May, 2009
Ms. Mary-Rose de Valladares, IEA HIA

List of Participants
60th EXECUTIVE COMMITTEE MEETING
May 27-29, 2009 in San Francisco, USA

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