Summer 2013

IEA HIA NEWS

IN THIS ISSUE

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THE IEA HIA TODAY

UN SECRETARY BAN KI-MOON OPERATES A FUEL CELL FORKLIFT "ON THE ROAD TO RIO"

New Members

Early in 2013, the IEA HIA was very pleased to **welcome Israel as a Contracting Party** to our Agreement. In March, after careful consideration and in an effort to enhance our capacity to achieve the IEA HIA mission and vision for hydrogen, the Executive Committee adopted a **policy framework** that **allows "Sponsor Members"** from industry, public-private partnerships, associations and consortia. We are happy to announce that the International Association, for Hydrogen Safety **(IA HySafe**) has **officially become the IEA HIA's first Sponsor Member.**

Strategy Matters

- The International Energy Agency's (IEA) flagship publication, *Energy Technology Perspectives 2012 (ETP 2012) - Pathways to a Clean Energy System*, has for the first time dedicated a chapter to a far-reaching examination of hydrogen use in the future global energy mix, concluding that hydrogen could play an important role in a low-carbon energy system.
- **IEA HIA Roadmap** On July 10th & 11th, the IEA undertook development of a Hydrogen Roadmap (H2RM), the last in the IEA's Technology Roadmap series. The H2RM is expected to have an intersectoral scope that encompasses transport, buildings, and industry, as well as infrastructure. There will be a special focus on use of hydrogen for large-scale energy storage and its linkages to the integration of variable renewable energies.

ExCo Meetings

IEA DEPUTY DIRECTOR AMBASSADOR RICHARD JONES AT 68TH IEA HIA EXCO MEETING IN PARIS

In June 2012, the IEA HIA held its 66th Executive Committee (ExCo) Meeting in June in Toronto, Canada. There, **the ExCo agreed to schedule in-person meetings at eight-month intervals**. Since the ExCo must officially meet biannually, this means that even years will now have one "webinar" ExCo meeting and one in-person ExCo meeting. Accordingly, the second 2012 IEA HIA ExCo Meeting (**67th ExCo Meeting**) took place **via global webinar** in **November** 2012. • The IEA HIA was delighted to **welcome IEA Deputy Executive Director, Ambassador Richard Jones, to speak at our** 68th ExCo Meeting held during March 2013 in Paris, France.

IEA HIA Portfolio

Final Reports for Task 23 - *Small-Scale Reformers for On-Site Hydrogen Supply*, and Task 24 – *Wind Energy and Hydrogen Integration* have been approved and posted on the IEA HIA website. The **Task 23 Final Report** is featured in the **Publication Alert** section. • Two new tasks have been approved: Task 32 – Hydrogen-Based Energy Storage and Task 33 – Local Hydrogen Supply for Energy Applications.

DR. SUNITA SATYAPAL AT END OF TASK HYDROGEN SAFETY WORKSHOP

DR. INGRID SCHJØLBERG AT END OF TASK WORKSHOP - TASK 23 SSR FOR ON-SITE H2 SUPPLY

MR. PEDRO CASERO CABAZÓN RECEIVES 2012 IEA HIA PROJECT PRIZE FOR ELCOGAS' *PILOT PLANT FOR CO2 CAPTURE & H2 PRODUCTION*

ALL IEA HIA TRACK AT WHEC 2012 IN TORONTO, CANADA

WHEC 2012: L-R CURRENT IEA HIA CHAIRMAN JAN JENSEN WITH PAST CHAIRMEN NICK BECK AND ANTONIO GARCÍA-CONDE

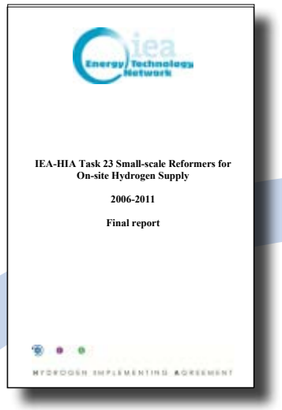
Promotion and Outreach

In first time ever events, End of Task Workshops were held for two tasks, Task 23 – Small-Scale Reformers for ***On-Site Hydrogen Supply (SSR for H_2) and Tasks 19/31 – Safety. Task 23's workshop, On-Site H_2 Supply: Reforming versus other options,*** took place on 24 April 2012 at GDF Suez in Paris, France. Task 19/31's Hydrogen Safety Workshop: ***Sharing Knowledge, Identifying Needs, Celebrating Progress*** was held October 2 - 3, 2012 at IEA HIA headquarters in Bethesda, MD, USA.

On 4 June 2012 the IEA HIA awarded the 2012 IEA HIA Project Prize to Elcogas for its ***Pilot Plant for CO2 Capture and H2 Production*** at WHEC 19 in Toronto. WHEC 19 in Toronto featured an IEA HIA track with presentations from Operating Agents for six tasks, as well as overview from the Chairman and highlights on hydrogen in the developing world.

PUBLICATION ALERT

The IEA HIA is pleased to announce the release of its Task 23 Final Report: ***Small-scale Reformers for On-site Hydrogen Supply. Task 23's main objective was to provide a basis for harmonization of technology for on-site hydrogen production from hydrocarbons and renewables.*** Four task outputs contribute to realizing this objective:



- First, a basis for harmonized capacities of on-site reformer units was developed.
- Second, the issues related to promotion of widespread on-site reformers were identified and examined.
- Third, a global market guide for the use of on-site reformers was created.
- Fourth, the technological links to renewables were described.

Task 23, Small Scale Reformers for On-Site Hydrogen Supply, emerged from a broad desire to reduce production costs, improve system performance, and advance mass production of on-site hydrogen reformers. A lack of consistency in energy efficiencies, hydrogen purities, and estimated footprints among reformer equipment of the same production capacity range has been a barrier to mass production and cost reduction. To address these issues, IEA HIA Task 23 Operating Agent Dr. Ingrid Schjølberg led a multi-year effort involving a global network of reformer manufacturers and gas companies, as well as research institutes. Altogether, a total of 15 experts from 10 countries participated in the task and contributed to the final report. By providing a forum for open discussion, Task 23 effectively promoted the novel collaboration and knowledge-sharing necessary for market harmonization. Efforts were divided among three subtasks:

1. Harmonized Industrialization
2. Sustainability and Renewable Sources
3. Market Studies

Key findings and outcomes include:

- Progress toward development of uniform standards intended to facilitate codification and safety certification that enhances prospects for mass-production and resulting cost reductions.
- A state of the art review of commercially available small-scale hydrogen production technologies – including a cost curve that illustrates reformer cost relative to capacity – focused on reforming hydrocarbon feedstock to hydrogen.
- A comprehensive discussion of material challenges and possible technological alternatives for hydrogen reformation such as catalytic heat-exchange, membrane, sorbent-enhanced, and plasma reforming.
- A thorough review of renewable sources of hydrogen production featuring a well–to–tank analysis of various carbon footprint reduction opportunities from sources like biogas and renewable electricity.
- Examination of how on-site generation of hydrogen can ease integration of carbon capture technologies that reduce the carbon footprint of hydrogen from fossil fuel reformation, a priority for market penetration.
- Market Studies on production capacities, existing infrastructure, and cost estimates as well as national and sub-state level policies for U.S., Norway, Italy, France, Germany, Turkey, Japan, Sweden, and the Netherlands.

A new task, **Task 33**, will succeed Task 23 and **feature an exclusive network of suppliers and end users of electrolysers, as well as reformers**. Building on the experience and results of its predecessor, Task 33 is expected to foster the cooperation crucial for infrastructure deployment with on-site generation.

The Task 23 Final Report was approved for release at the 68th Executive Committee meeting in Paris, France March 13–14, 2013. It is availasle for viewing at www.ieahia.org/new.htm. Citing the report, Jan K. Jensen, IEA HIA Chairman and Executive Vice-President of the Danish Gas Center, emphasizes that "… **Hydrogen production by on-site reforming** is an **important and competitive stepping stone in** the **development** of a hydrogen **re-refuelling infrastructure** for the transport sector."

THE HYDROGEN FUEL CELL MARKET SPACE

From April 2009 - March 2013 **Japan's Ene-Farm**, the subsidized Combined Heat and Power **(CHP) project**, installed **49,813 commercial systems**. The Ene-Farm project is a topic of study as a replicable model in Task 29 – Distributed and Community Hydrogen (DISCO H_2). • In April 2013, **Hyundai delivered 15 hydrogen fueled cars to** the City of **Copenhagen**. It appears that Hyundai might be the first car to be introduced on a commercial basis in Norway beginning in 2014. Given its attractive incentives for hydrogen fuel cells, Norway could be an interesting early market for introduction of hydrogen fuel cell vehicles, as it is has already been for electric vehicles. Also **in Norway**, **NEL Hydrogen** has recently **introduced** a **new electrolyzer**, which can operate over a large range of production capacity down to 10%. The new electrolyzer also has a much shorter response time to changes in production levels, so is more suitable for intermittent electricity sources such as wind and photovoltaics. • The Clean Energy Patent Index (http://cepgi.typepad.com/heslin_rothenberg_farley_/2013/03/clean-energy-patent-growth-index-2011-year-in-review.html) reports that **950 U.S. fuel cell patents were issued in 2011**, nearly double the ~540 figure for solar, the runner-up category. The **California Energy Commission (CEC)**'s updated **2013-2014 investment plan** includes **$20 million** to fund construction of **17 hydrogen fueling stations** in **California**. • The French Industrial Gas Company **Air Liquide invested €5 million ($6.5 million USD)** in **Plug Power**, the US fuel cell developer. Navigant Research reports a **62% increase in North American systems shipped** in the **last year** and a **48% increase in global MWs shipped**.

H I A

IEA HIA Members & Sponsors

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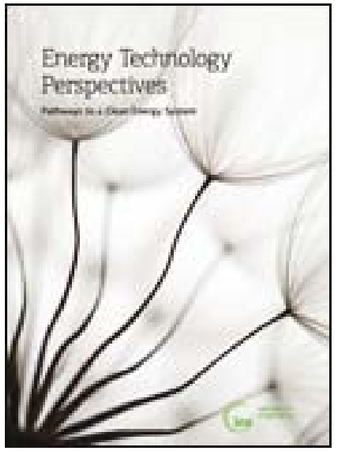
Switzerland
Turkey
United Kingdom
United States
United Nations Industrial Development Organization (UNIDO)

TECHNOLOGY SPOTLIGHT



The International Energy Agency's (IEA) flagship publication, ***Energy Technology Perspectives 2012 (ETP 2012) – Pathways to a Clean Energy System, for the first time dedicates a chapter to a far-reaching examination of hydrogen (H_2)*** use in the future global energy mix, ***concluding that hydrogen could play an important role in a low-carbon energy system***. The transportation sector is pivotal to realizing this outcome: deployment of hydrogen powered Fuel Cell Electric Vehicles (FCEVs) at the ETP 2012 2°C Scenario analysis levels could ***reduce CO_2 emissions significantly, helping to limit average global temperature increase to 2°C, the agreed UN target***. An increasing role for hydrogen could help avoid over-reliance on other uncertain low-carbon energy sources, particularly bio-energy. Policy-wise, ***ETP 2012 makes the case for sharp increases in funding of R,D,D&D*** (Research, Development, Demonstration and Deployment) ***for hydrogen and FCEVs***. *ETP 2012* argues that if the cost of a full hydrogen/FCEV system could be cut by a few percent through stronger R,D,D&D programs, this ***investment would yield high returns in a sustainable energy future, paying for itself many times over***. Without hydrogen, concludes *ETP 2012*, it may not be possible to eliminate fossil fuel in transport and industry in the longer term, post 2050. "***The inclusion of a hydrogen chapter in ETP 2012 is a real milestone***," says IEA HIA Chairman Jan K. Jensen, "and there is more analysis to come on the role of hydrogen in a sustainable, low-carbon energy system."

Key findings of the *ETP 2012* Hydrogen chapter include:

- In the transport sector, FCEVs deployed at levels consistent with either the ETP 2012 2°C "2DS hydrogen" or "2DS high-hydrogen" Scenarios would reduce energy-related CO_2 emissions in 2050 by more than half compared with 2009, ensuring an 80% chance of limiting average global temperature increase to 2°C.
- *ETP 2012* affirms that hydrogen is one of only a few near-zero emission energy carriers, emphasizing that hydrogen's added-value lies in its potential for flexibility to serve a full array of end-use applications, including buildings and industry. This assessment references conventional heating and power applications, where low-carbon hydrogen from renewable sources of energy or fossil fuels in combination with carbon capture and sequestration (CCS) can now be mixed with natural gas. It also cites industrial processes, such as steel production, which could be decarbonized through H_2 based steel-making in the post 2050 timeframe.
- *ETP 2012* reports on the global status of the hydrogen infrastructure and FCEV stock, spotlighting the number of vehicles (cars and buses) on the road now, as well as the number of hydrogen fueling stations operating in today's leading countries.
- While *ETP 2012* estimates the investment needed for a 2050 hydrogen transmission and delivery infrastructure as between USD 0.8 and 2.1 trillion, this amount is less than 1% of the *ETP 2012* estimated USD 250 trillion that will be spent by 2050 for on-road vehicles and fuels.
- Large-scale hydrogen energy storage could help to enable high levels of variable renewable energy deployment, an *ETP 2012* finding of seminal importance. The addition of a hydrogen storage system to a wind park, a critical added-value, could reduce levelized costs of electricity generation at reduced curtailment greater than 5%.

ETP 2012 acknowledges that there's more work to do on hydrogen and the IEA HIA agrees. ***Citing*** the significance of ***H_2 Mobility's planned 2015 commercialization launch***, *ETP 2012* stresses that ***continued coordinated action is needed to develop hydrogen infrastructure***. *ETP 2012* also encourages more early-stage hydrogen deployment projects to enhance real-world experience that will facilitate a major hydrogen system roll-out. Moreover, ***large scale hydrogen storage in the gas grid (P2G) warrants serious investigation***, since hydrogen can be converted from and back to electricity. *ETP 2012* recommends in-depth regional level analysis of the interaction between large-scale variable energy integration, energy storage and the use of hydrogen as both a fuel and feedstock.

IEA HIA STRATAEGIC PLAN 2009 - 2015

Tech Talk

While the IEA writes and publishes the ETP, its ETP development process allows for expert input from the IEA Technology Network. This approach enabled the IEA HIA contribution to the Hydrogen Chapter. More precisely, the IEA HIA contribution came from ExCo Members and our tasks, especially Task 30 – Analysis of Global Hydrogen Resources, and Task 28 – Large Scale Hydrogen Infrastructure and Mass Storage.

The IEA analysts faced the challenge of integrating and balancing the research, findings and conclusions on this important new ETP topic. We thank them for including hydrogen as an integral part of the ETP system analysis. In particular, we would like to acknowledge Dr. Lew Fulton and Dr. Markus Wråke: their support was key to launching the first-ever ETP chapter on hydrogen.

Due to the intense nature of this IEA HIA activity and the rigorous response from our tasks, a further word of thanks and clarification is in order here.

First – Task 30. So important is cooperation between the IEA and the IEA HIA Task 30 analysts, that Task 30 has a subtask devoted to liaison with IEA analysts. This subtask, Subtask C, is headed by Ms. Kari Espegren. It was she who synthesized comments and reactions from Subtask A – Global Hydrogen Resource Assessment led by Co-Operating Agent Dr. Susan Schoenung and Subtask B – Updated and Harmonized Data Sets led by Co-Operating Agent Mr. Jochen Linssen.

Then for Task 28 – Infrastructure, Operating Agent Dr. Marcel Weeda performed the comment synthesis function. As a group, Task 28 experts are party to the extraordinary exercise of visioning and framing a hydrogen infrastructure. Their efforts reflect state of the art efforts around the world on the part of industry and government to harmonize technology, business and policy.

In the future, the ETP will be an annual publication whoses analyses track progress against a set of core scenarios and also examine a set of specific technology issues that drive change. The IEA HIA looks to future editions of the ETP (and the World Energy Outlook [WEO]!) that feature the important role of hydrogen in the global energy mix.

TASK INK

IEA HIA Portfolio

PAST

Task 1 1977-1988
Thermochemical Production

Task 2 1977-1979
High Temperature Reactors

Task 3 1977-1980
Assessment of Potential Future Markets

Task 4 1979-1988
Electrolytic Production

Task 5 1979-1983
Solid Oxide Water Electrolysis

Task 6 1979-1988
Photocatalytic Water Electrolysis

Task 7 1983-1992
Storage, Conversion, and Safety

Hydrogen Production & Integrated Hydrogen Systems

THEME: COLLABORATIVE R,D &D

Current Acts

Task 21 Biohydrogen
Operating Agent: Dr. Michael Seibert, immediate past OA
Dr. Jun Miyake, former and current acting OA

- The Fall 2012 meeting was held December 3-5 in Bethesda. Task 21 experts then went to Capitol Hill to brief U.S. Senate Energy and Natural Resources Committee staffers about biohydrogen.
- When funding issues resulted in the departure of Operating Agent (OA) Dr. Michael Seibert, former OA Dr. Jun Miyake stepped forward to fill the gap. Task 21 is expected to present a proposal for a successor task at the December 2013 ExCo Meeting.

TASK 21 VISITS CAPITOL HILL IN WASHINGTON, DC TO BRIEF STAFFERS ON THE SENATE ENERGY AND NATURAL RESOURCES COMMITTEE

Closing Acts

Task 23 Small-Scale Reformers for On-site Supply of Hydrogen (SSR for Hydrogen)
Operating Agent, Dr. Ingrid Schølberg

- See **Publication Alert** for news about the **Task 23's Final Report**.

Task 26 Advanced Materials for Waterphotolysis
Operating Agent, Dr. Eric Miller

- Task 26 has been completed and the final report will be fully presented in the upcoming months.
- For its successor, Task 26 will propose a new, broader task: "Renewable Hydrogen Production," that includes complementary photolytic (electrochemical and biological) production systems.

Task 27 Near-Term Market Routes to Hydroden by Co-Utilization of Biomass as a Renewable Energy Source with Fossil Fuels
Operating Agent, Dr. Jan Erik Hansenn

- ELCOGAS produced the IEA HIA Project Prize winner, Pilot Plant for CO_2 Capture & H_2 Production
- Final report pending

Opening Act

Task 33 Local Hydrogen Supply for Energy Applications
Operating Agent, Dr. Øystein Ulleberg

This task succeeds Task 23 – SSR for Hydrogen. It will evaluate and harmonize on-site production technologies – including electrolyzers – for cost reduction, improved efficiencies and mass production Strong interface with other IEA HIA analytic efforts is expected.

Hydrogen Storage

Closing Act

Task 22 Fundamental and Applied Hydrogen Storage Materials Development
Operating Agent, Dr. Bjorn Hauback

- The final Task 22 meeting was held October 26-27 in Japan. The Final Report is in preparation and will be presented for ExCo approval at the 69th IEA HIA ExCo Meeting in December 2013.
- Recognized as the "gold standard" for global research in hydrogen storage, the ~50 Task 22 projects produced >2500 publications and presentations as well as >50 patent applications

Opening Act

Hydrogen Storage

Task 32 Hydrogen-based Energy Storage
Operating Agent, Dr. Michael Hirscher

- This task succeeds Task 22 – Hydrogen Storage. The kickoff meeting was held end of April in Crete, Greece. Task 32 will have strong representation from experts who participated in Task 22.
- Task 32 will have a broader focus than its predecessor with increased emphasis on applied research and other energy storage technology applications.

Hydrogen Integration in the Existing Infrastructure

Current Acts

Task 28 Large-Scale Hydrogen Delivery Infrastructure
Operating Agent, Dr. Marcel Weeda

- A fourth subtask entitled "Supporting large-scale deployment of variable renewable energy sources" was presented by OA Marcel Weeda on behalf of the IEA HIA at the 2012 Energy Storage Conference, making the case for large scale storage of H_2 for variable renewable energies and the greening of natural gas
- The other three tasks are: Subtask A Scenarios; Subtask B Assessment of HRS concepts; Subtask C – Analysis of Hydrogen Delivery Pathways
- Work on the Final Report is well underway. Emphasis has been placed on development of messages.

Task 8 1986-1990
Technical and Economic Assessment of Hydrogen

Task 9 1988-1993
Hydrogen Production

Task 10 1995-1998
Photoproduction of Hydrogen

Task 11 1995-1998
Integrated Systems

Task 12 1995-2000
Metal Hydrides for Hydrogen Storage

Task 13 1999-2001
Design and Optimization

Task 14 1999-2004
Photoelectrolytic Production

Task 15 1999-2004
Photobiological Production

Task 16 2002-2005
Hydrogen from Carbon Containing Materials

Task 17 2001-2006
Solids and Liquid State Storage

Task 18 2004-2009
Integrated Systems Evaluation

Task 19 2004-2010
Hydrogen Safety

Task 20 2004-2007
Hydrogen from Waterphotolysis

Task 21 2005-2010
Biohydrogen

Task 22 2007-2012
Fundamental and Applied H_2 Storage Materials Development

Task 23 2007-2011
Small-Scale Reformers for On-site Hydrogen Supply (SSR for H_2)

Task 24 2007-2010
Wind Energy and Hydrogen Integration

Task 25 2007-2011
High Temperature Production of Hydrogen

Task 29 Distributed and Community Hydrogen (DISCO-H2)
Operating Agent: Dr. Federico Villatico, Immediate Past OA
Dr. Hiroshi Ito, Acting OA

- Completed identification and selection of projects in urban, rural/island and industrial categories. Finalizing in-depth SWOT analysis of projects that will serve as a reference for development of DISCO-H2 models, one model per category.
- Experts from Task 29 provided input to the IEA-RETD publication on "Renewable Energies for remote areas and islands."
- Task 29 presented a poster at the 2012 Fuel Cell Seminar and Exposition held November 5-8 in Connecticut, USA.

Analysis

Operating Agents: Dr. Susan Schoenung; Mr. Jochen Linssen

Task 30 Global Hydrogen Systems Analysis

- Subtask A: "An international model for resource analysis" is now fully functional, providing a dynamic modeling tool for "what if" sensitivity analyses of global hydrogen resource flows; the final report for this subtask is expected by year-end 2013.
- Subtask B: the Database structure is complete for 27 technologies. The draft handbook structure is complete.
- Subtask C: held a successful March workshop with IEA Analysts and ExCo in Paris.
- Created a new Subtask D: "Hydrogen storage enabling renewable energies."

Hydrogen Understanding, Awareness and Acceptance

Task 31 Hydrogen Safety
Operating Agent: Mr. William Hoagland

- Hydrogen Safety Stakeholders Workshop (October 2-3) was a success, and End of Term Workshop for Task 19 (that also highlighted current Task 31) brought together approximately 50 leaders in the hydrogen safety arena.
- It is anticipated that a second Hydrogen Safety Stakeholders Workshop will be held in Europe, likely in Berlin, to mark the completion of Task 31.
- Planning for the Task 31 successor is now underway.

OA BILL HOAGLAND ORIENTS "END OF TASK" H2 SAFETY WORKSHOP IN OCTOBER 2012 ON THE CAMPUS OF THE IEA HIA OFFICE IN BETHESDA, MD USA

DIPLOTECH

Internal cooperation with the IEA has been very fruitful. The 2012 ETP Hydrogen Chapter and upcoming IEA Roadmap were already discussed but another cooperative effort deserves recognition as well. As briefly reported in Task Ink, **Task 30 experts hosted a full day March 13 workshop with IEA analyst colleagues** to update them on Task 30 progress and exchange views on relevant subjects. Despite an unexpected snowstorm that brought transportation in Paris to a standstill and closed down the EuroStar in London and Brussels, several ExCo members were nonetheless able to make it to Paris in time for the workshop. This very enthusiastic session achieved its vital purpose of bringing together IEA HIA hydrogen energy experts with their IEA counterparts. The workshop was a credit to Task 30 and its OAs, Dr. Susan Schoenung and Mr. Jochen Linssen, and a special success for Subtask C Leader Ms. Kari Espegren. The purpose of Task 30 Subtask C is to liaise with IEA analysts.

The IEA HIA is much obliged to **Dr. John Topper**, Managing Director of the IEA Clean Coal Centre and Greenhouse Gas Implementing Agreement, for his **special** (webinar-based) **presentation** at the **June 2012 ExCo Meeting in Toronto**. In this informative presentation, Dr. Topper shared the considerable experience of Clean Coal and Greenhouse Gas IAs with the participation of Sponsor members. As the HIA has just embarked on a course of action to include Sponsor Members, we are grateful for his generous, wise, and timely counsel.

Chairman Jan Jensen attended the May ExCo Meeting of the Alternate Motor Fuels IA as a guest speaker and observer. He reports that the AMF IA is flourishing. **Secretariat Manager** Mary-Rose de Valladares **attended the June Wasserstoff und Brennstoffellentechnologien – Tragende Säulen der Energiewende** June 17-18 in Berlin. She also attended part of the **U.S. Department of Energy's Annual Merit Review for Hydrogen and Fuel Cells** (and other Vehicle Technologies) the week of May 13-17.

In March 2012, a new Energy Agreement was reached **in Denmark**. The Agreement contains a wide range of ambitious initiatives, bringing Denmark a solid step closer to the target of 100% renewable energy in the energy and transport sectors by 2050. In the first phase **(by 2020), use of natural gas and fuel oil in household heating systems is set to be phased out**. New regulations will prohibit use of heating systems based on natural gas or fuel oil in new buildings. By year-end-2012, wind power comprised 30% of Denmark's electricity supply. Meanwhile, state funding for Danish energy research and demonstration programs on fuel cells and hydrogen has increased from about 100 million Danish kroner per year to more than 150 million Danish kroner annually.

Tekes is **supporting a new type of Finnish research funding** dubbed "**strategic research opening**." This new funding mechanism addresses the new knowledge and competencies that will be needed by business in the future. Funded projects include a study on the production of hydrogen using solar power in a modern integrated biorefinery. Since 2012, the Tekes Fuel Cell Programme has funded several hydrogen based projects including: a Roadmap to hydrogen society; the Safety of fuel cell applications and hydrogen infrastructure (related to the major demonstration project Demo2013); and the Safe processing of hydrogen origining from new open cycle (related to the Outotoec Open cycle process reported under HIA Task 25.

CURRENT

Task 21 2010-2013
Biohydrogen

Task 26 2008-2011
WaterPhotolysis

Task 27 2008-2011
Near-Term Market Routes to Hydroden by Co-Utilization of Biomass as a Renewable Energy Source with Fossil Fuels

Task 28 2010-2013
Large Scale Hydrogen Delivery Infrastructure

Task 29 2010-2013
Distributed and Community Hydrogen

Task 30 2010-2013
Global Hydrogen Systems Analysis

Task 31 2010-2013
Hydrogen Safety

Task 32 Hydrogen-based Energy Storage

Task 33 Local Hydrogen Supply for Energy Applications

AFHyPAC, the French Association created in June 2011 from the merger of AFH2 and the French platform HYPAC (l'Hydrogène et les Piles à Combustibles), **hosted the April 2013 meeting of Task 28** – Insfrastructure at its Paris office. "**H2 mobility France**" or **MobHyF** is **working on a National implementation plan for hydrogen mobility** that highlights the specific important role of fleets in kick-starting the market. MobHyF, a consortium of some 20 companies, is taking part in the European program HIT: Hydrogen Infrastructure for Transport.

There are 6 H_2 filling stations in Norway, 2 connected with EU projects, and 3 operated by the company HYOP, that took over from Statoil. **A new Directive from EU, the Directive for Clean Transport in Europe, is indicating the number of Hydrogen filling stations in different countries** necessary to establish a minimum infrastructure for early use of Hydrogen in transport sector. For Norway, the target number of filling stations is 20.

In Europe, H2 Mobility is expanding its reach. **Inspired by the example of H2 Mobility Germany, H2 Mobility UK formally charted its course**. **A recent feasibility analysis serves** as the background and rationale for **creation of H2 Mobility Switzerland**.

Spain is making plans to celebrate the 10th anniversary of the Fundacion para el Desarollo de Nuevas Tecnologias del Hidrogeno en Aragon sometime in the first half of 2014.

In the **United Kingdom**, Scotland is **moving forward on its ambitious plan** of **meeting the equivalent of 100% of Scotland's electricity demand from renewables by 2025**.

In the **U.S., the launch of H2USA, a public-private partnership, was officially announced** at the **2013 Department of Energy (DOE) Annual Merit Review (AMR)**. H2USA will pursue the deployment of hydrogen infrastructure in the U.S.

TASK 19/31 HYDROGEN SAFETY END OF TASK STAKEHOLDER WORKSHOP OCTOBER 2 & 3, 2012
CAMPUS OF IEA HIA OFFICE BETHESDA, MD USA

MESSAGE FROM THE CHAIR

JAN K. JENSEN,
IEA HIA CHAIRMAN

The r**elease late last year of the ETP 2012** and its first-ever chapter on hydrogen was the **culmination of a multi-year effort on the part of the IEA HIA to encourage the IEA** to include **hydrogen** as part of its ETP system analysis. The development of the hydrogen chapter was a test of both the Implementing Agreement's ability to react to the ETP's strict publication schedule and the IEA's capacity to integrate our input. Our hope and expectation is that future editions will build on this foundation to deepen and expand hydrogen coverage.

The IEA's announcement of the imminent development of a **Hydrogen Roadmap (H2RM)** was long anticipated and very welcome. The H2RM will complete the IEA's Technology Roadmap series. IEA Roadmaps are a **crucial industry and public policy tool** that broadly signals technology value. The **IEA HIA** is committed to **participating** – start to finish–**in the three geographic workshops** planned by our IEA colleagues for the development of the hydrogen roadmap. In addition, at the behest of the **IEA**, the IEA HIA has **actively cultivated targeted industry participation in the roadmap development process**. The first workshop took place in early July in Paris. It finalized the overall roadmap scope and also focused on the European situation. The hydrogen roadmap will also address the critical issue of storage: its findings and recommendations will serve as a reference for the IEA Storage Roadmap, which will not address hydrogen.

Internally, the IEA HIA's **decision to invite Sponsor Members** to join the Agreement is yet another milestone. Our affirmation of a "**participation principle**" that levies essentially equal Common Fund dues on all Sponsor Members irrespective of category (i.e., public/private partnership, industry, association, consortia) reflects the **value the ExCo places on having Sponsors present and active "at the table as ExCo participants**." And, of course, **we are delighted to welcome the International Association of Hydrogen Safety (HySafe)**. HySafe's accession to the IEA HIA is **a boon to our hydrogen safety activities and a global step forward for hydrogen safety.**

Our two 2012 End of Task Workshops are an important component of IEA HIA Information Dissemination and Outreach strategies, allowing us to share the results of our work and communicate the advances in hydrogen.

With the approval of successor tasks for Task 22 - Storage, and Task 23 – SSR for Hydrogen, (which became Task 32 – Hydrogen-based energy storage, and Task 33 – Local Hydrogen Supply), our portfolio continues to evolve.

Dr. Ingrid Schjølberg, former Operating Agent (OA) for Task 23, has been named Project Director at the Norwegian University of Science and Technology (NTNU) Centre for Autonomous Marine Operations and Systems. Sintef's loss is NTNU's gain. Sincere congratulations are in order! The IEA HIA looks forward to working with Dr. Schjølberg again soon in her new maritime capacity.

IEAHIA NEWS

MR. NICK BECK
EXCO CHAIR CANADA 2005–2008

DR. NICKOS LYMBEROPOLOUS
EXCO VICE CHAIR, UNIDO 2009–2012

DR. MICHAEL SEIBERT,
OA TASK 21 BIOHYDROGEN

DR. FEDERICO VILLATICO–
CAMPBELL, OA TASK 29 - DISCO H2

At this time I would like to acknowledge and thank some of the outgoing representatives on the Executive Committee. There are some new faces on the Executive Committee as well. Mr. Tadashi Ito of Japan is returning to his home company Chiyoda Corporation from his assignment at NEDO. In his place we welcome Mr. Hiroyuki Kanesaka and Mr. Kenji Horiuchi as the Japanese Representatives. For Korea, Dr. Shul Yong Gun from Yonsei University replaces Dr. Yongsuk Tak from Inha University. Dr. Elli Varkarai, ExCo Member from Greece, has been recruited to work at Belenos Clean Power Holding Ltd. in Switzerland. Dr. Nikos Lymberopoulos, ExCo Member from UNIDO, has transitioned to the FCH JU in Brussels. The IEA HIA is fortunate indeed to have and to have had such high caliber representation.

I must also comment on other year-end 2012 changes. We are sad to announce that both Dr. Michael Seibert, Operating Agent for Task 21 – BioHydrogen and Emeritus – the U.S. National Renewable Energy and Laboratory (NREL); and Dr. Federico Villatico: Operating Agent for Task 29 – Distributed and Community Hydrogen (DISCO–H2) have transitioned out of their task leadership roles dues to funding related issues. Their departures represent a genuine loss to their respective tasks as well as the Agreement, but we are grateful for their service and continued friendship.

In closing, the IEA HIA extends its sincere thanks to all outgoing ExCo Representatives and Operating Agents, our old friends. We welcome and look forward to working with all incoming Representatives and OAs, our new friends.

Sincerely,

Jan K. Jensen

Jan K. Jensen, Chairman

DR. YONGSUK TAK,
EXCO MEMBER, KOREA 2008–2012

MR. TADASHI ITO,
EXCO MEMBER, JAPAN 2011–2013

DR. ELLI VARKARAI,
EXCO MEMBER, GREECE 2009–2013

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