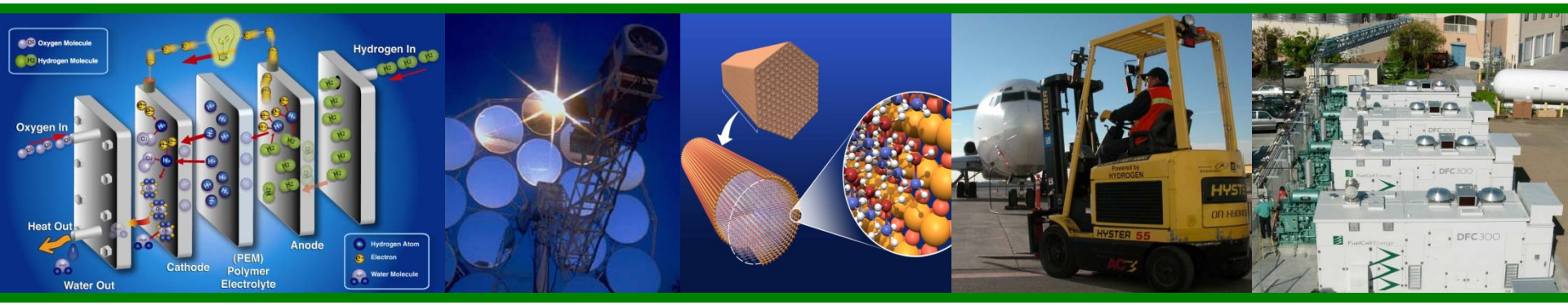
International Partnership for Hydrogen and Fuel Cells in the Economy




# Regulations, Codes and Standards Working Group Update Report

**Sunita Satyapal (Jay Keller alternate)***

**Marc Steen (Pietro Moretto alternate) ****

**Co-Chairs**

***US, **EC**

***May 27 - 28, 2015***

**Wuhan, China**

# Overview

- Membership
- Meetings
- Background
- Update on
  - Component Material Compatibility Learning (RR)
  - Fuel Quality on Performance
  - Metrology
- Relevance of RCSWG activities to international regulatory and standardization activities
- Activities Relevant to IPHE Global Dimension
- Reply to SC action items

| Country | Point of Contact | Alternate |
|---|---|---|
| **Brazil** | **Sergio Oliveira** | **Newton Pimenta** |
| **China** | **Jinyang Zheng** | |
| **European Commission** | **Marc Steen** | **Pietro Moretto** |
| **France** | **Pierre Serre-Combe** | **Laurent Antonii** |
| **Germany** | **Thorsten Herbert** | |
| Italy | Romano Borchiellini | Massimo Santarelli |
| **Japan** | **Kazuo Koseki** | **Akiteru Maruta** |
| New Zealand | Alister Gardiner | |
| Norway | Gerd Petra Haugom | |
| Russian Federation | Sergey V.Korobtsev | |
| **South Africa** | **Brian North** | |
| United Kingdom | Stuart Hawksworth | |
| **United States** | **Sunita Satyapal** | **Jay Keller** |

**Countries noted in dark blue are the most active**

- **No contacts yet from Australia, Iceland and South Korea**
- **Canada and India have been dropped from our list due to inactivity**

# RCSWG meetings

- **Brussels, Belgium September 12, 2013**
- **Fukuoka, Japan November 18, 2013**
- **Washington DC, USA June 17, 2014**
- **Karlsruhe, Germany April 27, 2015**
- **Next Meeting Scheduled:  Yokohama, Japan Oct 2015**

# Background

## Challenge and Approach

Harmonized regulations, codes and standards (RCS) are essential to establishing a market-receptive environment for commercialization of Hydrogen and Fuel Cell Technologies. In May 2010 (Essen, Germany), IPHE SC endorsed the importance of the RCS Working Group (WG) in taking a leading role in harmonizing RCS. RCSWG is a standing working group for IPHE




## Background

# Benefit

The RCSWG's role is to create and conduct a forum where potentially contentious and controversial issues of RCS are handled. The RCSWG can recommend a consensus solution and promote resolution of contentious issues within the technical realm of RCS. The RCSWG also conducts pre-normative work to globally harmonize the execution of testing relevant to RCS.



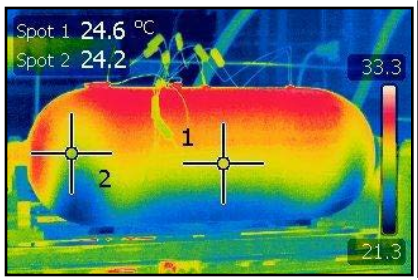

# RCSWG Tasks Status Update

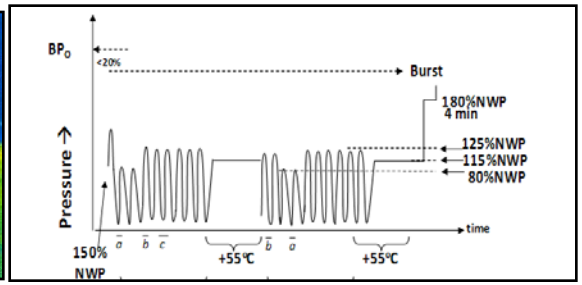
## 1. Type IV Tank Testing Round Robin

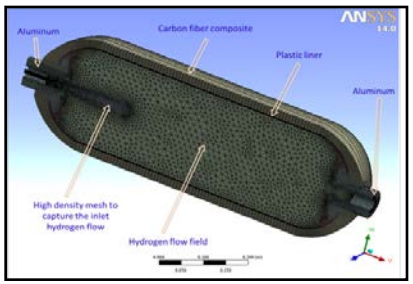
- **September 2011:** Launched a multi-phase Round Robin (RR) testing program for composite pressure vessels *(Japan, UK, **Brazil**, **EC**, **France**, Canada, **China, U.S.**)* *(Noted in Bold are the enduring active contributors.)*
- **Round Robin for Hydraulic Testing – Completed** ✓
- **Final Report submitted to IPHE at the SC 2014/5/20 Oslo meeting**
- **Report in submitted to ICHS2015**

## 2. Pneumatic Fast Fill Physics – JRC – Completed ✓

## 3. SoA Meter Performance (Metrology) – JRC On going



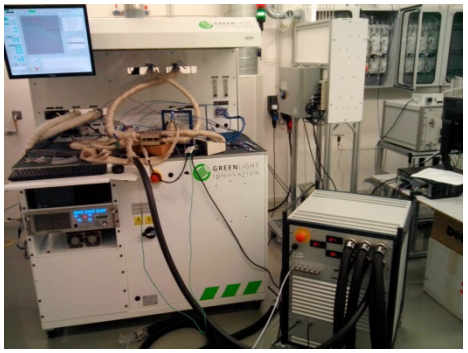




# RR on Fuel Quality Effects Performance – JRC Lead

- **Overall Objectives are to:**
  - Support an International effort in providing validated test results for fuel quality
  - Ensure at an International level a “Common Approach” in performing fuel quality studies

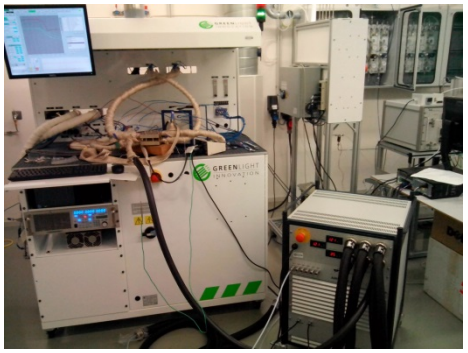


# RR on Fuel Quality Effects Performance – JRC Lead

- **Targets**
  - Identification of tolerance levels for $H_2$ contaminants accepted at an international level
  - Provide feedback to standardization bodies with a validated analytical control chain procedure
  - Lower the hydrogen analytical costs



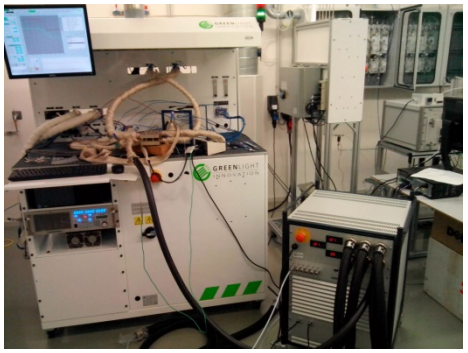



# RR on Fuel Quality Effects Performance – JRC Lead

- **Targets**
  - Lower the hydrogen analytical costs
    - Identification of the most relevant contaminants to be used as canary alarms for quality assurance
    - Develop / identify the cheapest analytical method in the field

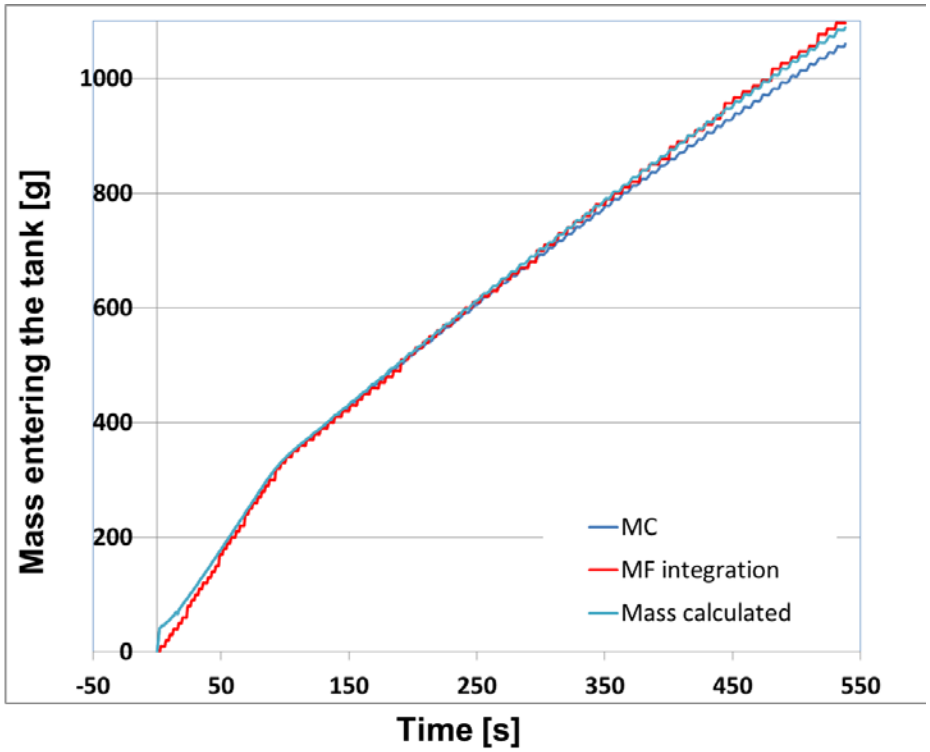
**Note: ISO / TC 197 is restarting WG 12 on Fuel Quality which will include assurance – Making this work very timely.**



# Update on Metering – JRC

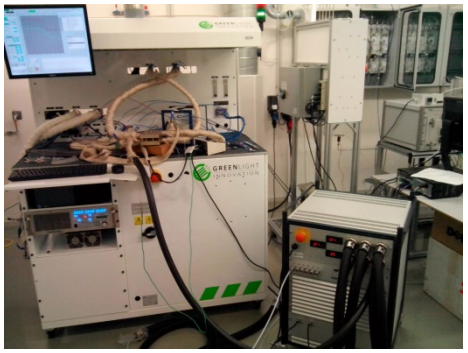
- **Main Message**
  - At least one commercially available mass flow rate meeting claims an accuracy of 2%
  - Max difference between PT calculation and integrated MF is 4% (Promising)



# Component Material Compatibility Learning RR Approved SC and RCSWG

- **There is a disparate need to understand and refine material testing in high pressure hydrogen environments**
  - Current testing is not repeatable even within the same laboratory. A learning RR is being pursued to address this issue.

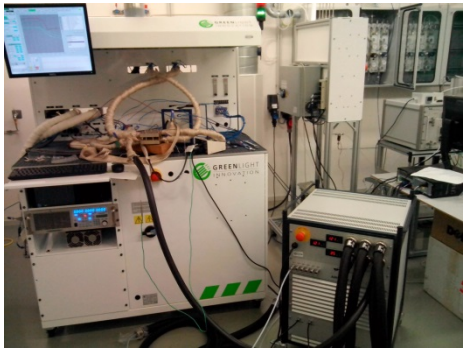


# Component Material Compatibility Learning RR Approved SC and RCSWG

- **Draft work plan has been circulated to the WG**
  - Seeking feed back
  - Participation – commitment (pending funding)
    - Germany (MPA), U.S. (Sandia), China (Zhejiang University), France (CEA)
  - Participation - expression of interest
    - Japan (Kyushu University), Korea, UK (HSL), HFC



# Component Material Compatibility Learning RR Approved SC and RCSWG

- **Draft work plan has been circulated to the WG**
  - Participation – Observers, technical contributors
    - South Africa (HySA)
  - Activity structure is still being discussed
    - Round Robin or
    - Multilateral collaboration




# International Activities Relevant to IPHE Global Dimension

- **IA-HySafe, IEA Activities (Canada, Denmark, EU, France, Germany, Italy, Ireland, Japan, Norway, Russia, Spain, U.K., U.S.)**
  - Hydrogen Safety Priorities Workshop: Washington (Nov. 10-11, 2014) – topical lecture planned for ICHS2015
  - IEA Hydrogen Safety Kick off meeting (Task 37): Karlsruhe (April 20-22)
  - ICHS2015 Organization Meeting (OC), Karlsruhe (April 23, 2015) IA-HySafe wants to get more involved with IPHE RCSWG
    - Held Joint IEA Task 37 (Safety), RCSWG – (many of the same people were also at the ICHS2015 OC meeting)
    - Dr. Jay Keller will be the liaison between IA-HySafe & RCSWG

# Relevance to International Standardization and Regulatory Initiatives

***Involvement by RCSWG co-chairs:***

- **ISO TC 197 Hydrogen Technologies –**
  - Technical Program Director for the Built Environment and Safety.
    - Provides direct feed-in of RCSWG experiences and PNR results into ISO and visa versa.
      - For example: Fuel Quality for station qualification, Filling Protocol (SAEJ2601), QRA …
  - Other topics currently addressed by TC 197
    - Risk mitigation, Station acceptance, hoses, valves, dispensers …

# Relevance to International Standardization and Regulatory Initiatives

***Involvement by RCSWG co-chairs contd.:***

- **Liaison-A of Commission (through JRC) with ISO TC 197 and with IEC TC 105 facilitates**
  - Consideration of (EU, but also IPHE) policy-priorities in international performance-based standardization of FCH technologies, products and processes
  - Ex-ante harmonization at global level of standards to be developed
  - Due consideration of safety issues in standards (as per Regulation EU No 1025/2012)

# Relevance to International Standardization and Regulatory Initiatives

- **ISO TC197**
  - **Active Working Group Meetings to be held during the week of June 15, Paris (AFNOR): Fueling Stations**
    - WG12 H2 Quality & Quality Control (NWIP)
      - EIGA WG11 Quality Control
      - Analytical Methods (TC 158)
    - WG19 Dispensers
    - WG20 Valves
    - WG24 Fueling Risk Assessment Mtg
    - WG24 Plenary Meeting.
  - **TC197 Plenary Meeting: Washington DC, Nov. 30 thru Dec. 4, 2015**

# Response to SC Action Items

| SC Action Item | RCSWG position | WG action and update | IPHE dimension |
|---|---|---|---|
| IPHE / RCSWG / IA-HySafe Webinar(s) on Safety Data base for ICHS2015 & Public Acceptance | • Improve Communication and outreach. | Yes<br>**Planning in progress** | • Policy: Yes<br>• Member countries coverage: Yes |
| RCSWG presence on IPHE Web site, safety database portal. | • Impact on commercialization<br>• Improve communication and out reach | Yes<br>**May 2015 – working issues on safety database portal** | • Policy: Yes<br>• Member countries coverage: Yes |

# Response to SC Action Items

| SC Action Item | RCSWG position | WG action and update | IPHE dimension |
|---|---|---|---|
| Fuel quality: Effects on the Stack | • Impact on commercialization<br>• Resolve scientific & technical issues | Yes<br>**RR Active** | • Policy: Yes<br>• Member countries coverage: Yes |
| Fuelling station: Metrology (metering) | • Impact on commercialization<br>• Resolve scientific & technical issues | Yes – **In progress, JRC data shows current meter accuracy is inadequate - some claim to have achieved required accuracy** | • Policy: Yes<br>• Member country different |

**Thank you for the official IPHE endorsement of ICHS-6, 2015**

***In view of renewed interest in Hydrogen and Fuel Cell technology deployment and infrastructure build up in IPHE member countries:***

- **the RCSWG re-iterates its recommendation to the SC to secure the political and/or financial support in the member countries to ensure success of this IPHE sanctioned working group.**

# Thanks to the SC and all IPHE member countries