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SFEM WG Hydrogen

Presentation HIPS-NET

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SFEM WG Hydrogen

In consideration of the strong interest and real needs from industry that were expressed at the JRC-EARTO-CEN/CENELEC workshop on Putting Science into Standards « Power to Gas and HCNG », Sector Forum Energy Management (SFEM) has launched last February 9th, its WG on Hydrogen following communication to CEN and CENELEC BTs:

- to provide CEN/BT and CENELEC/BT with concrete proposals on the way forward to address standardization needs in this emerging field.
- to provide EC & concerned stakeholders with R&D & Innovation needs in this field

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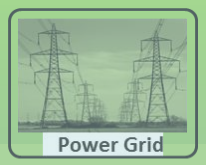
ELECTRICAL GRID



T1

Ancillary Services

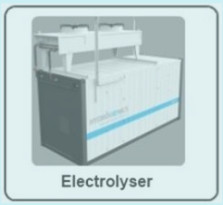
RENEWABLE ELECTRICITY

METHANATION *out of scope*

+ CO2

S-CH4

POWER TO H2



T2

H2

HYDROGEN DISTRIBUTION & USE

T4

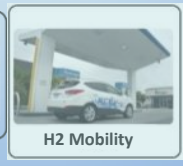
Admixture H2 in NG 0 ≤ H2 ≤ 20%

GAS DISTRIBUTION & USE

T3

H2 Trailers &packages

H2 storage



OTHER H2 SOURCES

COAL GASIFICATION

NG SMR

H2

out of scope

H2 FROM BIOSOURCE

T5

SFEM WG Hydrogen
Scope of Work

- Mapping existing standardization initiatives (TCs, JWGs, SFs,…)
- Mapping standardization needs
- Prepare a strategy roadmap with list of priorities
- Liaise with ISO (TC 197) and IEA (Hydrogen related I.A.)
- Liaise with FCH-JU
- Liaise with relevant ISO, CEN and IEC TCs
- Strengthen cooperation between regulatory work, standardization work and RDI programs
- Mapping RDI needs

→ Recommendation for NWI and/or extension of work within existing TCs, JWGs, SFs, …

→ Recommendation for RDI priorities (support, funding, …)

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SFEM WG Hydrogen
Mapping and Identification of Gaps

- Identification of all standards relevant to H2, H2NG and P2G
- Analysis of standards
- Establish liaison
- Identification of gaps and challenges per Task force
- Description of challenges
- Prioritization of challenges
- Focus on standardization needs, but future research needs should also be identified
- Mapping and Identification of Gaps
- Consensus on main gaps and challenges for research and standardization among WG members

→ As basis for recommendation to CEN/CENELEC (and funding bodies)

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SFEM WG Hydrogen
Main milestones

- Kick of 9th of February
- TFs launched by end of February
- First feeding of mapping tables by end of March
- SFEM WG Hydrogen plenary on April 13, 2015
  → presentation of the first mapping draft by each TF and discussion
- SFEM WG Hydrogen plenary on June 8 and 9, 2015, including ½ a day for TFs' face to face meetings
  → preparation of the structure of the final report
- Draft report from June to August 2015
- SFEM WG Hydrogen plenary on September 21, 2015
  → presentation of the draft final report for discussion and recommendations
- Final report by beginning of November
  → validation by WG Hydrogen members
- Circulation among SFEM – SFEM Plenary on November 17, 2015
  → validation/amendment and recommendations
- Final report transmitted to CEN and CENELEC BTs with recommendations.

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SFEM WG Hydrogen

Kick off meeting February 9th, 2015 (1)

- About 60 experts who expressed their interest to follow or actively participate (20150609)
- About 40 participants :
  - ✓ Industry,
  - ✓ CEN/CENELEC,
  - ✓ European Commission : Joint Research Centre (JRC), DG Energy (ENER), DG Research & Innovation (RTD), DG Internal Market, DG Industry, Entrepreneurship and SMEs (GROW),
  - ✓ Fuel Cells and Hydrogen Joint Undertaking (FCH-JU),
  - ✓ Research institutes
  - ✓ Consumers reps
- Management
  - ✓ Convenors : Bernard GINDROZ, SFEM & Eveline WEIDER, JRC
  - ✓ Secretariat : Françoise DE JONG, NEN

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Kick off meeting February 9th, 2015 (2)
Organization of WG Hydrogen

TF 1 Electricity grid connection
TSO
DSO

TF 2 Electrolysers

TF 3 H2NG
Gas infrastructure and applications and H2NG storage
TSO, DSO, Storage and End-users

TF 4 Hydrogen infrastructure and applications and hydrogen storage

High level coordination
- Energy management, link between the systems

TF 5 Cross cutting
- Terminology
- Regulation/Legislation/ Certification
- Safety/Security
- Metering/Testing/Monitoring
- Interfaces to the grid (connectivity)
- R&D needs; gap analysis
- International dimension
- Identification of involved stakeholder communities

Serve community
- Identify stakeholders and if possible involve them

Each TF to map existing initiatives and on-going work, as well as needs in:
- Standardization
- RDI

SFEM WG Hydrogen

2nd plenary April 13th, 2015 (1)

Main recommendations (1)

- Scope
  - New overview scope will be prepared (better visualization)
  - Power to Power (P2P) in the scope
- Specific recommendations with regard to the TFs
  - Complete the overview (mapping research and standardization)
  - Scope of the TFs
  - Coordination between the TFs
- Establish links to the relevant IEA Tasks
- SFEM Working Group Hydrogen meeting attendees agree on liaisons with ISO/TC 197, FCH-JU, IEA, CEN/TC 238 (EN 437), CEN/TC 234, CEN/TC 268 WG5, SFG-I and –U and other identified relevant TCs.
- Need for a common paper with definitions and terminology related to the scope of our work.

SFEM WG Hydrogen

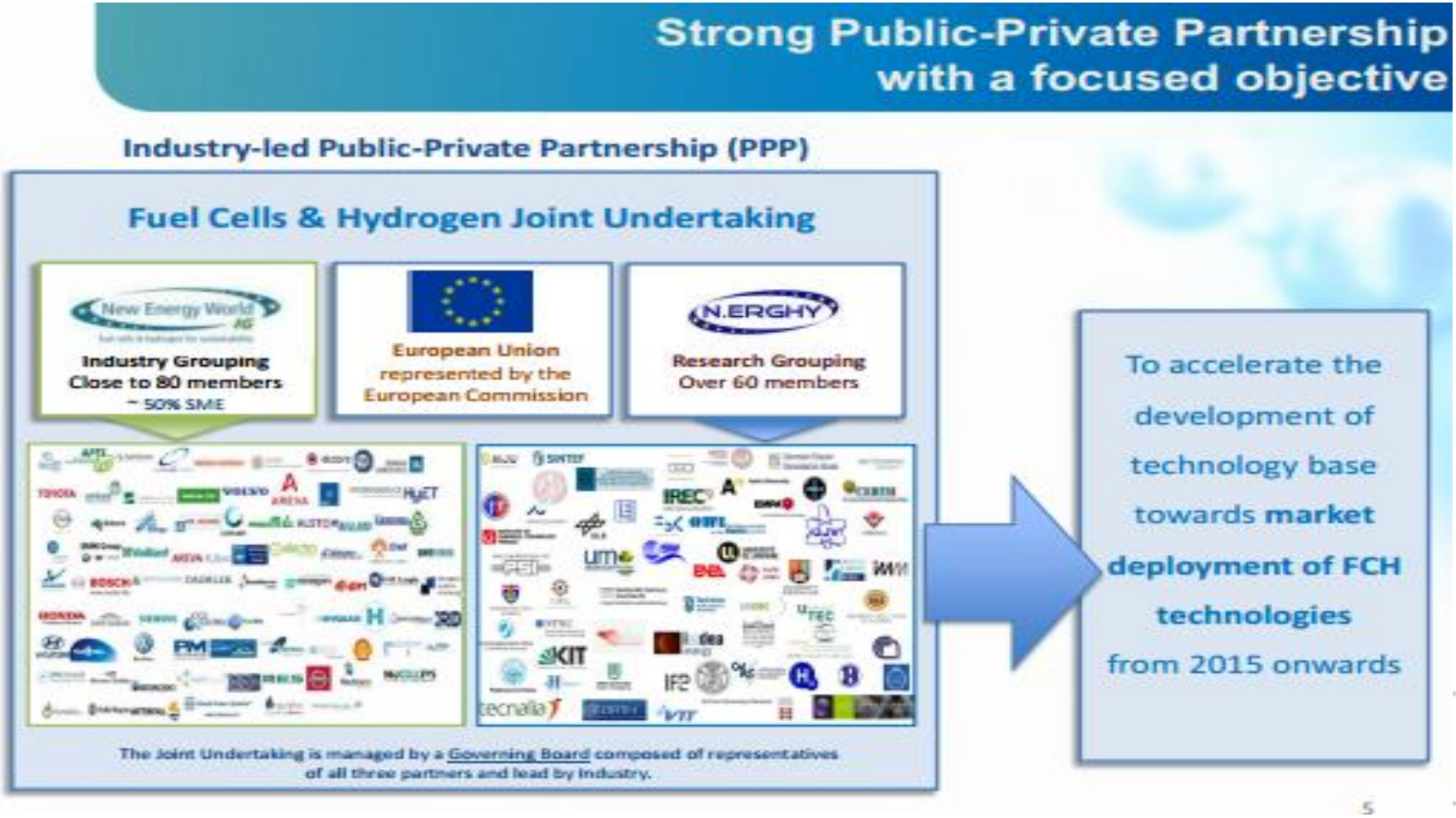
2nd plenary April 13th, 2015 (2)

Main recommendations (2)

- Establish a WG with regard to the terminology of HCNG
- Further research is needed on basic properties of methane – hydrogen mixtures with the agreed on upper limit of 20% concentration of hydrogen.
- Look into the use, within the scope of our work, of unused oil and gas pipelines for transport of hydrogen (pure and mixtures).
- Link with the newly created project group, with regard to the Mandate Alternative Fuel Infrastructure, within CEN/CENELEC will be established
- Support the new to be established FCH-JU RCS strategy coordination group. The vision from this group is to identify and coordinate standardization needed for market introduction of FCH technologies.

SFEM WG Hydrogen
2nd plenary April 13th, 2015 (3)

Source Presentation FCH-JU (1)



SFEM WG Hydrogen
2nd plenary April 13th, 2015 (4)

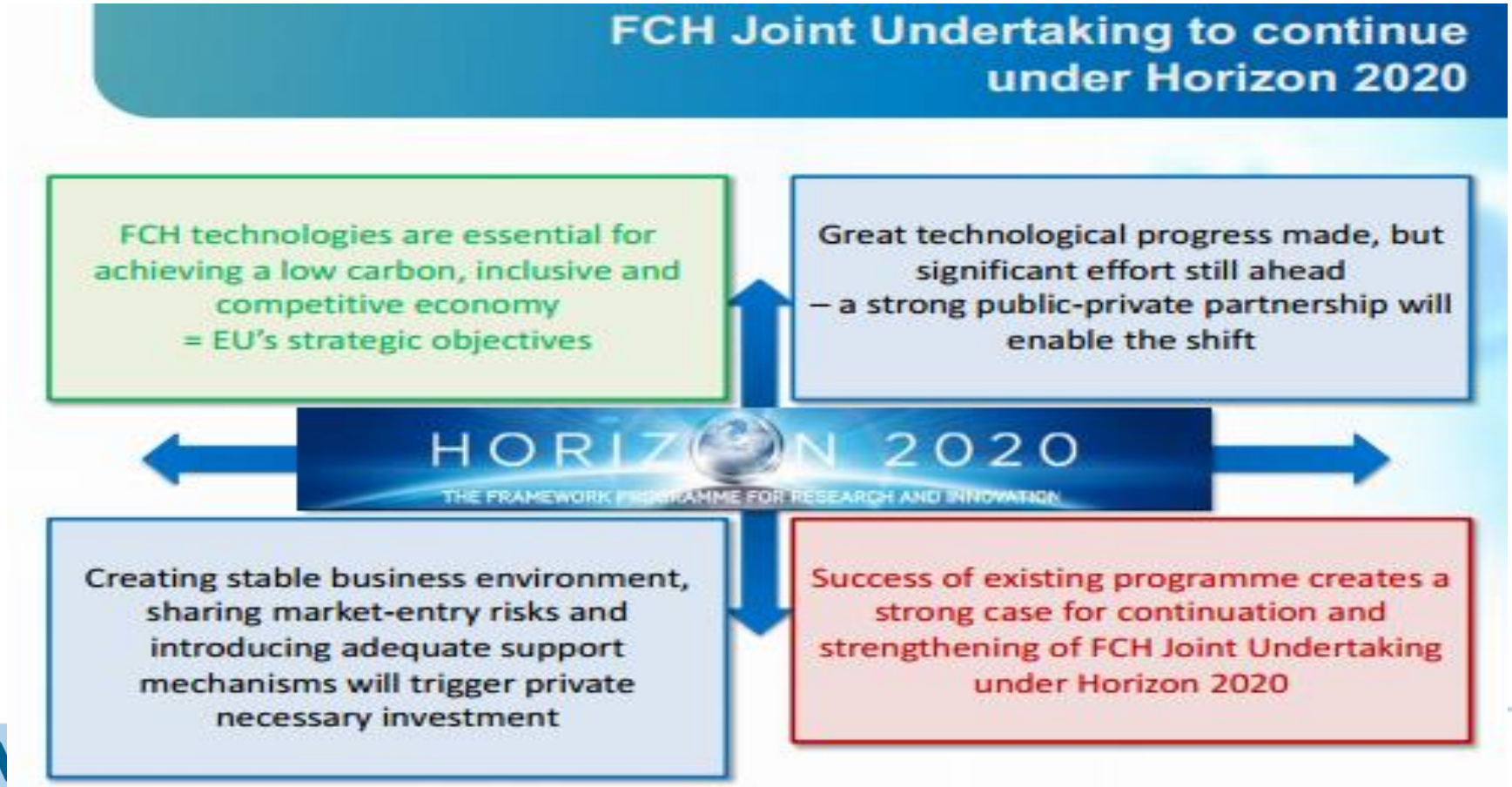
Source Presentation FCH-JU (2)

FCH JU Objectives

- Aim at **placing Europe at the forefront** of the fuel cells and hydrogen technologies worldwide and **enabling the market breakthrough** of the FCH technologies, thereby allowing commercial market forces to drive the substantial potential public benefits.
- **Support RTD** in the MS and AC associated with FP7 in a **coordinated manner** in order to avoid market failure, focus on developing market applications and facilitate additional industrial efforts towards a rapid development of FCH Technologies.
- Support the **implementation of the RTD priorities of the Multi-Annual Implementation Plan** of the FCH JU, notably by awarding grants following competitive calls for proposals.
- Aim to encourage increased public and private RTD investment in FCH technologies in the MS and AC
- Ensure the **coordination and efficient management of funds**

SFEM WG Hydrogen
2nd plenary April 13th, 2015 (5)

Source Presentation FCH-JU (3)



SFEM WG Hydrogen
2nd plenary April 13th, 2015 (6)

Source Presentation FCH-JU (4)

Continuation of EU support under Horizon 2020 programme (MAWP --2014-2020)

HORIZON 2020

Transport

- Road vehicles
- Non-road vehicles and machinery
- Refuelling infrastructure
- Maritime, rail and aviation applications

Energy

- Hydrogen production and distribution
- Hydrogen storage for renewable energy integration
- Fuel cells for power and combined heat & power generation

Cross-cutting Issues
(e.g. standards, consumer awareness, manufacturing methods, ...)

General Objective

- The overall objective of the FCH 2 JU is to **implement an optimal research and innovation programme at EU level** to develop a portfolio of clean and efficient solutions that exploit the properties of hydrogen as an energy carrier and fuel cells as energy converters **to the point of market readiness by 2020**

"More emphasis on close to market activities"

9

SFEM WG Hydrogen
2nd plenary April 13th, 2015 (7)

Source Presentation FCH-JU (5)

FCH 2 JU Specific objectives (MAWP --2014-2020)

The general objective of the FCH 2 Joint Undertaking is to develop a strong, sustainable and globally competitive fuel cells and hydrogen sector in the Union, in particular to:

- reduce the production cost of fuel cell systems to be used in transport applications, while increasing their lifetime to levels competitive with conventional technologies
- increase the electrical efficiency and the durability of the different fuel cells used for power production, while reducing costs, to levels competitive with conventional technologies
- increase the energy efficiency of production of hydrogen from water electrolysis while reducing capital costs, so that the combination of the hydrogen and the fuel cell system is competitive with the alternatives available in the marketplace
- demonstrate on a large scale the feasibility of using hydrogen as a competitive energy storage medium for electricity produced from renewable energy sources

SFEM WG Hydrogen
2nd plenary April 13th, 2015 (8)

Source Presentation FCH-JU (6)

FCH JU strategy (long-term vision/ objectives)
(MAWP -- 2014-2020)

Cross-cutting research activities

- Social acceptance and public awareness
- Education and training
- Safety-related issues
- Pre-normative research (PNR)

...

- Building databases for environmental, economical, socio-economic subjects
- Identification and development of financial mechanisms to support market introduction
- Support portable applications & other niche market fuel cell solutions
- Socio-economic research to determine environmental and societal impact
- Recycling of FCH technologies

...

SFEM WG Hydrogen
2nd plenary April 13th, 2015 (9)

Source Presentation FCH-JU (7) tentative approach

The RCS strategy coordination

From the Multiannual Work Plan

- **The gap:** "...but there is no platform to define and express the needs and strategy of the whole European FCH sector."
- **The answer:** "The FCH 2 JU will tackle RCS issues through the **Cross-cutting activities.**
- **An industry led RCS Group**, composed of NEW-IG and N.ERGHY representatives will be created. ...the RCS Group **will define a strategy in consultation with all European stakeholders** and will take the necessary actions to implement it ...
- **RCS Group** has not been established yet, but it is **foreseen shortly.**

SFEM WG Hydrogen
2nd plenary April 13th, 2015 (10)

Source Presentation FCH-JU (8) tentative approach

The RCS strategy coordination

From the Multiannual Work Plan

In general, the RCS Group will coordinate the following FCH 2 JU activities on RCS and PNR:

- •**Follow RCS developments**, and update and prioritize RCS needs of the sector through a continuous global watch function;
- •**Tailor PNR** activities in the FCH 2 JU programme to ensure that safety issues and needs for standardization and regulation are appropriately addressed and validated.
- •**Collect and evaluate RCS-relevant information from demonstration projects; monitor PNR activities.**
- •Maintain, consolidate and **disseminate results of RCS and PNR activities**

SFEM WG Hydrogen

3th plenary June 9th, 2015 (1)

The RSC Strategy Coordination group of the FCH 2 JU has been established, the kick-off meeting was held on 27.05

Normally topics for the FCH2-JU annual work program are proposed by the industry or research grouping. For the call of next year the input from the SFEM WG Hydrogen to the annual work program is established via membership of expert(s) from the WG and the RCS Strategy Coordination group.

SFEM WG Hydrogen
3th plenary June 9th, 2015 (2)

Overview of table (mapping)

- To be ready by 15.07
- Annex to the report
- Entries should be reviewed for completeness
- High priority not only for immediately needed actions, but also highlight important challenges medium and long term
- Review of the entries for the other TFs and feedback to the conveners
- If possible provide clear link to challenges

SFEM WG Hydrogen
3th plenary June 9th, 2015 (2)

Table TF3 (180 lines)

- Hydrogen storage
- Gas quality
- Gas grid infrastructure

  (Grid integrity, Effect of fluctuating gas composition, Effect on gas turbines and compressors, Injection in the grid (pre-mixing), Flow behaviour in the grid, Impact on equipment, connections, seals etc)
- Gas analysis methods and instruments

  (Sensors for concentration monitoring and process control, Gas analysis methods/ gas quality measurements/certification for H2NG)
- H2NG safety

  (Ignition temperature & energy, explosion safety, gas detection, PIMS, Odorization)
- HCNG End-users

  (CNG cars (steel tanks (2%), adaptation of combustion system, filling stations – metering), Residential appliances (Appliance category, certification,), Industrial burners (fluctuation, emissions, performance, gas measurement), ….
- Other topics

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SFEM WG Hydrogen
3th plenary June 9th, 2015 (3)

Drafting of report - Report Structure

- Introduction
- Scope of work
- Executive Summary
  - Standardisation needs
  - Research challenges
  - Cross-cutting topics
- Summary of relevant past and on-going activities
- Research and standardisation needs

SFEM WG Hydrogen
3th plenary June 9th, 2015 (4)

Drafting of report - Report Structure

- Summary and conclusions
- Recommendations
- Roadmap
- Complementary actions and outlook
- Terminology/ Glossary
  - Definition of HCNG/H2NG
  - Definition of Regulation, Codes and Standards
  - Electrolyser terminology and system boundaries
- List of Working Group Members
- Annex 1: Table of prioritised list of research and standardisation challenges
- Annex 2: List of references

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SFEM WG Hydrogen
3th plenary June 9th, 2015 (5)

Main recommendations (1)

- Drafting of vizualization of the Scope still in progress
- Agreed on proposal for timeframe for the prioritizing exercise (with adjustments), mapping of standards, organization draft report, draft report with expected inputs and next steps (basic timeline)

  The timeframe is a challenge but members will put in the effort to realize it.

  - Of importance for drafting the reports is a good overview of the priorities, urgency, deadlines, argument provided (written out) and the link with research.
  - If appropriate, link challenges with mapping of research and standardisation
  - Provide input, based on the priorities, for recommendations in the final report
  - It was proposed to prepare a terms and definitions standardization document. First input for this document will be in the report
  - If priority issues are already agreed upon to send these to the coordination team for the draft reporting ahead of the full list

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3th plenary June 9th, 2015 (6)

Main recommendations (2)

- TF5:
  - H2NG and hydrogen system safety; materials was mentioned as one of the topics to be dealt with.
  - Research and Knowledge -> cross cutting challenges
  - Technical -> monitoring, testing, metrology
  - Legislative -> certification and regulation
  - Societal: public acceptance, awareness, education, training
  - ➢ It was agreed to have input from the other TFs to set the priorities with focus on standardization efforts.
  - ➢ The item mentioned as being least related to standardization was public acceptance.
  - ➢ It was emphasised that also standards are relevant for training and education. This relates to qualification and competence of personnel.
  - ➢ The certification of the guarantee of origin for hydrogen is of high importance.
  - ➢ It was also proposed to look into reliable sources of data for addressing life cycle analysis and well-to-wheel studies.

Main recommendations (3)

Next steps:

- Technical Committee
- Hydrogen platform evaluate the need to create a platform to continue the exchange of topics still to be dealt with and identified by this WG. It is important to have the full picture and to exchange information with experts. This WG could be transferred to this platform or the WG could remain with the objective to (continue) to act as platform.

SFEM WG Hydrogen

3th plenary June 9th, 2015 (8)

Arguments for creating a Technical Committee (TC):

- TC covering the wide range of topics that have been identified.
- The WG already identified critical issues to be addressed by standardization.
- The scope of the WG and outcomes already at this moment justifies a TC.
- The new TC could be a mirror committee of ISO/TC 197. The scope should be considered with regard to ISO/TC 197 activities but from a European point of view.
- There is a need that standards reflect the interest of European industry.
- In CEN/TC 268 there are already topics being dealt with that are not exactly related to their scope.
- This TC should have the liaison with international TCs and have a close look what is possible for adaption of standards on a European level.
- To address the fact that standards already published may have conflicts with the terminology used in the market, regulations etc.
- Ensuring continuity from the WG work and propositions, considering the incompressible time for creating a TC, especially a joint CEN/CENELEC TC.
- The attendees are in favour to establish the TC based on the content of the (draft) report. However, it was noted that with drafting the scope for the new to be created TC the scopes of other TCs should be taken into account.
- The recommendation to create a TC will be made to SFEM in due time.

NEN proposed, based on the above, to submit to CEN/CENELEC BTs the form for the new to be created Technical Committee.

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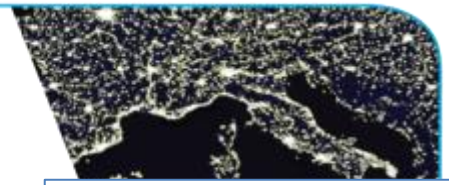
3th plenary June 9th, 2015 (9)



Publication of draft report for comments

January	February	March	April	May	June	July	August	September	October
	Mapping and identification of challenges								
	Kick-off meeting		Plenary meeting		Plenary meeting			Final meeting	

Drafting of report

Finalization of report

Preliminary list of topics

Draft structure of report

- Prioritized list of open issues
- Report structure

Draft report

Final report

SFEM WG Hydrogen

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