UN ECE - INFORMAL GRPE WORKING GROUP HYDROGEN FUEL CELL VEHICLES - GRPE-H2FCV
SUB-WORKING GROUP ENVIRONMENT (SGE)

Note addressing aspects to be considered by the Subgroup Environment and giving the structure of the technical reports in support of the harmonisation process.

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TABLE OF CONTENT

List of tables

Introduction

The UN ECE informal GRPE working group on hydrogen/fuel-fuel cell vehicles (GRPE-H2FCV) has been operative for several years now. In June 2005, WP.29/AC.3 agreed on a proposal by Germany, Japan and United States of America regarding how to **manage the development** process for a Global Technical Regulation (**GTR**) on hydrogen-powered vehicles. However because of different circumstances it was not until April 2007 that the group received a clear mandate and a roadmap in order to achieve its goal of establishing a GTR for this class of vehicles (ECE/TRANS/WP.29/AC.3/17). The following **premises** have to be kept in mind when defining the GTR:

1. The aim is to attain equivalent levels of safety as those for conventional gasoline powered vehicles;
2. The GTR shall be performance based and
3. The GTR shall not be restrictive for future technologies.

Given that hydrogen powered vehicle technology is still emerging, WP.29/AC.3 agreed that input from researchers is a vital component of this effort. Based on a comparison of existing regulations and standards of HFCV with conventional vehicles, the following has **to be investigated** and considered:

1. The **main differences** in safety and environmental aspects and
2. Which **items** need to be regulated and the **justification** behind it.

Under the agreed process, once AC.3 had developed and approved the action plan for the development of a GTR, two subgroups has been formed to address the safety and the environment aspects of the GTR:

1 The subgroup safety (**HFCV-SGS**) which is chaired by Japan and the USA reports to GRSP.

2. The environmental subgroup (**HFCV-SGE**) which is chaired by the European Commission (JRC) and reports to GRPE.

In order to ensure communication between the subgroups and continuous engagement with WP.29 and AC.3, the designated project manager (Germany) coordinates and manages the various aspects of the work ensuring that the agreed action plan is implemented properly and that milestones and timelines are set and met throughout the development of the GTR.

The GTR will cover fuel cell (FC) and internal combustion engine (ICE), compressed gaseous hydrogen (CGH2) and liquid hydrogen (LH2).

The **final goal** of the environmental informal sub-group (**HFCV-SGE**) is to investigate the possibility of harmonization of environmentally related requirements and to propose actions in those cases where harmonization might not be possible.

Aspects to be addressed by the SGE

The areas to be addressed within the field of competence of the SGE are aspects other than the ones addressed by SGS including energy and environmental considerations. The following is a list of the areas the group should address within its mandate:

1. Pollutant Emissions
2. Hydrogen and Water Emissions
3. Fuel Consumption
4. Recycling
5. FC Disposal / Hazardous Materials

6. Fuel Quality
7. Engine Power

Other aspects may need to be added at a later stage.

One note of cautions needs to be indicated here, APUs (Auxiliary Power Units) are not part of the GTR, as it should only address FC and ICE engines running both with CFH2 and LH2 and it has not been included in AC3's action plan. It is also apparent that Electromagnetic Compatibility is a subject discussed in GRE for conventional vehicles and therefore GRE needs to be addressed to assess possible need for action.

Table 1 summarises the areas that are pertinent to the different vehicles that the GTR should address.

Table 1 Areas that GTR should address for different vehicles and its present status

	FC	Hybrid		ICE	Doc	Action TR= Technical Report
	H_2	FC	ICE-H_2	Mono fuel (H_2) Bi-fuel Blends Dual fuel		
	Environmental & Energetic aspects					
Fuel Consumption	x	x	x	x	H2SGE-04-IP-02.2	Technical report finished
CO_2 emission				Bi-fuel, blends & dual fuel	H2SGE-04-IP-05[1]	Technical report finished
External Electrical consumption		x	x		H2SGE-04-IP-02.2	Technical report finished
Pollutant emissions			x (NO_x)	x	H2SGE-04-IP-04[2]	Technical report finished
H_2 & H_2O emissions	x	x	x	x	H2SGE-04-IP-06[3]	Mr Albus to finalise TR based on former doc
Engine Power (measur. procedures)	x	x	x	x	H2SGE-04-IP-02.2	Technical report finished
Maximum speed (measur. procedures)	x	x	x	x	H2SGE-04-IP-02.2	Technical report finished
Fuel quality (reference)	x	x	x	x	H2SGE-04-IP-03	Chairman to structure the former doc in TR
Recycling	x	x	x	x		Volunteers required. EC activities to be followed.
Disposal (hazardous mat.)	x	x	x	x		Volunteers required. EC activities to be followed.

[1] Former 09-04-06-HFCV-SGE-TR-carbondioxideemissions by Mr. Albus

[2] Former 09-04-06-HFCV-SGE-TR-pollutantemissions by Mr. Albus

[3] Former 09-06-07-HFCV-SGE-TR-H20 by Mr. Albus

Noise	x	x	x	x		Volunteers required. GRB activities to be followed.

Technical Reports

A very practical way of going ahead might be the drafting of a technical report consisting of dedicated chapters for each of the areas of interest to the SGE addressing the following points:

1. Explanation and Specification of the issue
2. Application and Scope
3. Definitions
4. Overview on existing Regulations & Standards,
   Including an explanation of the possible existing links
5. State of research
   Including an overview of the state of art,
   Ongoing/finalised research activities stating references on both cases,
   Finalised and on-going projects,
   Whether further research is needed, then specifying what and why
6. Assessment of Harmonisation - development of a GTR,
   Whether it is needed?
   Specifying the harmonisation
   Whether it is foreseeable and explaining why
7. References

In particular, it is proposed that the common structure of the technical report (TR) will be made up of the **following chapters**:

1. Purpose and Explanation:
   This chapter will introduce the item, including a technical description, with a clear statement about the purpose of a regulation concerning the subject of the report (this chapter needs to bear a resemblance to the chapter "purpose" in each GTR).
2. Application and Scope:
   It will address the type of vehicle to which the report is dedicated: vehicle classes (SR1), propulsion system (FC, Hybrid, ICE) and fuels (mono, bi, flex ...).
3. Definitions (if any)
   It will include only definitions deemed because of either it is needed to understand the TR chapter, or a controversial discussion in meetings show the need for clarification.
4. Overview on existing Regulations / directives / standards:
   The chapter will give a brief but comprehensive overview about existing regulations, directives and standards (RCS?) together with those under development. The details on them need to be referenced in chapter 7 (see below).
5. State and review of research:

Brief and comprehensive overview about finalised and ongoing research pertinent to the chapter summarising their results and conclusions and pointing out any lack of research results needed. (References should be listed in 7)). If further research is needed for the development of a regulation, this chapter should also describe it.

6. Assessment of harmonisation:

   This chapter should include, based on the information provided in chapters 1 to 5, a statement about possible harmonisation of requirements for a specific item under the 1998 agreement. If harmonisation seems not to be possible, other solutions can be suggested (e.g. an amendment of an existing ECE-Regulation).

7. References:

   A list of references made to publications, regulations, standards etc. made in the previous chapters.

Conclusions

This document has intended to put down the basis for the development of technical reports that will serve as the basis to provide an opinion to WP.29/AC.3 on the possibility of harmonising under the 1998 agreement the different regulations, directives and standards concerning environmentally related requirements and to propose actions in those cases where harmonization might not be possible.