



## First findings from the project *Preparation of a Cooperation on Regulations, Codes and Standards (RCS) for Hydrogen Electromobility with China*

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Im Auftrag von:



Koordiniert durch:



# H<sub>2</sub> RCS China – Project goals on the German side



**SGEC**  
中德电动汽车创新支撑中心  
Sino German Electro-Mobility  
Innovation and Support Center

- Creation of a common understanding of standardization and regulation in the field of hydrogen and fuel cells in mobility with all related aspects, in particular vehicle, infrastructure, safety and test procedures.
- Joint identification of synergies and complementarities in the development of standards and regulations with the aim of harmonizing as many aspects of H<sub>2</sub> and FC technology as possible on an international level for the benefit of both countries.
- Gradually creating a basis for the free exchange of products and components between China and Europe. Aim: to strengthen the marketability of zero-emission mobility with H<sub>2</sub> and FC on the global market.

# H<sub>2</sub> RCS China – Project goals on the Chinese side



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- Development of a common understanding of the relevance of international standards (ISO, IEC) and rules (UN GTR, UNECE) as well as national rules and standards.
- Comparison of the differences between the standards system for FCEVs in China and Germany. Determine how the difference can be made up + identify RCS needing further investigation.
- Determination of the need for regulation (standards, regulations) in China, Germany and worldwide.
- Creation of a stable mechanism for the exchange of information and identification of RCS experts.
- Joint approach of international standardization + formulation/ revision of relevant intl. RCS
- Support for the further development of the existing Chinese RCS Roadmap for EVs regarding H<sub>2</sub> & FC

## Examples:

GB 50516-2010 - Technical code for hydrogen refueling station [加氢站技术规范]

T/CATSI 02 007-2020 - Fully wrapped carbon fiber reinforced cylinder with plastic lining for storing compressed hydrogen on board as fuel for land vehicles [industrial group standard]



Source: [www.gbstandards.org](http://www.gbstandards.org) and StateGrid 2018



## General implications observed:

- Due to the rapid developments in China due to central requirements, but also enormous activities at the provincial level (which may issue their own standards), extensive changes are to be expected, which will then be successively reflected in the international channels
- Due to the legal force of GB standards, the effects on imports and exports are considerable
- The penetration of the bodies/ committees in the international standardization landscape with Chinese representatives is increasingly evident

[1,000 college/ university graduates per year are standardization specialists for various fields in China. In Germany there are no corresponding study courses | Source: Wirtschaftswoche, 30 April 2020]



## How can the German contribution to the further development of the Chinese RCS roadmap for EVs look like with regard to FCEVs and HRSs?

1. Fuel cell system for vehicles (validation, certification)
2. Pressure vessel (one pressure vessel / harmonized requirements) [for vehicle application, for application in hydrogen filling station (HSR), for product transport]
3. Hydrogen filling station with "HRS / vehicle" interface for 35, 50, 70 MPa CGH<sub>2</sub> as well as for CcH<sub>2</sub> and LH<sub>2</sub> [temperatures, pressures, flow rates, processes, communication, standardization, certification, approval / acceptance]
4. Fuel cell vehicle (FCEV) [incl. all necessary components and lessons learned]

**Pages 60-61 (FCEV safety)**

**Pages 74-75 (on-board CGH<sub>2</sub> storage)**

**Pages 80-81 (FC system)**

**Pages 95-96 (filling nozzle / tank)**

**Pages 104-105 (HRS)**





## Question:

- Various requirements laid down in Chinese standards for test and verification procedures for fuel cell stacks and systems cannot be implemented in practice
- The lack of GB standards for the approval of Type IV tanks was identified as a barrier to the introduction of fuel cell cars
- China will for the first time develop its own refueling nozzles with 35 MPa, especially for HDVs

## Solution approach:

- Fuel cell manufacturer brought together with CATARC in a web meeting to discuss and clarify which standards have to be met in order to be able to allow vehicles with this fuel cell on board (content reported to NOW)
- Since October 2020, in China there has been an industry standard T/CATSI 02007-2020, which is to be converted into a GB standard in the next few years. China is active in UN GTR13 Phase II. We should work together to harmonize the requirements, especially since China wants to incorporate the GTR into a GB standard for FCEV approval.
- The development of procedures / requirements for a 35/50/70 MPa refueling protocol is presently under way for HDVs in the PRHYDE project [[www.prhyde.eu](http://www.prhyde.eu)] - China is involved in terms of information (harmonize together!)



## Question :

- Differences in the operating license and the acceptance of HRSs in the various provinces. Type III and Type IV tanks should be able to be filled at all HRS
- An overview of the Chinese GB and GB/T standards and other local requirements is missing – this is e.g. not affordable for SMEs. The Federal National as well as the Bavarian H<sub>2</sub> strategy describe an H<sub>2</sub> center that could do that.
- Influence on the development of standards in China is considered important to ensure that intl. standards and regulations are considered there

## Solution approach :

- Proposal for a cooperation project in Wuhan to popularize the CEP acceptance process as well as discussion of an approach for a harmonized HDV refueling protocol for 35/70 MPa also to support the Type IV GB standard to be prepared
- An H<sub>2</sub> RCS platform should also provide a current overview of RCS in China - NOW is seen in this role
- Thanks to professional input from native-speaking employees of Western companies in Chinese standardization bodies, this has been achieved with the industry standard for Type IV tanks and with the revision of GB 50516-2010 for HRSs. Access can also be gained by participating in sponsorship (CATARC Blue Book).



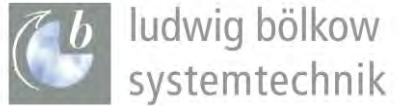
## Other Chinese bilateral RCS cooperations (e.g. Japan, France, EU)



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- China's research on safety technology for the use of hydrogen and thoughts about of standards system [China- Japan]  
Japan is the world leader in developing and promoting FCEV technology. It has carried out systematic research in safety technology, established a fully equipped research and testing organization for hydrogen energy safety in vehicles, and established a comprehensive system of pressurized hydrogen storage cylinders and valves. Experience with safety inspection methods and standard systems for instruments, pipe fittings, etc. has certain reference and reference values.  
[\[https://mp.weixin.qq.com/s?\\_\\_biz=MzAxMTUxNzgyOA==&mid=2247493004&idx=1&sn=e7d4187723aea1b0a587d068b20aea9d&chksm=9bbd4f67accac671bf08968178b0fb26f1e98f203f3935e411288dee6537e3f00b76a9549e14&mpshare=1&&srcid=11228Og8zIEe54TZVvHEmTDa&sharer\\_sharetime=1606042589073&sharer\\_shareid=0610069a15ca132fbbaffe8a4b7feaed&from=groupmessage&scene=1&subscene=10000&clicktime=1606044000&enterid=1606044000#rd\]](https://mp.weixin.qq.com/s?__biz=MzAxMTUxNzgyOA==&mid=2247493004&idx=1&sn=e7d4187723aea1b0a587d068b20aea9d&chksm=9bbd4f67accac671bf08968178b0fb26f1e98f203f3935e411288dee6537e3f00b76a9549e14&mpshare=1&&srcid=11228Og8zIEe54TZVvHEmTDa&sharer_sharetime=1606042589073&sharer_shareid=0610069a15ca132fbbaffe8a4b7feaed&from=groupmessage&scene=1&subscene=10000&clicktime=1606044000&enterid=1606044000#rd)
- Sinopec and Air Liquide Inaugurate Two Hydrogen Multi-Fuel Stations in Shanghai [China-France]  
Unlike previous petrol and hydrogen fueling stations that separate gas and hydrogen, the new project combines them. Sinopec achieved this by recycling the former gas station to create a secondary energy complex. The benefits of this innovative new concept of construction results it better land conservation, reduced waste and lower safety risks.  
[\[https://fuelcellworks.com/news/sinopec-and-air-liquide-inaugurate-two-hydrogen-stations-in-shanghai/\]](https://fuelcellworks.com/news/sinopec-and-air-liquide-inaugurate-two-hydrogen-stations-in-shanghai/)
- EU-China Energy Cooperation Platform (ECECP)  
Official platform with workshops for energy incl. H2 and regulations [<http://www.ececp.eu/en/videos-of-webinar-china-carbon-neutral-by-2060-the-business-opportunities-for-eu-energy-solutions-providers-innovation>]

## H<sub>2</sub> RCS China preparation for a cooperation



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