International Conference on Hydrogen Safety 2023

Status of Activities of ISO/TC197 Hydrogen Technologies

September 21, 2023

Tetsufumi Ikeda

The Association of Hydrogen Supply and Utilization Technology (HySUT)

Chair, ISO TC/197 Hydrogen Technologies

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Contents

1. Introduction About HySUT

HySUT
The Research Association of Hydrogen Supply/Utilization Technology

Established **July 31, 2009**
End of activity March 31, 2016

HySUT
The Association of Hydrogen Supply and Utilization Technology

Established Feb 2, 2016
Start of activity **April 1, 2016**

Chairman: Tomohide Miyata, Director, Senior Vice President, ENEOS Corporation
Location: 5-4-12Akasaka Minato-ku, Tokyo 107-0052
Members: 48 companies and organizations (as of September 2023)

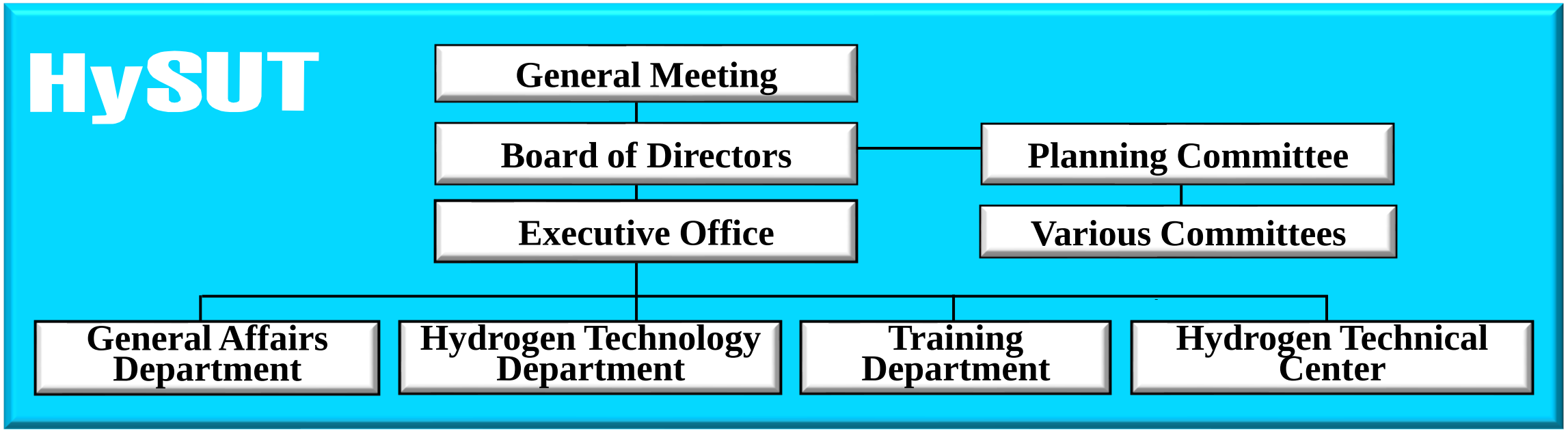
Missions: We aim to ensure the stable supply and safe distribution of hydrogen, improve user satisfaction, and contribute to the development of the hydrogen energy industry by taking a comprehensive approach and engaging in such activities as technological development, surveys and research, education and outreach on the supply and the utilization of hydrogen energy.

Industry organization specializing in hydrogen fueling infrastructure for mobility such as fuel cell vehicles

Activity Fields and Organization Chart of HySUT

1. **Technology Research and Development /** R&D for HRS (Hydrogen Refueling Stations) (NEDO's Program)
2. **International Standard Harmonization /** **Country member body of ISO/TC197 (NEDO's Program)**
3. **Support and Reliability Improvement of HRS /**
   Technical Support for Retail HRS, Safety and Security Activities, Education and training
4. **Industrial Activities /** Guidelines for HRS Technologies, Regulations Review
5. **Public Relations /** Outreach activities including exhibitions and trade shows

NEDO: The New Energy and Industrial Technology Development Organization



2. ISO/TC 197 Hydrogen Technologies

Scope:
Standardization in the field of systems and devices for the production, storage, transport, measurement and use of hydrogen

Secretariat: SCC

Committee Manager: Mr Siasia Morel

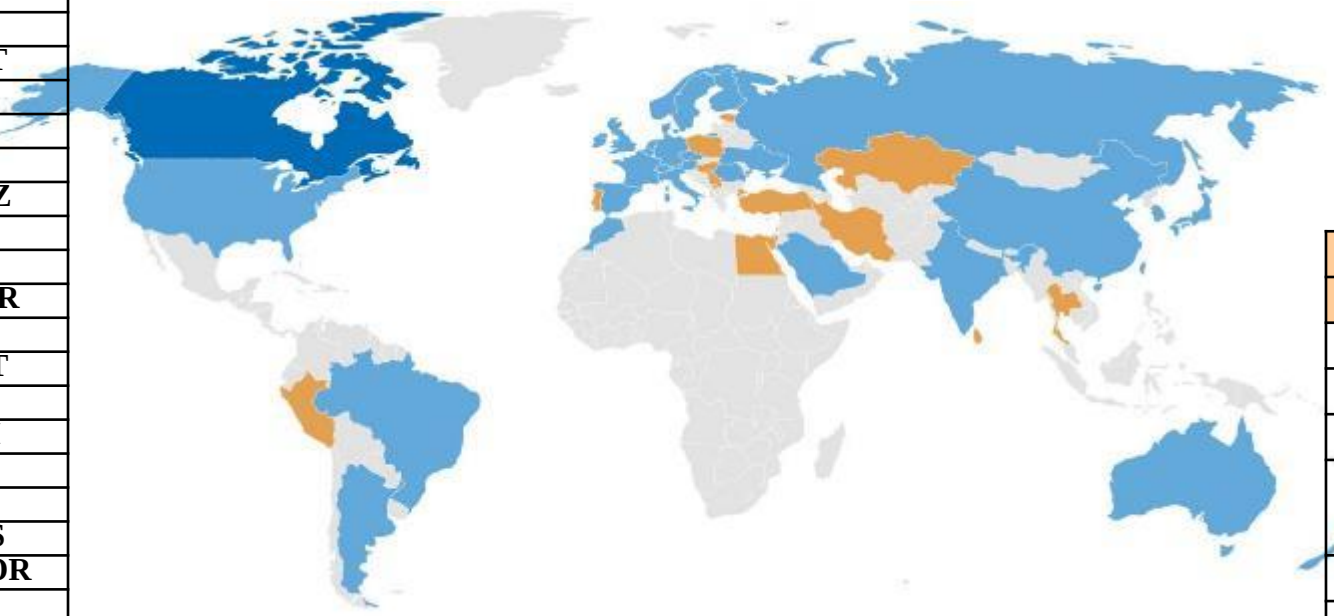
Chairperson (until end 2024): Mr Tetsufumi IKEDA

ISO Technical Programme Manager [TPM]:
Mrs Kirsi Silander-van Hunen

ISO Editorial Manager [EM]: Mr Arun ABY Paraecattil

ISO/TC 197 Hydrogen Technologies

PARTICIPATING MEMBERS (34)	
COUNTRY/TERRITORY	ACRONYM
Argentina	IRAM
Australia	SA
Austria	ASI
Belgium	NBN
Brazil	ABNT
Canada	SCC
Chile	INN
China	SAC
Czech Republic	UNMZ
Denmark	DS
Finland	SFS
France	AFNOR
Germany	DIN
Hungary	MSZT
India	BIS
Ireland	NSAI
Italy	UNI
Japan	JISC
Korea, Republic of	KATS
Morocco	IMANOR
Netherlands	NEN
New Zealand	NZSO
Norway	SN
Romania	ASRO
Russian Federation	GOST R
Saudi Arabia	SASO
South Africa	SABS
Spain	UNE
Sweden	SIS
Switzerland	SNV
Ukraine	DSTU
United Arab Emirates	MoIAT-STR
United Kingdom	BSI
United States	ANSI



- Established in 1990
- 31 Plenary meetings
- Next meeting – Vienna, Nov. 2023

OBSERVING MEMBERS (14)	
COUNTRY/TERRITORY	ACRONYM
Bulgaria	BDS
Egypt	EOS
Estonia	EVS
Hong Kong Special Administrative Region of China	ITCHKSAR
Iran, Islamic Republic of	INSO
Israel	SII
Kazakhstan	KAZMEMST
Peru	INACAL
Poland	PKN
Portugal	IPQ
Serbia	ISS
Sri Lanka	SLSI
Thailand	TISI
Türkiye	TSE

ISO/TC 197 Plenary Meeting

Foshan, Guangdong Province, China / Dec. 4 - 8, 2017

Vancouver, British Columbia, Canada / Dec. 3 - 7, 2018

Grenoble, France / Dec. 9 - 13, 2019

Virtual / Dec. 9, 2020

Seoul, Korea, Hybrid → Virtual / Dec. 6 - 10, 2021

Sydney, Australia / Dec. 5 - 9, 2022

ISO/TC 197 Plenary Week
Sydney, Australia, December 5-9, 2022

Program:

- ✓ **Working group meetings**
- ✓ **Strategic planning meeting**
- ✓ **Plenary meetings (TC197 & SC1)**

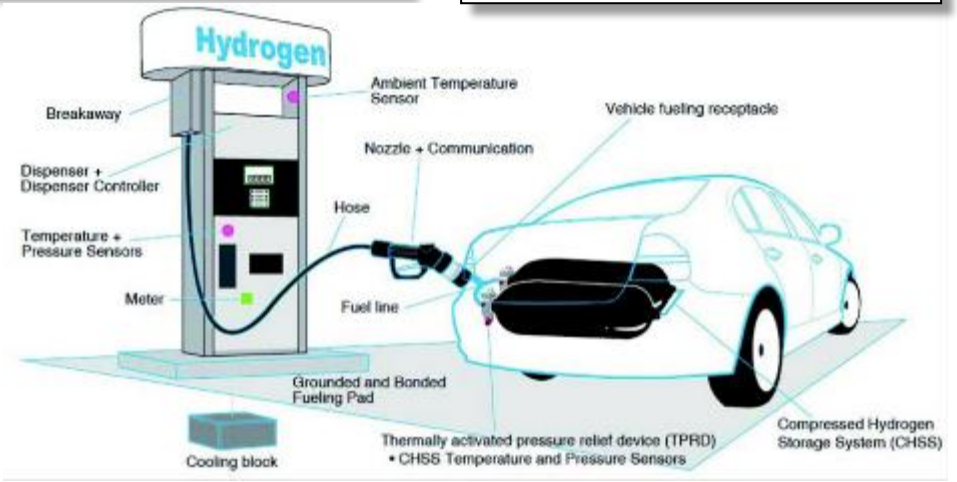
ISO/TC 197 Work Program by 2020

Fuel Quality

ISO 14687 Rev
→ Pub. 2019, cont.

Electrolysers

ISO 22734 Rev
→ Pub. 2019



Vehicle Components

Fueling Connectors
ISO 17268 Rev → Pub. In 2020, cont. work on H70HF (HD)

On-board Storage
ISO 19881 → Pub. in 2018, cont. to align with GTR13 Ph2

TPRD
ISO 19882 → Pub. in 2018, cont. to align with GTR13 Ph2

Storage Technologies

GH_2 Ground Storage ISO 19884 → FDIS failed; restart in 2020 w/NWIP (WG 15 on-going)
Me-Hy Portable Storage
ISO 16111 Rev → Published in 2018

Fueling Family ISO 19880

-1: HFS General Requirements → Pub. in 2020
-2: Dispensers → DIS Restart → FDIS by end 2023
-3: Valves → Pub. in 2018
-4: Compressors → CD
-5: Hoses → Pub. in 2019, cont.
-6: Fittings → CD → DIS by early 2023
~~-7: Fueling Protocols~~ (New Project #)
-8: Fuel Quality Control → Pub. in 2019, cont.

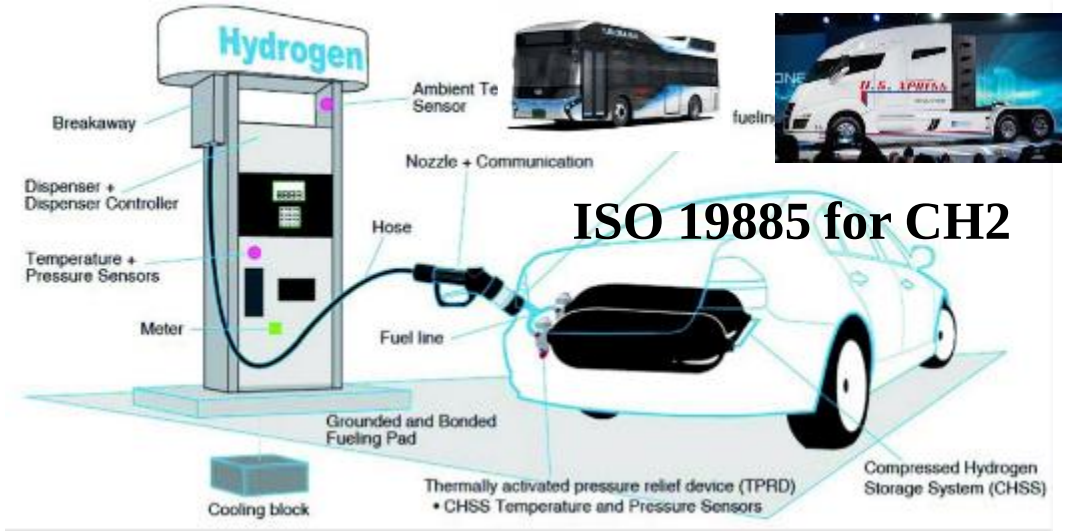
ISO/TC 197 Approved New Projects (2020 - 22)

Electrolysis ISO 22734:

Dynamic performance / safety -1
Testing for grid service -2

Fueling Family ISO 19880:

Sampling -9
O-Rings -7



Fueling Protocols for Compressed Hydrogen ISO 19885:

-1: General Req'ts
-2: Comm Req'ts
-3: HF for HD Road Vehicles

Safety:

ISO/TR 15916 Rev → Corr. Materials Compatibility Table
New LH2 chapter

Fuel System Components for Compressed H_2 Vehicles:

ISO 19887 JWG w/TC22/SC41

ISO/TC 197 Approved New Projects (2023 -)

- LH2/sLH2 fueling protocol: Rev. ISO 13984
- LH2/sLH2 onboard tank: Rev. ISO 13985
- CcH2 connector: ISO 17268-3

- Methodology for determining the greenhouse gas emissions associated with the production and transport of hydrogen

  ➡ SC1 TS19870

ISO/TC 197 Hydrogen Technologies

SC 1 Hydrogen at Scale and Horizontal Energy Systems

Scope:

Standardization of large scale hydrogen energy systems and applications including aspects of testing, certification, sustainability and placement, and coordination with other relevant standardization bodies and stakeholders

Secretariat: SCC

Committee Manager: Ms Sara Marxen

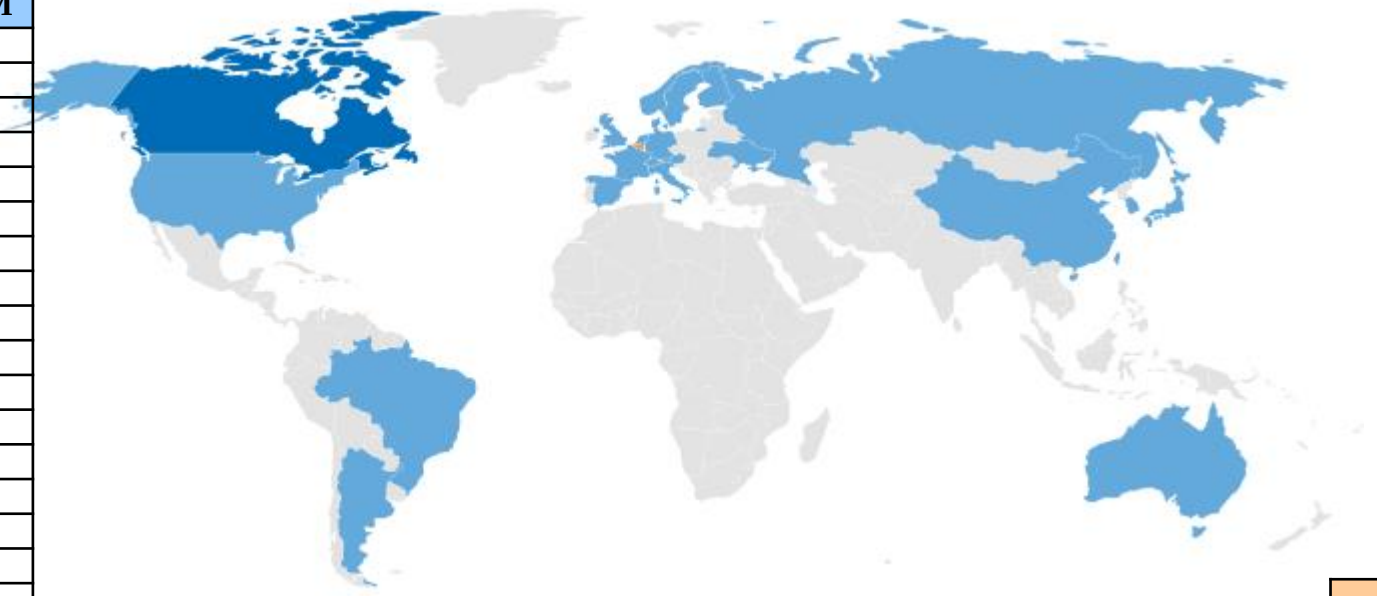
Chairperson (until end 2025): Dr Andrei Tchouvelev

ISO Technical Programme Manager [TPM]:
Mrs Kirsi Silander-van Hunen

ISO Editorial Manager [EM]: Mr Arun ABY Paraecattil

ISO/TC 197 / SC 1

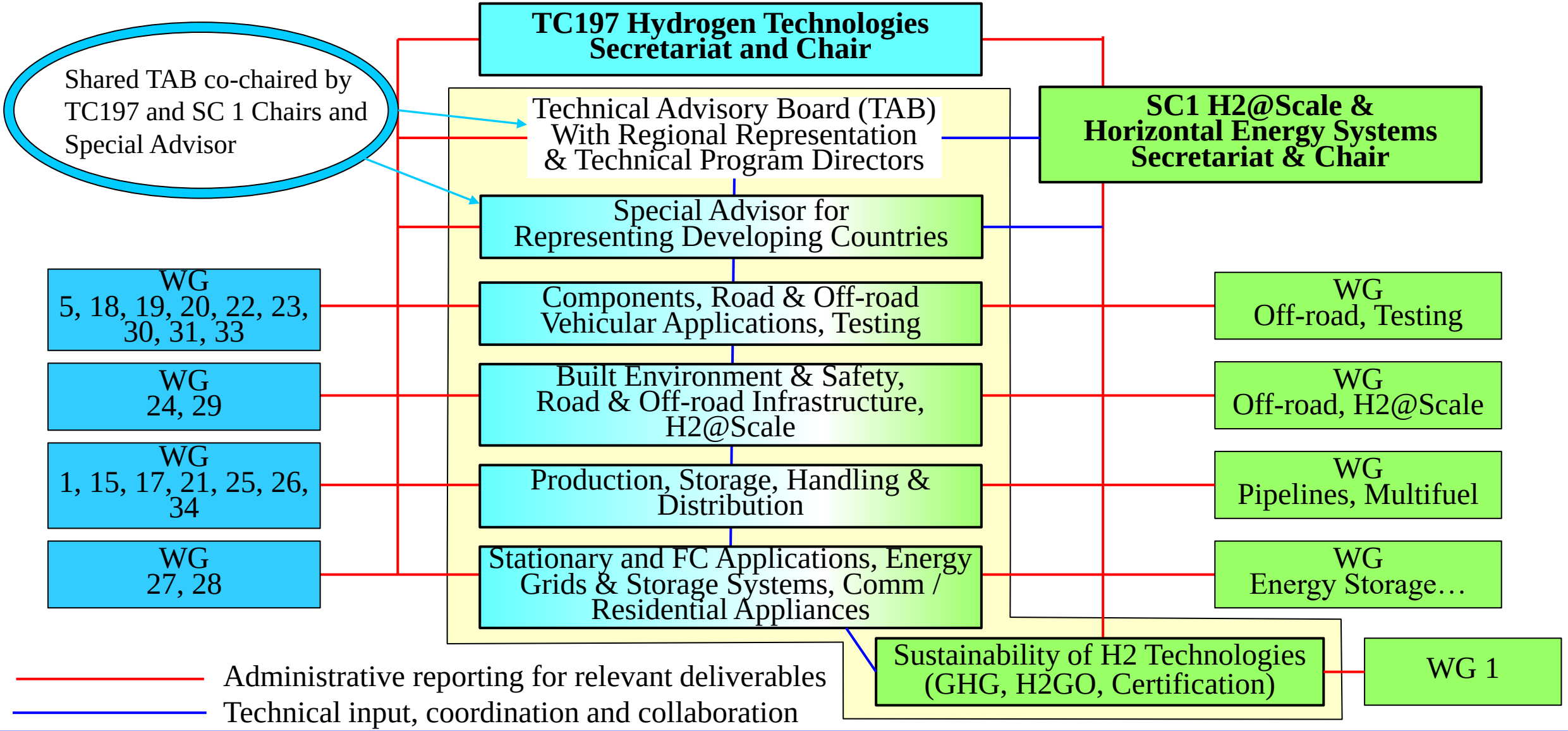
PARTICIPATING MEMBERS (25)	
COUNTRY/TERRITORY	ACRONYM
Argentina	IRAM
Australia	SA
Austria	ASI
Belgium	NBN
Brazil	ABNT
Canada	SCC
Chile	INN
China	SAC
Denmark	DS
Finland	SFS
France	AFNOR
Germany	DIN
Italy	UNI
Japan	JISC
Korea, Republic of	KATS
Namibia	NSI
Netherlands	NEN
Norway	SN
Russian Federation	GOST R
South Africa	SABS
Spain	UNE
Sweden	SIS
Switzerland	SNV
United Kingdom	BSI
United States	ANSI



- Established in 2022
- 1 Plenary meeting
- Next meeting – Vienna, Nov. 2023

OBSERVING MEMBERS (3)	
COUNTRY/TERRITORY	ACRONYM
Belgium	NBN
Poland	PKN
Ukraine	SE UkrNDNC

ISO/TC197 High Level Organization Chart



ISO/TC 197 & SC1 Division of Scope

ISO/TC 197 Focus

- ✓ Basic Requirements for Hydrogen Technologies
  - ➢ Production
  - ➢ Storage
  - ➢ Handling
  - ➢ Built environment
  - ➢ Protocols and components including road vehicles and their fueling infrastructure

(Toyota website)

ISO/TC 197 / SC1 Focus

- ✓ Applications' requirements of Hydrogen technologies at large scale and in horizontal energy systems with H2 as a central link
- ✓ Coordination with TCs & stakeholders on:
  - ➢ Renewables and Energy Storage/Grid Balancing
  - ➢ Multi-fuel systems
  - ➢ Sustainability aspects (GHG, H2GO, Cert)
  - ➢ Testing and certification of H2 components
  - ➢ Rail, maritime, aviation applications
  - ➢ Residential applications

(Toyota website)

(Toshiba website)

ISO/TC 197 Working Groups

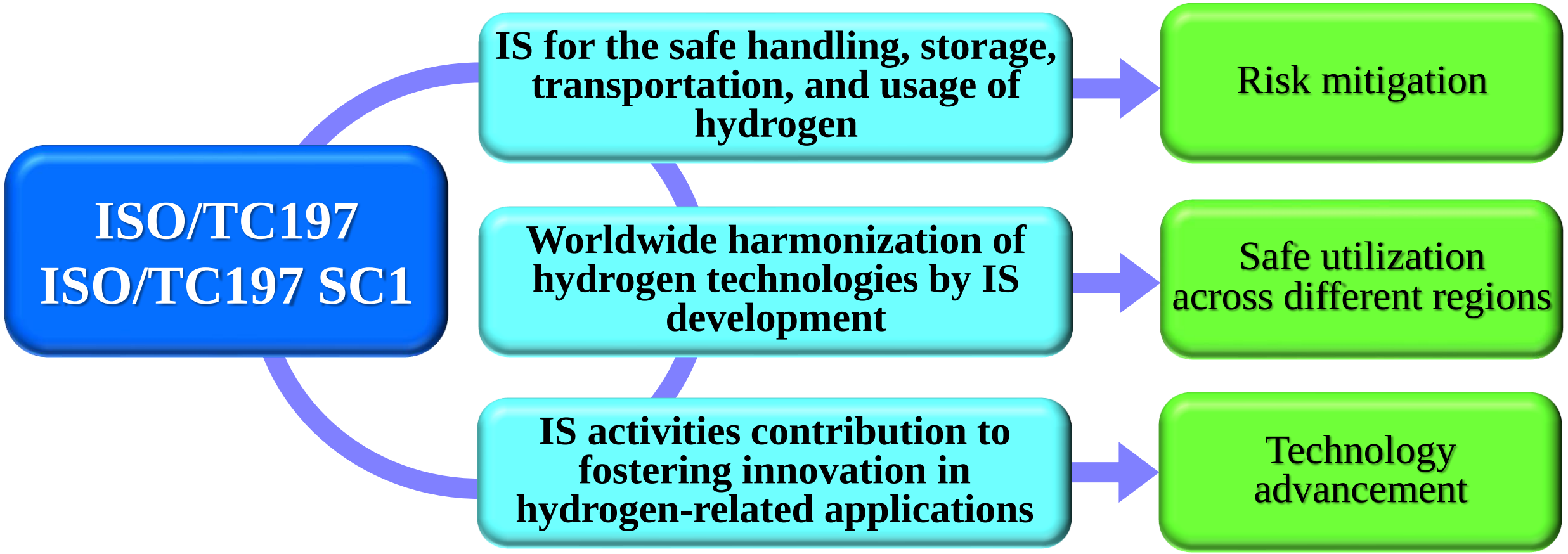
WG	Title	ISO
WG1	Liquid hydrogen - Land vehicles fuel tanks	13985 revision
WG35	Liquid hydrogen - Land vehicle fueling protocol	13984 revision
WG27	Hydrogen fuel quality	14687 revision
WG29	Basic considerations for the safety of hydrogen systems	TR15916 revision
WG5	Gaseous hydrogen land vehicle refuelling connection devices (up to and above 120 g/s flow)	17268-1, -2 rev.
WG36	Gaseous hydrogen land vehicle refuelling connection devices – Cryo-compressed H2 gas	17268-3
WG19	Gaseous hydrogen fueling station – Dispensers	19880-2
WG21	Gaseous hydrogen fueling station – Compressors	19880-4
WG22	Gaseous hydrogen fueling station – Hoses	19880-5
WG23	Gaseous hydrogen fueling station – Fittings	19880-6
WG31	Gaseous hydrogen fueling station – O-rings	19880-7
WG28	Gaseous hydrogen fueling station – Hydrogen quality control	19880-8
WG33	Gaseous hydrogen fueling station – Sampling for fuel quality analysis	19880-9
WG18	Gaseous hydrogen land vehicle fuel tanks and TPRDs	19881, 19882 rev.
WG15	Cylinders and tubes for stationary storage	19884
WG24	Gaseous hydrogen – Fuelling protocols for hydrogen-fuelled vehicles	19885-1, -2, -3
JWG30	Gaseous hydrogen land vehicle fuel system components	19887
WG34	Hydrogen generators using water electrolysis – Industrial, commercial, and residential applications	22734-1 revision
WG32	Hydrogen generators using water electrolysis – Test protocols for performing electricity grid services → To be moved to SC1 as WG2 (expect NWIP from Germany for TS)	TR22734-2 TR → TS
SC1/WG1	Methodology for Determining the Greenhouse Gas Emissions Associated with the Production, Conditioning and Transport of Hydrogen to Consumption Gate	TS19870

Publication target: end of 2024

Publication target: end of 2023

3. Summary

Standardization Activities and Hydrogen Safety



Thank you very much for your attention!

See you in Vienna!
November 13 - 17, 2023

This report contains the results of the programs supported by the New Energy and Industrial Technology Development Organization (NEDO).