CHAdeMO

2021
Activity Report

(1 April 2021 - 31 March 2022)

CHAdeMO Association

President’s address

Chairman Takafumi Anegawa

We would like to thank all our members for their continued support of our activities to promote the deployment of electric vehicles and fast chargers. Although the COVID-19 pandemic is still far from over following the 2020 outbreak, we would like to thank you again for your cooperation in maintaining the productivity and results of CHAdeMO activities even after the switch to full telework and videoconferencing.

As the world strengthens its environmental policies to combat climate change, national governments have set numerical targets for the introduction of EVs, and automobile manufacturers have announced investment plans and development targets for EVs. In addition, the Biden administration's infrastructure investment bill includes a huge subsidy budget for charging infrastructure, and various tailwinds are blowing for the diffusion of EVs. In this context, some may be concerned about the EU's debate on communication standards and the US's move to exclude CHAdeMO from its charging infrastructure investment plan, heard through social networking services. CHAdeMO Association not only develops technologies, but also makes proposals to governments and relevant organisations on market needs and the state of public charging infrastructure. In addition, most OEMs understand the technical superiority of CHAdeMO and the effectiveness of ChaoJi as a unified standard, and we believe that there are great expectations not only for the transition of existing markets, but also for expansion into growing markets such as Asia.

In terms of technology development, several projects are underway to address the electrification of all types of mobility, from small to large. In the area of high-power charging, the ChaoJi standard is being extended to 1.8 MW, and studies are underway for Ultra ChaoJi, which could support aircraft and ships. Meanwhile, for small vehicles, in addition to the ePTW WG, a draft specification has been issued for the EPAC charging standard for electric bicycles, which is even smaller and less expensive.

In terms of public relations, the CHAdeMO website was redesigned in March to make it easier to understand how we are working to achieve our vision of zero-emission mobility.

We believe that the bi-directional power supply function (V2X) and the certification system, which has underpinned the safety and reliability that are CHAdeMO's strengths, will be a driving force for the global expansion of EVs, and we will continue to work towards the harmonisation of EV charging standards in the future. We look forward to your continued support.

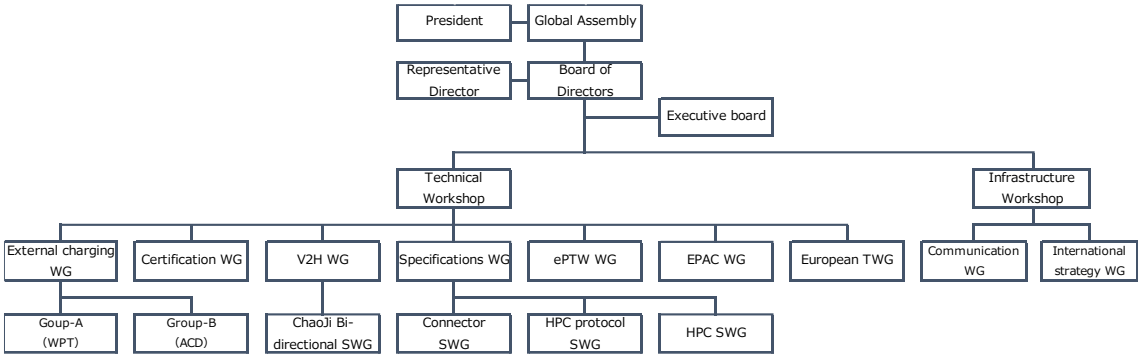
Technical Working Group (WG) Activities

The Technical WG established a new EPAC-WG (Electrically Power Assisted Cycles) in April 2021, with Bosch as the leader and Shimano Corporation as the sub-leader.

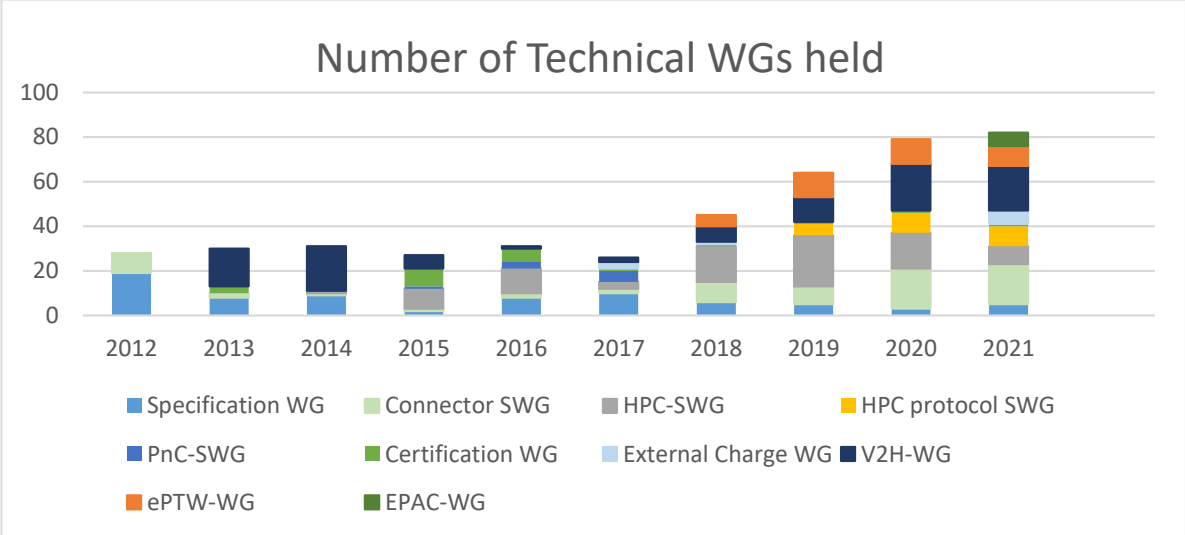
The High Power Charging (HPC) SWG achieved its intended objective with the publication of specification 3.0 in April 2021 and decided to consolidate its activities in the Specification WG.

The External Charging WG was suspended for some time after the preparation of guidelines for pantograph charging in 2018, but was re-established in 2021, with Group A examining WPT (wireless power transmission) and Group B for ACD (automatic connection devices), by target systems.

The V2H-WG has established a new SWG to study the bi-directional extension specifications for CHAdeMO 3.0 (ChaoJi-2).



The total number of meetings held by the WGs has increased since 2018. This is mainly due to the start of two WGs, the ChaoJi project and the ePTW WG.

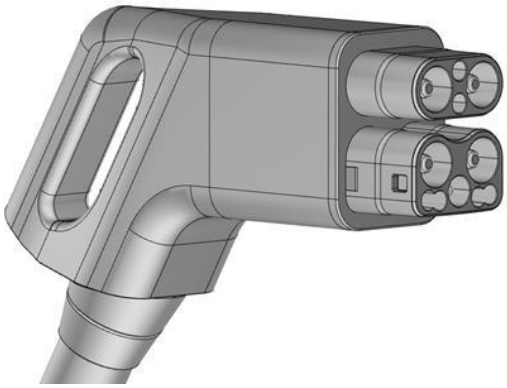


Specification WG

Specification version 1.2.4 was published in April 2021. The 2.0 standard specification was published in 2018, but this reinstatement of the 1.2 certification was in response to a request from charger manufacturers noting the drawback that updating the version control number increases the amount of software development if high voltage, the key extension function of 2.0, is not used. The ongoing activities of the WG confirm and harmonise the latest provisions on electrical safety and EMC, which continue to be discussed in IEC's MT5, and these are reflected in 1.2.4.

The ChaoJi demonstration project in Japan is continuing to study the procurement plan for chargers and cables, with a planned start of the demonstration in 2022.

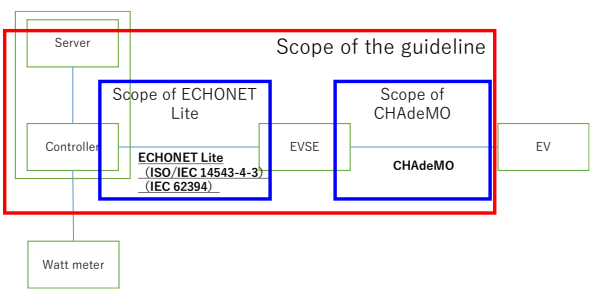
HPC SWG



The HPC SWG resumed its activities in November to study the Ultra-ChaoJi specifications. Standard development is continuing in collaboration with the international ChaoJi TWS and we are studying the 1.8 MW-class (600 A*2*1500V) Ultra-ChaoJi for heavy-duty vehicles and aircraft, and have submitted proposals to IEC/TS 61851-23-3 (Megawatt charging systems) and IEC/TS63379 (Megawatt charging couplers). In addition, Ultra-ChaoJi has received a request from the American electric aircraft standard organisation task force (SAE AE-7D) to study the possibility of customising Ultra-Chaoji for aircraft, on the assumption that Ultra-ChaoJi is compatible with the existing GB/T interface. Supplying control power specifically for aircraft, as well as a bifurcated inlet adaptor that enables simultaneous charging from two GB/T chargers are being considered. Short-circuit tests were also conducted to verify the safety of the charging connectors, and it was confirmed that the CHAdeMO connector did not cause any hazards such as explosions, fire or smoke even in the worst-case scenario of a short circuit between the P and N terminals.

HPC protocol SWG

Conformity checks for the ECHONET Lite Standard were carried out in cooperation with the ECHONET Consortium, identifying possible use cases for connection to HEMS servers and upper networks, checking the



consistency of parameters between the two protocols, studying methods for exchanging vehicle IDs and connection information, etc. The Guidelines were issued in February 2022.

In October, tests were carried out in cooperation with Keysight Technologies and Fujikura to measure the frequency bandwidth to confirm that two-wire TCP/IP, which is planned to be adopted for high-level communication in the integrated protocol, would not be affected when a large current is applied. In March, communication evaluation tests during high-current charging were conducted on actual equipment with the cooperation of Isuzu Motors, Shindengen, Fujikura, Vector Japan and Keysight Technologies, confirming that 100 Mbps is a level at which the ChaoJi cable set can be used adequately.

In relation to Europe, we participate in the sub-group of the Sustainable Transport Forum (STF), an advisory body for the European Commission, as a technical expert. We showed how the functional requirements of ISO 15118, which is considered a likely communication standard in Europe, can be achieved by adding Wi-Fi to CHAdeMO's CAN communication. In collaboration with the OCA V2X task group, discussions were held on the definition of mutual communication parameters.

Connector SWG

The dimensions and tolerances for the mating shape of the ChaoJi connector with the inlet were examined, and the strength and safety of the inlet adaptor and other components were evaluated and verified in collaboration with the international ChaoJi TWS SWG1. For backward compatibility, we have studied safety when applying inlet adapters, not only for CHAdeMO and GB/T but also CCS, and interference problems in combination inlets with AC charging ports.

Temperature measurement of terminals with a cooling structure to cope with high currents, which was raised in ChaoJi TWS SWG 1, was carried out using an actual model with a current flow of 400 A. The results were reported and suggestions for ensuring safety were made.

External charging WG

The External Charging WG resumed its activities in July 2021, with the aim of examining how the CHAdeMO design concept can be applied to two technologies: WPT (wireless power transmission) and ACD (automatic connection devices).

Market needs for WPT are increasing due to its convenience, and one of the objectives of the

activity is to study the technical requirements for retrofitting it to CHAdeMO vehicles. Daihen Corporation was appointed as the leader to conduct the technical study and issued guidelines in January 2022.

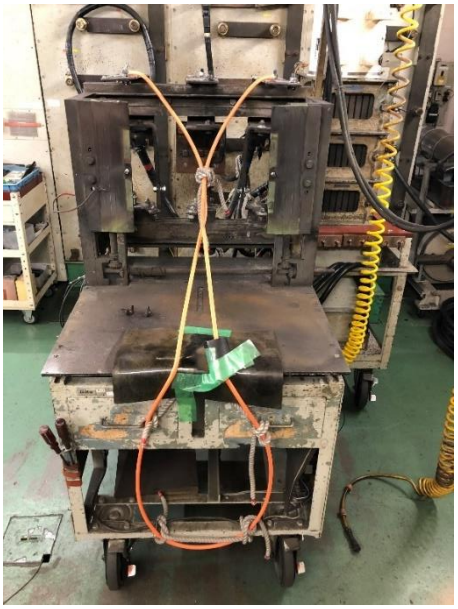
ACD activities have started with Isuzu Motors as the lead. One of the objectives is to implement countermeasures for reduced operability due to the use of heavier cables for higher power, along with safety measures for high voltages and currents. The project also studied countermeasures for regulations, which currently stand in the way of the introduction of high-voltage chargers in Japan.

Certification WG

In 2020, the 1.2 certification was terminated with the start of 2.0.1 certifications, but as there are no high-voltage vehicles compatible with 2.0, some members expressed a wish to resume the 1.2 verification. The Certification WG resumed the certification in September 2021 in line with the revision of the 1.2.4 specifications.

The CPT (protocol test tool), developed as a certification system in 2018, work is continuing to obtain the necessary certification for overseas sales.

V2H-WG



In FY 2021, deliberations were held on the revision of the guidelines (corresponding to Standard Specifications v1.2 and v2.0) and the Japanese version of the V2H/V2L Guidelines v2.2 (corresponding to Standard Specifications v1.2) was published in March 2022.

In addition, a voluntary study group of WG members conducted a safety evaluation of connectors. This activity intended to check the safety of existing connectors and the interrupting performance of fuses in connectors used in small diameter cables, assuming that the upper limit of short-circuit current flowing out of vehicles will increase to 30 kA due to the increased capacity and performance of on-board batteries. On 2 July, an experiment was conducted in cooperation with Mitsubishi Electric Corporation. As a result, it was concluded that safety was sufficiently ensured, even with the existing connectors, and that identification of vehicles exceeding 10 kA, which had been a concern as a safety measure, was unnecessary.

ePTW WG

In FY 2021, a draft specification for chargers for electric two-wheelers and a certification specification with protocol checklist were discussed and the following documents were published as v1.0 in February 2022 (both Japanese and English versions).

- Specifications for fast charging stations for electric two-wheelers
- Specifications for the certification of fast charging stations for electric two-wheelers
- Charger protocol checklist for electric two-wheelers
- Charging connector performance verification document for electric two-wheelers
- Inlet performance verification for electric two-wheelers
- Specification confirmation for electric two-wheelers with fast charging capability

The development of the tool required for certification was completed in March 2022 following firmware modifications, such as strictly synchronising the timing of the charging sequence and data measurement through actual testing of the certification system.

In terms of relevant international standards, following the publication of IEC 61851-25 at the end of 2020, the connector standard IEC 62196-6 was officially published in April 2022.

EPAC-WG

The EPAC-WG (Electrically Power Assisted Cycles) started new activities in April 2021 with Bosch as the leader and Shimano Corporation as the sub-leader. In contrast to the ePTW charging standard, which envisages a maximum output of around 10 kW for motorcycles and small vehicles, EPAC supports a maximum output of up to 800 W.

In recent years, a new type of electrically power assisted bicycle, the e-BIKE, has become increasingly popular, particularly in Europe. Compared with ordinary electrically power assisted bicycles, e-BIKEs have superior dynamic performance and higher battery performance, and an increasing number of users are using them for longer distances. In Japan, shared bicycles have been introduced in metropolitan areas, and since the spread of COVID-19, the need for shared bicycles as a means to avoid crowded methods of transport has increased. Against this backdrop, and in view of the growing need for short-time charging even for bicycles, it was decided to work on the development of a manufacturer-independent common interface. Since the WG was established in April 2021, it has worked energetically and published a draft standard specification in March 2022.

The fact that the widespread use of electrically power assisted bicycles has already resulted in a limited proportion of long-distance users, and that each company has its own charging interface, means that, in order to reduce the cost burden on both the charger installers and the users, the WG members agreed from the outset that the user will connect to the charger using his or her own adapter.

CHAdeMO Specification	Power, Voltage, Battery capacity	Application examples
ChaoJi-2 	▪ 350kW, 500kW+ ▪ 500V+ ▪ Battery 100kWh+	
CHAdeMO 	▪ 50-150kW ▪ 150-500V ▪ Battery 50kWh+	
e-PTW CHAdeMO 	▪ 1-10kW ▪ 20-120V ▪ Battery 2-10kWh	
EPAC CHAdeMO 	▪ <800W ▪ 36V nominal / 42Vmax ▪ Battery <1000Wh	

IEC standardisation activities

The IEC DC charging standards, IEC61851-23/24ED2, are still under revision and deliberation. In 2021, Serge Roy retired after more than 10 years as convener since the project's inception. We thank him for his significant contribution to the publication of the current international standards and for his technical support to CHAdeMO as a consultant. He has been succeeded by Mr Lars Bech of ABB.

IEEE standardisation activities

The DC charging standard IEEE 2030.1.1 project published IEEE 2030.1.1-2021 in February 2022, which reflects the CHAdeMO 2.0 and V2H guidelines. The next steps will be to revise the certification programme (ICAP) and further standardise CHAdeMO 3.0/ChaoJi-2, for which a plan will be drawn up after inviting members to join the project.

External relations and public relations

In Japan, expectations for integration between smart grids and EVs are growing, and requests to speak at various webinars and organisations are increasing. CHAdeMO disseminates information on technical trends and the activities of CHAdeMO, including the bi-directional power supply function, through the submission of technical articles to academic and trade journals and interviews with the media. The state of the EV charging infrastructure has also been frequently discussed in Japan's parliament, and we have reported on the universal design of chargers as well as progress in increasing the output of chargers.

CHAdeMO continues its cooperation with China, with whom we are developing ChaoJi, via web conferencing. It has been decided that demonstration tests for ChaoJi chargers will start on the Beijing-Shanghai motorway in April 2022, in which CHAdeMO will also participate.

In various other parts of Asia, where electrification is rapidly making progress, the development of standards and the deployment of charging infrastructure are underway. CHAdeMO is providing technical cooperation to government certification bodies such as ARAI (India) and BPPT (Indonesia), as well as the state electric power enterprise EGAT (Thailand).

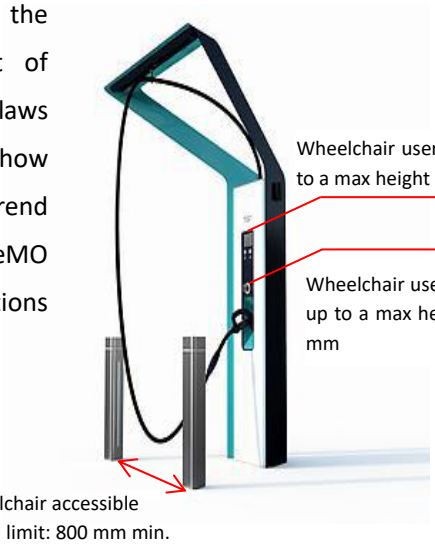
Infrastructure WG

The 2021 Infrastructure WG meeting was again held via web conference due to the spread of COVID-19, and was attended by 200 people.

Infrastructure Workshop

Date	Participants	Main agenda	Presenter
35th 11-Oct	200	Greetings	President Takafumi Anegawa
		Technology installed in Honda e	Honda motor Satoshi Ichinose
		Efforts to develop a test system for Two-wheeler CHAdeMO	Chroma Japan Hisamoto Sakakibara
		Introducing services that can contribute to the development of CHAdeMO 3.0 compatible products	DIGITAL PROCESS Etsuo Ogami
		CHAdeMO Association Activity report	Secretary General Makoto Yoshida
		Closing	Director Hiroshi Kabasawa

In FY 2021, the Japanese Parliament took up the dissemination of EVs and the development of charging infrastructure, and deliberated on how laws and regulations should be enforced – especially, how universal design should be applied as the trend towards higher power output progresses. CHAdeMO revised its Installation Guide and added descriptions of barrier-free measures.

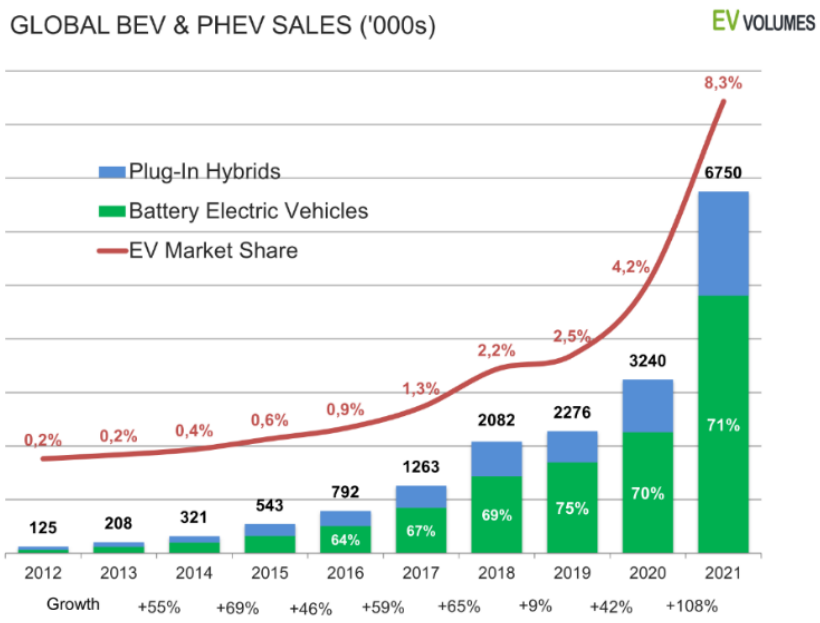


European Office Report

In FY 2021, the CHAdeMO Europe office continued to organise and participate in webinars and online meetings during the first half of the year, but in early autumn, as various in-person events gradually resumed, the office took the step of exhibiting at exhibition stands and participating in-person at conferences with the input of the member companies. However, towards the end of the year, the Omicron variant rapidly expanded and interpersonal events were cancelled again, making it a year in which a flexible response was required. On the technical standards and legislative front, we contributed as a member of the expert group under the advisory body (STF) of the European Commission's Directorate-General for Transport (DG MOVE), and stepped up our efforts to ensure that CHAdeMO members and users are not inconvenienced.

Global EV registrations and sales are back on track

According to EV sales data provider EV Volumes.com (a CHAdeMO member), global EV registrations in 2021 numbered 6.75 million (including LCVs), doubling (+108%) from 2020, in contrast to a general slowdown in vehicle sales in 2021, due to the pandemic and production cuts due to semiconductor and component supply disruptions. The global breakdown was 71% BEVs and 29% PHEVs, with the BEV share remaining almost the same as in the previous year. The global stock of 16.5 million vehicles was almost three times higher than three years ago, and the share of electric vehicles in new vehicle sales was 9%.

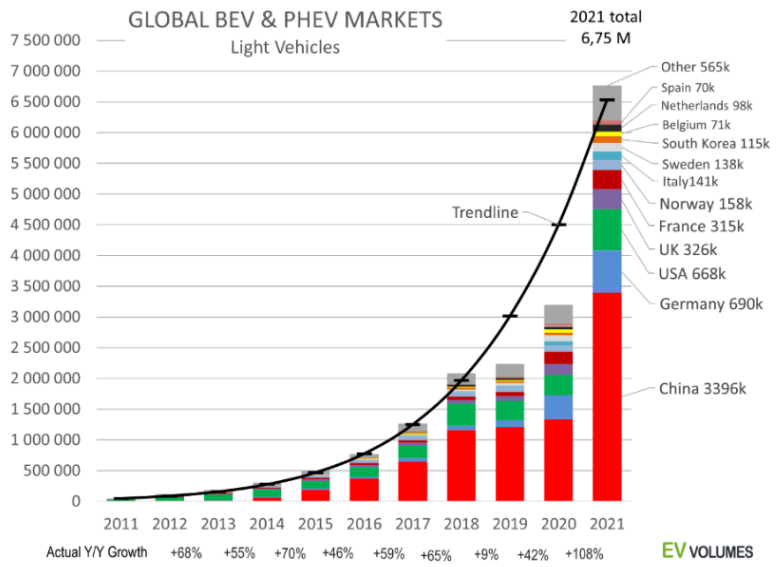


Europe: the second largest market after China

EV Volumes.com states that the EV market growth in the two years of 2019 and 2020 was slowed by tighter GHG emission regulations and the COVID-19 pandemic, with growth in 2021 being a

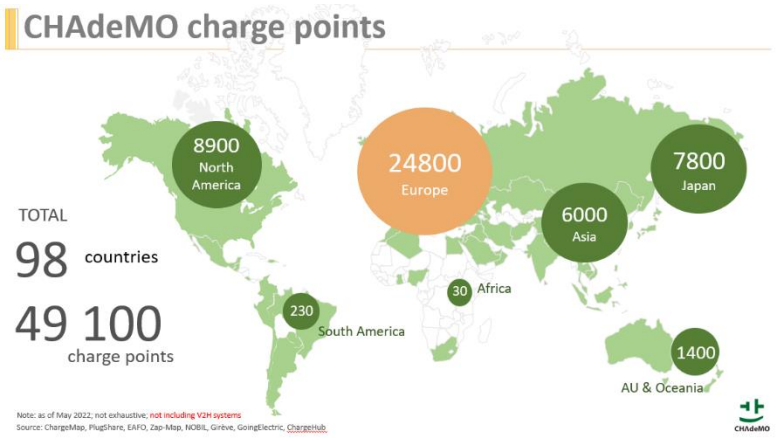
'return to the original trend line.'

The largest market was China with 3.4 million units, followed by Europe with 2.3 million units, with these two major markets accounting for 85% of global electric vehicle sales. Plug-in vehicle sales in Europe were up 66% on the previous year (155% in China), and the share of electric vehicles in new vehicle sales jumped from 10% to 17%, with BEVs and PHEVs accounting for around 50% each.



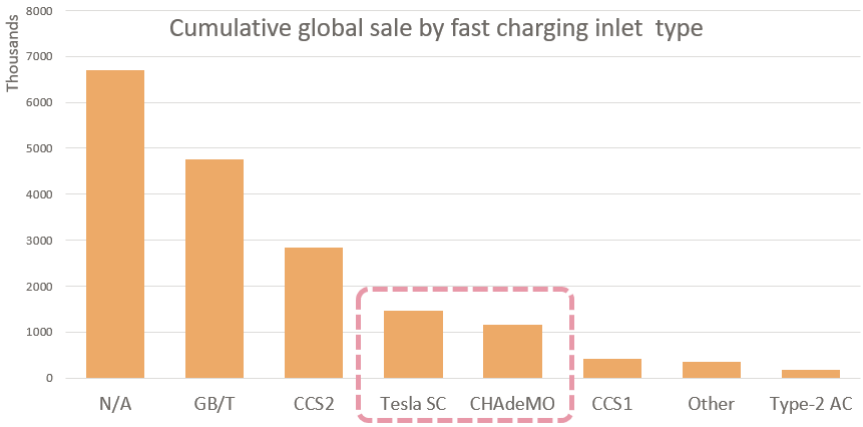
CHAdeMO continues to grow globally

As of May 2022, the number of CHAdeMO charging points worldwide exceeded 49,000, with about half concentrated in the European region.[1] The number of countries where CHAdeMO chargers were found to be installed reached 98, with new CHAdeMO installations compared to the same period last year in Bahrain, in the Middle East, and in Trinidad and Tobago and Panama, in Latin America.



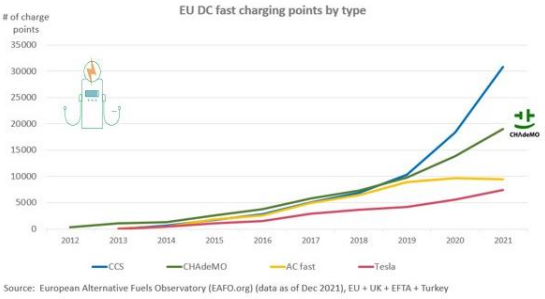
[1] Data: ChargeMap, PlugShare, EAFO, Zap-Map, NOBIL, Girève, GoingElectric, ChargeHub, not including V2H systems

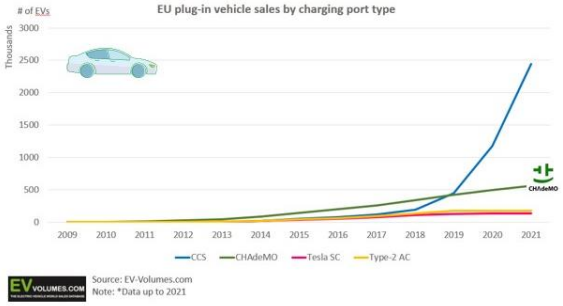
According to EV Volumes.com, the most common EV classification by fast charging inlet type continues to be EVs that are not compatible with fast charging (mainly PHEVs), followed by GB/T, CCS2[2], Tesla and CHAdeMO. Together with the Tesla vehicles, which are compatible with CHAdeMO chargers via adapters, CHAdeMO chargers can charge 2.62 million vehicles worldwide.



CHAdeMO is slowing down in some parts of Europe

In Europe, the charging infrastructure market is growing rapidly due to the Recovery Fund and other measures for the COVID-19 pandemic. With this, the installation of CHAdeMO DC fast chargers is growing across Europe, exceeding 20,000 units by 2021[3], although investments in CHAdeMO plugs is slowing down in some regions, where the proportion of CHAdeMO plugs is decreasing.





On the vehicle side, cumulative sales of CHAdeMO fast-chargeable electric vehicles (BEV + PHEV) in the European market exceeded 500,000 units. However, cumulative sales of CCS vehicles overtook CHAdeMO in 2020, with over 2.2 million vehicles if CCS plug-enabled Tesla vehicles are included. (vs. around 710 000 CHAdeMO + non-CCS Tesla.)

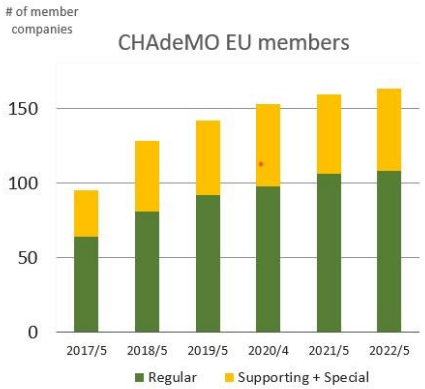
[2] The number of CCS1 and CCS2 inlets is estimated by the Chademo Europe Secretariat. Figures for the Asia-Pacific region are prorated, assuming North America as CCS1 and Europe, Middle East and Africa as CCS2. Tesla GB/T and Tesla CCS-like inlet vehicles are included in GB/T and CCS2 respectively.

[3] EAFO (European Alternative Fuels Observatory) https://alternative-fuels-observatory.ec.europa.eu/

European membership increased slightly

The number of CHAdeMO members in Europe is 163, an increase of three from the same period last year, when offsetting new and exiting members.

By country, Japan, Germany, China, the USA, the UK, France, Spain, India, Taiwan, Russia, Italy and the Netherlands have the largest number of members, in that order, with these 12 countries accounting for 80% of all members.



Active involvement in standards and legislative discussions

The European Commission's July 2021 proposal to amend Directive 2014/94/EU on the deployment of alternative fuels infrastructure (AFID: Alternative Fuels Infrastructure Directive) into a Regulation (AFIR: AFI Regulation) is being debated at the European Parliament and the Council of the European Union. CHAdeMO Association continues to lobby in Europe for the importance of CHAdeMO in the European market and for a non-disadvantageous treatment of CHAdeMO users.

CHAdeMO is an expert member of the technical group on 'governance and standards for communication', which is a sub-group of the Sustainable Transport Forum (STF), an advisory body of the European Commission consisting of representatives of EU Member States and industry members. CHAdeMO participates in the discussions of the sub-group, with a three-year engagement until 2023.

In the 2021 fiscal year, France revised its law and lifted the obligation to place a CHAdeMO connector on all public DC chargers. CHAdeMO Europe, in cooperation with the various EV Users Associations, vehicle OEMs, charger manufacturers and other parties, appealed to the French Government on the importance of CHAdeMO. We explained to the French Ministry of Ecological Transition that lifting the obligation to install CHAdeMO plugs would hinder CHAdeMO EV users' freedom of movement and the future development of the used EV market, and learned in return from the Ministry that CHAdeMO would remain a requirement for certain important charging infrastructure, including major arterial roads, for subsidy applications.

Most CHAdeMO meetings go online

- **EU Technical Sub-Committee** (30 November 2021, online)

  The 2021 meeting of the EU Technical WG was conducted online, with a summary of activities by Technical Group Chair, Mr Imazu, followed by reports from representatives of three specific SWGs: the HPC SWG (lead: Mr Kamishima), HPC protocol SWG (lead: Mr Arai)

and EPAC WG (lead: Mr Takahashi). There were detailed explanations of the work on charging standards for various types of electric vehicles in CHAdeMO, ranging from high power charging for HDVs to electrically assisted bicycles.

▪ V2G webinar series

Last year, CHAdeMO Europe organised a total of five V2G webinars. In this series, attended by more than 100 participants each time, guest speakers from the V2G domain share their insights on the businesses, products, technologies and business models involving V2G (archived videos are available from here). Speakers are always welcome (contact: Mika Yamanaka).

Date of the event	Highlights (article)
○ 2021/04/14	Breakthrough ideas for today's and future V2G business opportunities
○ 2021/06/30	V2G business viability: lessons learnt from demonstration projects
○ 2021/09/30	How to create V2G value propositions
○ 2021/12/09	AC and/or DC
○ 2022/03/10	Learning from innovators: a better way to create business from V2G

▪ CHAdeMO speaks at events

CHAdeMO's European Secretariat actively participated in e-mobility events again this year. Due to the impact of the pandemic, CHAdeMO mainly participated in events remotely in the first half of the year, but was able to resume in-person participation from early autumn onwards.

On 10 June, Tomoko Blech participated online in an event from Prague (Charging Infrastructure for EVs), where she presented on the history and advantages of V2G at CHAdeMO. In the autumn, when in-person events resumed, office staff continued to participate in events in Berlin on 8 November (EV Charging Infrastructure Conference), in Glasgow on 10 November (COP26, photo) and in Munich on 17 November (eMove Future Mobility Conference), where CHAdeMO V2G continued to be the main theme, with the overview and findings of the projects of the Association members and collaborators effectively communicated to the public. COP26, in particular, was a major international framework beyond e-mobility and a valuable opportunity to promote CHAdeMO extensively.

▪ CHAdeMO shared booth

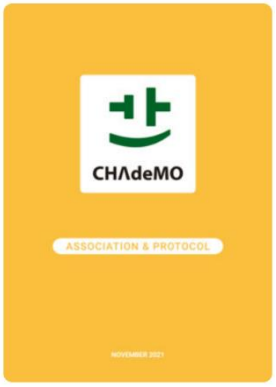
In November, for the first time in two years, CHAdeMO held a shared stand at eMove360 Europe 2021 in Munich. With the five co-exhibiting members - EVTEC, Indra, JAE, Nissan and SCU (Sicon Chat Union Electric) – CHAdeMO put forward the results of V2G projects worldwide to promote electro-mobility with V2G.

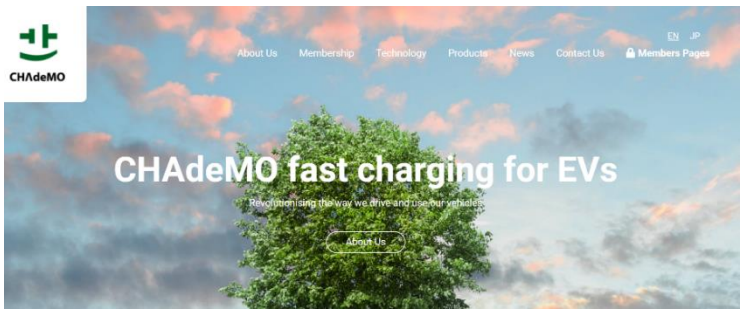
▪ Contribution to international organisations and cooperation

The European Secretariat continues to cooperate with international organisations. This year, it made contributions to the peer review of the annual *Global EV Outlook* published by the International Energy Agency (IEA) and *Cleaner vehicles: Achieving a resilient technology transition* by the International Transport Forum (ITF).

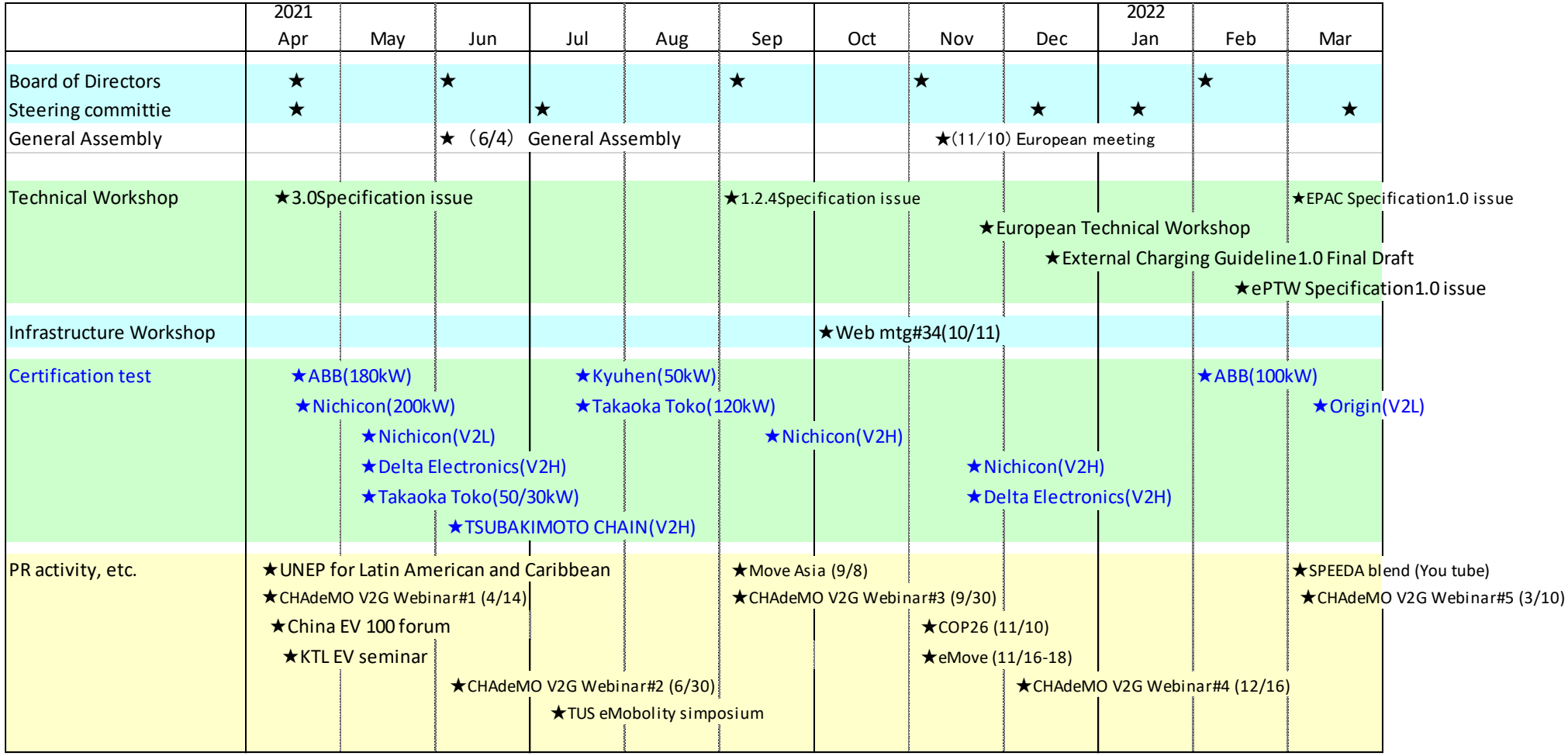
▪ Revamp of website and PR materials

The Secretariat has revamped its website and PR tools such as brochures (photo on the left). By adding bright yellow as an additional colour to the green of the CHAdeMO logo and utilising environmentally friendly imagery, the new CHAdeMO vision of 'powering global zero-emission mobility for the happiness of future generations' was embodied. The website (photo on the right) was not only improved in design, but the content was also updated and organised to improve its usability.





Summary of activities in 2021



Executive Committee meetings and WGs held

Board of Directors / Steering committie

	date	Main Agenda
22nd B 0f D	22-Apr	Financial statement, 2021 budget
GA	4-Jun	2021 Action plan, Director appointment
100th SC	16-Jul	Activity report, Certification system
23rd B 0f D	10-Sep	Activity report, Ultra-ChaoJi development
24th B 0f D	5-Nov	Activity report, Ultra-ChaoJi development
101th SC	17-Dec	ChaoJi prototype
25th B 0f D	28-Jan	Activity report, 2022 budget
26th B 0f D	25-Mar	Activity report, 2022 budget

Boad members : TEPCO, Nissan, Mitsubishi motors, Toyota, Subaru, HONDA, HITACHI, Panasonic, Dave Yoshida(secretary)

Specification WG

	date	Main Agenda
46th	27-Apr	1.2.4 revision, MT5 feedback
47th	15-Jul	1.2.4 comment review, 3.0JP specification
Publishment	6-Sep	CHAdeMO 1.2.4
48th	15-Oct	3.0JP specification, High voltage Vehicle
49th	22-Dec	3.0JP specification, Market errors report

WG members :
TEPCO(chair), Nissan, Mitsubishi motors, Toyota, Subaru, Honda, Suzuki motors, Mazda, Isuzu, Tesla, Takaoka Toko, Nichicon, Hasetec, HITACHI, Takasago, NS-Texeng, YAZAKI, Sumitomo Electric Industries, Shindengen, Kikusui, Denso TEN, Vector Japan, UL Japan, TUV Rheinland Japan, Mitsubishi Fuso, Mercedes-Benz Japan, Hyundai motors, Yamaha

High power charging SWG

	date	Main Agenda
Publishment	16-Apr	CHAdeMO 3.0
13rd Intl SWG	20-May	2021 activity plan, ChaoJi Intl SWG report
27th	28-May	2021 activity plan, ChaoJi Intl SWG report
28th	15-Nov	Ultra-ChaoJi spec, activity plan
29th	20-Dec	Ultra-ChaoJi spec, CHAdeMO 3.0.1 draft review
14th Intl SWG	18-Feb	Ultra-ChaoJi connector, 3.0.1 comment review
30th	18-Feb	Ultra-ChaoJi connector, 3.0.1 comment review
31st	16-Mar	Ultra-ChaoJi connector, 3.0.1 comment review

SWG members :
Nissan(chair), Mitsubishi motors, Toyota, Honda, Isuzu, Yazaki, Fujikura, Sumitomo Electric Industries, JAE, Shindengen, NS-Texeng, Nichicon, Hasetec, UL Japan, TUV Rheinland Japan, TEPCO, SUBARU, Mitsubishi Fuso, Mercedes-Benz Japan, HYUNDAI MOTOR JAPAN, Jaguar Land Rover Japan, Takaoka Toko, ABB Japan, Toshiba

External charging WG

	date	Main Agenda
1st	21-Jul	2021 activity plan, Leader appointment
2nd	31-Aug	Guideline1.0 review, ACD use case review
3rd	15-Oct	Guideline1.0 review, Operating range study
4th	25-Nov	Guideline1.0 Draft review
Publishment	26-Jan	Guideline1.0 Final Draft
5th	1-Feb	ACD development plan, 2022 activity plan
6th	30-Mar	Guideline1.0 FD2 comment review

SWG members :
Nissan(chair), ABB, Vitesco, Tritium, Mitsubishi Fuso, Mercedes-Benz Japan, Delta electronics, TCS, TERTEC, Ekoenergetyka, PSA, GM, COMEMSO,TEPCO, MMC

Certification WG

	date	Main Agenda
19th	23-Jun	Guideline revision, e-pTW certification plan
20th	9-Sep	Guideline revision, 3.0 certification plan

WG members :
Nissan(chair, secretary), Mitsubishi motors, UL Japan, TUV Rheinland Japan, IDIADA, JET, TUV Sud Japan, Toyo corporation, Chroma Japan, Keysight technologies, TEPCO, Digital process, Yamaha

HPC protocol SWG

	date	Main Agenda
17th	26-May	Use case survey, ECHONET hamonization
18th	30-Jun	ChaoJi SWG3 report, Communication band experimen
19th	30-Jul	ChaoJi SWG3 report, Communication band experimen
20th	6-Sep	ECHONET, Communication band experiment
	22-Oct	Communication band experiment @keysight
21st	29-Oct	Experiment report, ChaoJi SWG3 report
22nd	3-Dec	Experiment plan, ECHONET hamonization
23rd	11-Jan	Experiment plan, ECHONET hamonization
24th	15-Feb	Experiment plan, ECHONET hamonization
	18-Feb	ECHONET guideline 1.0Draft publishment
	8-Mar	Communication experiment @Shindengen
25th	15-Mar	ChaoJi SWG3 report, Use case survey

SWG members :
SUBARU(chair), Nissan, TUV Rheinland Japan, Shindengen, Panasonic, Chroma Japan, Suzuki motors, Tesla Japan, TEPCO, Keysight technologies, Isuzu, Vector Japan, Denso Ten, Mitsubishi Electric, Deleta Electronics

V2H WG

	date	Main Agenda
81st	14-Apr	Guideline2.2 review
82nd	20-May	Guideline2.2 review
83rd	10-Jun	Guideline2.2 review
84th	2-Jul	Guideline2.2 review
85th	27-Jul	Guideline2.2 review
86th	19-Aug	Guideline2.2 review
87th	7-Sep	Guideline2.2 review
88th	30-Sep	Guideline2.2 review
89th	14-Oct	Guideline2.2 review
90th	2-Nov	Guideline2.2 review
91st	16-Nov	Guideline2.2 review, 2.0 bidirectional
92nd	30-Nov	Guideline2.2 review, test specification review
93rd	16-Dec	Guideline2.2 review, test specification review
94th	20-Jan	Guideline2.2 review, test specification review
95th	2-Feb	Guideline2.2 review, test specification review
96th	16-Feb	Guideline2.2 review, test specification review
	18-Feb	ECHONET guideline 1.0Draft publishment
97th	25-Feb	Test specification review
98th	10-Mar	Activity plan

WG members :
Nissan(chair), Hitachi(vice-chair), Nichicon(vice-chair), Honda, Panasonic, Mitsubishi Electric, DIGITAL PROCESS, Sumitomo Electric Industries, TSUBAKIMOTO CHAIN, TEPCO, Takaoka Toko, Mitsubishi motors, Toyota, UL Japan, TUV Rheinland Japan, JET, Idiada, Toyota Industries, OMRON, DIAMOND&ZEBRA ELECTRIC, Mercedes Benz Japan, ABB, GS Yuasa

Connector SWG

	date	Main Agenda
Web mtg	6-Apr	3.0 Connector Performance confirmation
Web mtg	13-Apr	Inspection of mating shape for ChaoJi
Web mtg	23-Apr	Inspection of mating shape / rock pin
Web mtg	28-Apr	ChaoJi max package
Web mtg	14-Jun	ChaoJi max package
Web mtg	25-Jun	ChaoJi max package
Web mtg	21-Jul	Ultra-ChaoJi specification
Web mtg	19-Aug	CC1 contact point review
Web mtg	21-Sep	Inlet short circuit test results
Web mtg	1-Nov	3.0 specification review
Web mtg	9-Nov	PT62196-7CD review
Web mtg	17-Nov	3.0 specification review
Web mtg	14-Dec	3.0 specification review, Ultra-ChaoJi
Web mtg	11-Jan	PT62196-7(Adaptor review)
Web mtg	24-Jan	PT62196-7(Adaptor review), ChaoJi SWG1 report
Web mtg	15-Feb	PT62196-7(Adaptor review), temperature rising test
Web mtg	2-Mar	PT62196-7(Adaptor review)
Web mtg	30-Mar	PT62196-7(Adaptor review)

Connector SWG members :
Fujikura（chair 2021.3～）, Yazaki（chair ～2021.3）, Sumitomo Electric Industries, Japan Aviation Electronics, SWS, FURUKAWA ELECTRIC

Two-wheeler WG

	date	Main Agenda
29th	14-Apr	Specification draft review, Test system evaluation
30th	8-Jun	Specification draft review, Test system evaluation
31st	9-Jul	Test system evaluation
32nd	17-Aug	Specification, Protocol check sheet review
33rd	14-Sep	Specification, Protocol check sheet review
34th	12-Oct	Specification, Protocol check sheet review
35th	9-Nov	Specification, Protocol check sheet review
36th	14-Dec	Specification, Protocol check sheet review
37th	8-Feb	Specification, Protocol check sheet review
	22-Feb	Specification1.0 publication

WG members :
Yamaha (chair), TEPCO, Honda, Suzuki motors, Subaru, Takaoka Toko, Nichicon, Shindengen, Kikusui, Sumitomo Electric Industries, TUV Rheinland Japan, Chroma Japan, Aidea, ASTI, Keysight technologies, UL Japan, JET, Digital process

EPAC-WG

	date	Main Agenda
1st	19-Apr	Purpose of establishment, Activity plan
2nd	17-May	System configuration, Basic design review
3rd	19-Jun	Project schedule, document configuration
4th	2-Nov	Specification draft review
5th	24-Jan	Specification draft review
	1-Mar	EPAC Specification 1.0 draft publication
6th	26-Mar	2022 activity plan

WG members :
Bosch(chair), Shimano, TERTEC, KTL, ARAI, IDIADA, MECO, TUV Rheinland Japan, Comemso, Honda, Panasonic, JIANGSU ALFA Bus, JET, Digital process

European SC meetings

date	Main Agenda
25-May	AFID, event
12-Jul	AFID, events
4-Oct	AFIR, events
7-Dec	AFIF, Fit-for-55, events
2-Feb	AFIF, Fit-for-55, communciation & PR guideline

SC members: ABB, Circontrol, Enel, Idiada, Nissan, Stellantis (PSA)