

eMOVE360 2019
Charging & Energy
Conference



CHAdeMO

Keynote:
**CHAdeMO 3.0 – Standard harmonization
efforts between CHAdeMO and GB/T**

OCT2019
CHAdeMO Association Technical Committee
Tomoya Imazu

Standard harmonization efforts between CHAdeMO and GB/T

CHADEMO STATS

- EVs
- Chargers
- Members

CHADEMO CONNECTOR PERFORMANCE

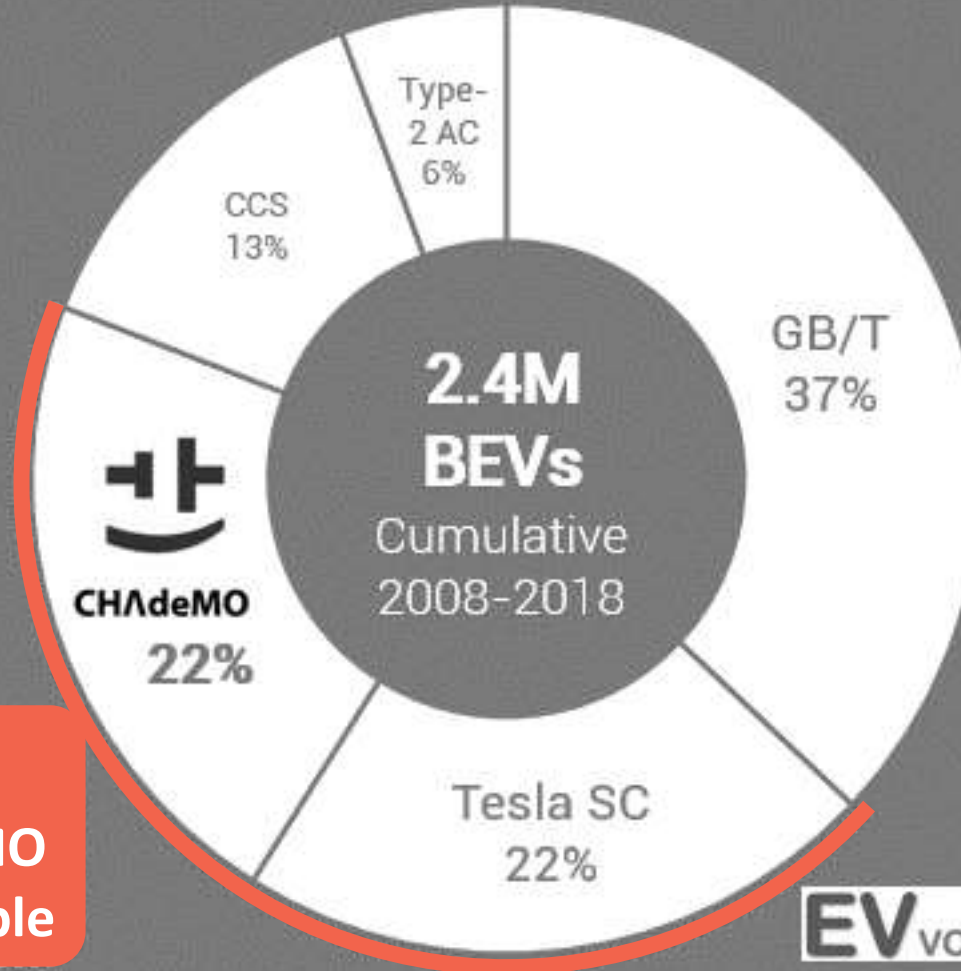
- IEC DC charging standards
- CHAdeMO performance
- CAN protocol
- Safety
- CHAdeMO + E-races

CHADEMO FUTURE



CHAdeMO serves the biggest share of the market

GLOBAL FAST-CHARGEABLE BEV INLET SHARE



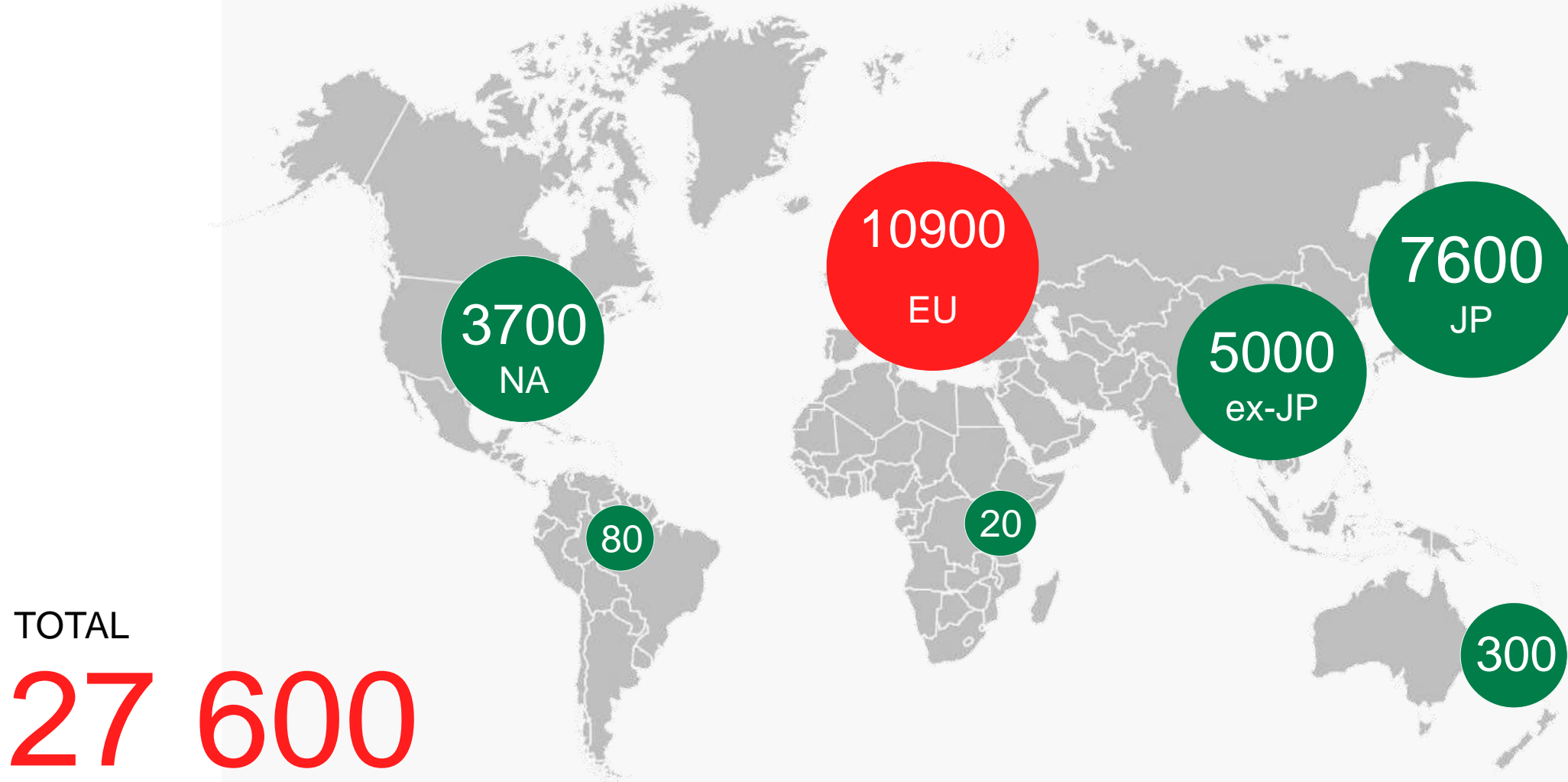
44%
CHAdeMO
compatible

EV VOLUMES.COM

Source: EV-volumes.com; BEVs only, excluding non fast-chargeable BEVs (33% of all BEVs)

CHADEMO STATS - CHARGERS

CHAdeMO has the largest global installation base



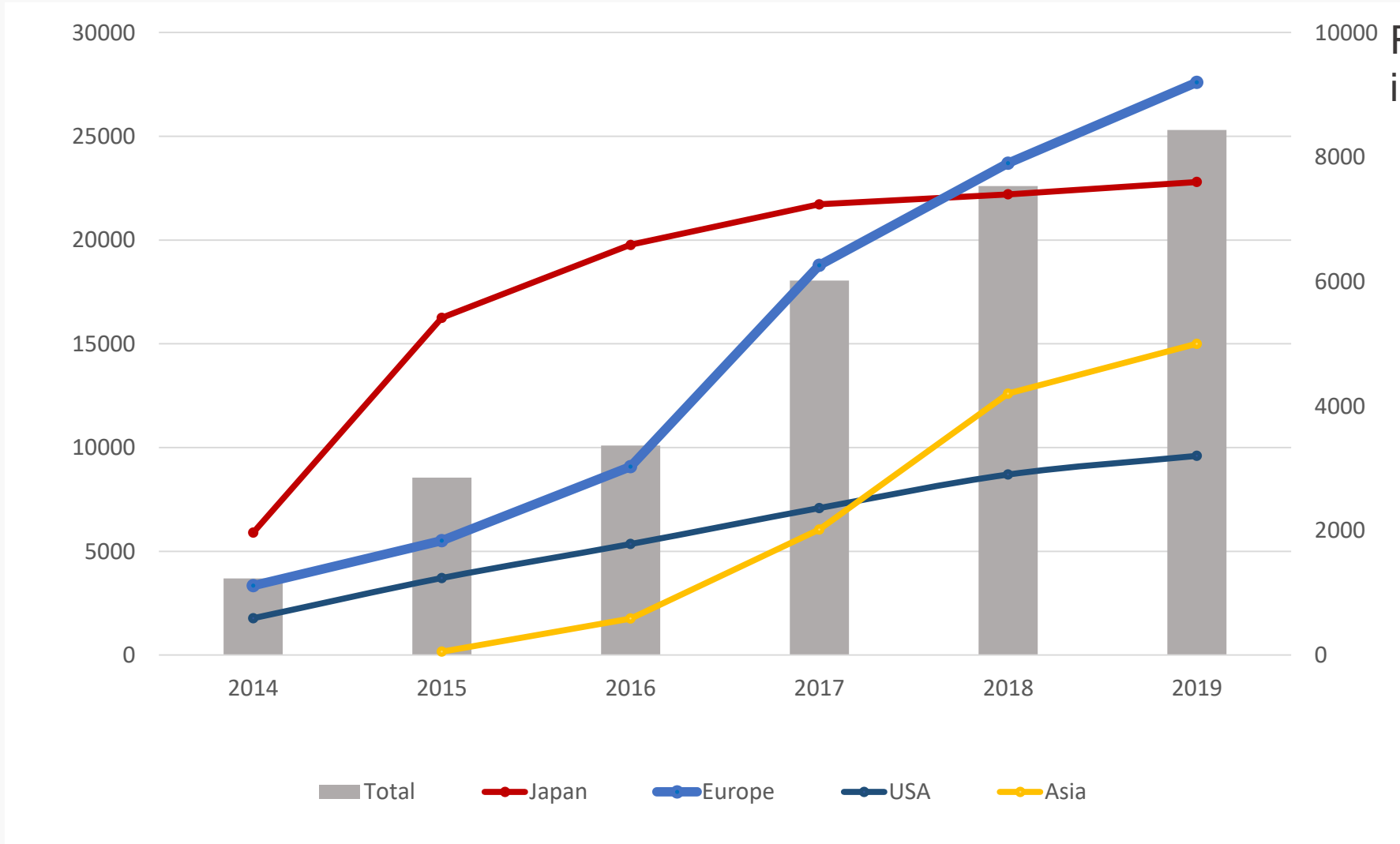
Note: as of OCT 2019 with updates for EU/NA/JP; not exhaustive; not including V2H systems

Source: ChargeMap, PlugShare, EAFO, Zap-Map, NOBIL, Girève, GoingElectric, ChargeHub

CHADEMO STATS - CHARGERS

Europe outgrows Japan and other regions

Global
installation



Regional
installation

Source: CHAdeMO Association, as of April 2019

CHADEMO STATS - MEMBERS

A wide variety of industry players join CHAdeMO





Our members:
430
entities
from
41
countries

And many, many more..

CHADEMO CONNECTOR

CHAdeMO is accredited as various international/regional DC standards

| | CHAdeMO (Global) | CCS 1 (US) | CCS 2 (EU) | GB/T (PRC) | TESLA (PROPRIETARY) |
|---|---|---|---|---|---|
| Connector |  |  |  |  |  |
| Vehicle Inlet |  |  |  |  |  |
|   | ✓ | ✓ | ✓ | ✓ | |
|   | ✓ | ✓ (SAE) | | | |
|   | ✓ | | ✓ | | |
|   | ✓ | ✓ | ✓ | ✓ | |
|   | ✓ (Reference) | | | ✓ | |

CHADEMO CONNECTOR

CHAdeMO, GB/T and Tesla use CAN communication while CCS uses PLC

| | CHAdeMO (Global) | CCS 1 (US) | CCS 2 (EU) | GB/T (PRC) | TESLA (PROPRIETARY) |
|--------------------|---|---|---|---|---|
| Connector |  |  |  |  |  |
| Vehicle Inlet |  |  |  |  |  |
| Communication | CAN | PLC | PLC | CAN | CAN |
| Number of pins | 10 (1 optional) | 9 | 7 | 9 | 5 |
| Max power in specs | 400kW 1kVx400A | 400kW 1kVx400A | 400kW 1kVx400A | 237.5kW 950Vx250A | 135kW 410Vx330A |

Background



Chinese/Japanese governments to support CEC-CHAdeMO collaboration

Association updates | CHAdeMO News | High Power | Protocol news | Standardisation

Both Chinese and Japanese government leaders commit to provide support to the joint development of next-gen ultra-fast charging standard by CEC and CHAdeMO and its roll-out to 3rd countries

2018-10-30 [▶ Read more](#)

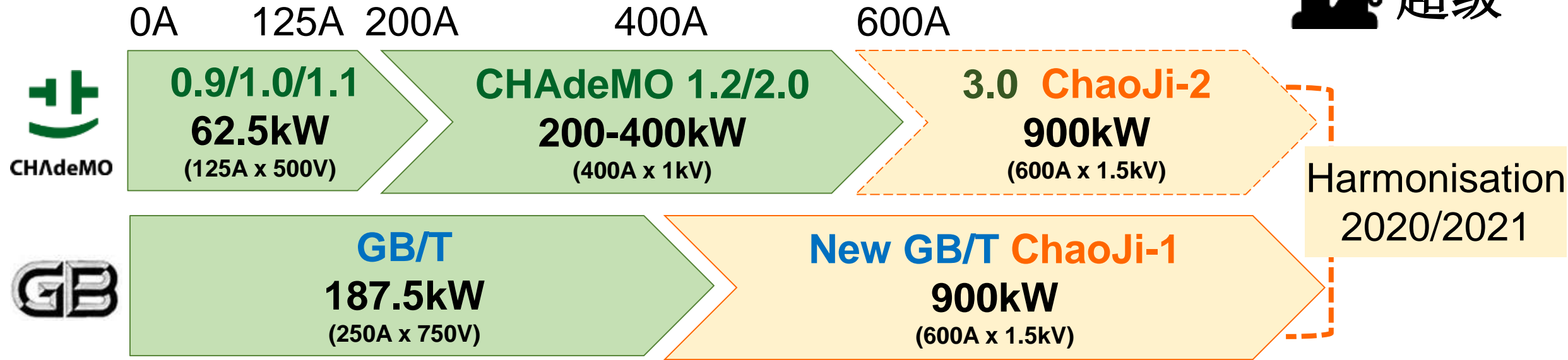
<https://www.chademo.com/chinese-japanese-governments-to-support-cec-chademo-collaboration/>



The development of the new HPC standard is supported by both Chinese and Japanese governments.

-> Other countries (including S.Korea, India and Germany) are invited to join this initiative !

On-going next-gen publication work aimed for 2020/2021

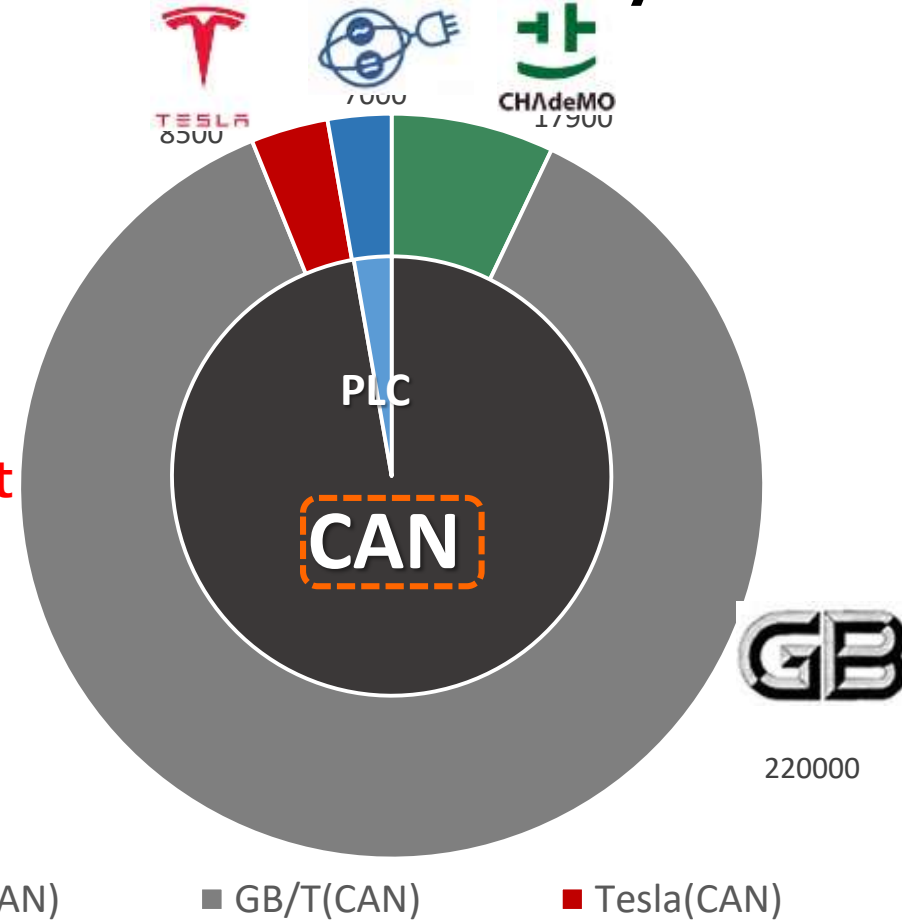


ChaoJi key points:

- ✓ **Control-pilot circuit** harmonised with new AC, GB/T and CCS (and heavy-duty vehicle IEC 61851-23-1) *Always the priority is the existing world.*
- ✓ **Backward compatibility** with CHAdeMO, GB/T and (potentially) CCS
- ✓ **Simple, light and compact** connector
- ✓ **Future proof** covering currents up to 600A with liquid-cooling
- ✓ **V2G and PnC** ready
- ✓ **Optional combo-style inlet** integrating AC type-1, -2 and GB/T-AC

Roadblock against Global unification of charging system

- ✓ For economical optimization global unification of charging system is expected. Everyone agrees for unification **IN GENERAL**.
- ✓ But no one wants to ignore existing chargers and Evs in the market **IN PRACTICE**.
- ✓ **Therefore, maximum backward compatibility is the key for unification. We do unification not for STOP/WASTE existing world but for UTILISE it.**
- ✓ **85% of existing chargers are charging-control-communication compatible! We can find technically easy solution for CHAdeMO and GB/T. Technically CCS backward compatibility also possible.**



■ CHAdeMO(CAN) ■ GB/T(CAN) ■ Tesla(CAN) ■ CCS(PLC)

Source: CHAdeMO; Tesla <https://www.tesla.com/supercharger>; CharIN <http://www.charinev.org/ccs-at-a-glance/infrastructure/>;
China representative's presentation at APEC Workshop (Santiago, Jan 2018)

Interoperability/backward compatibility

Note: the amendment of IEC 61851-1 is necessary for the use of adapter

| | | Vehicle | | | |
|---------|------------------------|---------------------------------|------------------------------|------------------------|---------------------|
| | | CHAdeMO R4~2.x | GB/T-2011 or 2015 | CHAdeMO 3.0 (ChaoJi-2) | New GB/T (ChaoJi-1) |
| Charger | CHAdeMO R4~2.x | OK | | Use adapter | Use adapter |
| | GB/T-2011 or 2015 | | OK | Use adapter | Use adapter |
| | CHAdeMO 3.0 (ChaoJi-2) | Use CHAdeMO-ChaoJi dual charger | | OK | OK |
| | New GB/T (ChaoJi-1) | | Use GB/T-ChaoJi dual charger | OK | OK |

- New ChaoJi EVs will be able to charge with the existing CHAdeMO and GB/T chargers using an 'inlet adapter'.
- Existing CHAdeMO and GB/T EVs are not allowed to use any adapters, so they will need to use the dual chargers during the transition period.
- **Backward compatibility with CCS is also technically possible, detailed specification is under consideration.**

Interoperability/backward compatibility (TBD)

| | | Comm. protocol | |
|--------|--|---|--|
| | | ChaoJi EV | ChaoJi charger |
| Market | China | GB/T | GB/T |
| | Japan | CHAdeMO | CHAdeMO |
| | S.Korea (TBD) | CCS1/CHAdeMO | CCS1/CHAdeMO |
| | EU (TBD) | CCS2/CHAdeMO | CCS2/CHAdeMO |
| | NA (TBD) | CCS1/CHAdeMO | CCS1/CHAdeMO |
| | The rest of Asia and all other regions | 1 st preference: GB/T 2 nd preference: CHAdeMO | GB/T and CHAdeMO (dual protocol) , refer to the next slide |

- Keep the region-specific protocols in the short term, but also consider the potential to be unified in the long term.

Interoperability/backward compatibility

Initial charging sequence:

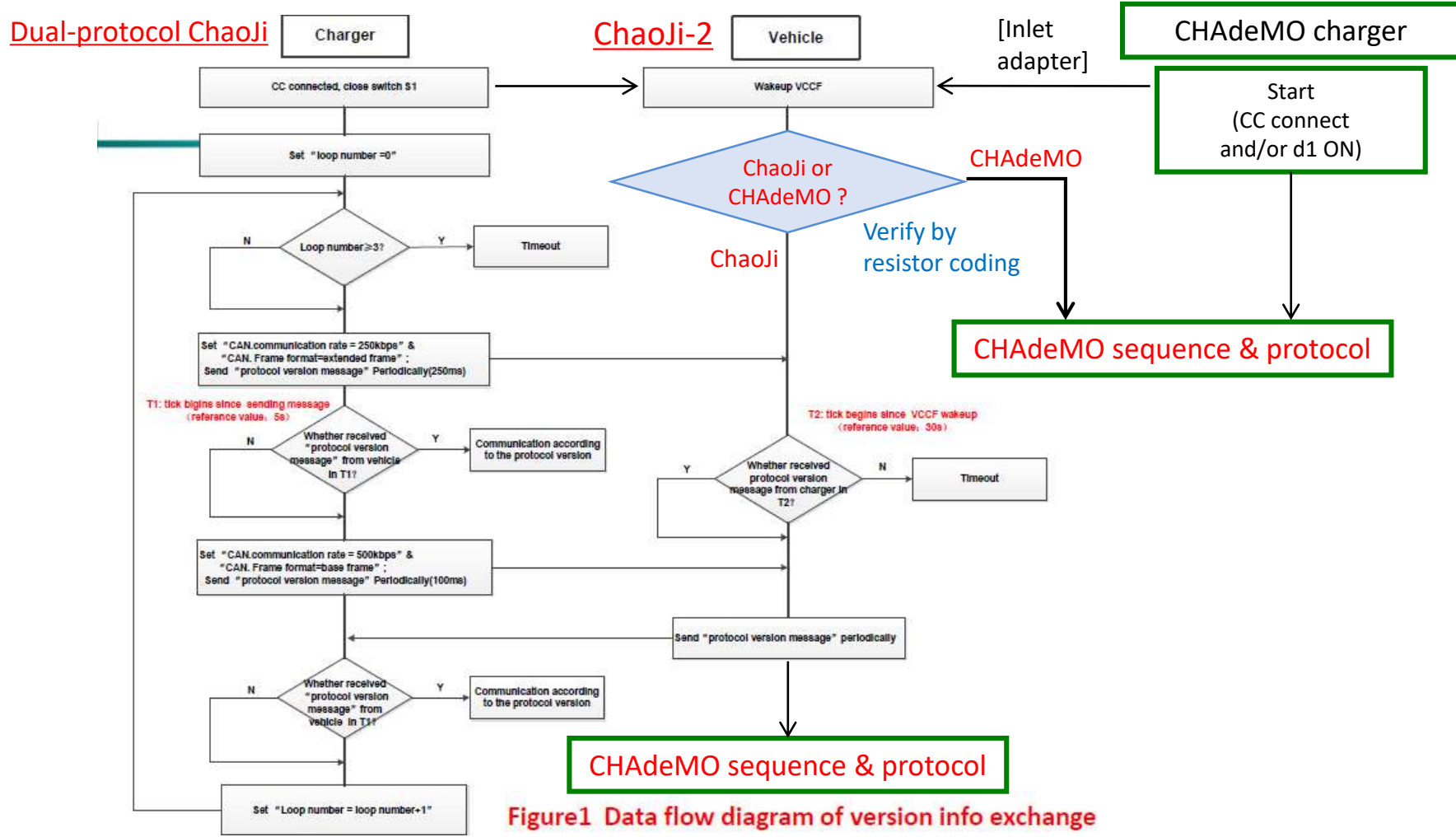


Figure1 Data flow diagram of version info exchange

Deployment Image

FUTURE

TODAY



[Transition period (2021 ~ 20XX)]

[Full ChaoJi deployment (20XX~)]

The transient is not forced-reaction but “economical option at any time”.

| | | | | |
|-----------------------|---------|------------------|---|------------------|
| Hardware (coupler) | CHAdeMO | CHAdeMO + ChaoJi | CHAdeMO and ChaoJi to co-exist as multi-outlet chargers | ChaoJi |
| Hardware (CP circuit) | CHAdeMO | CHAdeMO + ChaoJi | | ChaoJi |
| Software (protocol) | CHAdeMO | CHAdeMO | | New GB/T ? (TBD) |

Schedule (Japan/EU/NA/Other)

2019

2020

Mar.

Jun.

Sept.

Dec.

Mar. /Apr.

- 3/27
- Voting (Regular members)
- Judgment (General Assembly)
- CHAdeMO Europe TWG

Development of Specification 3.0 / ChaoJi-2
(TWG/SWG meetings to be held at regular intervals)



● CHAdeMO 3.0 release

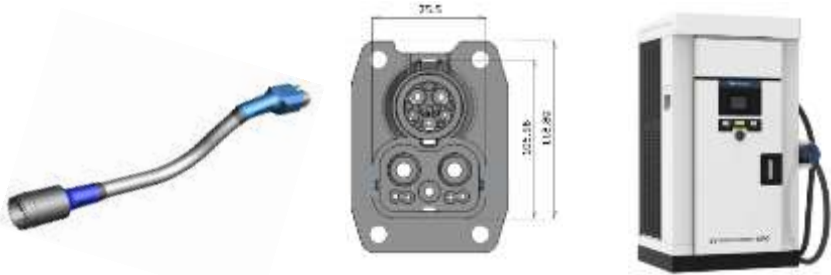
Prototype development of 3.0 / ChaoJi-2 HPC couplers/cables, adapters, chargers and EVs



Prototype testing (in Japan TBD)

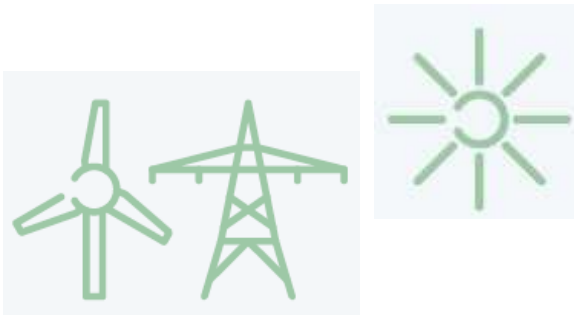


★ '20/3
3.0 / Chaoji-2
Prototype
chargers and
EVs unveiling



All possible with CHAdeMO

standards under construction IEC61851-23, 24/-23-1/-25



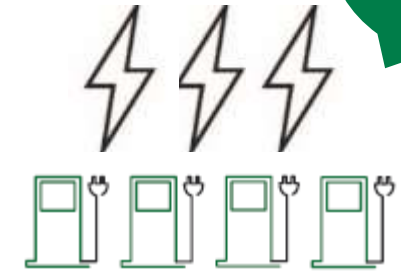
VPP
DR via
V2X

OFFICE/HOME CHARGING



Billing
Authentication
PnC

DESTINATION CHARGING



High
Power



Pantograph
Wireless
Dynamic

PATHWAY CHARGING

Vehicles
of all
size





CONTACT

Tomoya Imazu, Dave Makoto YOSHIDA –
info@chademo.org

Tomoko BLECH - info@chademo.eu