CHAdeMO

QUICKCHARGING AND BEYOND

20 July 2016 EV Roadmap 9

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PRESENTATION PLAN

- CHAdeMO Overview
  - Organization and members
  - Wide variety of products
  - Latest installation and EV plug share
  - CHAdeMO as international standards

- QUICKCHARGING AND BEYOND
  - Future vision of charging
  - High power CHAdeMO
  - V2X

CHAdeMO

CHAdeMO Overview
Organization and members

350 GLOBAL MEMBERS

33 COUNTRIES

CHAdeMO

CHAdeMO Overview
Wide variety of products

50

CHARGER MANUFACTURERS

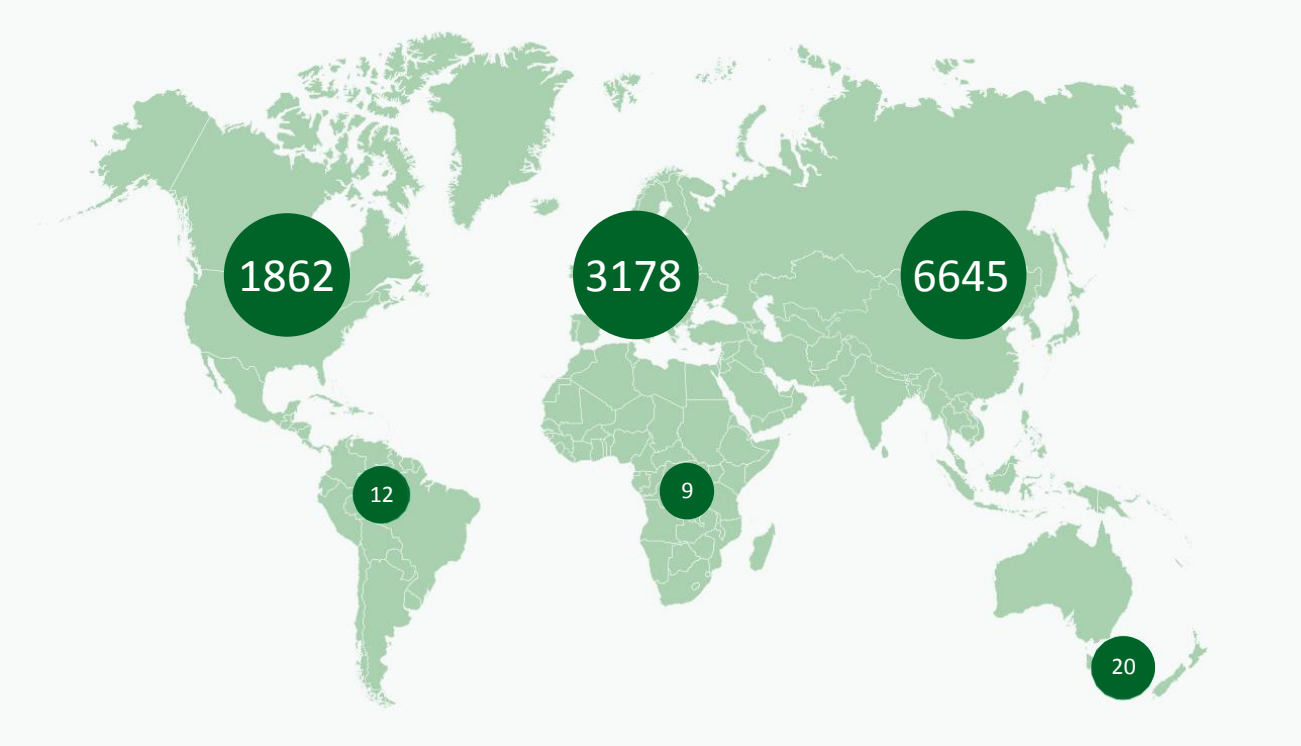
200

CERTIFIED CHARGER MODELS

+ VARIETY OF PLUGS

CHAdeMO

CHAdeMO Overview

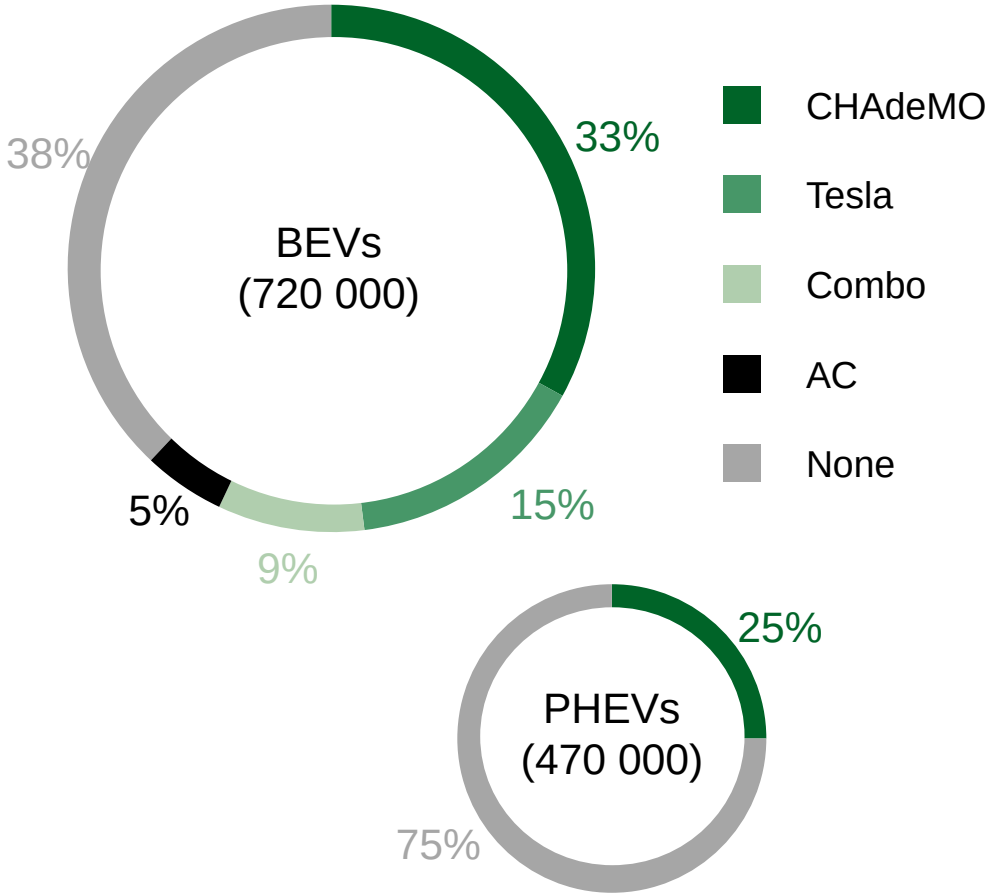


TOTAL Installations

11726

(as of June 2016)

Global plug-in sales by fast charging inlet



Source: IHS Automotive; 2010-2015 cumulative data

CHAdeMO Overview

CHAdeMO International Standards

IEEE

IEC

CHAdeMO (Japan)	GB/T (PRC)	COMBO1 (US)	COMBO2 (DE)
			

CENELEC

Note: IEC/EN 61851-23, IEC/EN 61851-24, IEC/EN 62196-3; IEEE 2030.1.1 TM-2015
Published on the IEC website as well as CENELEC's national committee websites

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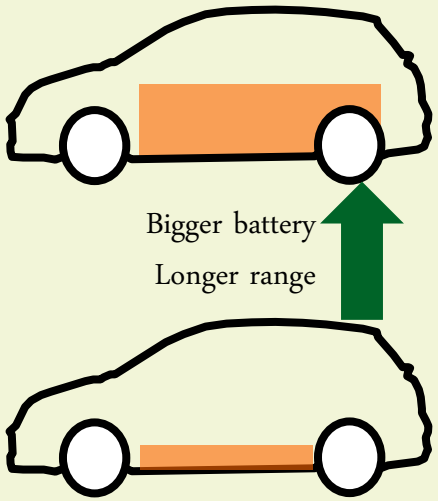
QUICKCHARGING AND BEYOND
Future vision of charging



Increased energy to charge

Varied charging behaviors
- Long distance driving
- Top-ups
- Needs-based charge time

More capacity as energy storage

Smart charging / V2X
- RES integration
- Financial incentives
- Emergency back up

Charging needs:

- ✓ **Normal** (3-7kW) @ Home, Office (w/**V2X**)
- ✓ **Medium** (10-25kW) @ Destination (stores)
- ✓ **High/Super High** @ Highway, Long drive use

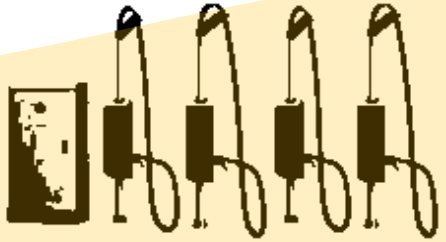
QUICKCHARGING AND BEYOND

CHAdeMO high power roadmap

150kW

50kW

100/150-200kW
(Cont./Peak)



350-400kW

Standalone type

125Ax500V

350Ax500V
（400Ax500V）

Multi-stand (power share) type

350-400Ax1kV

Forced cooling connector & cable

Dynamic power control （Real time adaptive control）

2016 **2018** **2020**

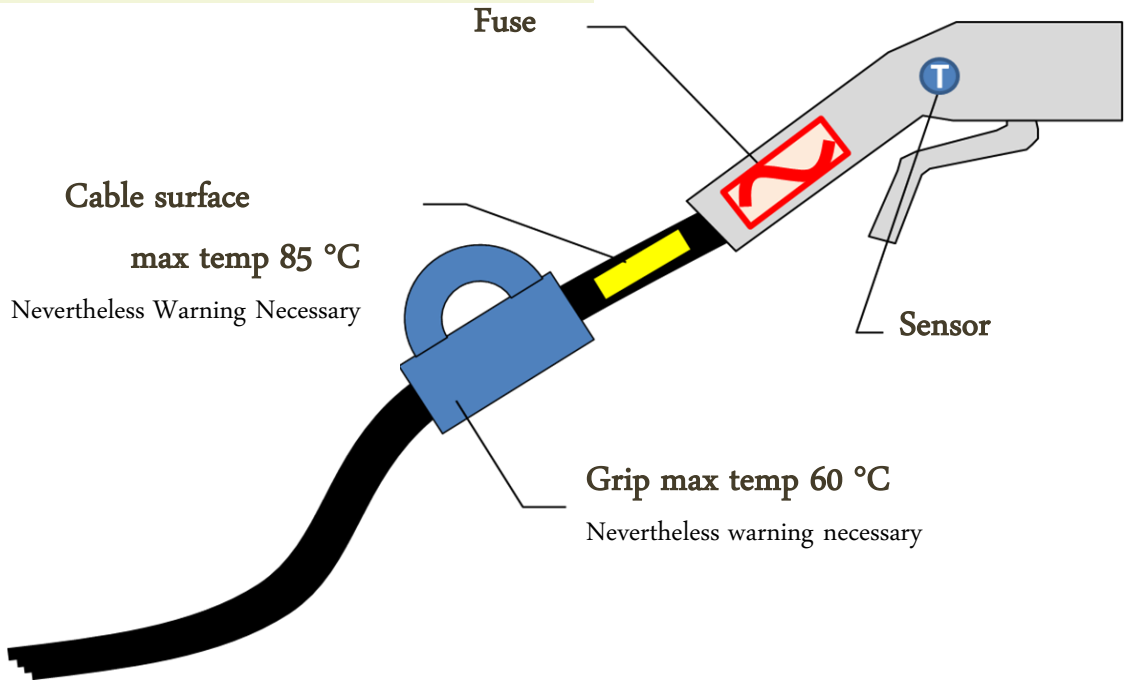
QUICKCHARGING AND BEYOND
CHAdeMO 150kW requirements

150kW

- CHAdeMO specifications for 150kW (350A/500V) are taking shape

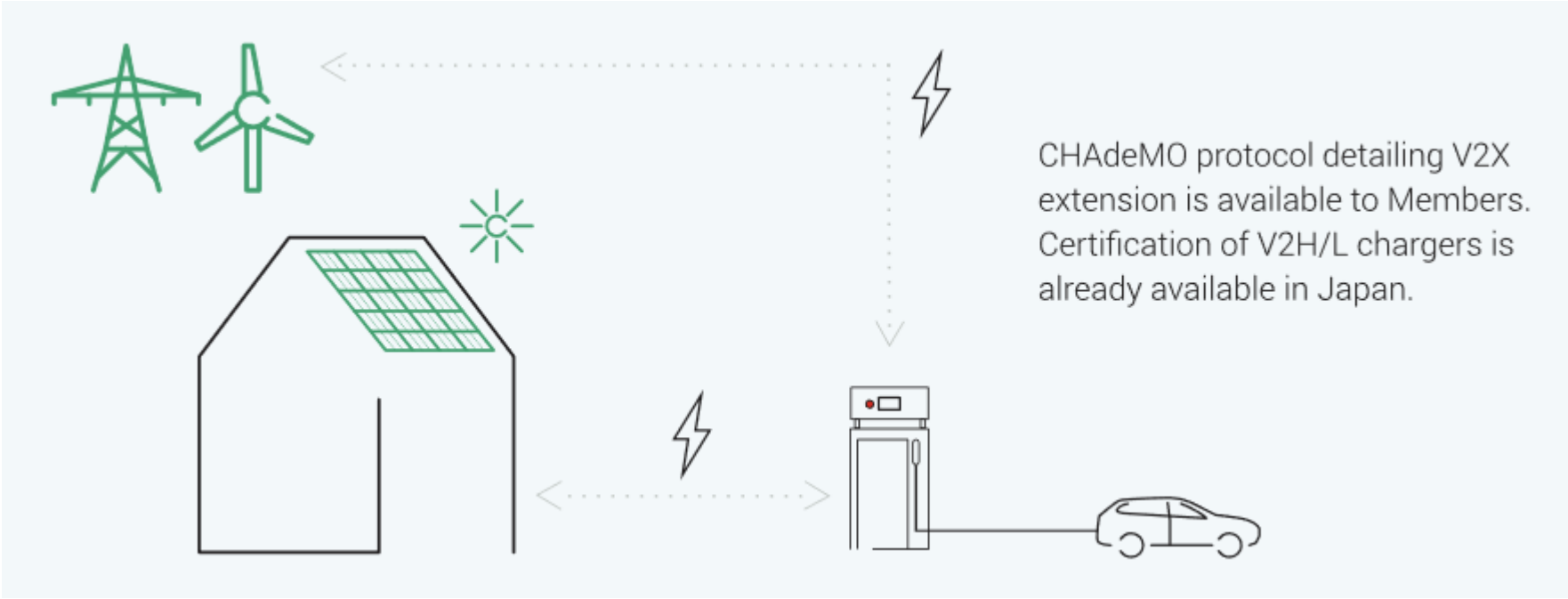
Safety for overcurrent:	fuse in the gun (not in the charger body)
Threshold of cable temperature:	part to be held below 60 °C
(ref UL2251)	part to be touched below 85°C
Cable temperature control:	thermo-sensor at gun and/or cable
	Direct current control by sensor feedback

- Changes mainly concern connector and not the specifications or charger body design



QUICKCHARGING AND BEYOND
V2X overview

V2X

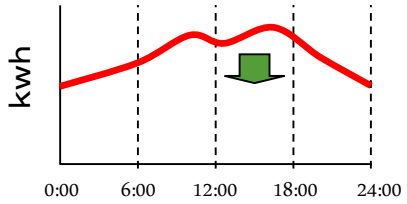


Back-up for blackout

Electricity supplied by EV to electrical devices in homes when black-out

Electricity peak shaving

Peak shaving by charging at night and discharging by day



Connecting w/ solar power

Solar power used at night if it is stored in EV during the day

QUICKCHARGING AND BEYOND
CHAdeMO V2X products in market

V2X

V2L
(Load)

= Certified

V2H
(Home)

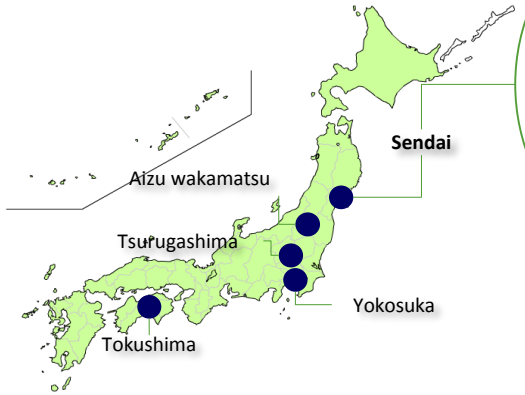
V2B
(Building)

V2G
(Grid)

QUICKCHARGING AND BEYOND
CHAdeMO V2B case studies (emergency back-up)

V2X

- **Local governments**



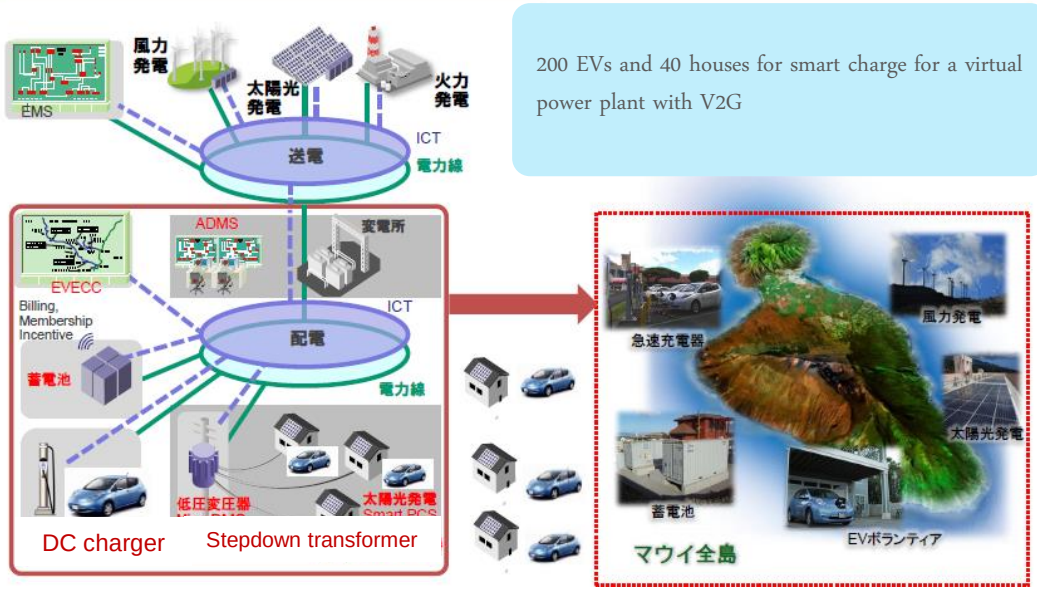
- **Office buildings**
  - For business continuity
  - Elevators, water pumps, lights powered by EVs

- **Apartment complex**
  - Shared EV
  - Emergency electricity supply powered by EV battery: 10 days
    - TV, radio, lights, mobile phone chargers…

QUICKCHARGING AND BEYOND
CHAdeMO smart charging demo projects

V2X

Smart Grid in Maui, USA



200 EVs and 40 houses for smart charge for a virtual power plant with V2G

V2B with EV and used Battery

↑ PCS ↓ Battery

THANK YOU

150kW

UPCOMING

V2X

A REALITY

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