



CHAdemo



DC V2X systems: advantages and evolution

Lyon, 20 May 2019

Tomoko BLECH

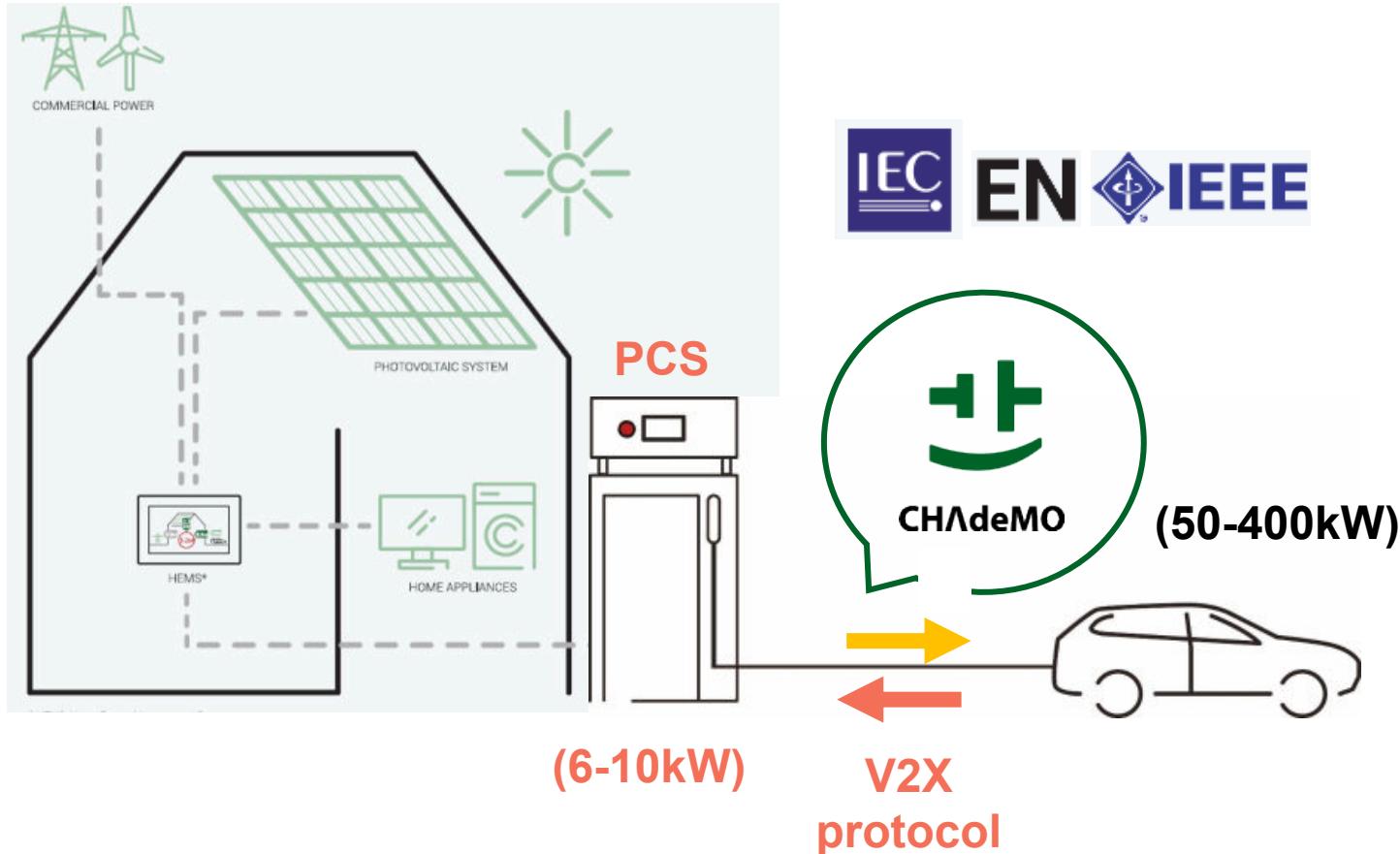


Agenda

- CHAdeMO basics and V2X
- International standardisation
- AC/DC system comparison
- Product R&D trend
 - Category
 - Trends
- Summary



CHAdeMO and CHAdeMO Association



CHAdeMO
Association



Association members



Our
members:

430

entities

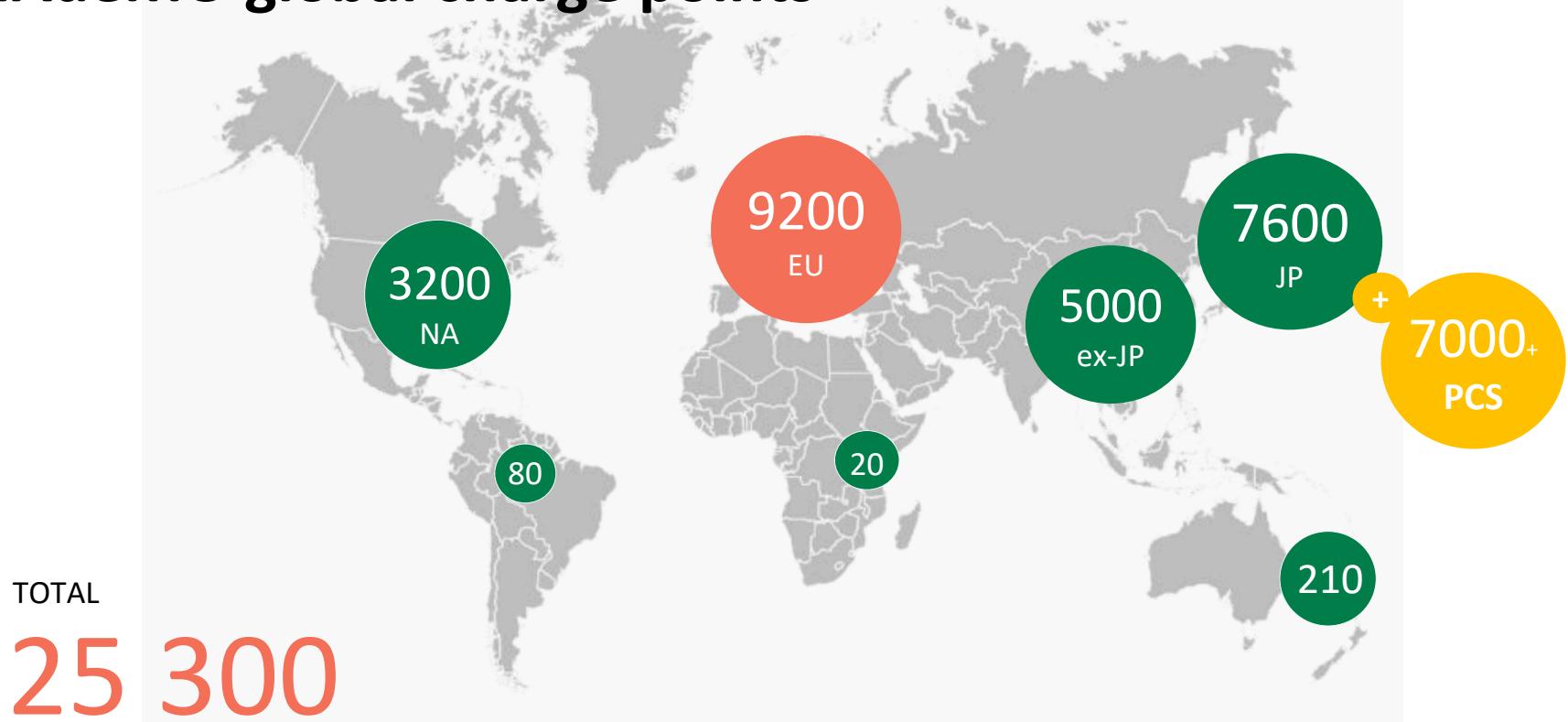
from

41

countries

And many, many more..

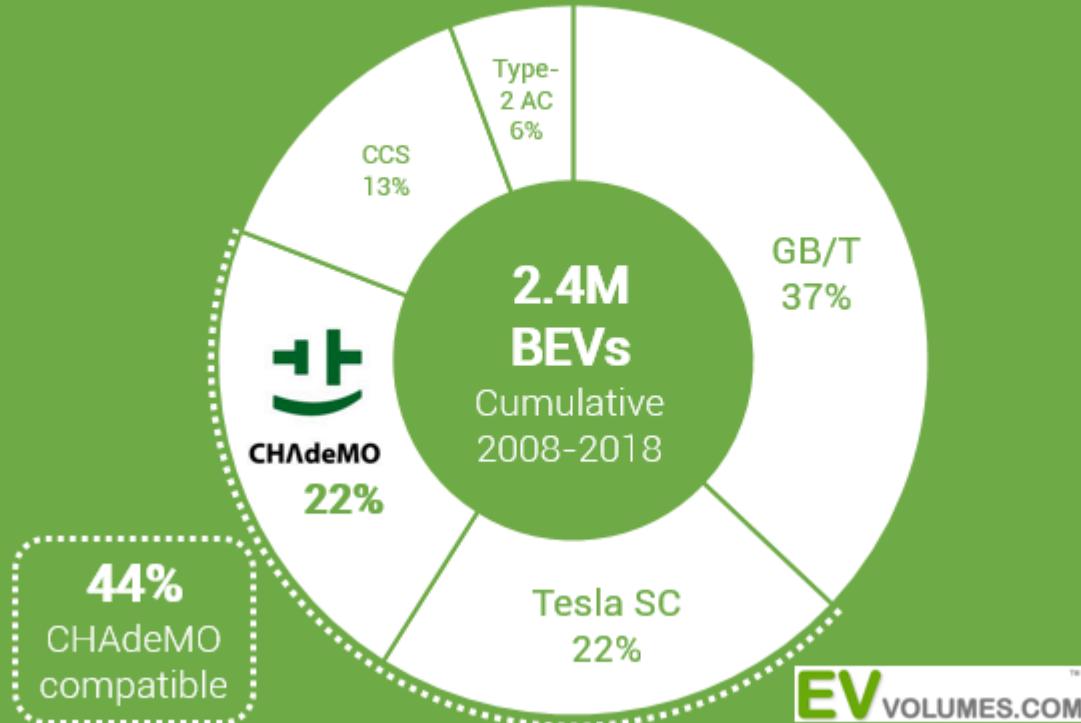
CHAdeMO global charge points



Note: as of April 2019; not exhaustive; not including V2H systems

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

GLOBAL FAST-CHARGEABLE BEV INLET SHARE



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



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International standards and smart charging requirements



GB/T
(PRC)



CHAdeMO
(Japan)



CCS Combo1
(US)



CCS Combo2
(DE)

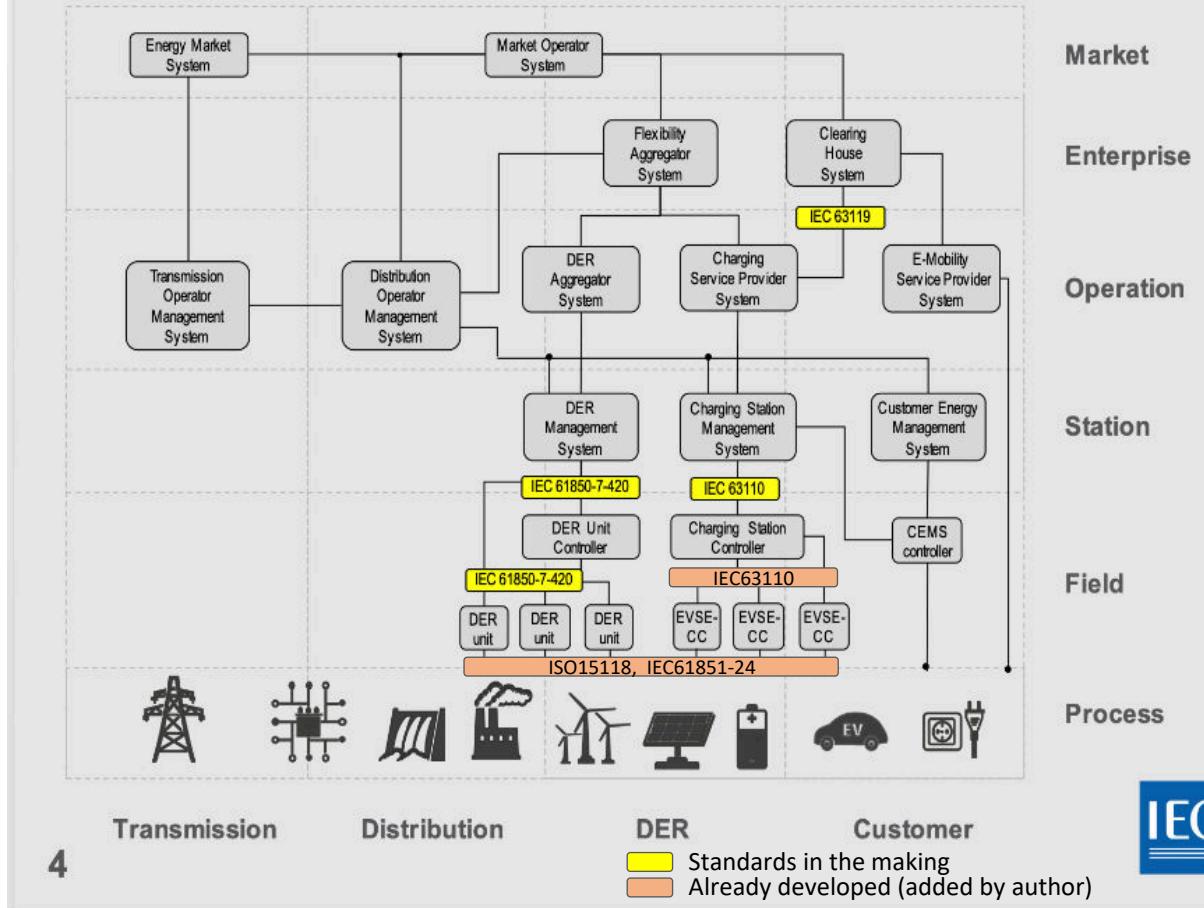


AC/DC Mono- directional	IEC 61851 (2014) ✓	IEC61851 (2014) ✓	ISO 15118 Ed1 (2014) ✓	ISO 15118 Ed1 (2014) ✓
DC bi- directional	Merging with CHAdeMO (2021)	CHAdeMO V2X (2014); IEC 62909-2 (2019) ✓	CCS (EU+US) + ISO/IEC 15118-20 (to be published in 2019)	
AC bi- directional	N/A (DC only)	N/A (DC only)	Bidirectional OBC (on-board charger) + ISO/IEC 15118-20 + IEC61851 Ed4 (to be started)	

V2X and energy market

SGAM information layer

Revision 2018-11-09



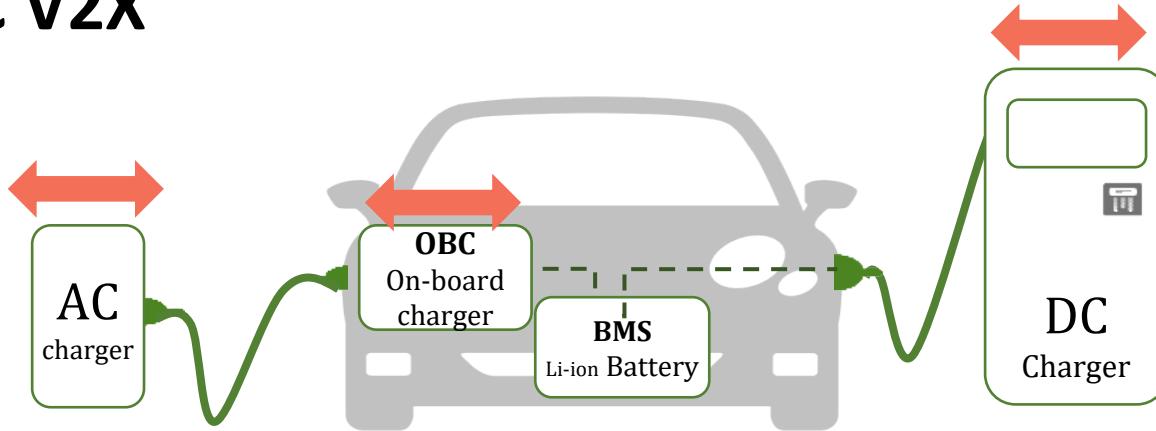


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AC / DC V2X



AC V2X

- Low power, slower charge
- Simple, easy, economic charger*
- More expensive (and heavier) EV*
- V2G in all locations when parked, but a challenge for DSOs
- More difficult to meet all grid requirements

DC V2X

- Faster with higher power
- Complicated, bigger, pricy charger*
- Less expensive (and lighter) EV*
- Greater scalability and service options → financial returns*
- Greater electrical safety, grid requirements easier to meet
- Direct solar, less loss



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V2X products in the market

V2V
(Vehicle)



V2L
(Load)



V2H
(Home-off Grid)

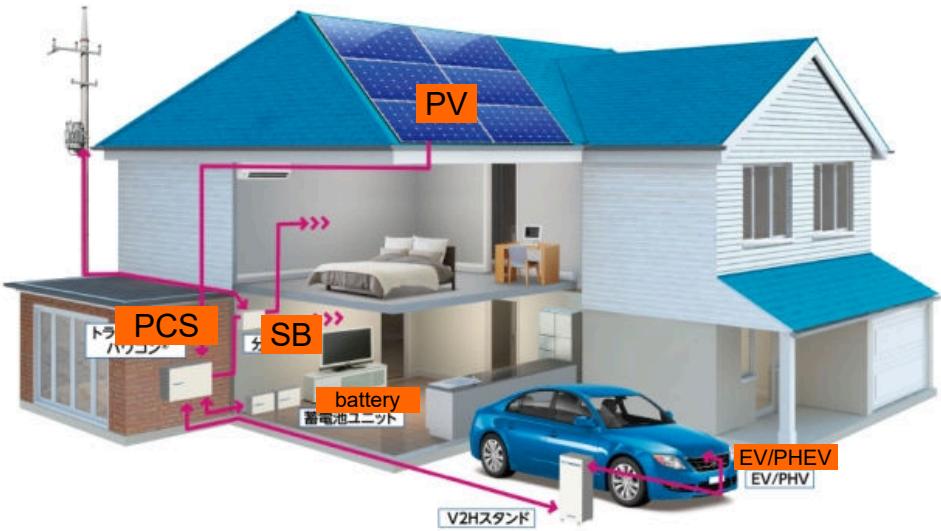


V2G/B/H
(Grid)



V2X Market trend 1: high-end multi-source systems

Multi-source system for homes



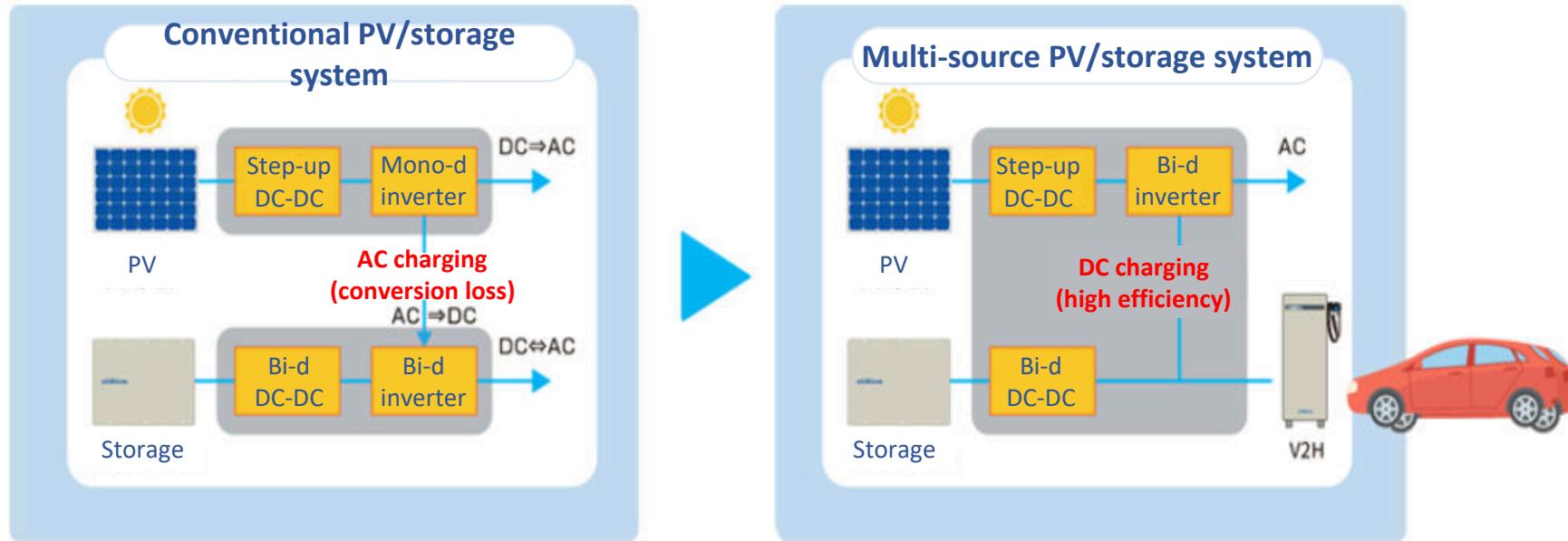
Source: Nichicon

Large-scale multi-source system



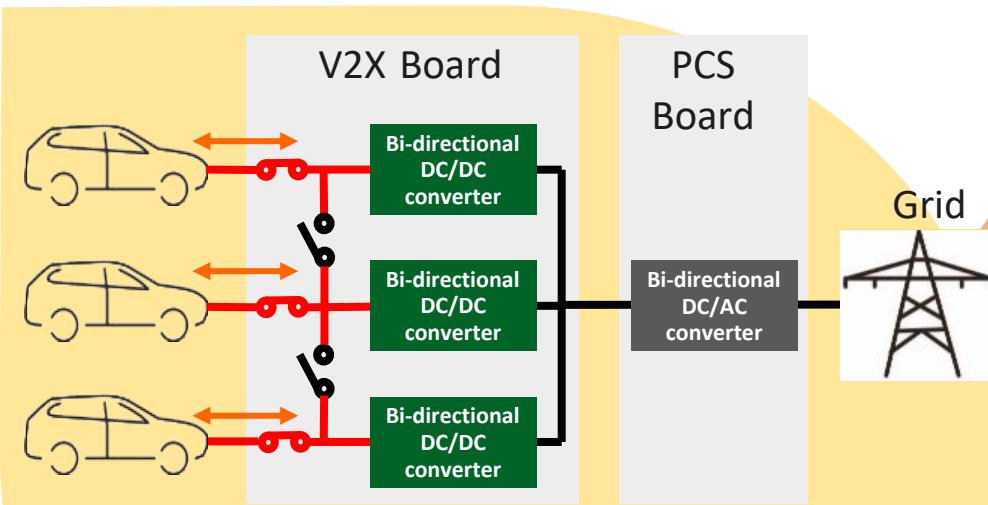
Source: TU Delft and Last Mile Solutions,
PRE Power Developers

How it works: avoiding conversion (and taxation) losses



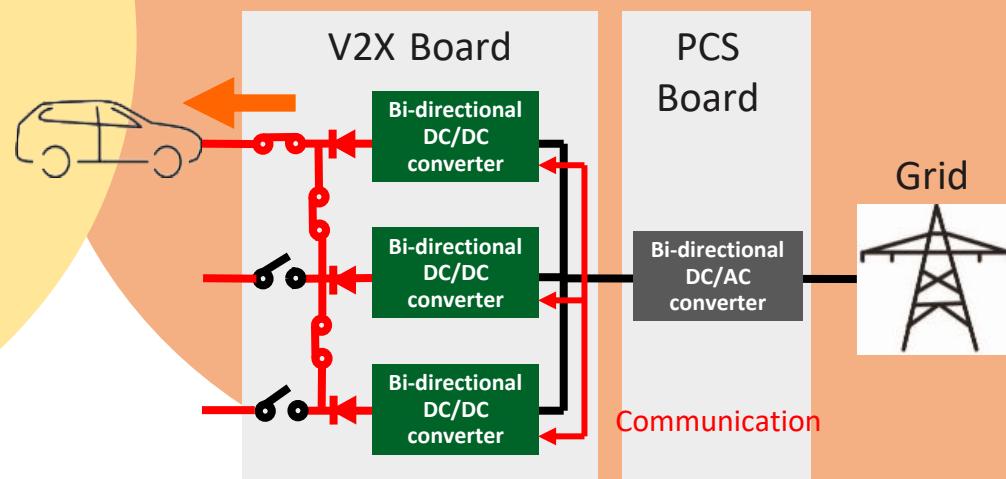
Source: Nichicon

Development in progress: fast-charge on V2X system



Fast-charger mode

- Parallelisation DC/DC converters
- Communication between each converter
- Ensure fast-charge



V2X Market trend 2: more affordable and compact PCS



eNovates /the New Motion
Wall-mountable V2G (10kW)



OVO/Indra
V2G for home(6kW)



Wallbox
DC V2G (7.4kW)

Photo courtesy of
Narcis Vidal, Enel X

Grid-integrated EVs: demo to commercial applications

 JUMPSmartMaui
USA

 LA Air Force Base
USA

 UCSD
USA

 PowerStream
Canada

 Yokohama Smart
City Project
Japan

 Nikola Project /
Parker Project
Denmark

 Nuvve Project
Denmark

 Amsterdam Smart City
Netherlands

 NewMotion V2G Project
Netherlands

 GrowSmarter
Spain



 Nissan HQ Project
France

 GridMotion
France

 Genoa Pilot
Italy

 Suvilahti Pilot
Finland

 Nissan-Enel Project
UK

 DriveElectric
UK

 OVO
UK

 Redispatch V2G
Germany

 SEEV4-City
UK

 Norway
 Netherlands
 Belgium
 Germany



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Summary

- CHAdeMO is the only enabler of V2X with production EVs/PCS readily available
- More V2X product options are increasingly becoming available both high-end and affordable models
- To reduce the price and accelerate V2X adoption, more AC/DC V2X products are awaited, although some standardisation work remains

