http://www.chademo.com

Spring 2015

Chademo_eu

CHAdeMO

## Our mission

**Creating the optimal fast charging standard compatible with all EVs and deploying the infrastructure in order to accelerate the realization of e-mobility.**


### Contact

Secretariat
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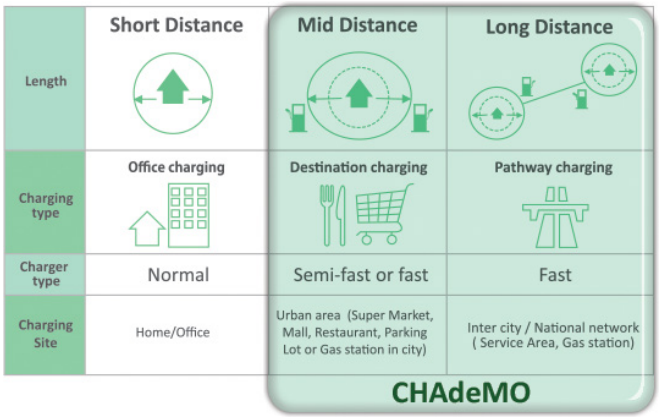
# CHAdeMO: the leading global protocol since 2009

## *The world's first DC charging solution with a proven record of safety and trust*

CHAdeMO is the world's first DC fast charging standard designed for modern Electric Vehicles, featuring high density lithium-ion batteries and compact yet powerful magnetic synchronized motors. The R&D of CHAdeMO dates back to 2005. After more than four years of thorough testing and on-site demonstration, the first commercial CHAdeMO charging infrastructure was commissioned in 2009.

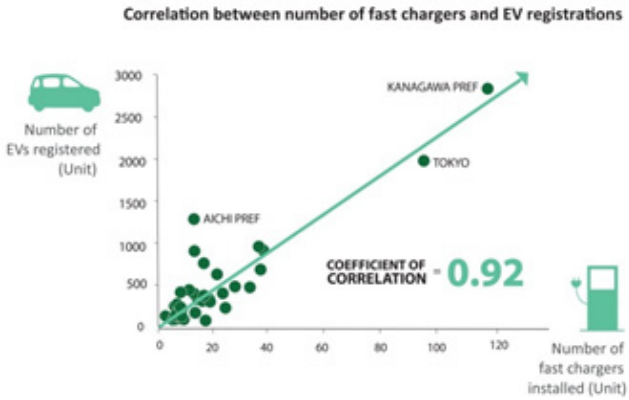
The goal of the R&D was to develop a public infrastructure of fast chargers that enables EV driving without worrying about battery range. More and more CHAdeMO EVs are being sold and their increasing popularity is accompanied by a growing infrastructure of CHAdeMO chargers, which can be found in the US, Europe, Australia, Japan, and other parts of the world.




## *Our objective*

The objective of CHAdeMO is to accelerate EV adoption by providing EV drivers with an opportunity to quickly charge their battery, alleviating any nervousness, or "range anxiety", they may have.

Fast chargers take away the risk of running out of power and being stuck at a normal charger for hours, thus providing a psychological comfort to EV drivers. Data demonstrates there is a positive correlation between the number of fast chargers installed and the registeration of EVs in the area.




CHAdeMO DC fast charging provides the best balance to urban EV users in terms of time, space and money. It allows them to regain mobility in a short time as it can feed the electricity necessary for a 40-60 km drive within 5-10 minutes. Within 30 minutes, they can almost fully charge their EV. This saves precious time for city dwellers and saves valuable space in the city by limiting the occupancy of charging spots by a single EV user.

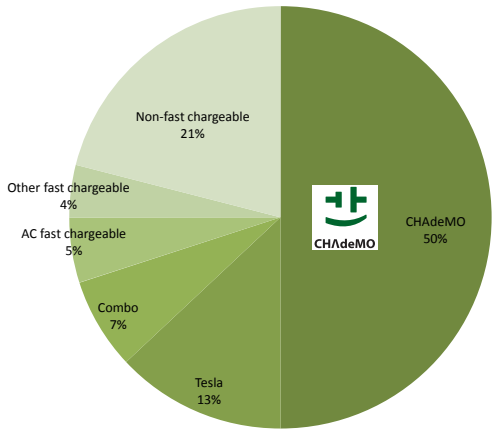
## *Serving a majority of EVs in the world*

The global sales of passenger EVs between 2010 and 2014 amounted to 368,000 of which almost 80 % are fast chargeable, thanks to the new EVs in the recent years.

Of all EVs sold around the world during the same period, by far, the biggest share are CHAdeMO compatible.

## Global EV Sales by fast charging type

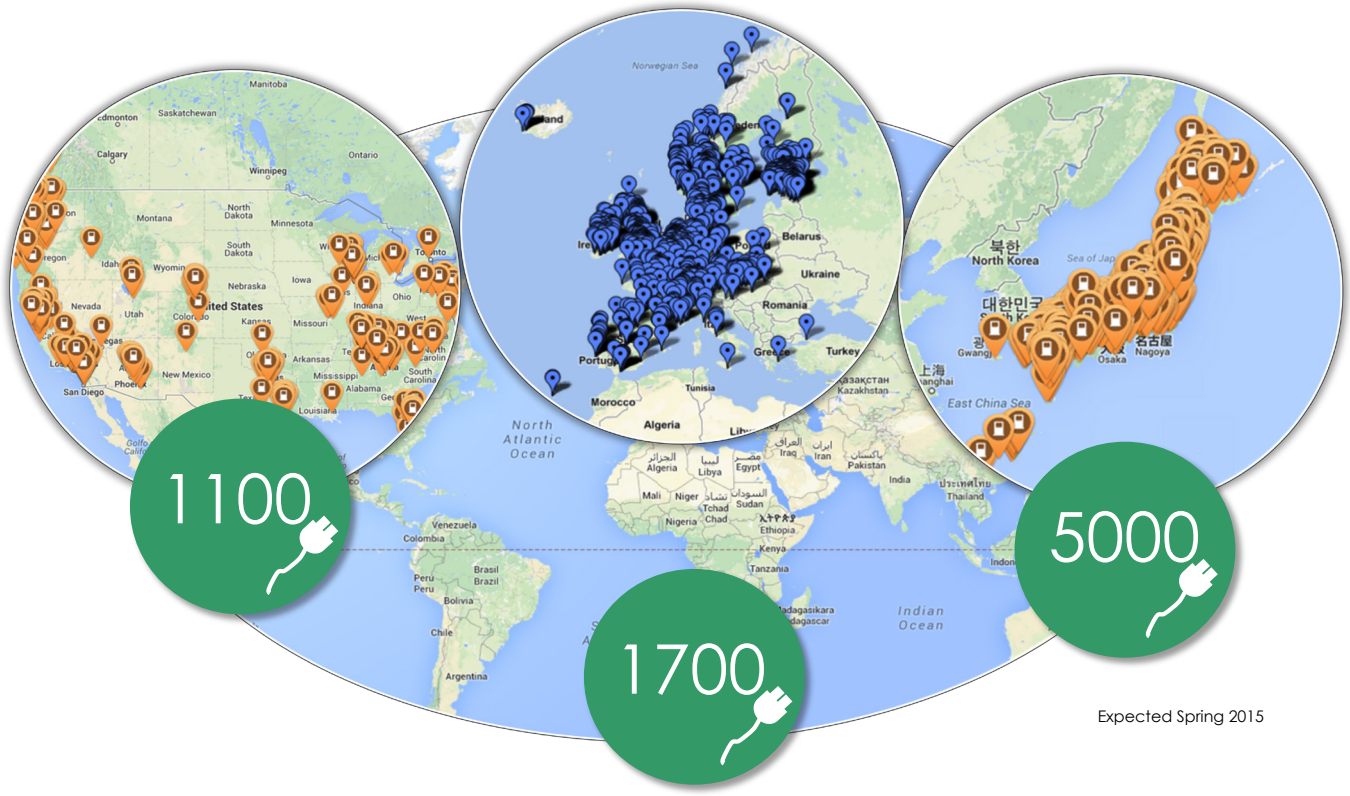
**(Cumulative 2010-2014)**




Source: IHS Automotive

# Approaching 8,000 chargers across the world & going strong, demonstrating world-class cooperation across industries

## Deployment of CHAdeMO fast chargers across the world




## CHAdeMO members

Overall, **341** organizations in **38** countries around the world are represented in the CHAdeMO association today.

And more...

# CHAdeMO chargers produced by over 50 charger manufacturers providing energy to EVs of different brands and models

## CHAdeMO certified chargers


Tritium (Australia)


Circontrol (Spain)


EVTEC (Switzerland)


DBT (France)


Efacec (Portugal)


ENDESA (Spain)


ABB (Switzerland)


Hitachi, Ltd. (Japan)


Takaoka Toko (Japan)


SIGNET Systems (Korea)


Siemens (Germany)


Andromeda S.r.l. (Italy)


IES synergy (France)


Nissan (Japan)


Hong Kong Productivity Council (Hong Kong)


Fuji Electric (Japan)


JoongAng Control (Korea)


Aker Wade (US)


Delta Electronics (Taiwan)


Takasago (Japan)


PNE Systems (Korea)


GS Yuasa (Japan)


Lafon (France)


GH electrotermia (Spain)


Nichicon (Japan)


Petrotec (Portugal)


Hasetec (Japan)


Schneider (France)


Ingeteam Power Technology S.A. (Spain)


e8energy (Germany)

**And more...**

## CHAdeMO compatible EVs


Nissan : LEAF


Mitsubishi Motors:Outlander PHEV


Citroen: C-ZERO


Peugeot:iON


Nissan: eNV200


Tesla Model S with adapter


Citroen: Berlingo


Peugeot: Partner


KIA Soul


Mistubishi Motors : i-MiEV


MitsubishiMotors: MINICAB-MiEV


Mitsubishi Motors: MINICAB-MiEV


BD Otomotive: eTRAFIC


Mazda : Demio EV


Honda : Fit EV


Toyota : eQ

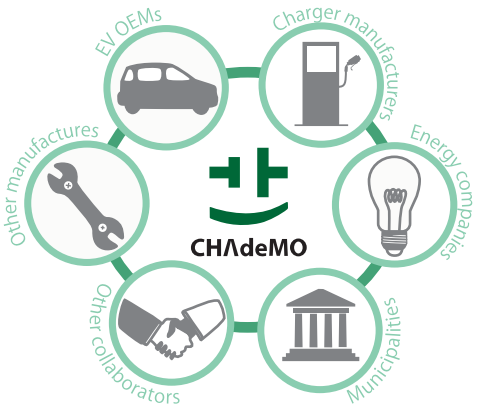

Subaru : Plug-in Stella


BD Otomotive: eScudo

## To be introduced


Nissan: Infiniti EV Sedan

# CHAdeMO association provides various activities for both its members and the public




## CHAdeMO activities for members

**•Technical- /infrastructure workshops**

CHAdeMO organizes technical and infrastructure workshops regularly to ensure our protocol is trustworthy. Technical workshops take place to provide transparent discussions on the improvement of the protocol as well as certification procedures. Infrastructure workshops are held to discuss various issues around deployments and installation of CHAdeMO chargers.

**•Co-exhibits at major shows**

CHAdeMO showcases its leading technology through joint stands at major shows


**•Exclusive newsletters**

Our newsletters provide regular updates to CHAdeMO members on topics around CHAdeMO fast charging. With information on activities of the association, the successes of its members, the status of the standardization process and the growing number of CHAdeMO chargers across Europe, the newsletter provides a channel of direct communication between the Secretariat and the members.

**•Delivery of the members' voice**

CHAdeMO association calls on related stakeholders to deliver our members' voice. With CHAdeMO chargers being an innovative new technology for future generations, a collective voice to demonstrate its advantages to political, administrative and industry decision-makers is essential.

## CHAdeMO activities for the public

**•Twitter**

CHAdeMO's twitter account was created to reach out to its members and the wider public with real-time CHAdeMO updates and conversations. The number of followers of our account (CHAdeMO_eu) constantly increases - articles, photos and links that we tweet are regularly picked up by various media and passed on in the form of tweets or articles, adding to the visibility of the protocol and its fast chargers.

**•Articles**

Stories about the fast charging deployment, fast charging successes of our members and collaborators, reactions to the standardization process and updates on the activities of the association are some of the categories of articles we post on our website(www.chademo.com).

**•Websites**

CHAdeMO association discloses useful information on our technology and fast charger deployment in English and Japanese. The website helps the general public to learn about our passion and role in today's world, which is facing global environmental problems.

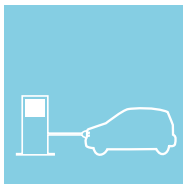
**•Conferences**

CHAdeMO participates in various fast-charger related conferences. Subjects vary depending on the theme and audience: from technical aspects and emerging findings, to regulatory issues.

# CHAdeMO: The fully proven fast charging system servicing customers around the world

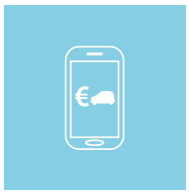
## Safety First

- Users' safety is paramount. CHAdeMO has mandated strict safety principles to guarantee safe operation.
- Communication is duplicated through the 'analogue' signals via pilot lines and the 'digital' data signals via CAN communication lines. These two communication routes can prevent false operation by defining action by AND condition, and stop order by OR condition.
- The interlocking hardware is structured so that the coupler is never disconnected from the inlet while charging, and no active electricity reaches the exposed terminal parts when disconnected.
- Electricity leakage is prevented through a unique electrical circuit design and the insulation checking procedure.



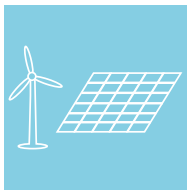
## CAN Communication

Today, CAN is used as the preferred on-board communication network system for all conventional/electric vehicles. Over a number of years it has been recognized as the most reliable and proven solution. CHAdeMO elected this trusted CAN protocol to ensure maximum safety and reliability for users.



## Future Flexibility

The CHAdeMO protocol limits the scope of standardization to the strict minimum to make sure that, first and foremost, charging is safe and interoperable. All other optional functions are left open to meet any specific local requirement and telecommunication environment. Recognizing the heightened expectation for what EVs can bring about, this flexibility is stimulating the innovative minds of investors both on the vehicle and infrastructure sides.



## Smart Grid Application

The mass deployment of electric vehicles happens together with an increasing production of renewable energy, and CHAdeMO can respond to the changing needs of the grid that accompany those developments, as it allows bi-directional charging with slight modification on the vehicle side. CHAdeMO is already capable of addressing efficiently the future needs of the market through vehicle-to-Home systems. CHAdeMO is an ideal solution for smart cities, validated in projects in various areas of the world, notably Japan, Spain, France and the US, under the umbrella of international Smart City collaboration.

## User Friendly Connector

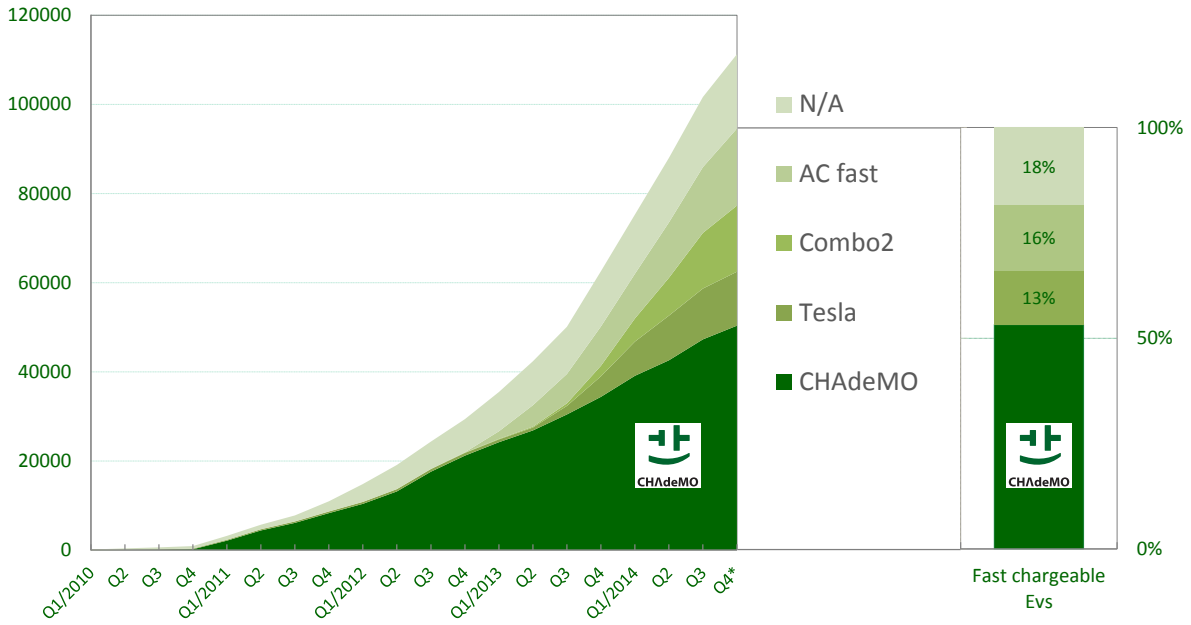
The connecting device consists of a connector on the charger side and an inlet on the vehicle side. CHAdeMO has been designed and continuously improved to ensure the optimal balance between ergonomic performance, simplicity, and charging capability. The dedicated DC inlet design allows CHAdeMO to keep the weight of the connector to a level suitable for customers' everyday use.

## Optimal Output Power

Considering the cost of delivering the required power and the charging time, the majority of utility companies around the world support CHAdeMO's view in setting the most appropriate power level at 50KW, although in terms of the connector design, this can be almost doubled. On the other hand, 20KW units require much less input power and can be an ideal charging solution in certain urban or commercial areas where access to higher power levels is not readily available. This flexibility on both ends of the charging power spectrum demonstrates the clear competitive advantage of CHAdeMO in the market.

# CHAdeMO stays strong in Europe: EU endorses CHAdeMO multi-standard chargers

## European EV sales by fast charging type (cumulative) 2010-2014




## *CHAdeMO supports multi-standard chargers*

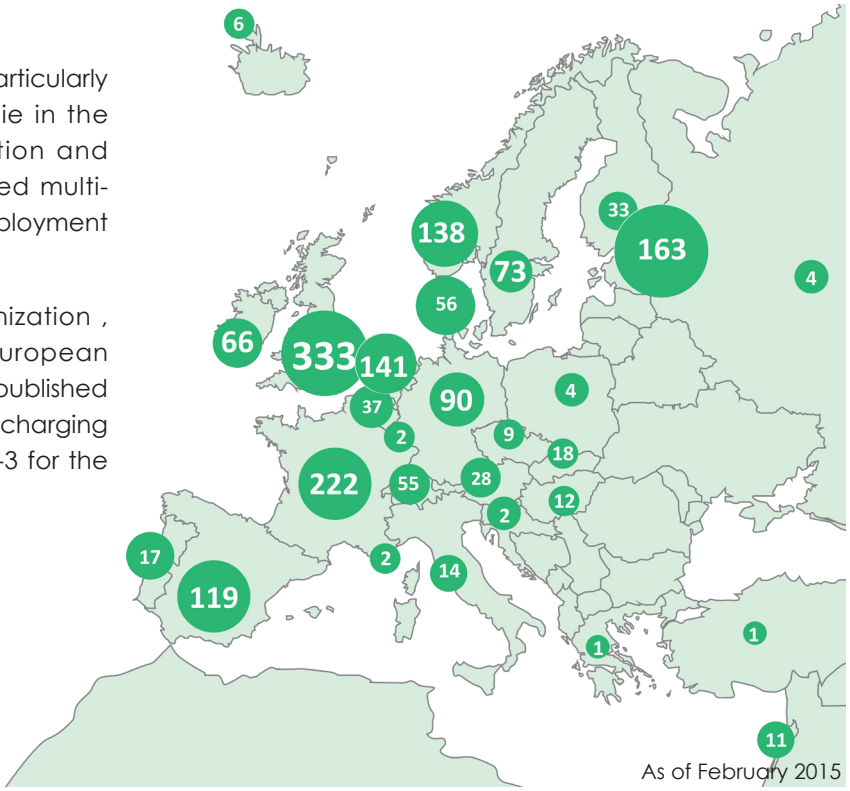
For the sake of dissemination of EVs and the EV industry, CHAdeMO fully endorses multi-standard fast chargers. CHAdeMO believes that the deployment of multi-standard fast chargers will break down the contentious issues on compatibility and enhance the public's accessibility to the EV market, hence accelerating the positive spiral of more chargers leading to more EVs.

Currently, a trend of multi-standard chargers is particularly observed in Europe. The reasons behind this lie in the alignment of politics, technical standardization and the market - the European Union has embraced multi-standard charging in the EU Directive for the deployment of alternative fuels infrastructure (2014/94/EU).

CENELEC, a European official standards organization , recognises both CHAdeMO and Combo as European official standards (EN). CHAdeMO has also been published as international standards in IEC: 61851-23 for the charging system, 61851-24 for communication, and 62196-3 for the connector.


Multi-standard chargers are already mainstream products in the EU market, as seen in some EU-funded large scale multi-standard charger deployment projects (see next page).

## CHAdeMO chargers installed in Europe




As of February 2015

# CHAdeMO is servicing over 50,000 EV drivers in Europe

## Scene 1: Urban area

### ▶ Car-Sharing

***Tallin, Estonia***

Estonia's nation-wide car sharing programme, ELMO, was created in 2013 to complement Estonia's national fast charging infrastructure. Their easy, web-based first-time subscription with immediate account activation, coupled with the nation-wide fast charging infrastructure, allows users to move around the entire country.

### ▶ e-Taxi

***Barcelona, Spain***

Barcelona implemented a 100% electric taxi fleet in the city. This is one of the first attempts in the world to commit to the implementation of the zero-emission vehicle as publicly accessible transport. There are 10 public CHAdeMO fast chargers installed in the Metropolitan area and the city aims for a 30-charger network in and around Barocelona by 2015.

*© Barcelona City Council*

## Scene 2: Nation-wide

***The Netherlands***

The Netherlands is working on an immense plan to implement a comprehensive nation-wide EV charging infrastructure project. In partnership with Fastned, the country foresees more than 200 charging locations along its highways and 200,000 EVs circulating on Dutch roads by 2020. Fastned also covers the Dutch part of the EU-funded ELECTRIC (European Long-distance Electric Clean Transport Road Infrastructure Corridor) project, which will install 155 triple-connector chargers in three other European countries (Sweden, Germany, Denmark).

***France***

The French utility giant Electricité de France (EDF) will install 200 new CHAdeMO/Combo2/AC fast multi-standard chargers along the French motorways linking large urban areas and suburban centres. Preceding this, the nation's second largest supermarket chain, Auchan, also launched a project to install 130 fast chargers in all of their supermarket car parks in France.

## Scene 3: EU-wide

***RCN (UK and Ireland)***

The first EU-funded multi-standard and multi-country charging infrastructure project was launched across the UK & Ireland in 2013. Over 1,100 km of major UK and Irish road network routes will be covered with 74 fast charging stations. Automakers that chose different fast charging protocols - BMW, Nissan, Renault, and Volkswagen - are working together for this extensive EU project.

***CEGC***

The CEGC (Central Europe Green Corridors) project is led by Verbund, a utility company in Austria. In this project, 115 triple-connector chargers will be installed across five countries. The biggest portion will be in Austria (60 chargers), followed by Slovenia (26), Slovakia (21), Germany (5) and Croatia (3). This €7.1 million project will be co-financed by the same automakers as the EU-funded RCN.