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CharIN e.V.

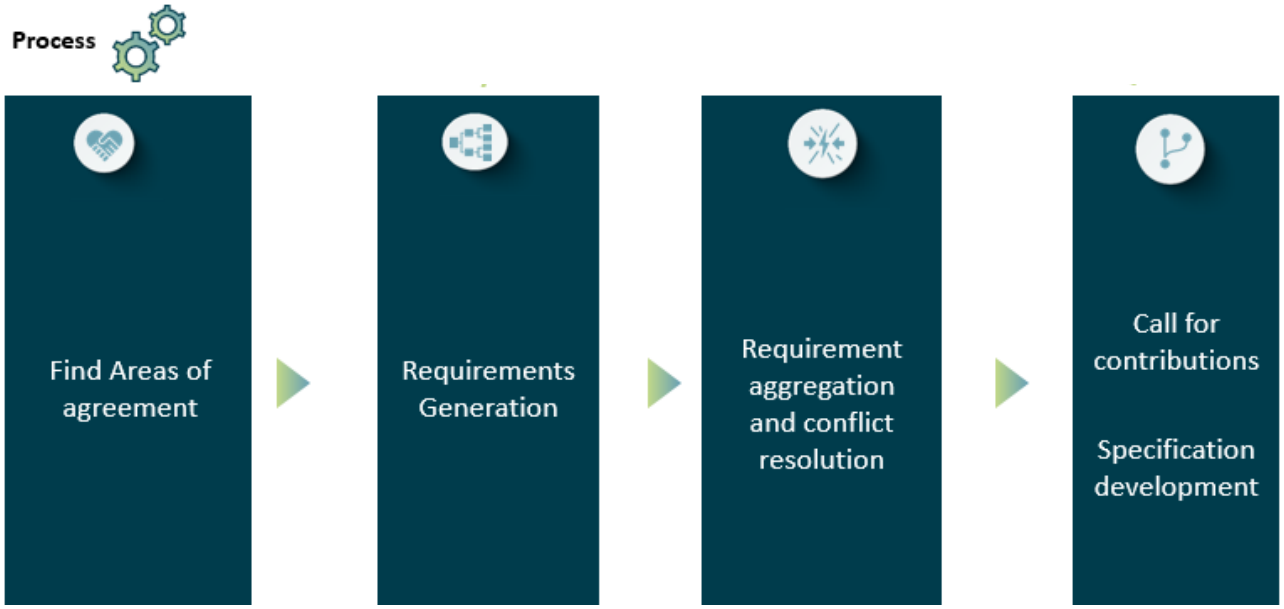
CharIN HPCCV Task Force: High Power Plug Update

April 2020

Where we started

A CharIN task force was formed in March 2018 with the following purpose statement:

"Define a new commercial vehicle high power charging standard to maximize customer flexibility." It was named the High Power Charging for Commercial Vehicle Task Force (HPCCV for short)



CharIN Appointed Task Force Lead

Rustam Kocher
DTNA - EMG

There are many public DC charging standards…but none are sufficient for commercial trucks

USA-Japan	Europe	USA-Japan-Europe	China
Combo 1: Combined AC & DC	Combo 2: Combined AC & DC	Chademo	GB/T
			

They were all designed to quickly charge passenger cars, not commercial trucks. Existing and future passenger car charging limits are 500-600A.

In order to charge a truck carrying 200-600 kWh batteries in 20-30 minutes, the charge time requested by customers, trucks will require power levels of **over 1 MW and current over 1000A**.

None of the existing public standards are capable of providing the power needed to quickly charge commercial trucks, which will require 4 to 10 times higher charging power than existing passenger car charging systems!

Task force represents wide range of industry stakeholders

Focus is on solving customer needs

CharIN

OEMs

DAIMLER, BYD, FCA, MAN, Ford, SCANIA, General Motors, HYUNDAI, Linde, PACCAR Inc, NAVISTAR, GILLIG, PORSCHE, TESLA, NEW FLYER, PROTERRA, VOLVO, RIVIAN

Customers

PENSKE, NFI, RUAN, ATA American Trucking Associations

Utilities

aps, California Energy Commission, DUKE ENERGY, EPRI Electric Power Research Institute, Portland General Electric

Travel Centers

bp, Love's, TA, PETRO Stopping Centers, Shell

Government Labs

Argonne National Laboratory, Sandia National Laboratories, INL Idaho National Laboratory, U.S. Department of Energy, NREL National Renewable Energy Laboratory

Suppliers and Equipment Manufacturers

ABB, APTIV, Thomas&Betts, chargepoint, BRUGG, heliox, DELTA, HUBER+SUHNER, IoTecha, TE connectivity, ITT, schunk, Cummins, LEONI, STÄUBLI, VECTOR, Transtech Industries, Inc., SYNOPSYS, REMA, TRITIUM, PHOENIX CONTACT, SINBON, SIEMENS

Design & Construction

BURNS McDONNELL, PROLOGIS, BLACK & VEATCH

Standards

CharIN, UL

Network Providers

The Mobility House, electrify america, GREENLOTS, allego, EVgo, FASTNED

Requirements

Process

- The HPCCV held a requirements-gathering process including all stakeholders.
- Subgroups were formed and created their requirements, which were then aggregated.
- An in-person meeting was held in September 2018 to gain group agreement on the requirements. They were later finalized during online meetings.
- Those requirements were then approved by the CharIN Board of Management on Nov 28, 2018
- The requirements were published on the CharIN website and solutions were solicited to solve the requirements.

Requirements (not a complete list)
• Single conductive plug
• Max 1,500 VDC
• Max 3,000 ADC
• PLC + ISO/IEC 15118
• Touch Safe (UL2251)
• On-handle software-interpreted override switch
• Adheres to OSHA & ADA (& local equivalent) standards
• FCC Class A EMI (& local equivalent)
• Located on the Left side of the truck, Roughly hip-height
• Capable of being automated
• UL (NRTL) certified
• Cyber-Secure
• V2X (bi-directional)

Current status:
Design Selection Made, Testing and Validation Underway

- **Selection has been made, iterative development is underway**: After a call for submissions to solve the requirements, competing propositions were presented. The HPCCV task force made their selection in May 2019, and in September 2019, the CharIN leadership declared their consensus to pursue the selected design of a hand-held conductive charging plug and socket capable of 3000 A, specifically for Commercial Vehicles.

- **The Task Force is now focused on iterative testing and validation of this selection** : Ongoing regular technical meetings discuss details of the future standard, including initial voltage range, current capability and associated thermal performance, plug/socket geometry fit and function, etc.

- Multiple task force members have agreed to convene for a **testing event** at the National Renewable Energy Laboratories (NREL) in Golden, Colorado now delayed to **late September 2020**. Powered and unpowered testing will be conducted.

- The ultimate goal of the task force is create a complete a requirements and specification document, including plug geometry. The goal is to complete this document by the end of 2020, although COVID-19 may delay that timeline.