

ChargeX Consortium

Improving the EV Charging Experience



CHARGEX
consortium



February 21st, 2024

LED BY





Vision

Any driver of any EV can charge on any charger the first time, every time

Mission

Bring together EV charging industry members, national laboratories, consumer advocates, and other stakeholders to measure and significantly improve public charging reliability and usability in North America **by June 2025**

Scope

Focus on complex issues that require multi-stakeholder collaboration and national lab support to solve and simplify

Scope of Work

Working Group 1

Defining the Charging Experience

- Define KPIs
- Set and validate targets
- Track industry performance

Working Group 2

Reliability/Usability Triage

- Create fixes for:
- Payment and user interface
 - Communication
 - Hardware

Working Group 3

Solutions for Scaling Reliability

- Improve:
- Diagnostics
 - Interoperability testing methods

Outcomes

- Labs produce recommended practices, prototype tools, voluntary recognition program design
- Industry adopts practices and tools, improves standards

Operating Model

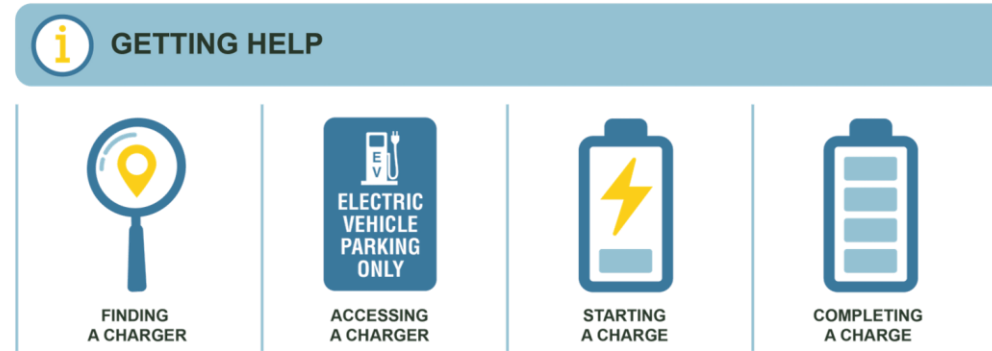
1. Working Group or Task Force defines focused project, identifies champion, and forms small project team
2. Project team performs work, develops draft product
3. Project team seeks input from Task Force, collects additional data, refines and publishes product
4. Task force implements, demonstrates product, and socializes across consortium
5. Consortium pushes for broad industry implementation

Project Progress Updates

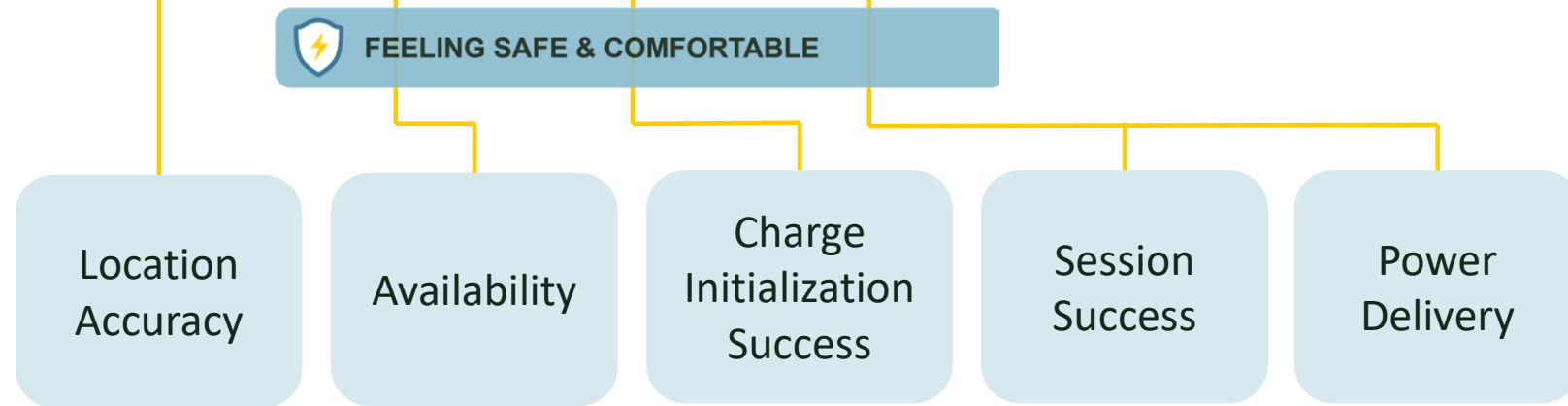
Defining the Charging Experience

Working Group 1
Lead lab: INL

Defined key aspects of the charging experience:



Defined KPIs to measure and improve performance:



Payment System Reliability

Working Group 2,
Payment & User Interface
Task Force
Lead Lab: NREL

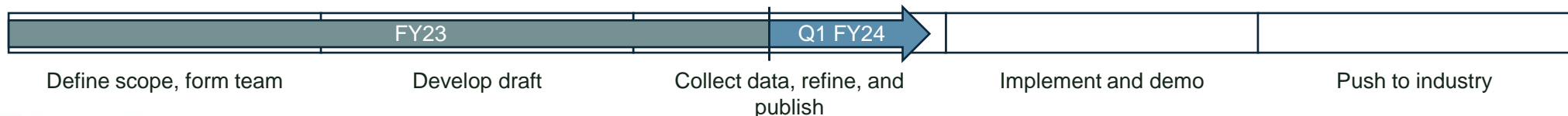
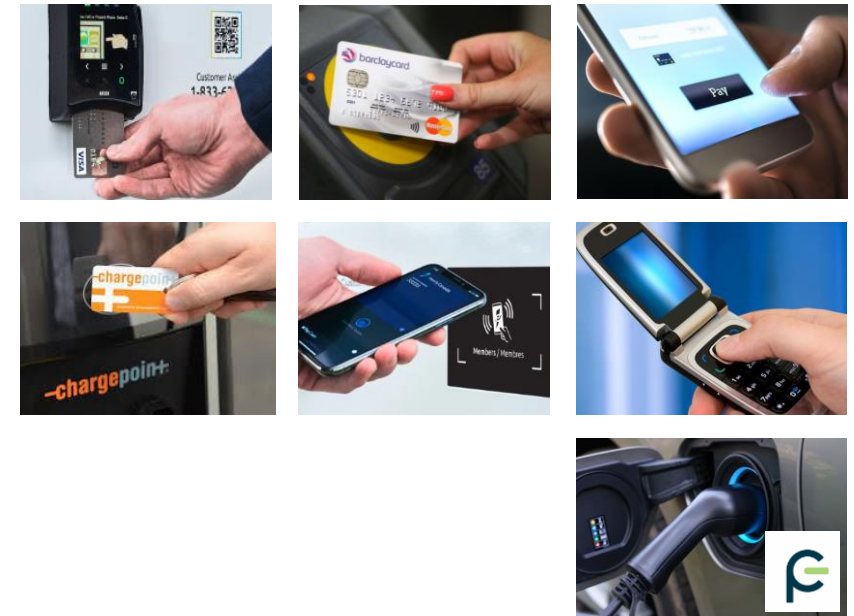
Goal: document problems and recommend solutions for wide range of payment system issues seen in the field

Progress:

- Finished best-practice document
- Addresses payment by credit/debit card, app, RFID card, phone/SMS, PnC

Next Steps:

- JO review; publish to ChargeX website
- Identify industry champions and secure commitment to implement and demonstrate select solutions



Project Progress Updates

Adapter Reliability and Safety

Working Group 2,
Hardware Task Force
Lead Lab: NREL

Goal: ensure industry testing standards and practices catch all major failure modes

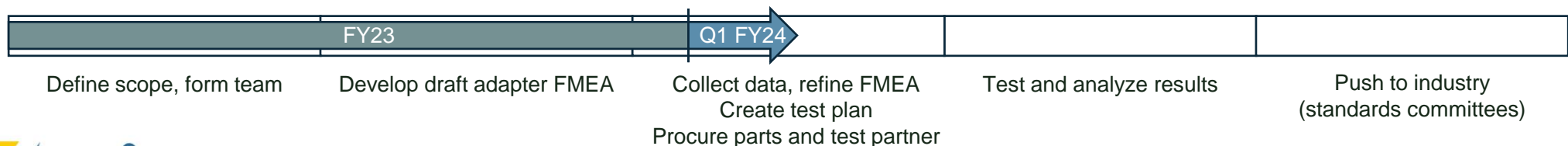
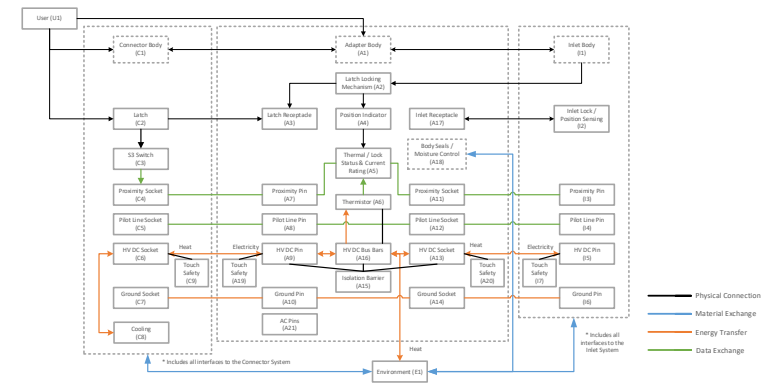
Progress:

- NREL completed draft FMEA with industry input
 - Holding in-person FMEA final review Feb 27 at NREL
- Hardware procurement well underway
- Design of standard reference inlet has begun



Scope expansion:

- Pin cap testing per industry request
- Broader EV and charger safety-related failure modes



Seamless Retry

Goal: institute process to automatically retry session initialization after failure to prevent customer unplug/replug

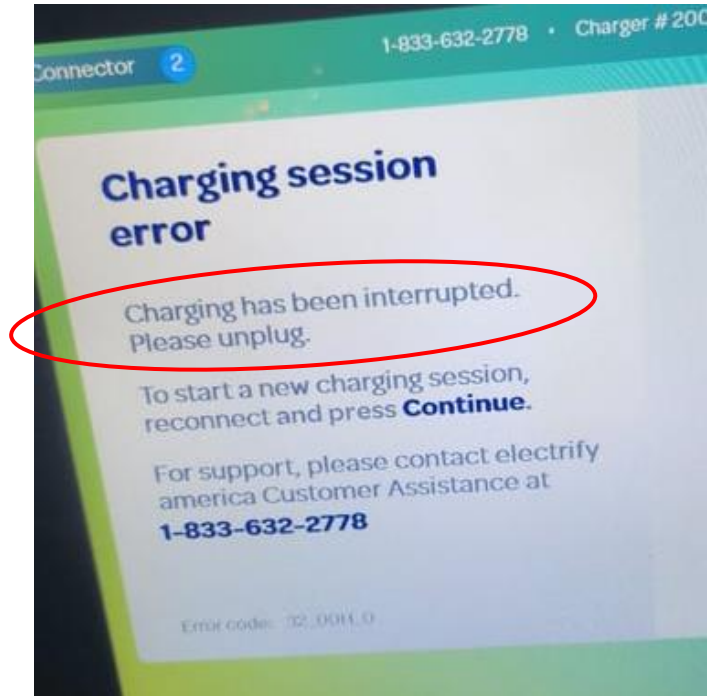
Progress:

- Labs wrote first draft of recommended practice based on industry input and existing standards
- Draft shared with Project Team for review

Next Steps:

- Write next draft and push to entire Comms TF for review
- Secure commitment to implement and demonstrate
- Define scope and form team for next topic: Timeouts

Working Group 2,
Communications Task
Force
Lead Lab: NREL



Minimum Required Error Codes

Working Group 3,
Diagnostics Task Force
Lead Lab: INL

Goal: institute common set of error codes across industry to accelerate problem resolution

Progress:

- Charger MRECs published, added to EV-ChART guidance
- Preliminary demo conducted at CharIN Festival on 11/28/23
- Revising MRECs based on findings of demo

Next Steps:

- Secure commitment for full implementation, demonstration
- Work with Accenture to implement MRECs in EVerest
- Expand scope to address EV- and roaming-specific MRECs



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Diagnostic Data Sharing

Working Group 3,
Diagnostics Task Force
Lead Lab: INL

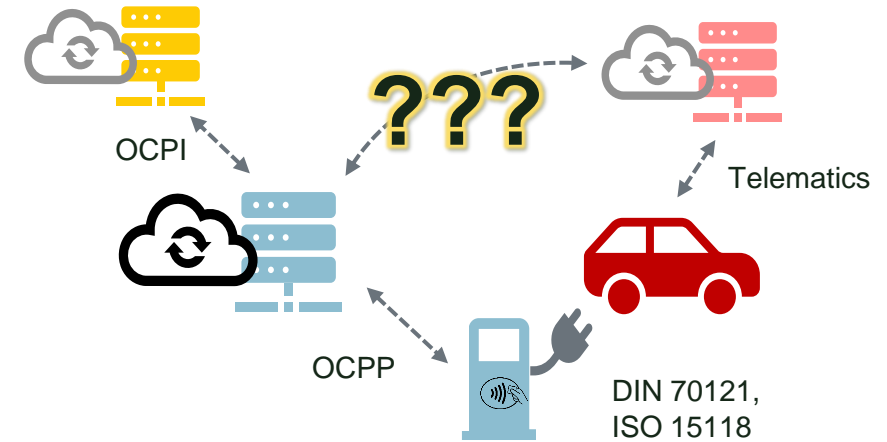
Goal: Develop solution to allow industry to efficiently share diagnostic data between charging and vehicle sides of ecosystem

Progress:

- Agreement that lack of data sharing hampers customer experience
- 3 areas of interest: co-identification, MRECs, additional data to determine where root cause resides

Next Steps:

- Develop data specification and method for sharing (cloud via API vs. EVSE to EV via pilot wire)
- Design short-term pilot
- Promote implementation and participation in pilot



Interoperability Test Cases

Working Group 3, Testing
Task Force
Lead lab: ANL

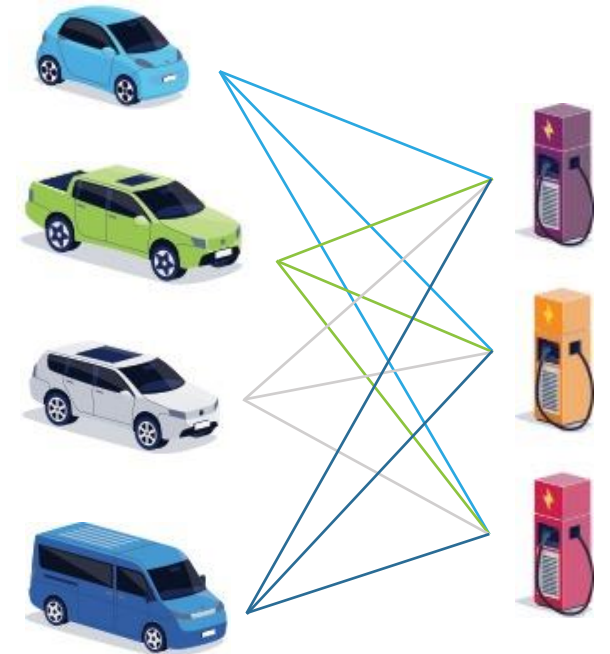
Goal: Develop comprehensive set of interoperability test cases to accelerate EV and charger product development

Progress:

- Completed interviews to understand current practice, writing report

Next Steps:

- Define scope of EV-EVSE interoperability test cases
 - Applicable standards/protocols (DIN, ISO, PnC, V2G, etc.)
 - Venues (peer-to-peer, industry test event)
 - Testing levels (happy path, edge case)
- Develop, demonstrate at JO-sponsored industry test event



Remote Test Harness

Working Group 3, Testing
Task Force
Lead lab: ANL

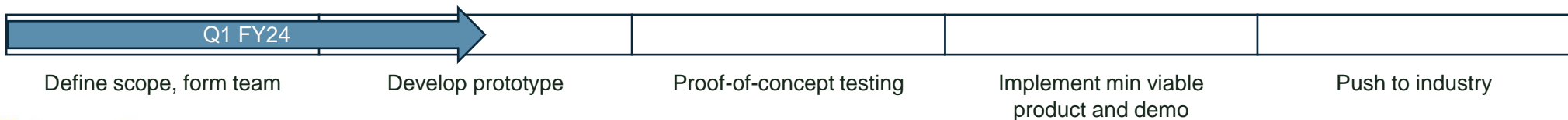
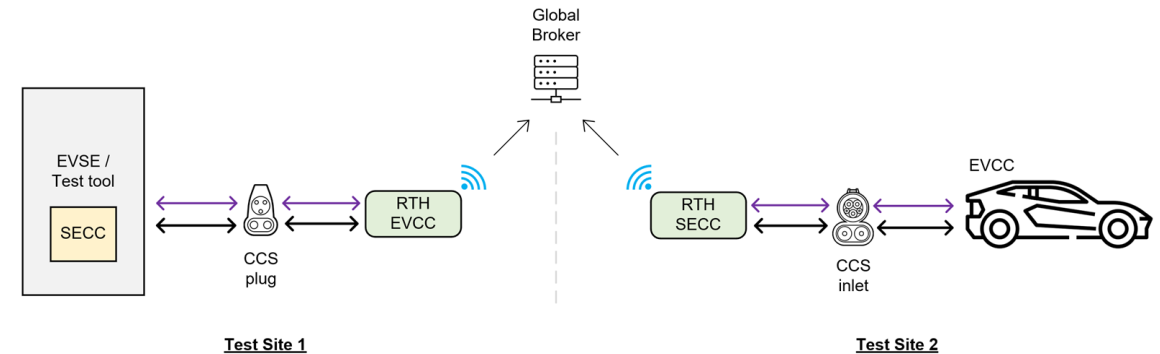
Goal: Develop first-of-a-kind testing system to conduct remote interoperability testing with EVs and EVSE at separate locations

Progress:

- Completed system design specification
- Feasibility testing 90% complete, presented progress to Testing TF

Next Steps:

- Create test plan
- Design hardware, implement software for DIN 70121, complete testing as proof-of-concept demonstration
- Recruit industry champions for minimum viable product testing



Other Projects

User Interface (Working Group 2, Payment & UI Task Force)

- Standardize steps to start a charging session so customer has consistent experience across charging networks

Impact (Working Group 1)

- Assess the impact of poor charging reliability on EV adoption

Questions?

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