

ANSI Electric Vehicles Standards Panel

Roadmap of Standards and Codes for Electric Vehicles at Scale (EVs@Scale)

ASEAN-U.S. Electric Vehicle Workshop on Technical
Standards

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American National Standards Institute

- Founded in 1918, ANSI is a private non-profit membership organization whose mission is to enhance U.S. global competitiveness and the American quality of life by promoting, facilitating, and safeguarding the integrity of the U.S. voluntary standardization system
- ANSI represents and serves the diverse interests of more than 270,000 companies and organizations and 30 million professionals worldwide
 - businesses, professional societies and trade associations, standards developing organizations (SDOs), government agencies, consumer and labor organizations
- Official U.S. representative to the International Organization for Standardization (ISO) and, via the U.S. National Committee, the International Electrotechnical Commission (IEC)



ANSI Standards Coordination Activities

One way ANSI coordinates and supports the standardization system is through **standards collaboratives and workshops**, which:

- Bring together the public and private sector in a **neutral forum**
- Identify current and in-development standards, where gaps exist, and recommend solutions
- Identify organizations that can perform the needed work and priorities

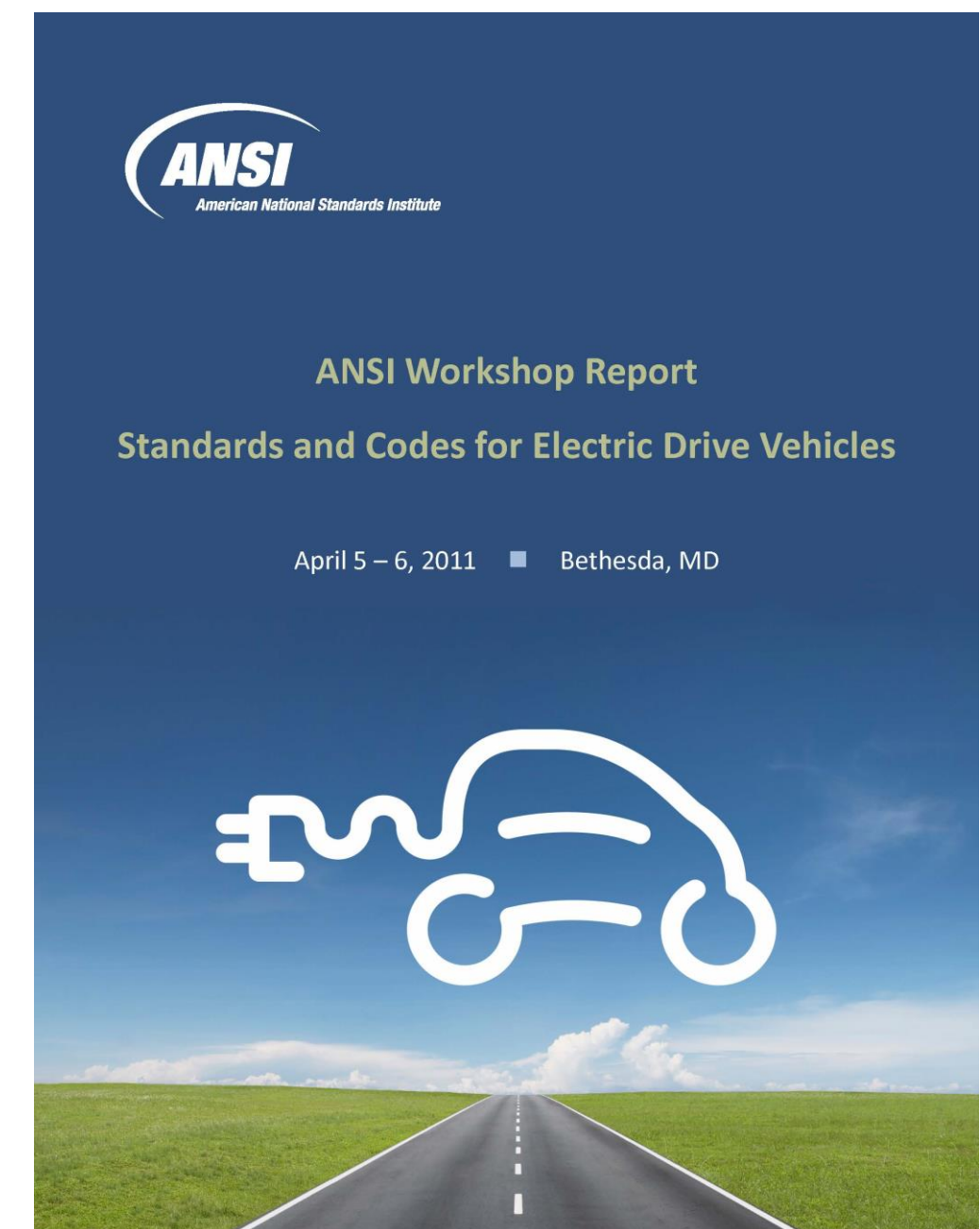


Why a Standards Roadmap for Electric Vehicles?

- Maximize coordination among standards developing organizations
- Capture work in progress and provide guidance on standards participation to other stakeholders
- Enable the U.S. to speak more coherently with international trading partners in policy and technical discussions regarding EVs
- Foster technology dissemination for EVs and charging infrastructure
- Respond to consumer concerns regarding safety, interoperability, performance, cost, and environmental impact
- Public policy drivers: reduce petroleum consumption and greenhouse gas emissions, achieve energy independence and security, and economic growth

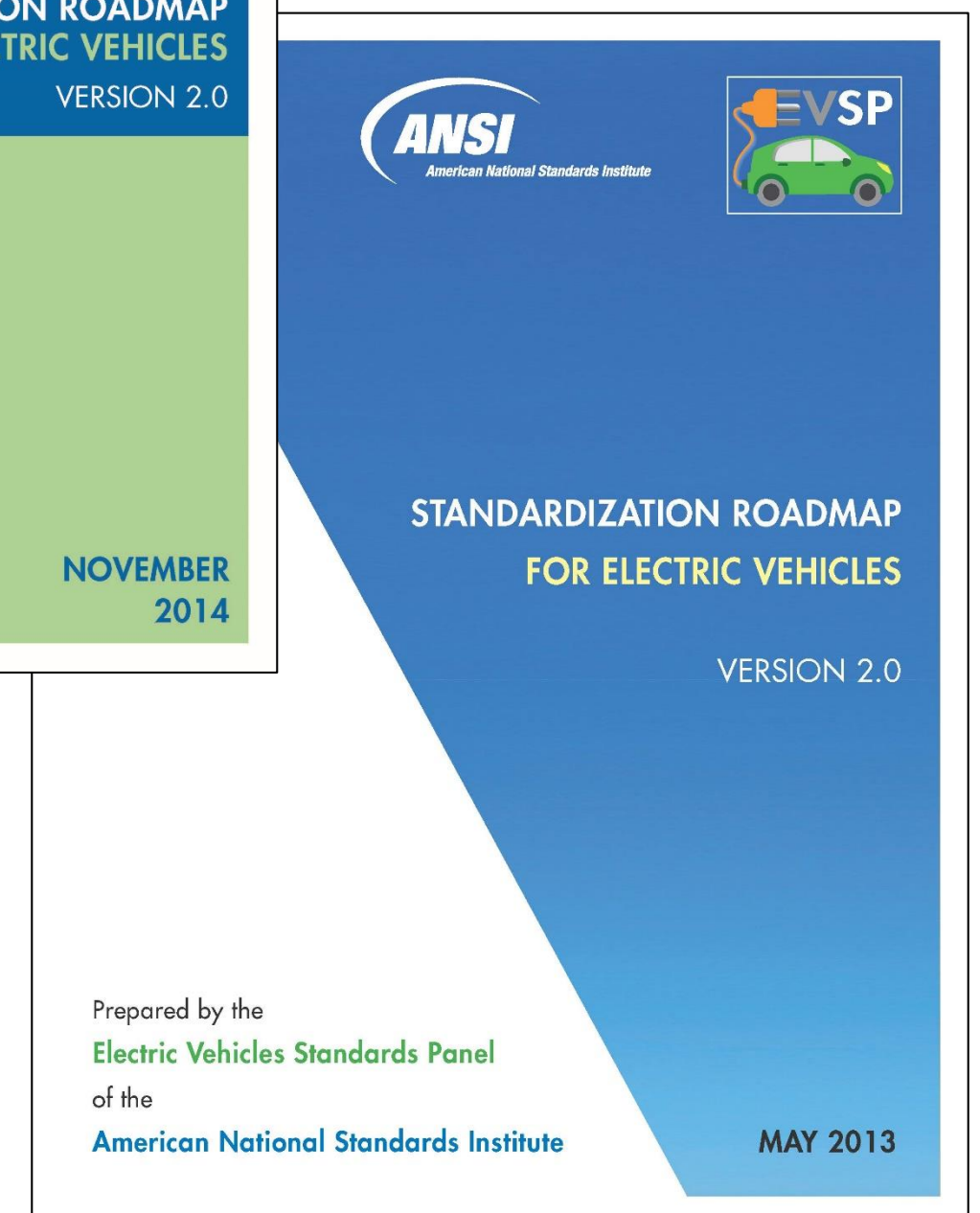
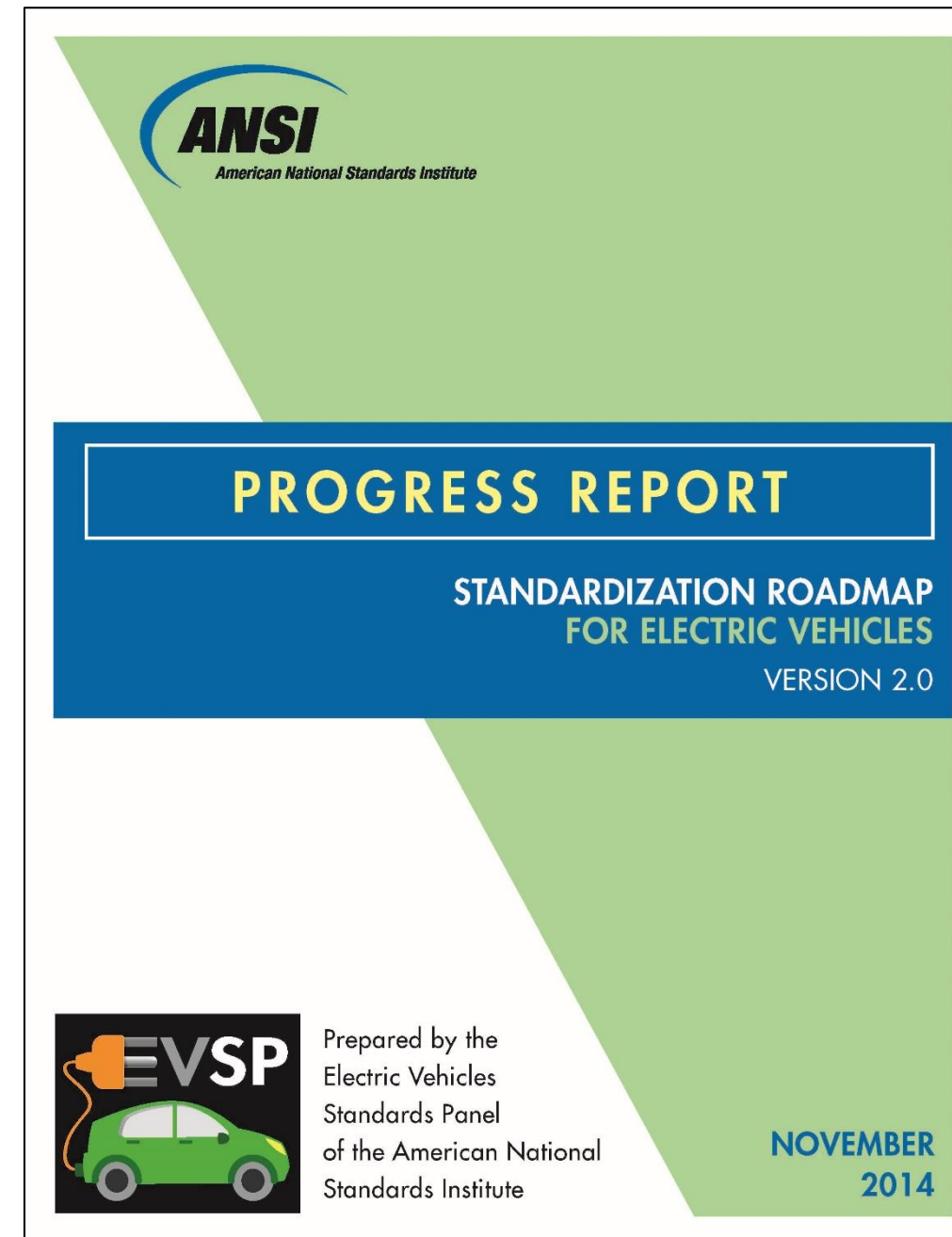
ANSI EVSP

- In March 2011 ANSI formed the Electric Vehicles Standards Panel (ANSI EVSP)
- Purpose: To develop a roadmap of the standards and conformance programs needed to facilitate the safe, mass deployment of electric vehicles and charging infrastructure in the United States, with international coordination, adaptability and engagement
- Strictly a coordinating body; it was not formed to develop standards



Prior ANSI EVSP Deliverables

- *Standardization Roadmap for Electric Vehicles*
 - *Version 1.0 (April 2012)*
 - [Version 2.0 \(May 2013\)](#)
 - [Progress Report \(Nov 2014\)](#)
- *ANSI EVSP Standards Compendium*
 - a [searchable spreadsheet of standards](#) related to issues identified in the roadmap (Nov 2014)
- Available as free downloads at links above



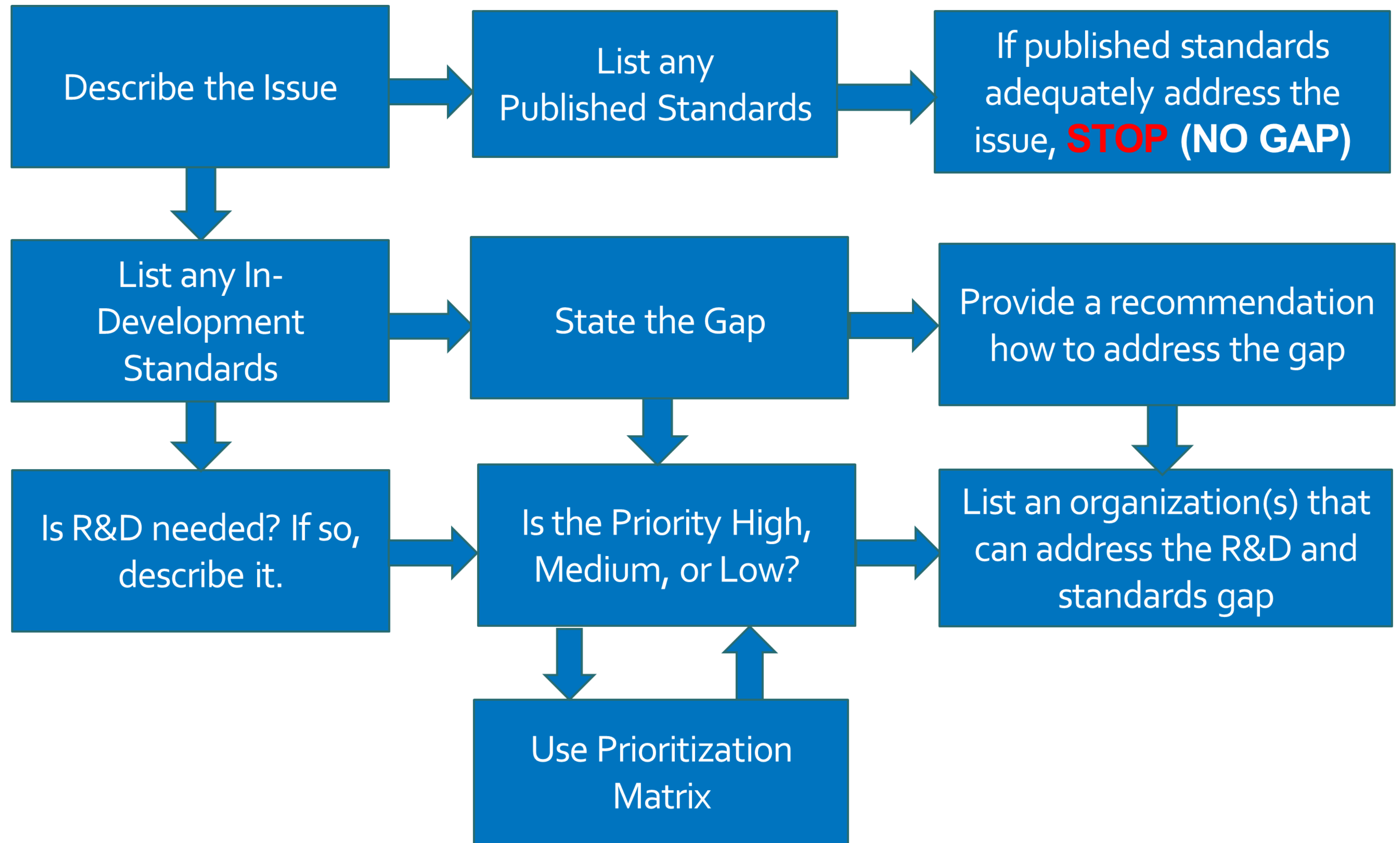
Recent Background

- [U.S. Department of Energy \(DOE\) Office of Energy Efficiency & Renewable Energy \(EERE\) Vehicle Technologies Office \(VTO\)](#) issued a June 2021 lab call funding opportunity announcement
- Lab call included a pillar on codes and standards to *“identify and address challenges and barriers to the integration of EVs@Scale charging with the grid created by uncoordinated development of codes and standards and the rapid advances in vehicle and charging technologies.”*
- EVs@Scale lab consortium formed in response committed to develop a 2022 roadmap like the [earlier ANSI EV standards roadmap](#). [Argonne National Laboratory](#) (ANL) is the lead lab for the codes and standards pillar, supported by consortium members [National Renewable Energy Laboratory](#) (NREL), [Oak Ridge National Laboratory](#) (ORNL), [Pacific Northwest National Laboratory](#) (PNNL), [Idaho National Laboratory](#) (INL), and [Sandia National Laboratories](#) (SNL).
- EV@Scale initiative supports federal and state funding associated with deploying EV charging infrastructure nationwide

Roadmap Overview

- Identifies issues as well as standards, codes, and regulations that exist or that are in development to address those issues
- Identifies “gaps” & recommends development of new or revised standards, conformance and training programs, where needed
 - A “gap” means no published standard, code, regulation, or conformance program exists
- Suggests prioritized timeframes for standards development and organizations that may be able to perform the work
- Focus is U.S. market with international harmonization issues noted in some areas
- On-road vehicles and associated charging infrastructure

Process Flow for Describing Issues & Gaps



WG1 – Vehicle Systems

On-Vehicle Energy Storage Systems

- Power Rating Methods
- Battery Safety
- Battery Testing: Performance and Durability
- Battery Storage
- Battery Packaging, Transport and Handling
- Battery Recycling
- Battery Secondary Uses
- Crash Tests/Safety

Vehicle Systems: Draft Gaps

- Battery Safety: thermal runaway, water immersion, vibration resistance (GTR 20)
- Delayed Battery Overheating Events (SAE J2929)
- Safe Storage of Damaged (Unknown Condition) Li-ion Batteries
- Design for Battery Recyclability
- Battery Secondary Uses

WG2 – Charging Infrastructure

Charging Systems

- DC Fast Charging and AC Level 2 for light-duty EVs
- Megawatt Charging Systems (MCS) for medium and heavy-duty EVs
- Wireless power transfer: static and dynamic

Station / Site Architecture

- General Infrastructure Installation Issues (e.g., permitting, environmental conditions, ventilation, cable management, physical security, accessibility)
- Specific Installation Considerations For Different Charging Scenarios
 - Residential Charging
 - Workplace/Public Charging
 - Highway / Corridor Charging
 - Truck Charging

Charging Infrastructure: Draft Gaps

- Static Wireless Charging for Heavy Duty/High Power Vehicles (SAE J2954/2)
- Dynamic Wireless Charging
- Communications standards for Static and Dynamic Wireless Charging
- Permitting for power export from EVSE to EV: address in Codes
- Functional management of EVSE cables in public parking spaces
- Labeling of EVSE load management disconnects for emergencies
- Fire Protection for EVs parked/charging in older buildings

WG3 – Grid Integration

Communications / Controls

- Communications Architecture for EV Charging
- Communications Requirements for Various EV Charging Scenarios
- Communication and Measurement of EV Energy Consumption
- Cybersecurity and Data Privacy
- Telematics Smart Grid Communications

Power Distribution/DER Integration

- Power (electrical) systems/safety
- Communications/controls
- Cybersecurity
- DC-as-a-Service (DCaaS) and Charging as a service

Microgrids/DERMs

Grid Integration: Draft Gaps

- Locating/reserving public charging spots; obtaining pricing information and near real-time availability
- Standards for EV sub-meters: performance, security/privacy, access, and data
- Metrology, Coordination and Control, Reporting
- Power Distribution and DER Integration
 - Power quality expectations
 - Additional areas under discussion

Project Timeline



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