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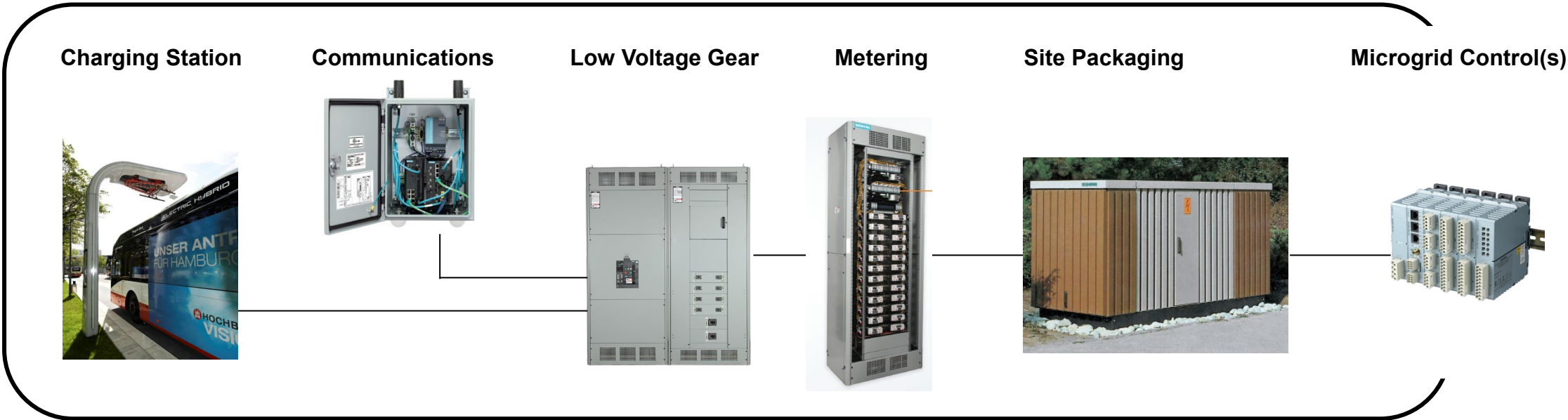
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Siemens VGI Panel Comments Oct 30 2018

Additional submitted attachment is included below.

Observations from Global eMobility™

Siemens viewpoint: Plug to Grid™



← **Software Platform** →

Five key mobility trends



Connected

Mobility will be increasingly connected in nature



On-demand

Journeys start when and from where the user needs them



Shared

Shift from individual vehicle ownership to flexible mobility access



Autonomous

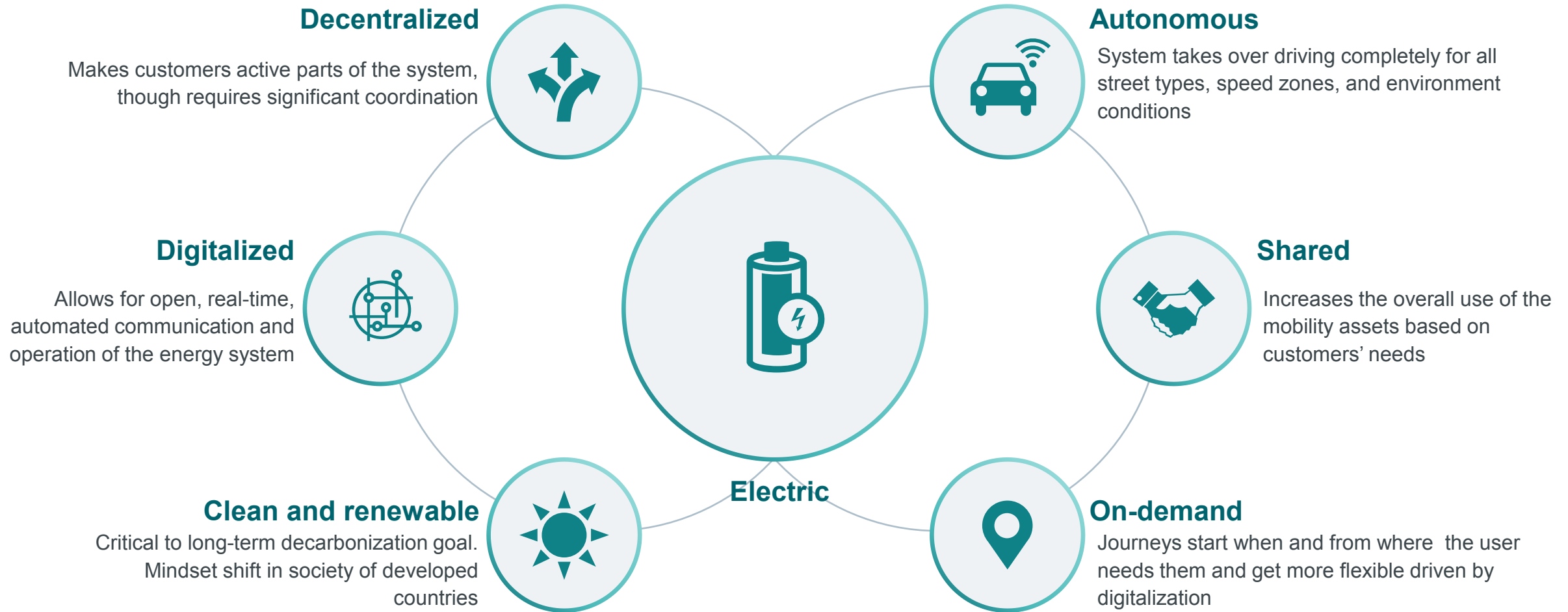
Vehicles are increasingly self-driving without the need for a driver



Electric

Mobility is powered by electricity rather than fossil fuels

The Mobility Sector is Under Disruption ...and Electrification is at the Core of this Change



Open technical standards

Suggested “best practices” standards



Data center to EVSE communications link

A port in the EVSE with the ability to plug in a Network Interface Card with minimum options of **WiFi** and **cellular**

Data center to EVSE data communications protocols

OpenADR for DR signal and **OCPP** for other data types

Data center to data center protocol

OCPI or **OICP** for sharing customer billing and payment data (interoperability) between EVSPs

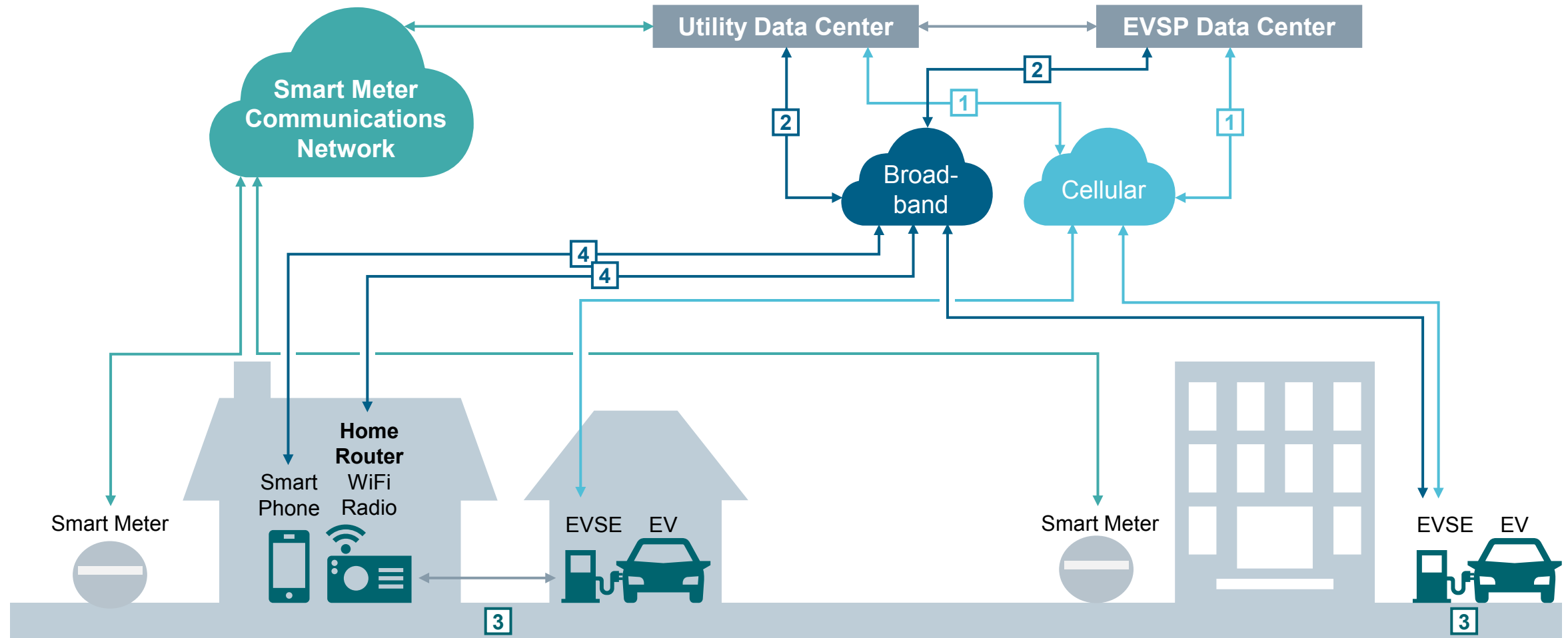
EV to EVSE for “Plug and Charge”

ISO 15118

EVSE meter accuracy

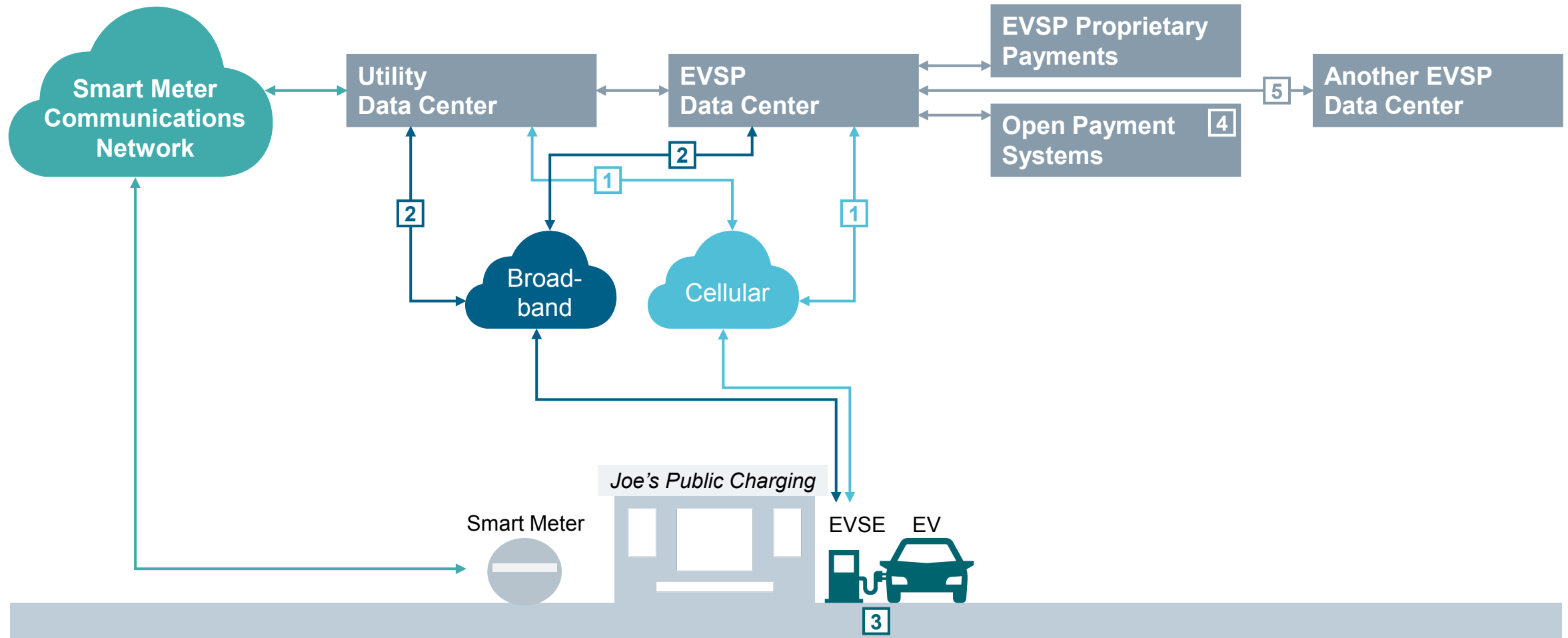
ANSI C12.20 (+/-0.2%) or **NIST Handbook 44 Sec. 3.20** (+/-1.0%)

Technical (Metering and Communications) Standards – Home, MUD, Workplace Charging



1 and **2** OCPP and OpenADR **3** SAE J1772 (plug), ISO 15118 (EV to EVSE) **4** IP

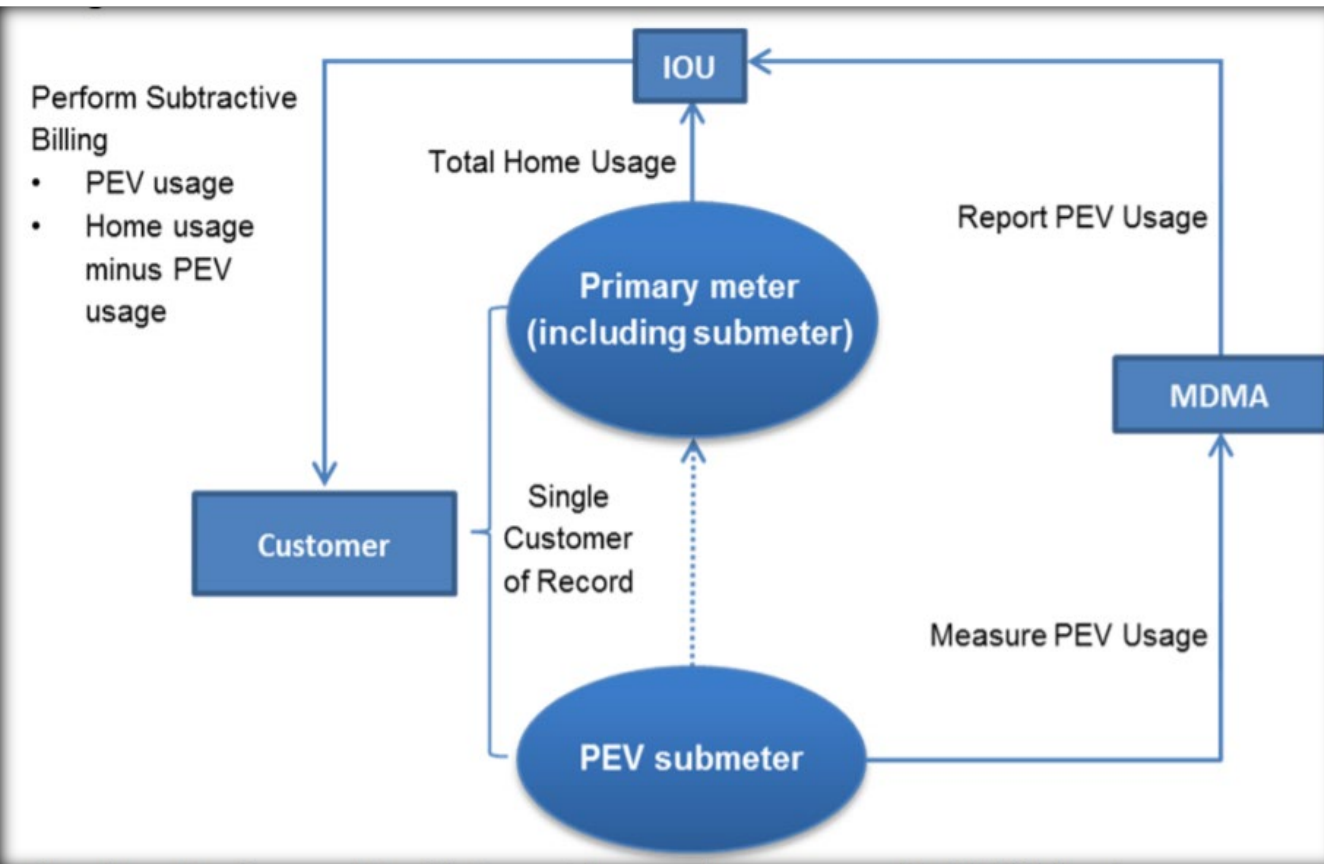
Technical and Payment Standards – Public Charging



1 and **2** OCPP and OpenADR **3** SAE J1772 (plug), ISO 15118 (EV to EVSE) **4** Credit Cards **5** OCPI or OICP

Overview of Sub-metering of EV Charging

Data Flows



Source: Nexant, California Statewide PEV Submetering Pilot – Phase 1 Report

CONCEPT

- ❖ Use a sub-meter built into the EVSE to record consumption for use in billing
- ❖ Bill using subtractive approach

BENEFITS

- ❖ Allows tariff to be applied on EV-only basis
 - ✓ *TOU or hourly pricing without exposing whole home or business to price volatility*
- ❖ Provides actual kWh and cost for power used to charge EV
 - ✓ Includes detailed consumption data
 - ✓ Eliminates need to estimate cost using whole-house or whole-business data
- ❖ Avoids need to provide a separate utility meter and meter box
 - ✓ Cost of < \$50 vs. \$500-1,500 for second meter

Challenges of Sub-metering

Potential Solution?

Note: conceptual only



Meter accuracy

- ❖ Testing
- ❖ Certification
- ❖ *Not a significant problem*

Communications

- ❖ Uses communications card in EVSE
 - ✓ Ethernet, Wi-Fi, or cellular
 - ✓ Cost typically \$20-200 per year
- ❖ Protocol may or may not be standardized
 - ✓ OCPP standard used most commonly

Data integration

- ❖ Specific to each utility
 - ✓ Technical interface
 - ✓ Data format
 - ✓ Business processes
 - ✓ Exception management
- ❖ Difficult and costly for 3rd parties

Looking forward to working with you



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