OPEN
CHARGE
ALLIANCE

What's New OCPP 2.1

Learn the new features of the upcoming version OCPP2.1

Agenda

1. Introduction

2. New Features in OCPP 2.1
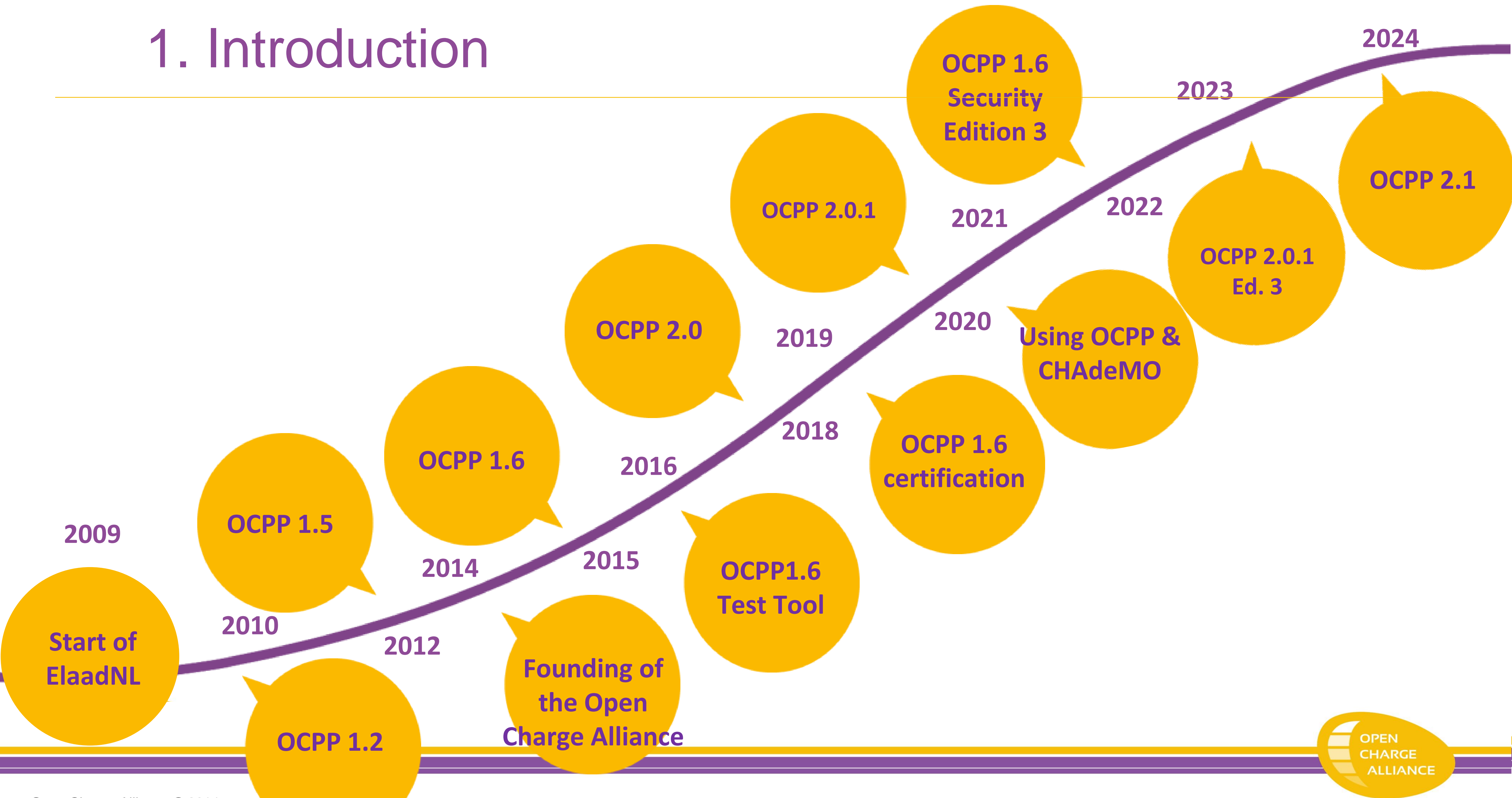
3. Roadmap for OCPP 2.1
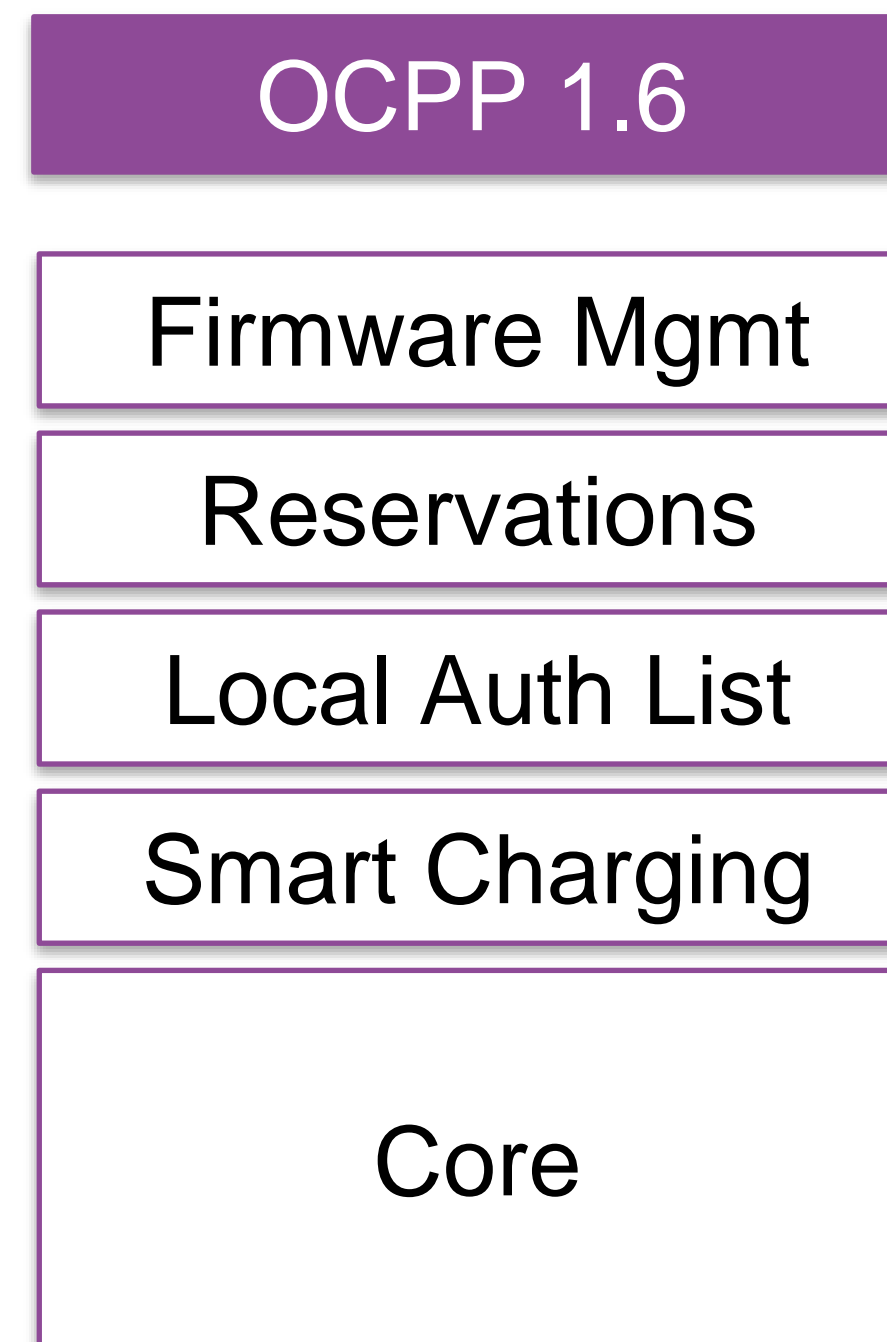
4. Summary

5. Q&A

1. Introduction

- Jacob Betz (Vector Informatik)

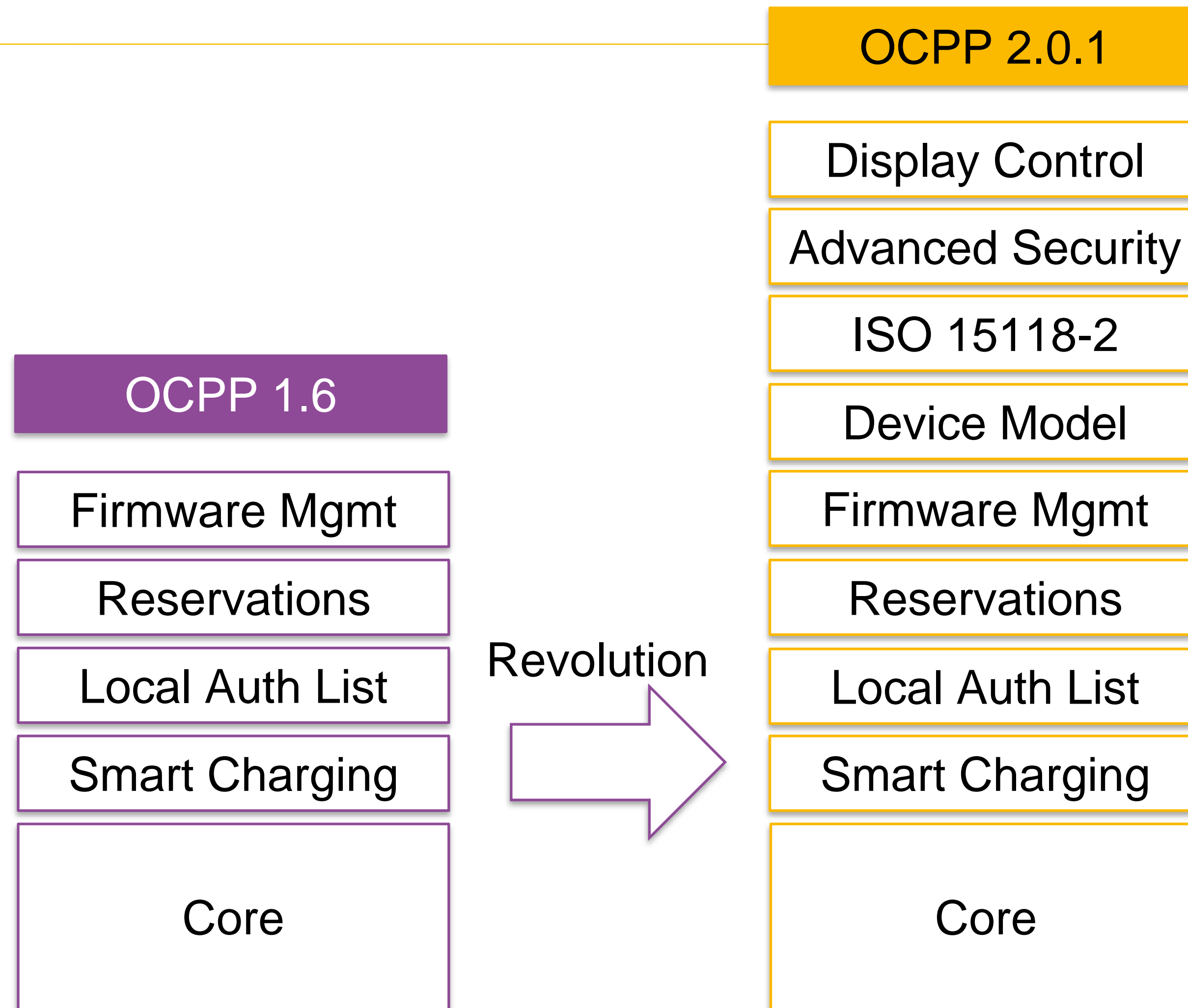- Chair Technology Working Group

- jacob.betz@vector.com

1. Introduction

2009 — Start of ElaadNL

2010

OCPP 1.5

2012 — OCPP 1.2

OCPP 1.6

Founding of the Open Charge Alliance

2014

2015

OCPP 2.0

OCPP1.6 Test Tool

2016

2018

OCPP 2.0.1

OCPP 1.6 certification

2019

2020

OCPP 1.6 Security Edition 3

Using OCPP & CHAdeMO

2021

2022

2023

2024

OCPP 2.0.1 Ed. 3

OCPP 2.1

OPEN CHARGE ALLIANCE

1. Introduction

OCPP 1.6

Firmware Mgmt

Reservations

Local Auth List

Smart Charging

Core

1. Introduction

OCPP 2.0.1

Display Control
Advanced Security
ISO 15118-2
Device Model
Firmware Mgmt
Reservations
Local Auth List
Smart Charging
Core

OCPP 1.6

Firmware Mgmt
Reservations
Local Auth List
Smart Charging
Core

Revolution

1. Introduction

OCPP 1.6

- Firmware Mgmt
- Reservations
- Local Auth List
- Smart Charging
- Core

Revolution →

OCPP 2.0.1

- Display Control
- Advanced Security
- ISO 15118-2
- Device Model
- Firmware Mgmt
- Reservations
- Local Auth List
- Smart Charging
- Core

Evolution →

OCPP 2.1

Local payment	EMS
Prepaid	DER support
ISO 15118-20	V2X
ISO 15118-2	Display Control
Device Model	Advanced Security
Reservations	Firmware Mgmt
Smart Charging	Local Auth List
Core	

1. Compatibility

2.1

2.0.1

OCPP schema

CSMS OCPP 2.1

2.0.1 schemas are used

2.0.1
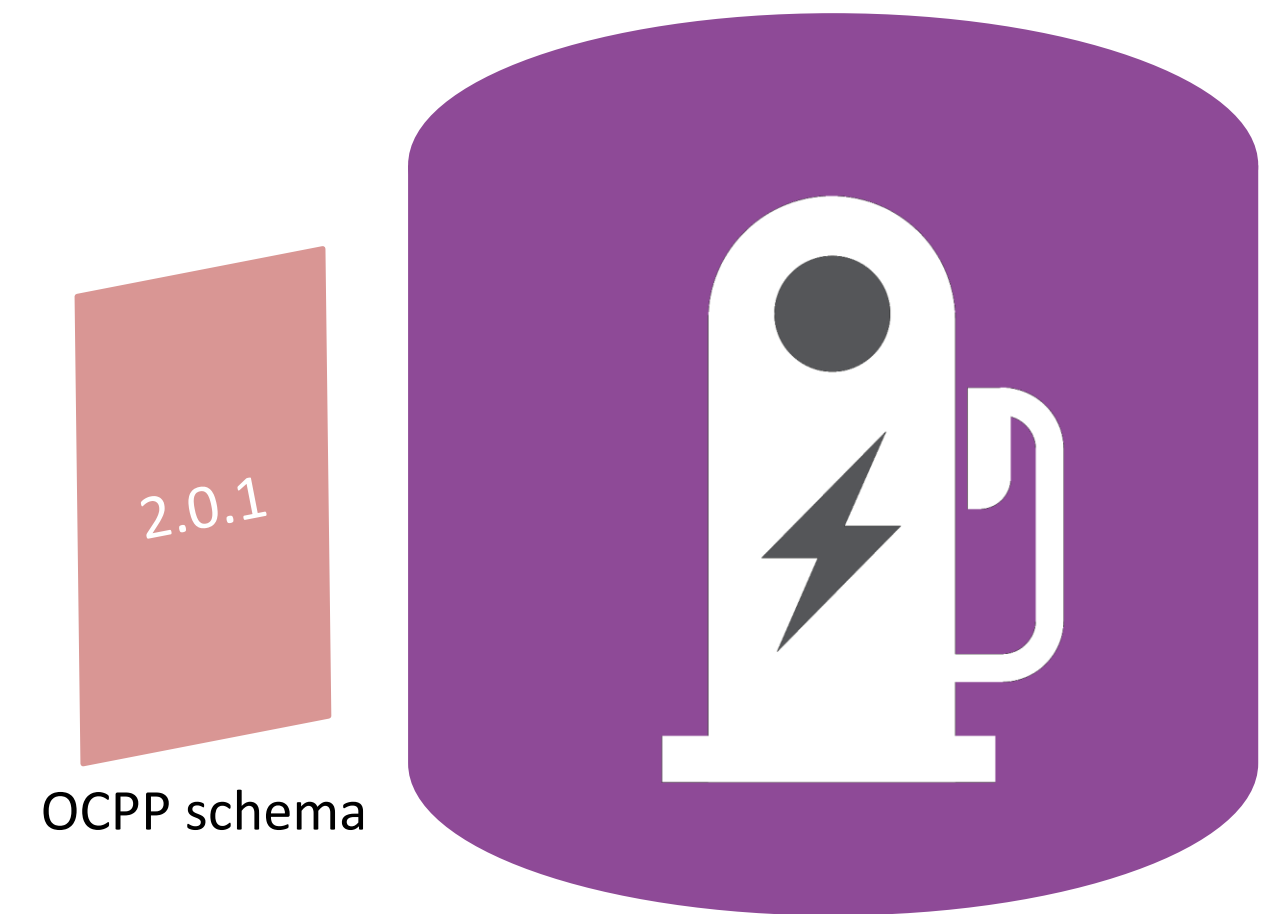
OCPP schema

CS OCPP 2.0.1

1. Compatibility

2.0.1 schemas are used

OCPP schema

OCPP schema
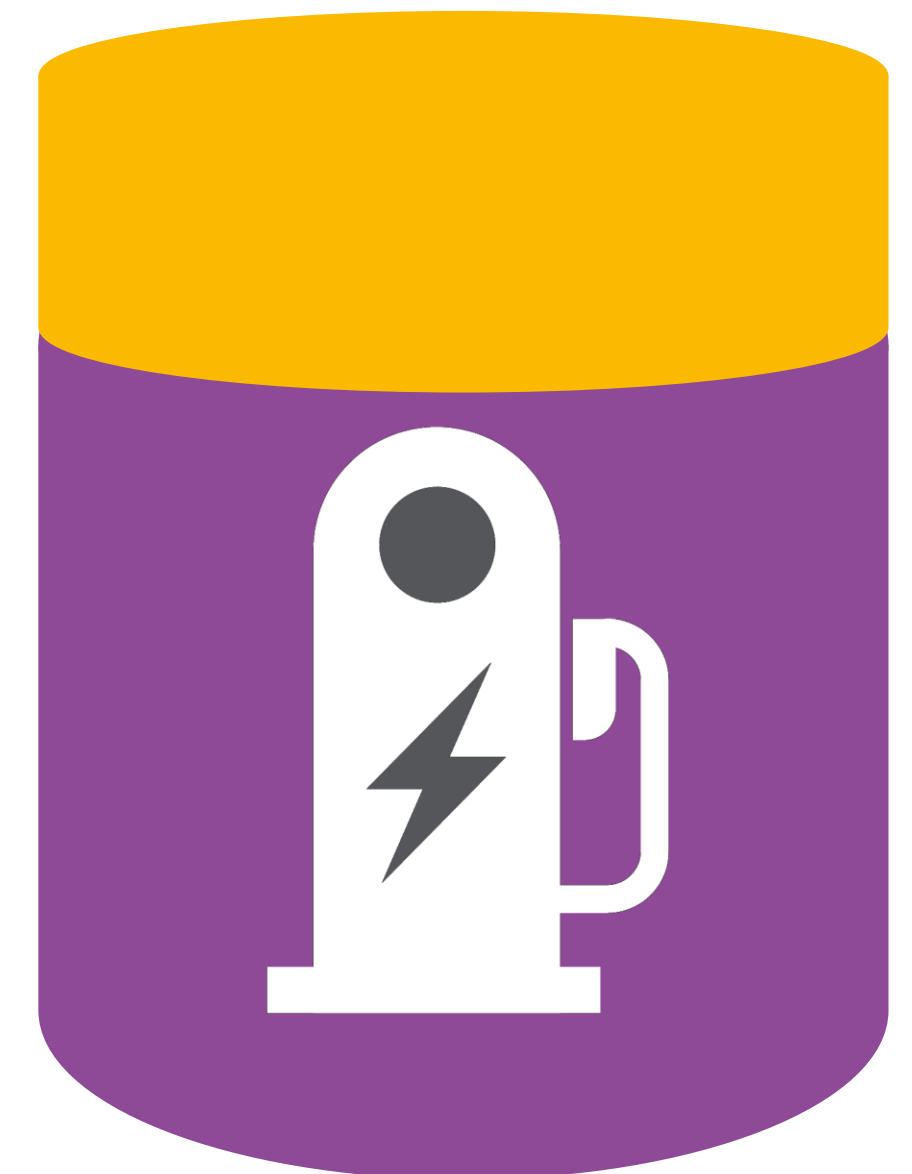
CSMS OCPP 2.0.1

CS OCPP 2.1

1. Compatibility

2.1

2.0.1

OCPP schema

2.1 schemas are used

2.1

2.0.1

OCPP schema
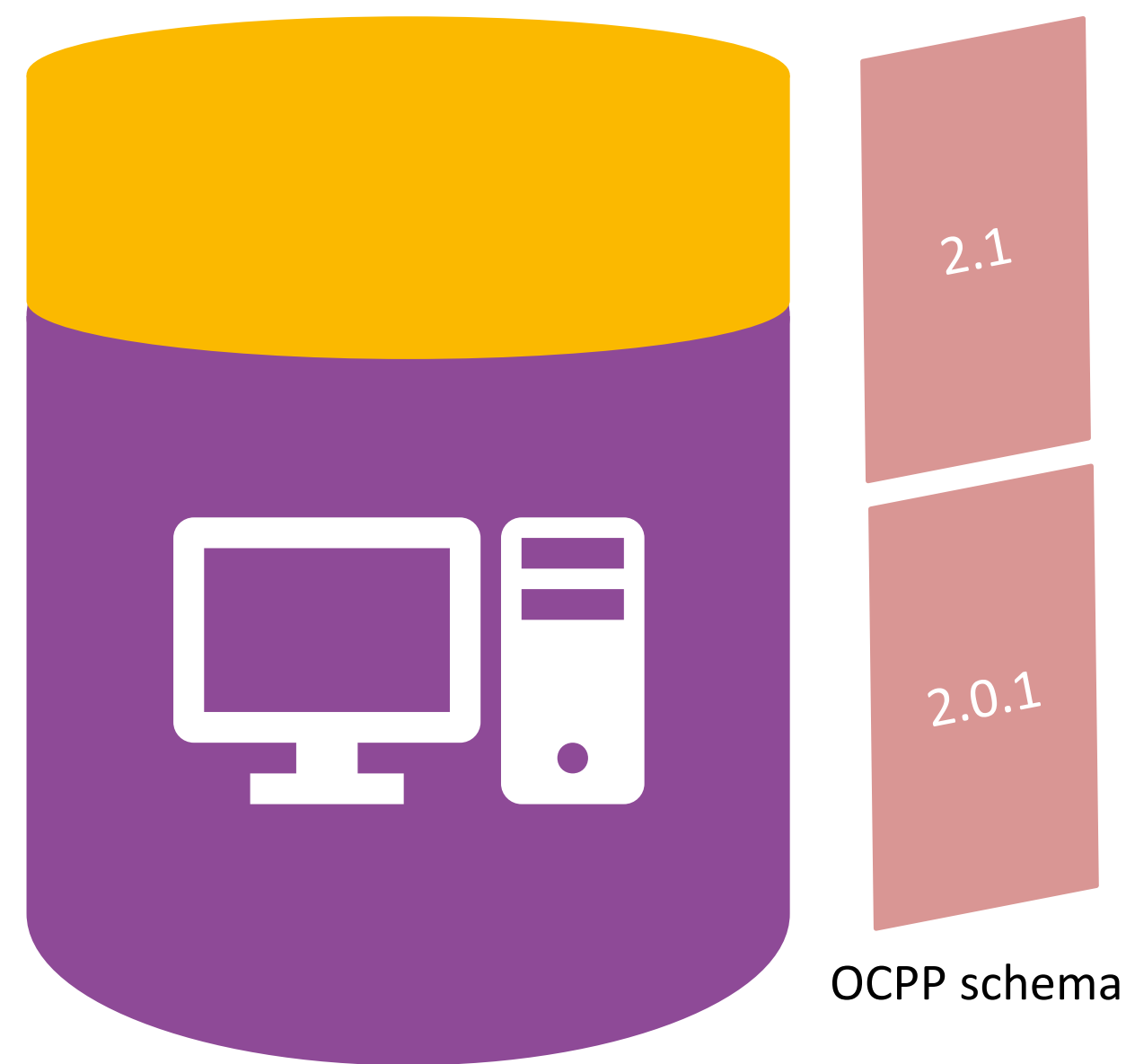
CSMS OCPP 2.1
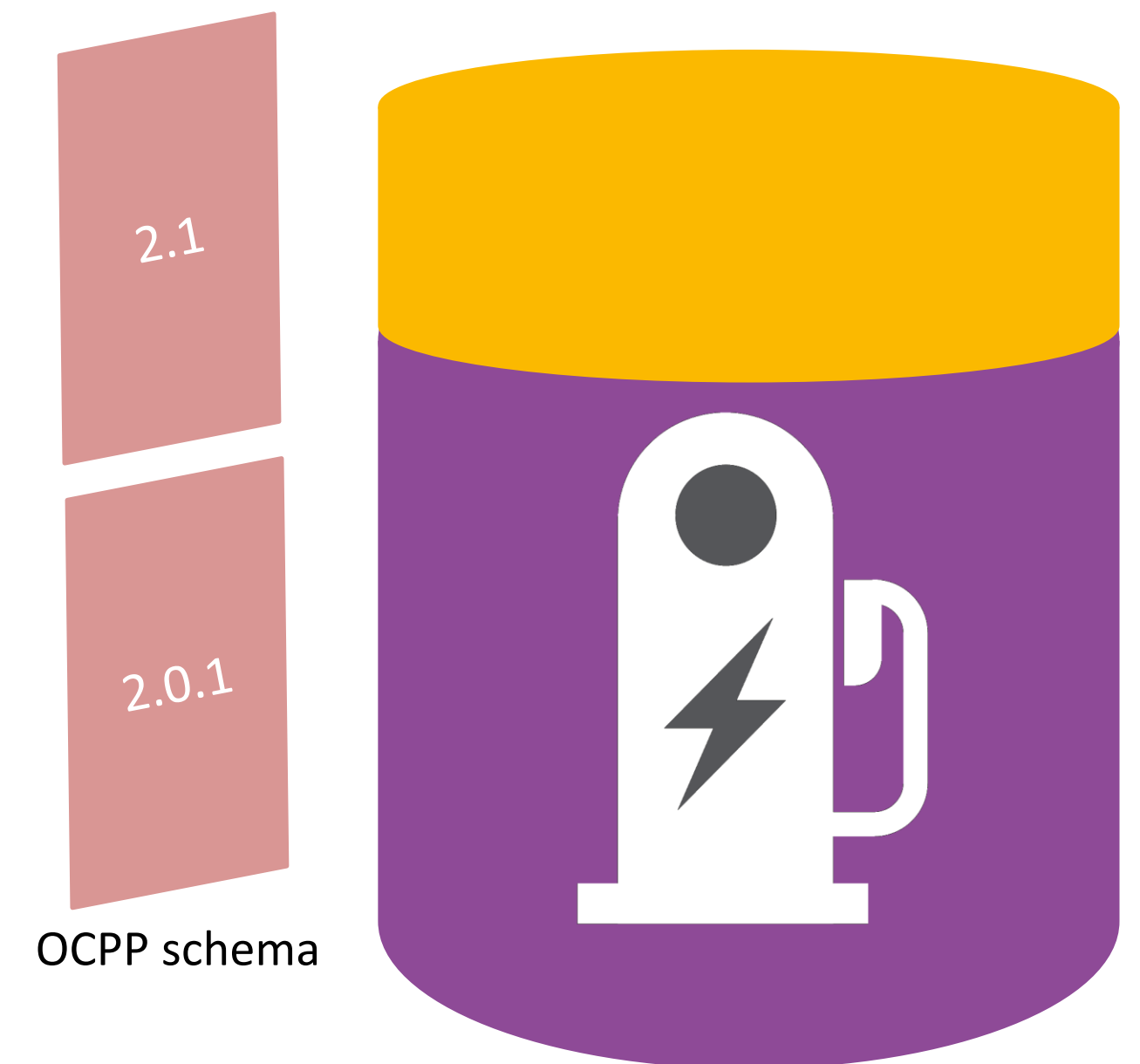
CS OCPP 2.1

2. Current State

- More than 377 pages of errata
  - Additional use-cases
    - 1 Provisioning
    - 6 Tariff and Cost
    - 6 Adhoc-Payment
    - 1 Smart Charging
    - 12 Bidirectional Power Transfer
    - 5 Distributed Energy Resource Control
  - Fixes/improvements for existing use-cases

2. Provisioning

- Reset - With Ongoing Transaction - Resuming Transaction
- Allow the reset of a charging station/ EVSE during a running transaction and resume it afterwards

2. ISO 15118-20

- Native support of ISO 15118-20 is added
- Certificates
  - OEM Root Certificate can be installed in charging station
  - Support of larger certificate chains
  - Support for Certificate revocation lists
  - Native support of multiple contract certificates
- Smart charging
  - Power per phase
  - Support for PriceLevelSchedule and AbsolutePriceSchedule

2. V2X Support

- Whole use-case section for bidirectional power transfer
- Compatible with ISO 15118-20 and CHAdeMO
- Several new smart charging strategies possible
  - Setpoint
  - Frequency Support
  - LocalLoadBalancing

2. Smart Charging

- Possible modes for smart charging
1. ChargingOnly
2. ExternalLimits
3. CentralSetpoint
4. ExternalSetpoint
5. CentralFrequency
6. LocalFrequency
7. LocalLoadBalancing
8. Idle

Already possible with OCPP 2.0.1

2. ChargingOnly

- No bidirectional charging
- Initial state for a transaction
- Charging station only uses the limit

2. ExternalLimits

- Limits are set by an external entity.
- Can be read back by the CSMS

2. CentralSetpoint

- CSMS specifies setpoint (target) value for either charging or discharging depending on the sign. Positive values indicate charging, while negative values indicate discharging.

- Additionally, the CSMS can specify hard limits for charging and discharging

Usage example of *limit/dischargeLimit* and *setpoint*
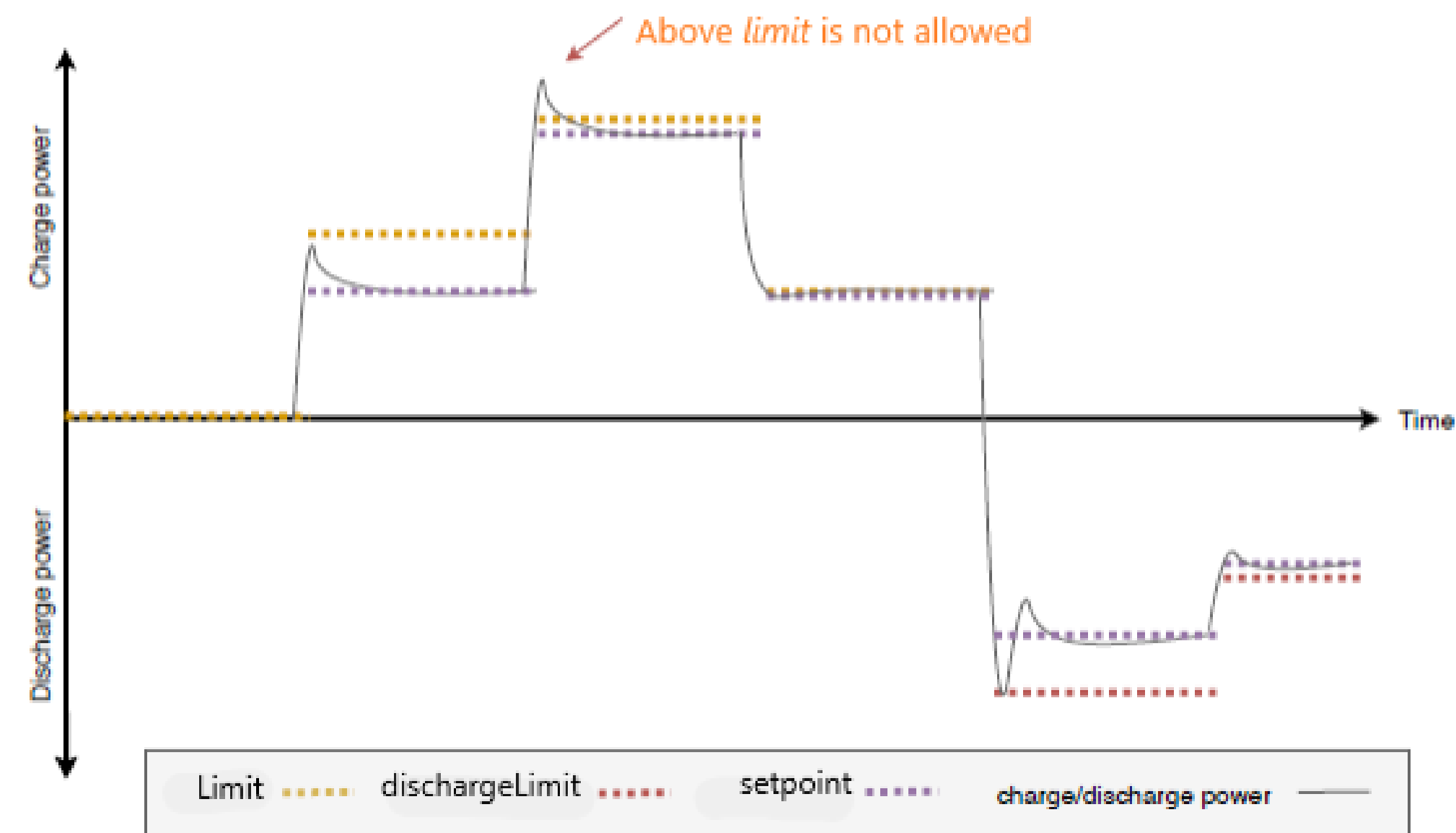
2. ExternalSetpoint

- External entity specifies setpoint (target) value for either charging or discharging depending on the sign. Positive values indicate charging, while negative values indicate discharging.
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Usage example of *limit/dischargeLimit* and *setpoint*
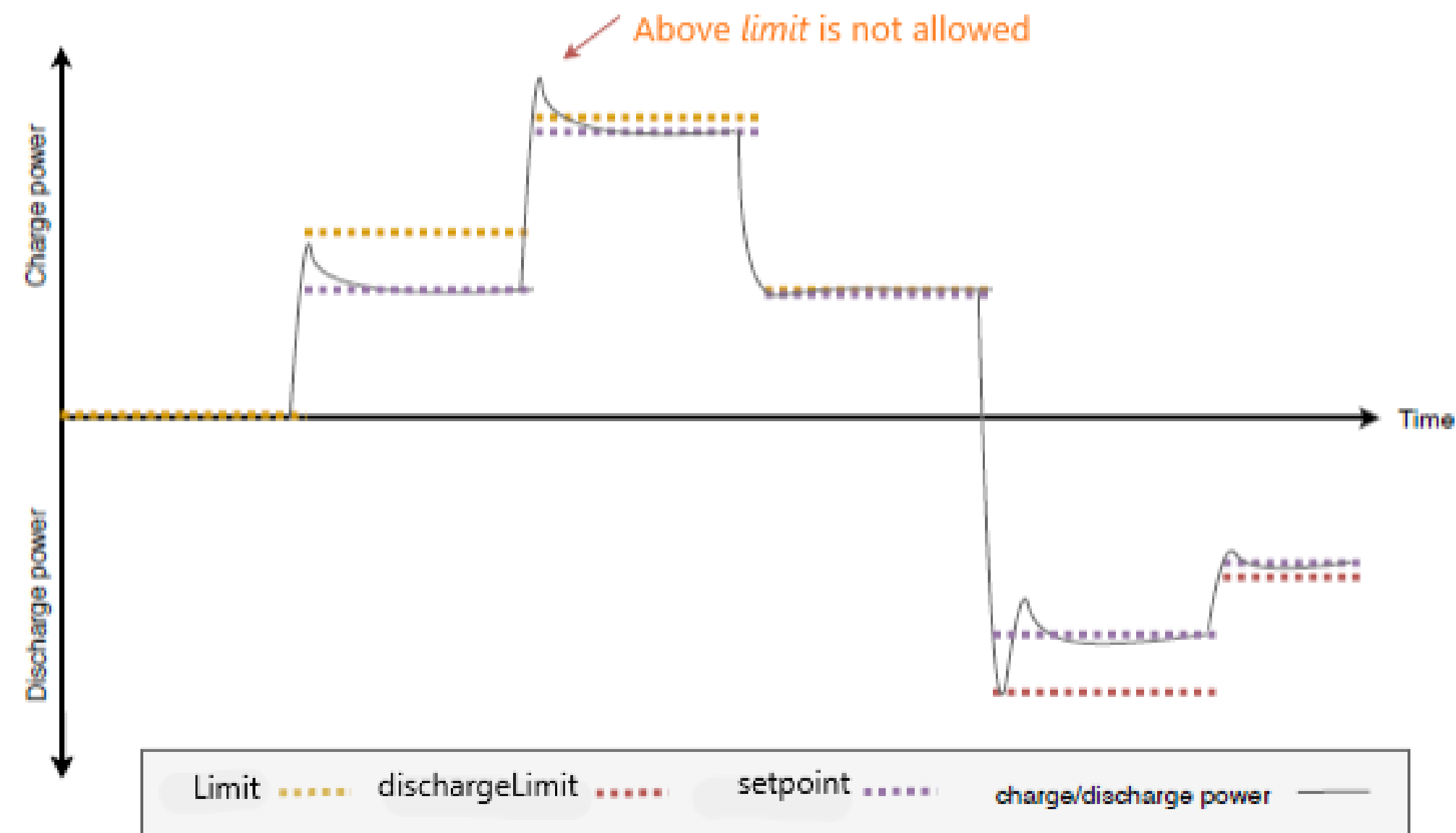
2. CentralFrequency

- EV is part in frequency containment reserve (FCR) or automatic Frequency Restoration Reserve (aFRR)
- CSMS uses dynamic charging profile
- CSMS sends regularly new profiles to the CS with new limits to be able to follow certain frequency curves
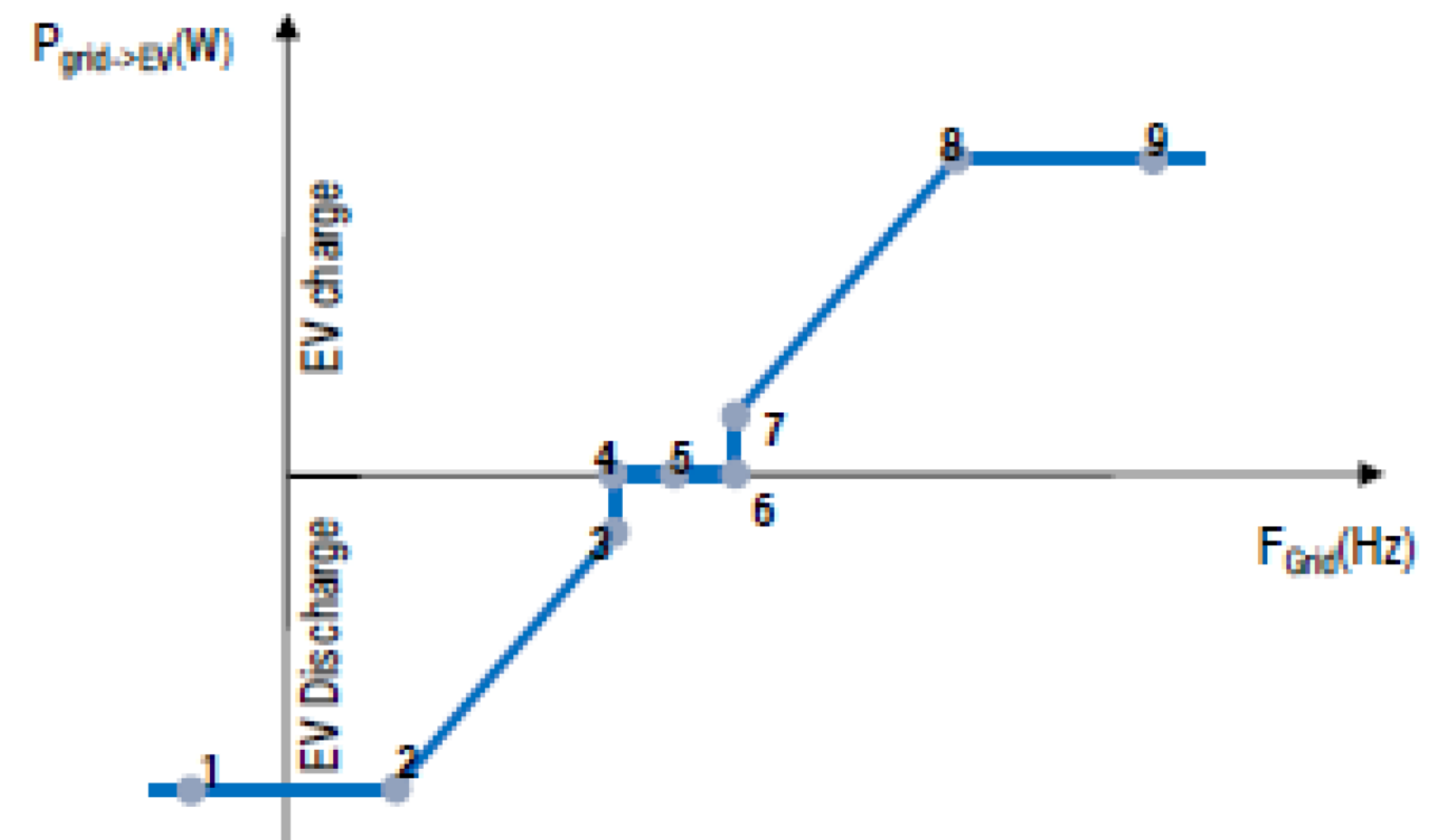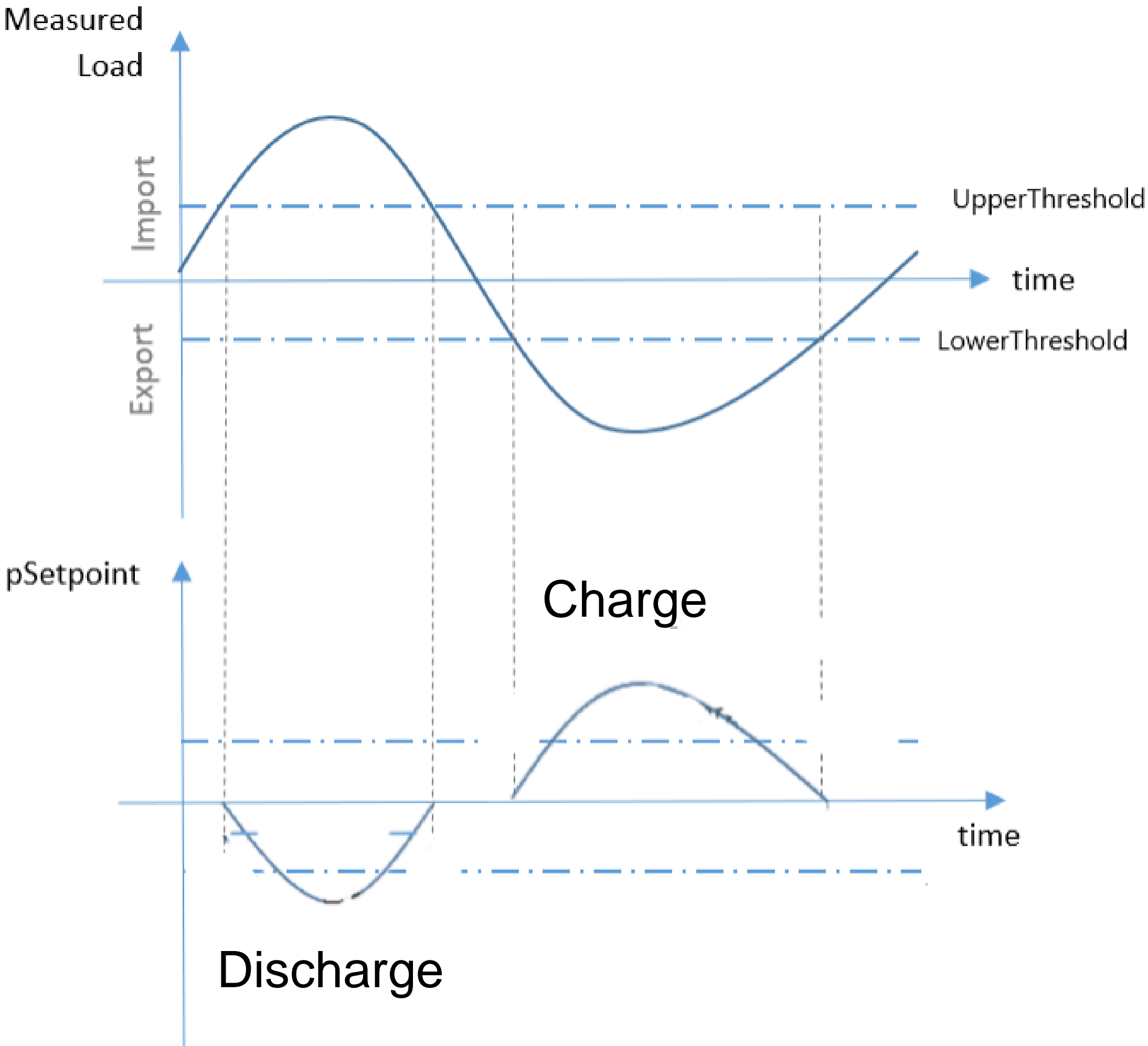
2. LocalFrequency

- EV is part in frequency containment reserve (FCR) or automatic Frequency Restoration Reserve (aFRR)
- CS measures frequency on its own and acts accordingly to the frequency droop curve
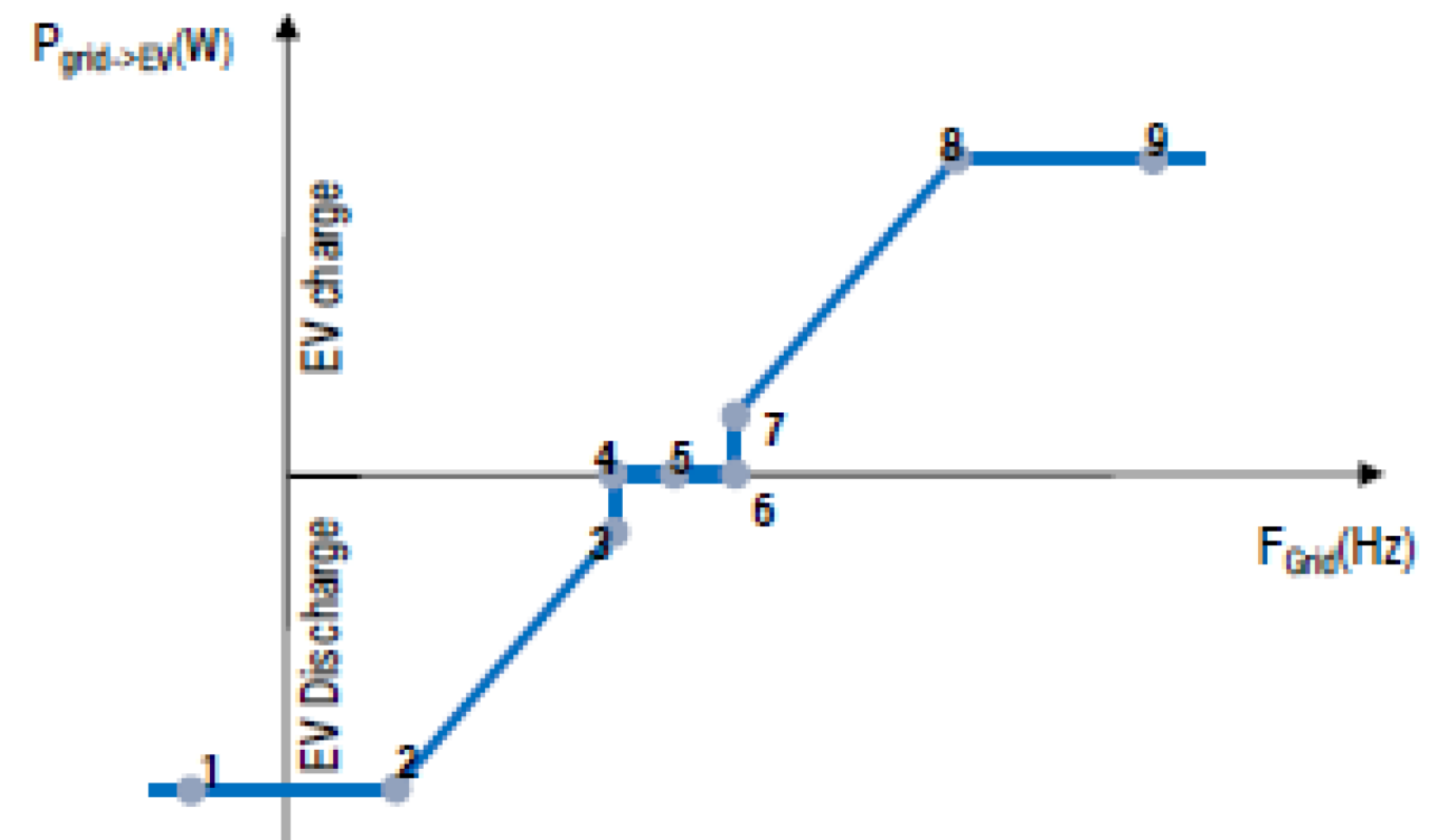
2. LocalLoadBalancing

Measured by smart
Energy meter:
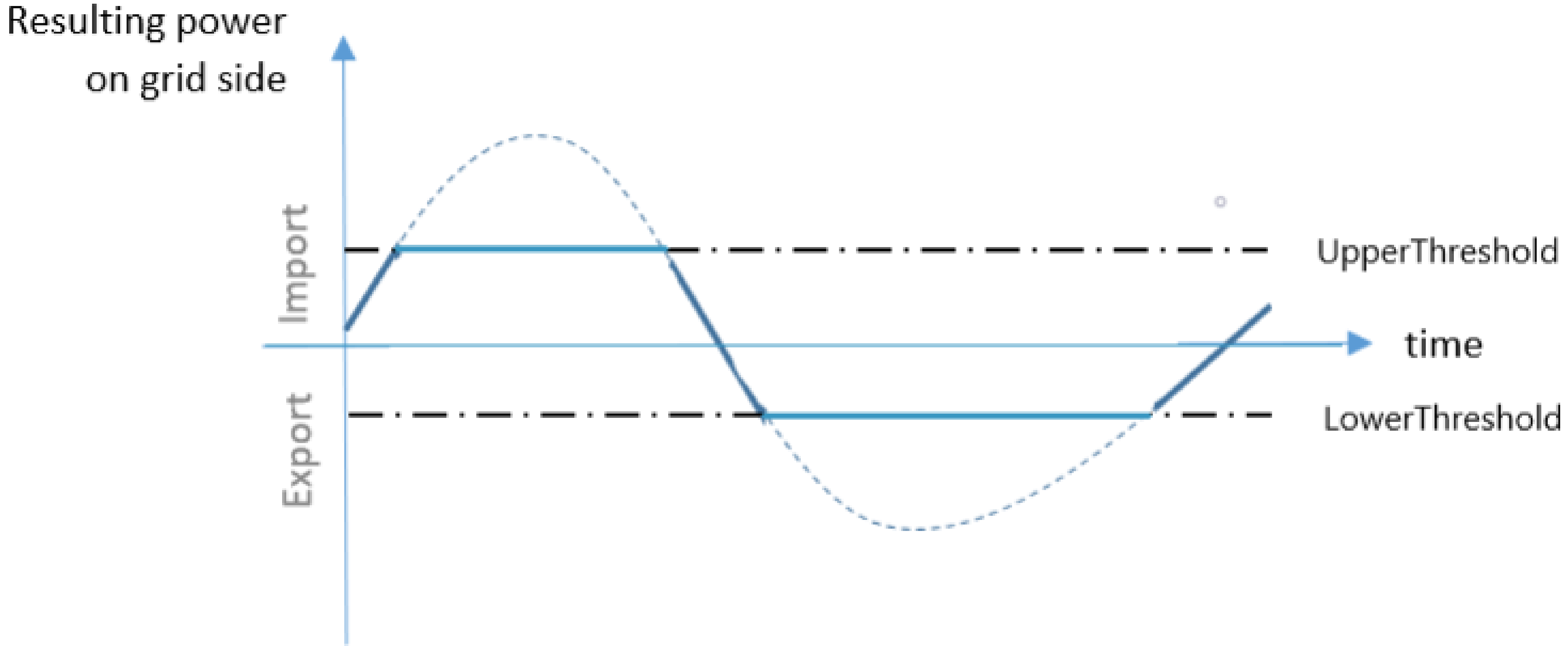
Power of vehicle

2. LocalLoadBalancing

Resulting power on grid side

Import / Export

UpperThreshold

time

LowerThreshold

2. Idle

- Allows the EV to go into sleep mode (enery saving)
- But a new profile can be sent to reactivate the EV

2. DER Support

- Charging stations can be used as Distributed Energy Resources (DER)
- Utility can set specific parameters e.g.,
  - power factor
  - frequency droop

IEC 61850		OCPP 2.1		ISO 15118-20	
IEEE 2030.5					
Utility		CSMS		Charging Station	Electric vehicle
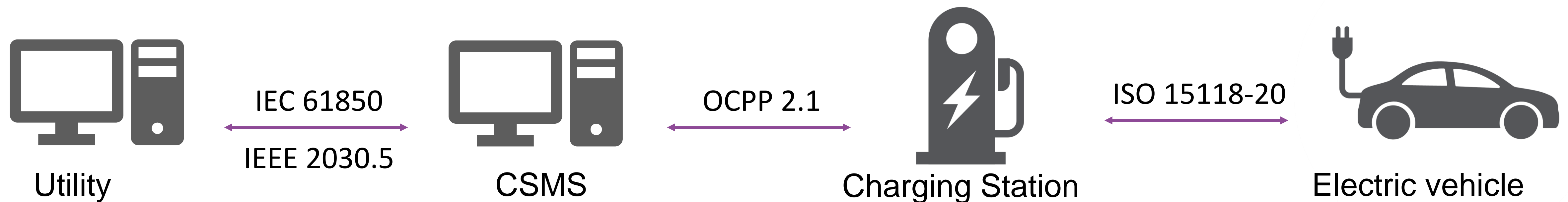
2. Static DER Settings

- Fixed power factor setpoint when absorbing active power
- Fixed power factor setpoint when injecting active power
- Frequency-Watt parameterized mode
- Enter service after trip
- Ramp rate
- Soft-start ramp rate

Example Frequency Must Trip/May Trip Curve
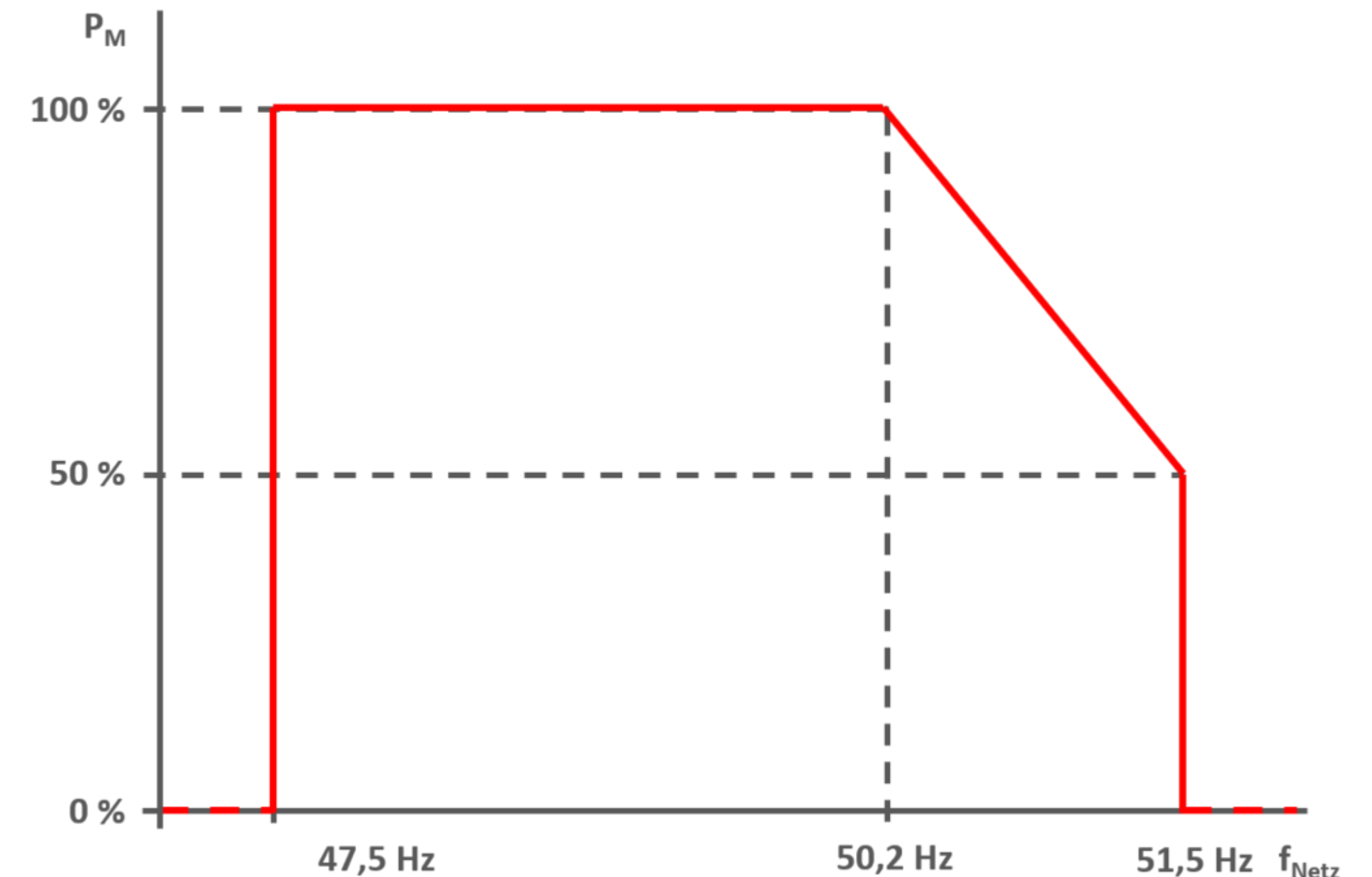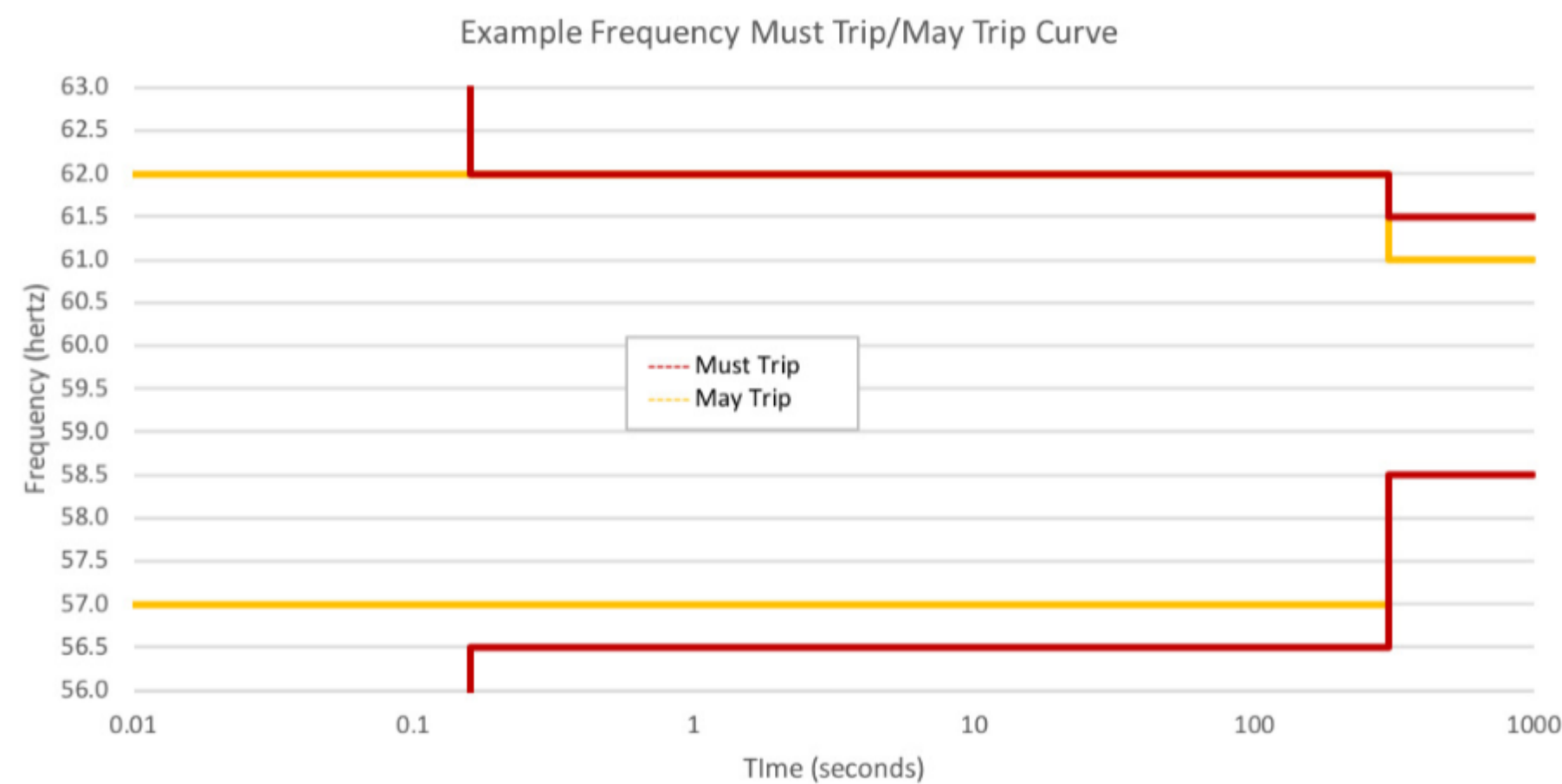
2. DER Alarms

- Added several alarms informing the CSMS about happened DER alarms
- E.g.
  - CurrentImbalance
  - UnderFrequency
  - OverFrequency

2. Energy management systems

- Defined several topologies for the EMS integration
- Local EMS controls an additional smart charging profile
  - Contains additional power that can be used for charging e.g., from PV
- Local EMS can control
  - the charging station directly
  - Via a local controller
  - Natively via intercepting the OCPP communication
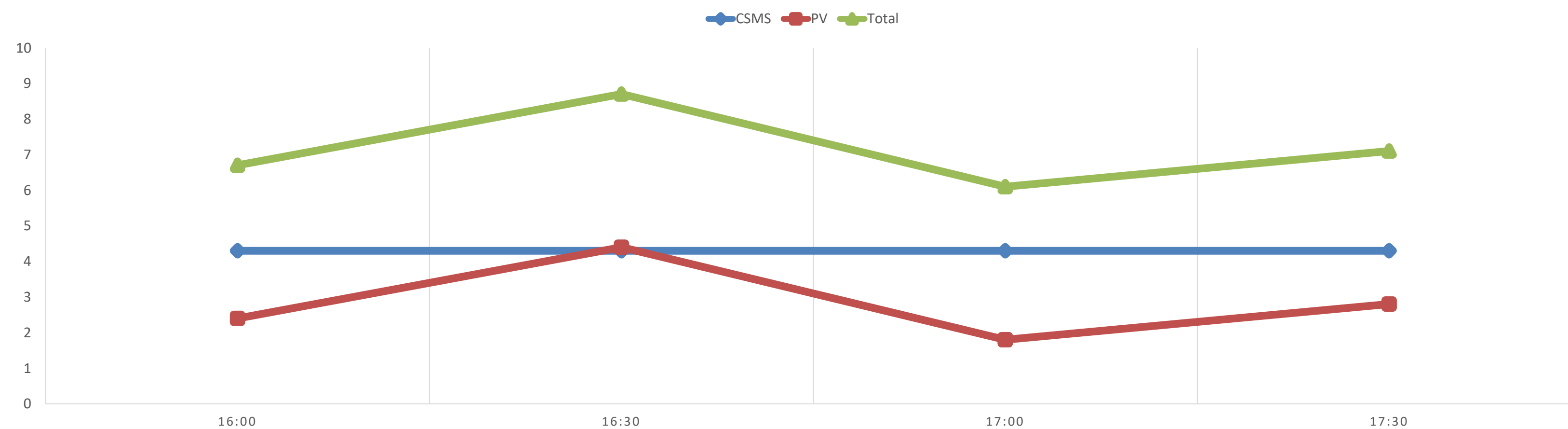
2. Prepaid

- Limit charging duration on
  1. Cost - input via UI or prepaid balance
  2. Energy imported - input via UI
  3. Time charging - input via UI
- Stopping on Energy and Time can be calculated by charging station
- Stopping on Cost needs local cost calculation functionality
- Can be started remotely or from the charging station

2. Local cost calculation

- Local cost calculation on charging station
  - CTEP regulation US
  - Prepaid transactions
  - Local credit card payment
  - Alignment with OCPI
- Integration of credit card payment
  - Local payment terminal
  - Payment with smartphone
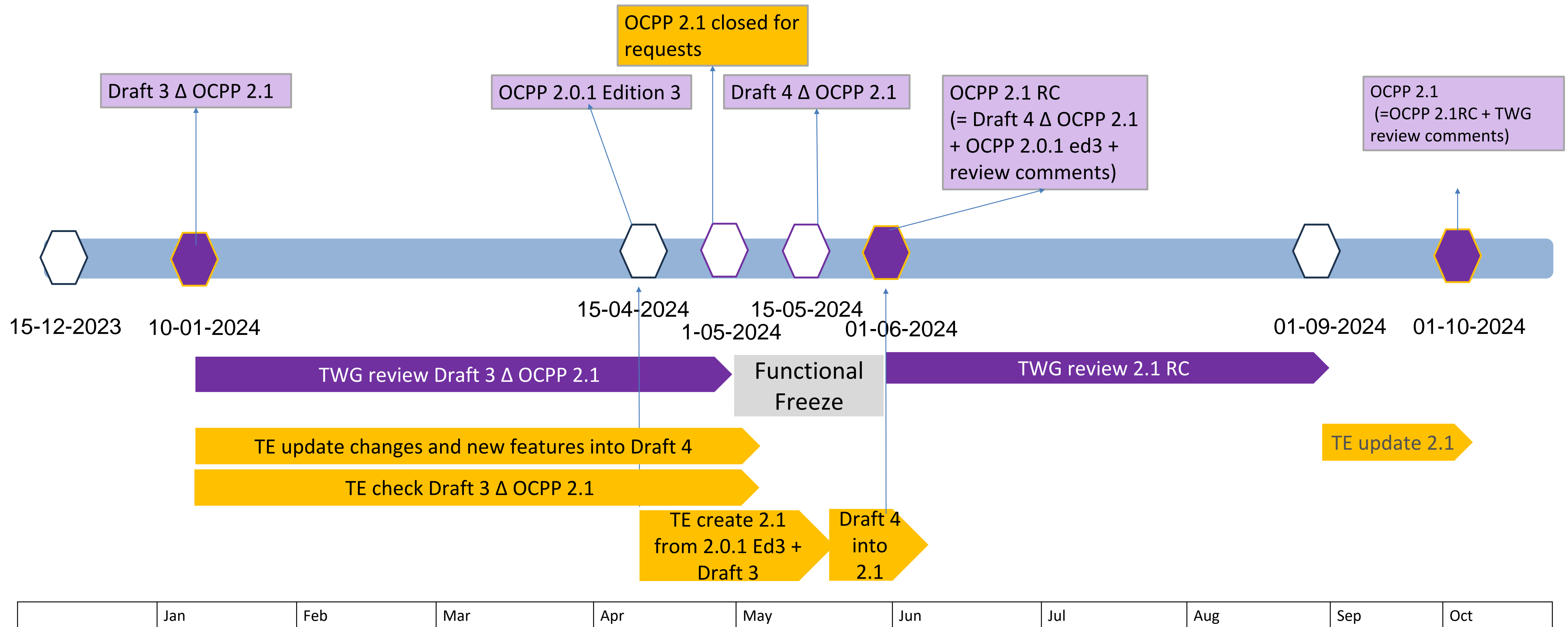- Multi-language support of the displayed text to the customer

2. Adhoc Payment

- User can pay without needing a contract with an eMSP
  - Credit card
  - Debit card
  - Online Payment
  - Etc.
- Two topologies are supported
  - Payment terminal is directly connected to the CS
  - Payment terminal is connected via the CSMS

3. OCPP 2.1 planning

Draft 3 Δ OCPP 2.1

OCPP 2.1 closed for requests

OCPP 2.0.1 Edition 3

Draft 4 Δ OCPP 2.1

OCPP 2.1 RC
(= Draft 4 Δ OCPP 2.1
+ OCPP 2.0.1 ed3 +
review comments)

OCPP 2.1
 (=OCPP 2.1RC + TWG
review comments)

15-12-2023   10-01-2024   15-04-2024   15-05-2024   01-06-2024   01-09-2024   01-10-2024
                                          1-05-2024

TWG review Draft 3 Δ OCPP 2.1

Functional Freeze

TWG review 2.1 RC

TE update changes and new features into Draft 4

TE update 2.1

TE check Draft 3 Δ OCPP 2.1

TE create 2.1 from 2.0.1 Ed3 + Draft 3

Draft 4 into 2.1

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct

4. Summary

- Implementing OCPP 2.0.1 is the first step for OCPP 2.1
- eMobility market is still evolving, we depend on new features
- It's not feasible to add features to old versions of OCPP
- Draft of OCPP 2.1 is already available for members
- We need your feedback on the changes

Prepare yourself for OCPP 2.1

Consider joining the OCA

5. Q&A

– Do you have any questions?