SCENARIOS AND USE CASES:

IMPLEMENTATION IN THE TEST SITES

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Agenda

- Objectives of the presentation
- Business Scenarios
  - BS1: Smart Charging
  - BS2: Itinerary planning
  - BS3: Cross-Provider/Border booking, authorization and payment management
  - BS4: NeMo Network Service
  - BS5: Horizontal Services
  - BS6: eMobility Report
  - BS7: Vehicle Preparation For Drive Off
- Discussion on Use Cases

Objective

To discuss on Business Scenarios and Use Cases

- Do these Use Cases cover your needs as an electromobility stakeholder?
  - if yes, which business scenarios are you particularly interested in?
  - if no, what is not covered?

Business Scenarios and Use Cases

Business Scenario #	Name	Use cases covered by BS
BS1 (A1, A2, B and C)	Smart Charging	UC1-UC8, UC15
BS2	Itinerary Planning	UC4, UC9, UC10, UC12-UC15
BS3	Cross-provider/border booking, authorization and payment management (Cross-country test site)	UC15-UC17
BS4	NeMo Network Service, Service Development Execution and Deployment (OPEN Cloud Marketplace)	UC18-UC55
BS5	Horizontal services: User profile, preferences and monitoring, Service Finder brokerage and pricing	UC49-UC56
BS6	eMobility report	UC57-UC61
BS7	Vehicle Preparation For Drive Off	UC62-UC64

UC 1: Convert mobility needs into charge needs

Scope and Level	**BS1-Smart Charging**	
Goal in context	The aim is to translate mobility needs of an EV driver or a fleet manager into a charge needs. The mobility needs can be described as: I want to go to point B from point A, starting at date X. The charge needs is the amount of energy that should be transferred to the battery to fill the trajectory.	
Preconditions	The EV driver or fleet manager, through his EMP or NSP tools, provides his mobility needs.	
Successful outcome	The charge needs is returned.	
Failure outcome	Failure	Outcome
	Error message describing the error	Service unavailable; impossible trajectory
Primary actors	EMP, VM, NSP, eRoaming Platform Provider	
Secondary actors	-	
Main scenario	▪ The EMP/NSP tool requests the NeMo Hyper-Network for this service giving as inputs the mobility needs and VIN or other EV identifier. ▪ The NeMo Hyper-Network routes this call to an eRoaming Platform giving inputs parameters. ▪ (Optional): The eRoaming Platform requests an NSP to get energy in Joule needed to cover a trajectory. ▪ The eRoaming Platform requests the VM backend to get vehicle real time data (SOC, preconditionment activated?) ▪ Computations and aggregations are done in VM back end and/or in eRoaming Platform to give more information about the charge needs. ▪ The charge needs is returned to the requestor.	

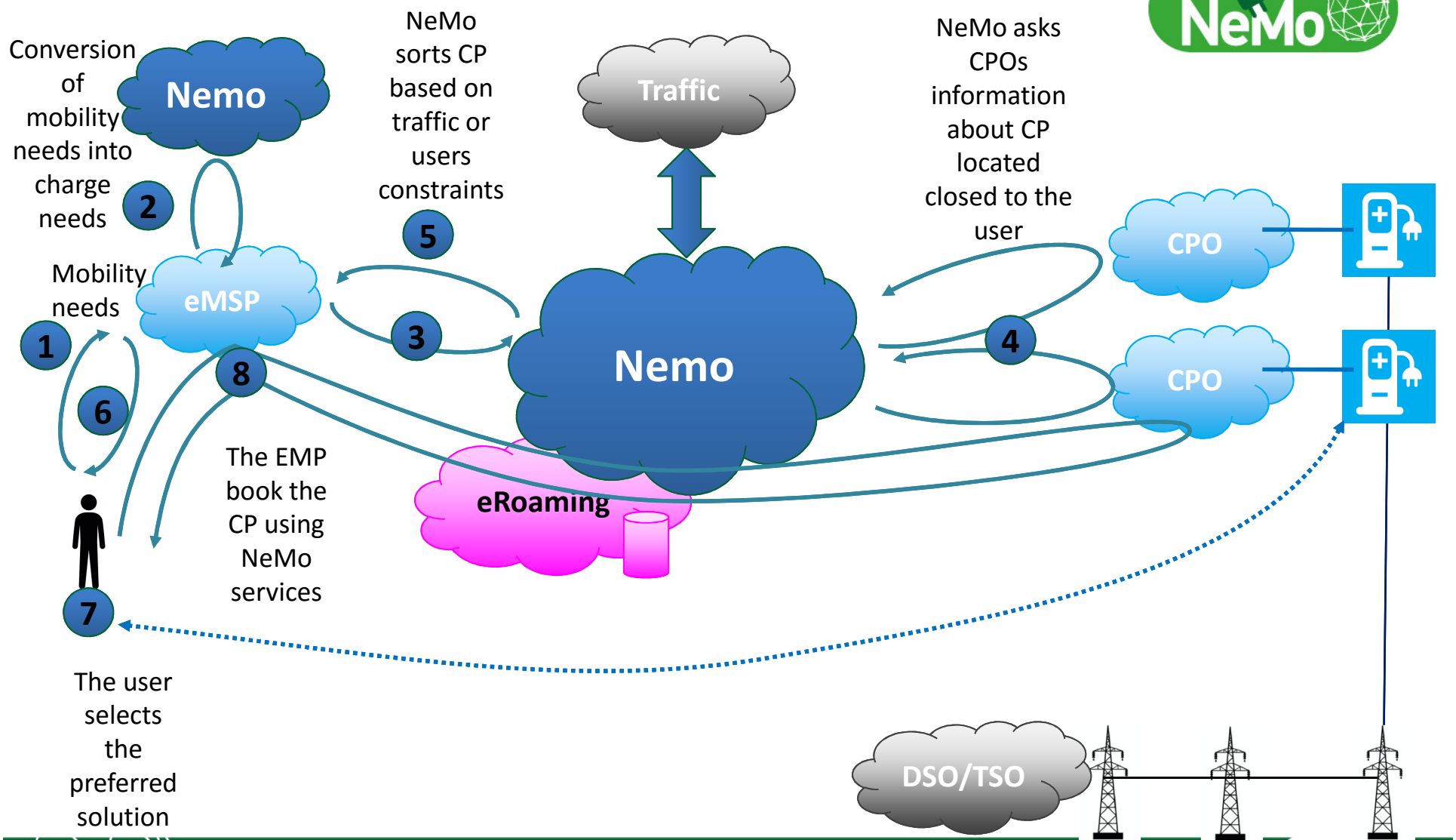
Requirements	▪ #ID EMP_mob_need_01: Get end users' mobility need: The EMP should get information related to the end-user mobility need (where to go? When? From where? …) in order to calculate the "Charge need" and optimise the charging process.
	▪ The mobility needs must describe at least an amount of km to run or, more precisely, a trajectory to run.
	▪ EV owner must have given his approval in order to get personal information about his EV from VM backend.
	▪ An eRoaming Platform must provide this service through the NeMo Hyper-Network.
	▪ VM backend must be able to provide "real time" data of an EV.
	▪ End to end time constraint:
	  ○ If no request to the vehicle (data previously uploaded by the vehicle to the VM backend): The user must have an answer within the normal app usability response time
	  ○ If request the vehicle (OEM backend requests vehicle to get real time data): The user can have an answer longer than the normal app usability response time.	

BS1: Smart Charging

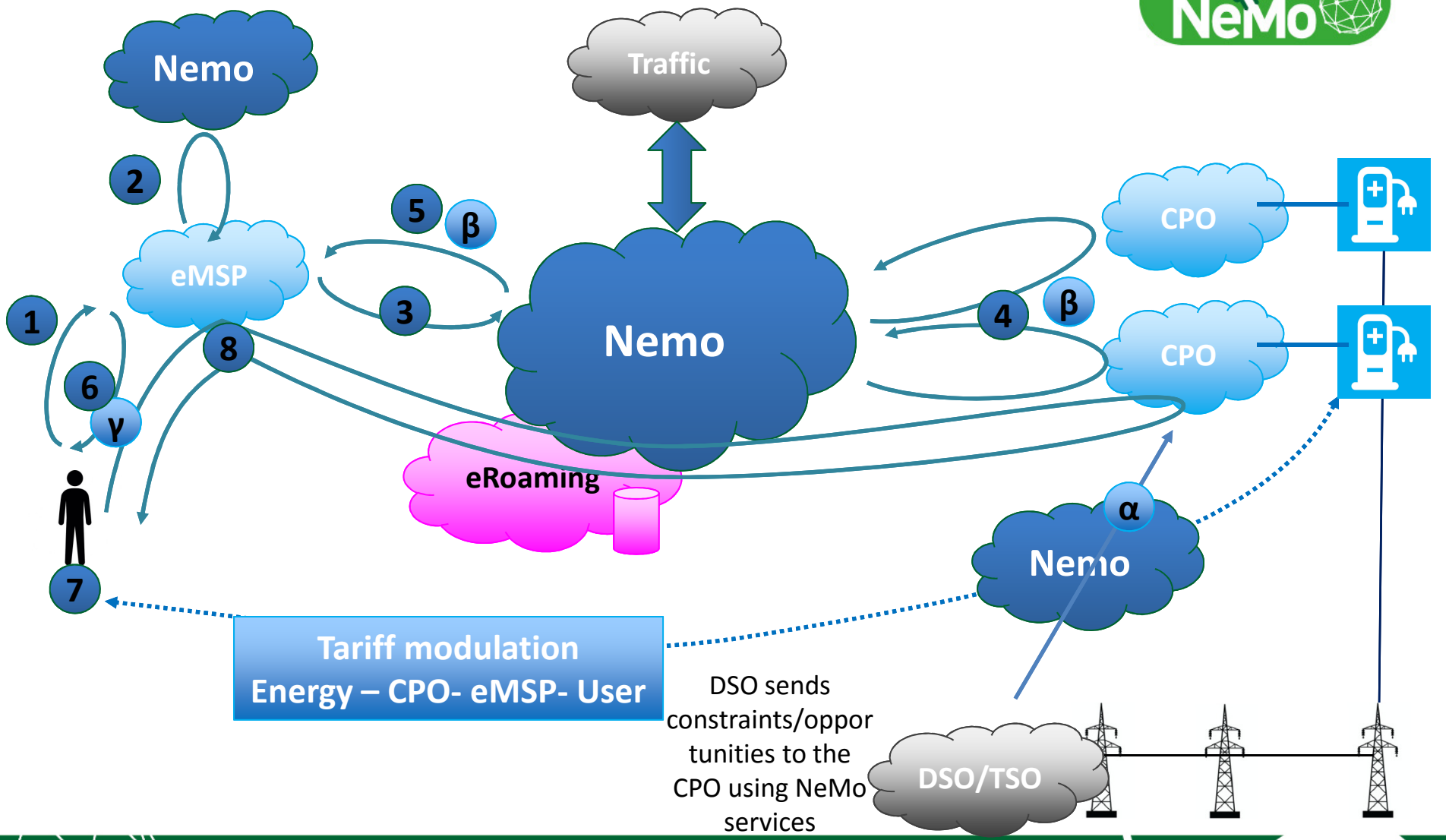
Objective:

- *To charge vehicles based on:*
  - *EV driver and fleet manager preferences (cost, time, place of recharge)*
  - *Charging point*
  - *Renewable energy availability*
  - *Grid constraints*
- *To provide services for all stakeholders of the EV:*
  - *to optimize energy efficiency of the grid*
  - *to optimize the usage rate of CPOs*
- *To consider SOH to determine the charging profile of a vehicle*

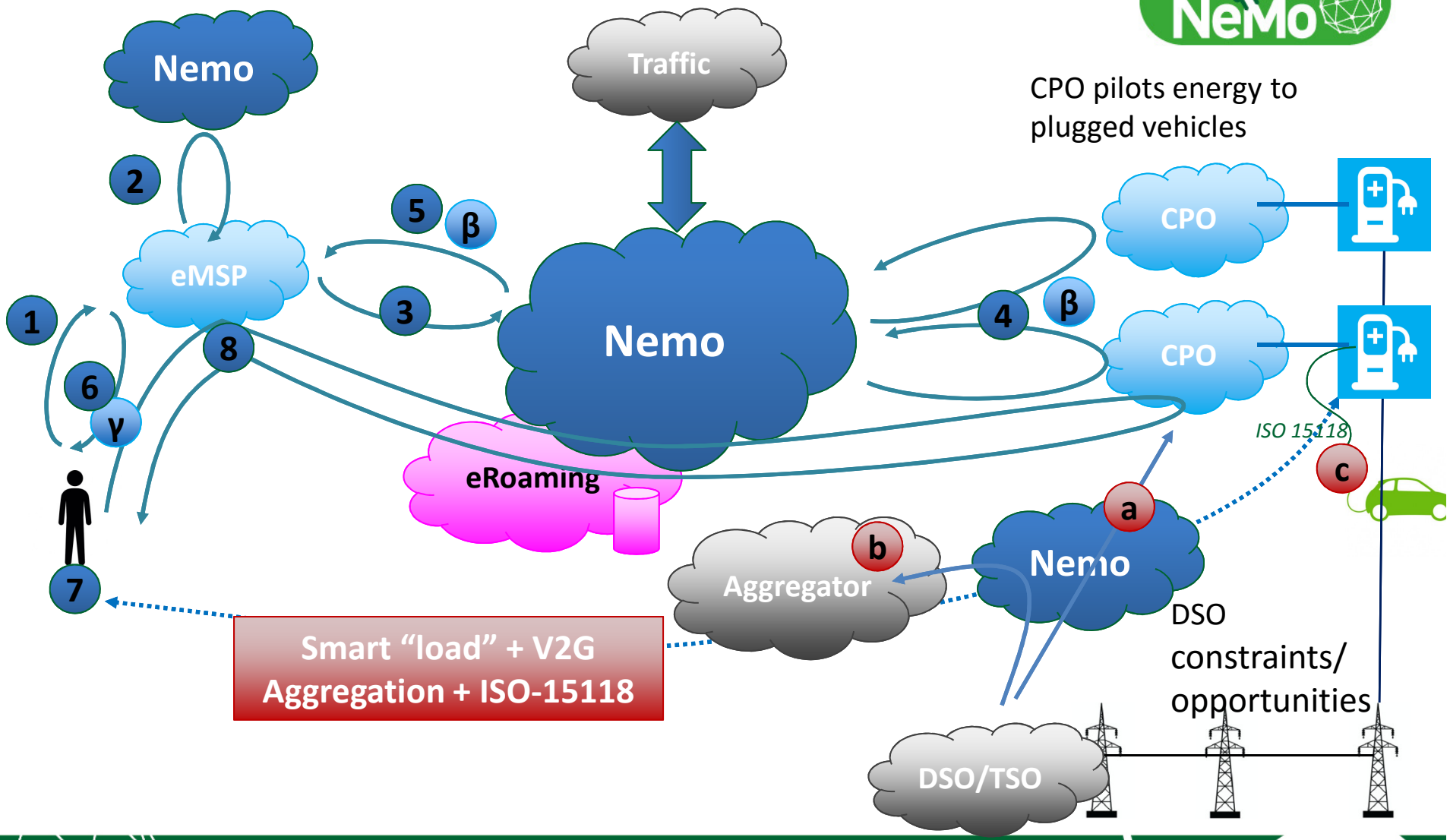
BS1: Smart Charging A1



BS1: Smart Charging A2

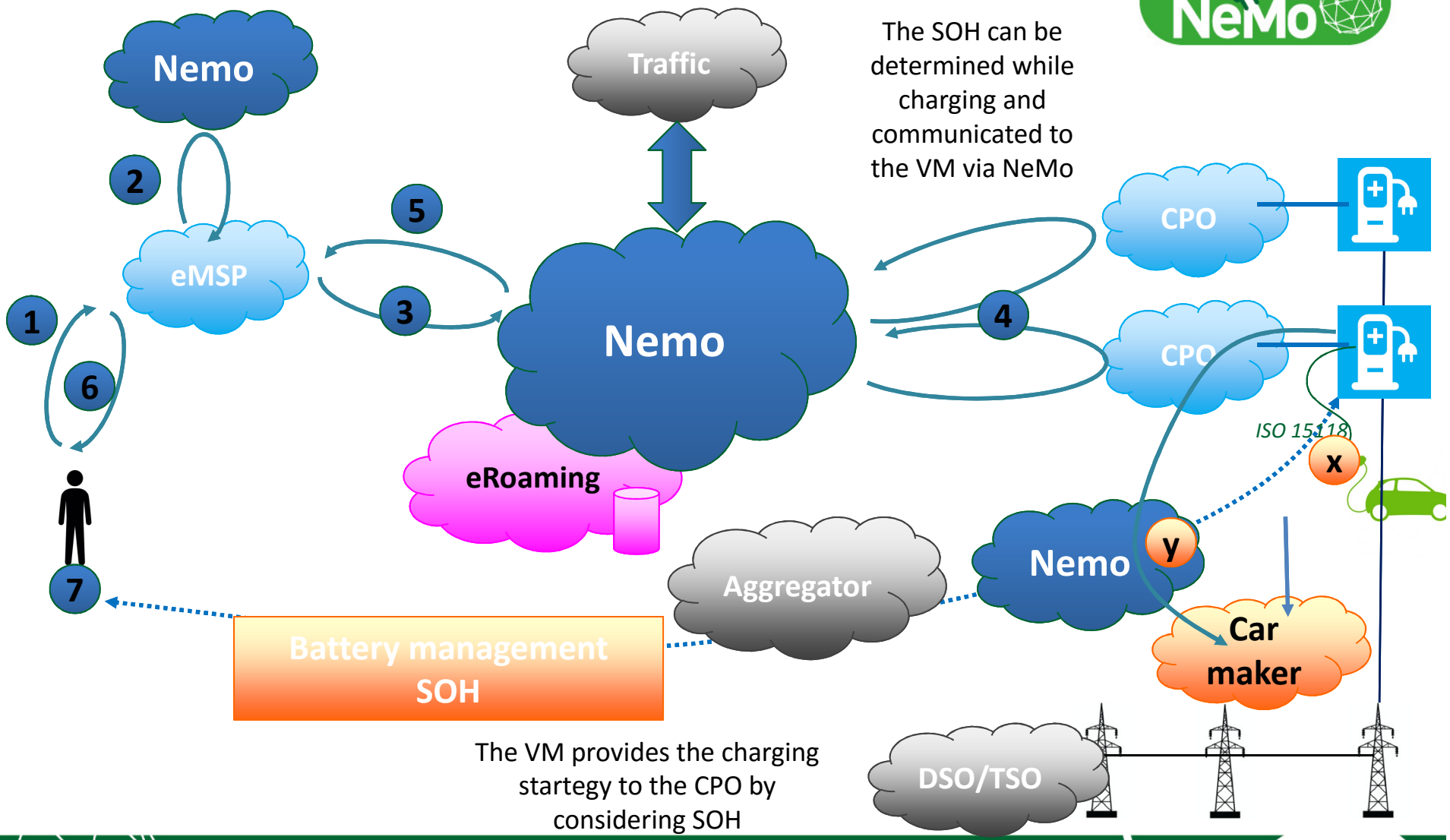


BS1: Smart Charging B



BS1: Smart Charging C

The SOH can be determined while charging and communicated to the VM via NeMo



The VM provides the charging startegy to the CPO by considering SOH

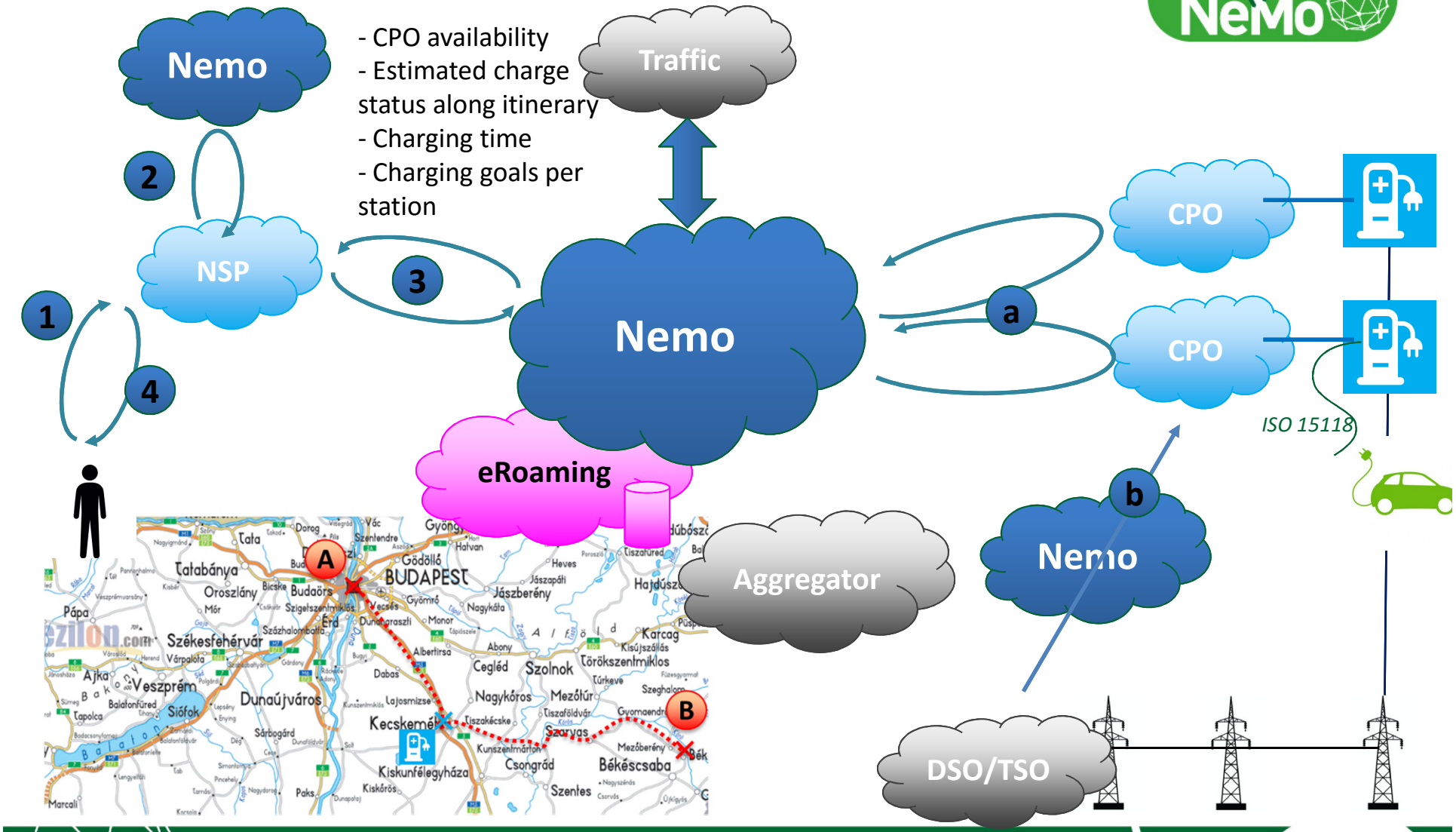
BS2: Itinerary planning

Objective:
to assist an EV driver in planning and driving an itinerary

The Itinerary Planning should take into consideration:

- ***static restrictions*** *and* ***information*** *(such as route, vehicle's charge capacity, etc.)*
- ***dynamic restrictions*** *and* ***information*** *(such as remaining charge, weather, charge price, driving profile, etc.)*
- ***security sensitive situations*** *(such as running out of charge in a highway with no emergency stopping lane)*

BS2: Itinerary planning

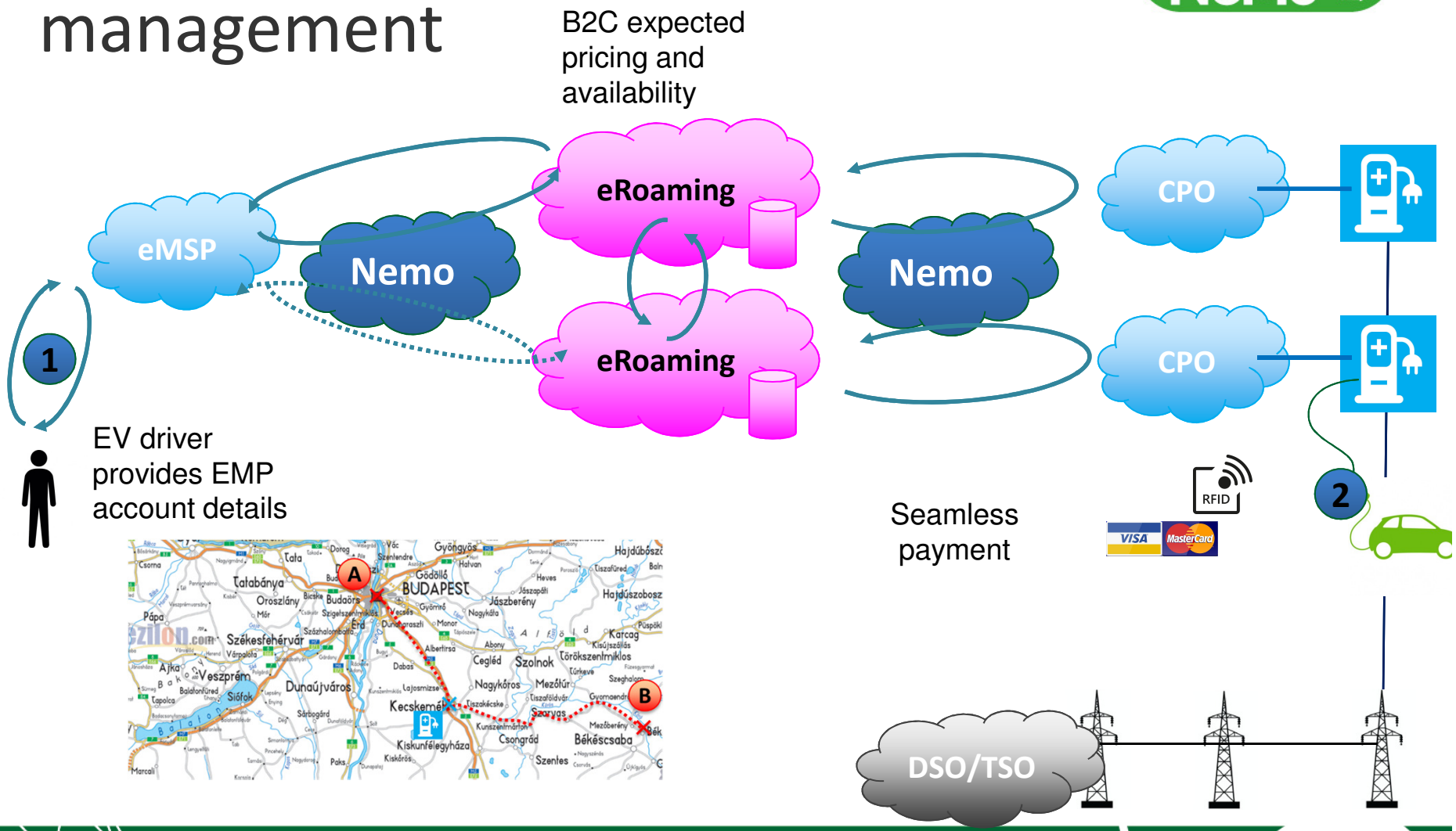


BS3: Cross-Provider/Border booking, authorization and payment management

Objectives:

- *to **automate** the different phases of EV **charging** so that an EV driver can have a **seamless charging** experience across **different providers** and **networks***
- *to **simplify** or **fully automate** the different steps in the charging process (such as booking, authorization/authentication and payment):*
  - *seamless experience for a **single CPO** in the "**base network**" of a driver*
  - *seamless experience for **different CPOs outside** of the **driver's base location** (i.e. by performing a cross-border EV charge plan)*

BS3: Cross-Provider/Border booking, authorization and payment management



BS4: NeMo Network Service

The NeMo Service Development Environment develops and offers new IT services (OPEN Cloud Marketplace) to the participants (Business Partners) in the NeMo Hyper-Network.

- *Participants (Business Partners) in the Hyper-Network are able to **exchange data** and **services** such as IT service offerings*
- *Stakeholders, like IT service providers **offer** their **IT service in the network**, either to all or selected participants (Hyper-Network Service)*

BS5: Horizontal Services

Objective: to develop and deploy horizontal NeMo Hyper-Network services:

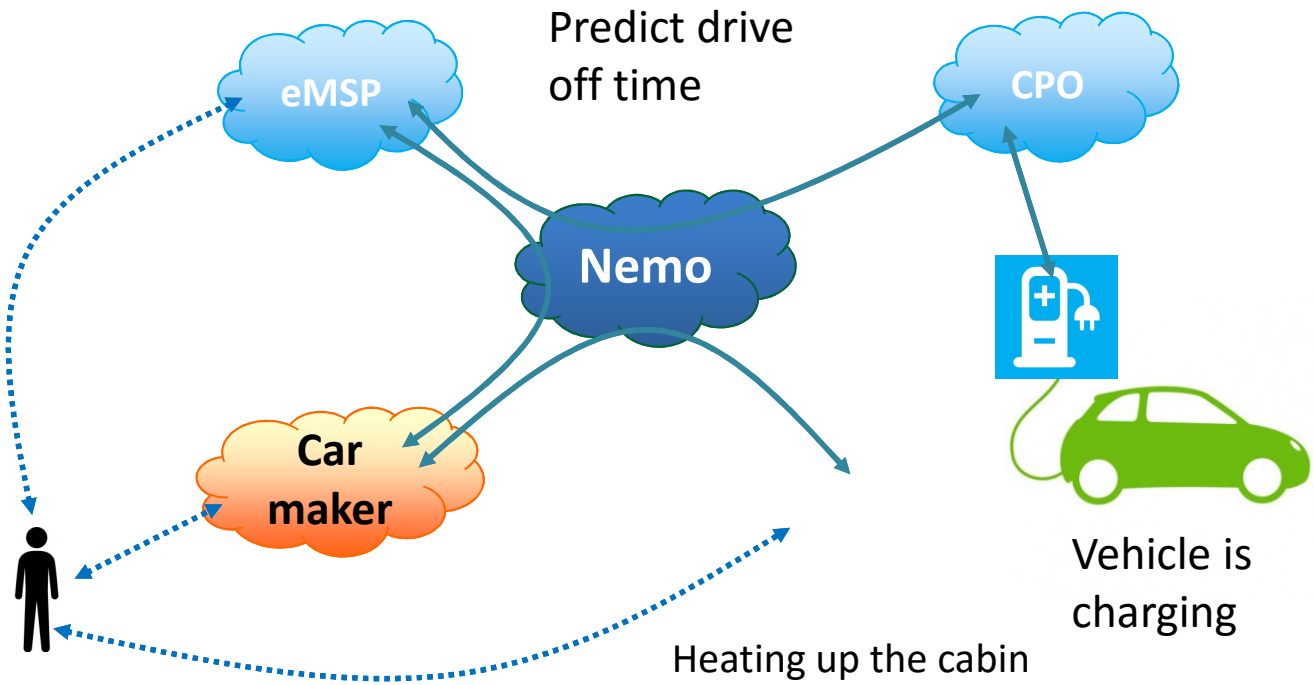
- ***actors' monitoring*** *and* ***profiling****: estimate actors' activity, interests and behavior*
- ***service finding****: find the best services candidates according to actor request*
- ***service optimizer****: provide the most appropriate service ranking based on actor profile, environmental variables or EV status*
- ***service brokerage:*** *propose better prices based on CPO preferred alternatives*
- ***rating/pricing:*** *access centralized listing of prices of the services that meet service request criteria*

BS6: eMobility Report

Objective: to provide information to different actors:

- ***DSO**: Grid load report, to anticipate grid impact, charge need by location to know the need of energy for each location (available renewable resources).*
- ***Public authorities**: Charge point usage, mobility patterns, to check alternative fuel directive roll out, traffic information.*
- ***CPO**: Charge point usage rate per type of location, to identify best locations for investment, charge needs per location, constraints for the DSO on the supply / available power supply.*
- ***VM**: mobility patterns, to better specify batteries and engines, usage rate of infrastructure (assure the customer about the level of re-charging).*

BS7: Vehicle Preparation For Drive Off



Heating up the cabin
Stop charging at 99%
Put battery to optimal temperature range
Charge 100%

Thank you!

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