mobility

«V2X SUISSE»

V2G at Mobility Car Sharing: 50 vehicles with bidirectional charging offering their flexibility to TSO, DSOs and ZEVs.

EVS35
OSL2022

V2X Suisse®

MOBILITY – the car sharing pioneer

More Info: www.mobility.ch/e-mobility

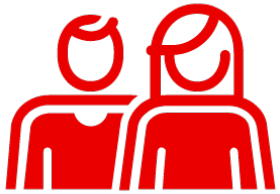
Return-carsharing

≈ 1500 Sites all over Switzerland

≈ 3000 Vehicles

Cooperative

214 employees



224‘000 Clients

Client satisfaction 8.7 out of 10

profitable

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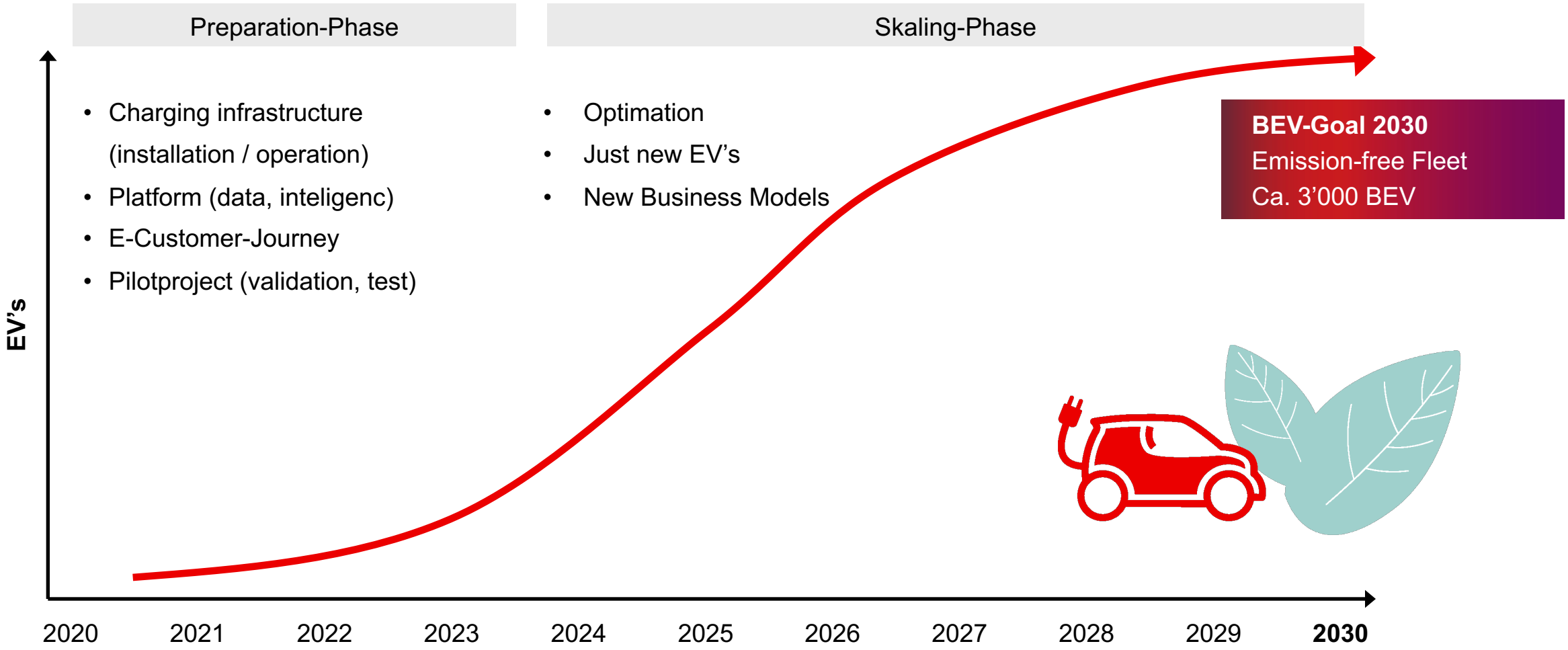
Fleet electrification-Roadmap



Where is MOBILITY in terms of electric cars?

- 230 e-cars (8% of the fleet) are electric (mainly Renault ZOE)
- Unmanaged Charging (plugin and charge)

Where is MOBILITY in terms of charging solutions?

Mobility installs it's own charging stations (AC and DC)

Why?

- Data & support
- Marketing
- Power management
- Customer Journey

How?

- Bouygues – Installations
- Juice – AC-Charger

- EVTEC – DC-Charger

Fleet electrification-Roadmap

Preparation-Phase

- Charging infrastructure (installation / operation)
- Platform (data, inteligenc)
- E-Customer-Journey
- **Pilotproject (validation, test)**
  - **Bidirectional?**
    - **V2X?**
    - **How many cars? (all?)**
    - **MAKE or BUY? (Partner?)**

Skaling-Phase

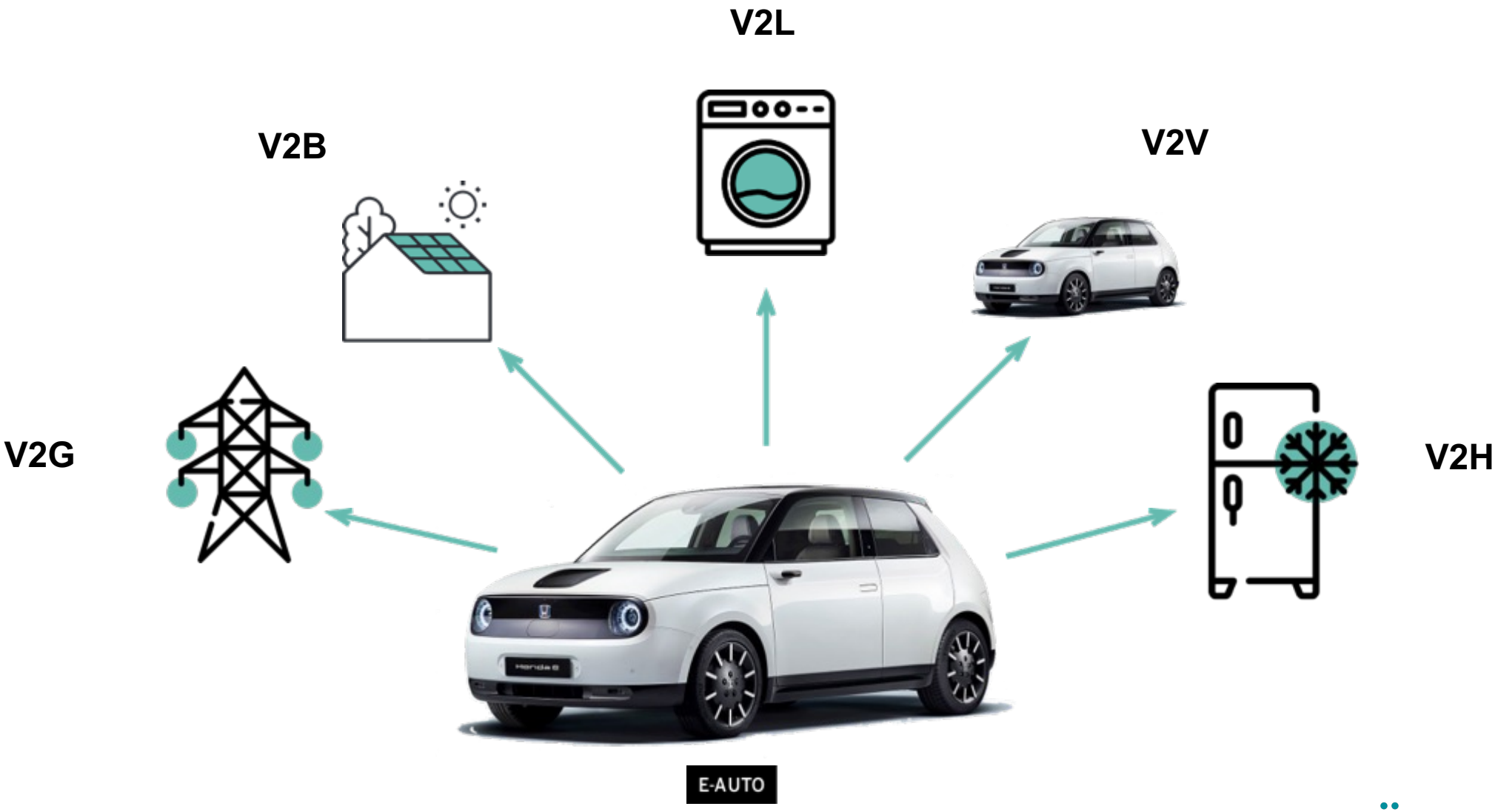
- Optimation
- Just new EV's
- New Business Models

BEV-Goal 2030
Emission-free Fleet
Ca. 3'000 BEV

EV's

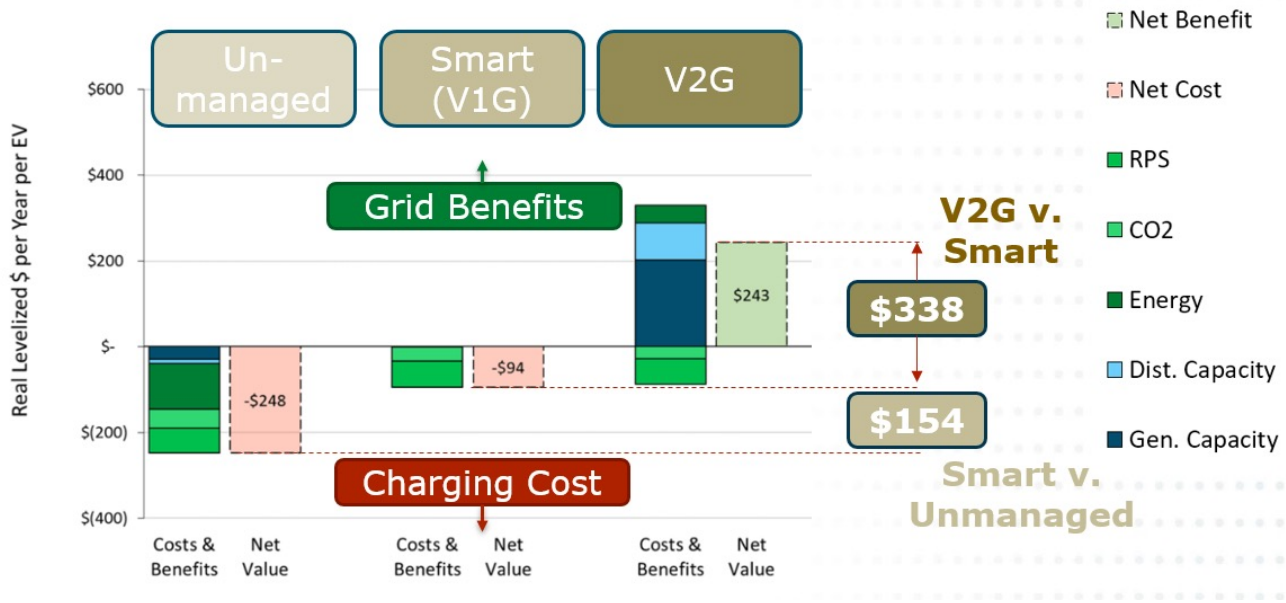
2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 **2030**

What is V2X? – Vehicle to everything



V2X: additional opportunities for carsharing

Financial: Carsharing operators can gain **additional revenue by providing V2X services** to the electricity system **when the cars are not booked**, including at night.



@ 1.- / car and day: 1'000'000 CHF per Year!

Christine Gschwendtner and Konstantin Kraus: "Coupling transport and electricity: How can vehicle-to-grid boost the attractiveness of carsharing?" (https://www.sciencedirect.com/science/article/pii/S1361920922000906)

V2X: additional opportunities for carsharing

Need: More renewable electricity with unpredictable production and hence more needed flexibility

Sustainable: V2X can support the electricity system as **mobile batteries in integrating more renewable electricity**.

The pumped-storage power plant (Ova Spin) offer around 45MW of pump power

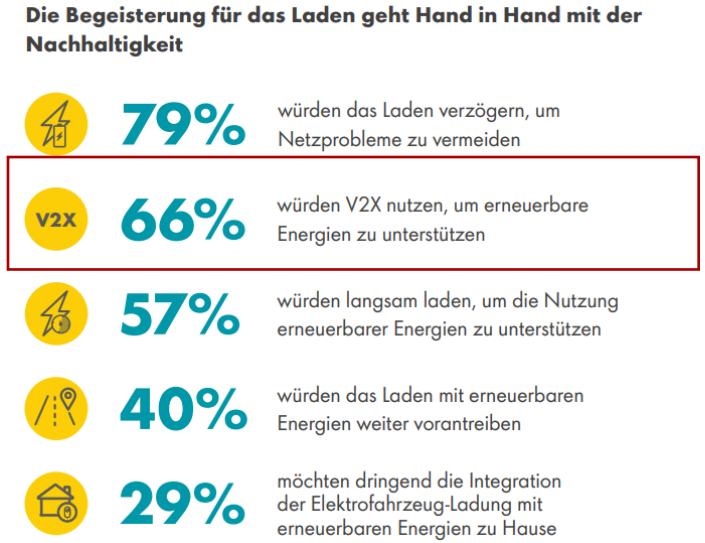
- (with 20kW charging power / car) this corresponds to the bidirectional power (theoretical max.) of 60MW!

1 x MOBILITY fleet = more than one of these power plants!

Less investment neeeded, no valley flooded

V2X: additional opportunities for carsharing

Attraction: V2X could increase the attractiveness of carsharing as it has already been shown that **E-carsharing is more popular than conventional carsharing.**



Risk of battery degradation is no concern for the customer and is at the carsharing company on a fleet level.

Christine Gschwendtner and Konstantin Kraus: “Coupling transport and electricity: How can vehicle-to-grid boost the attractiveness of carsharing?“ (https://www.sciencedirect.com/science/article/pii/S1361920922000906)

V2X-Suisse Project-Partners

sun2wheel
charge and discharge

EVTEC

novatlantis
nachhaltigkeit | wissenstransfer

tiko

ewz

AEM

primeo energie

SWISS SOLAR CITY

Helion

HONDA
The Power of Dreams

mobility

energieschweiz

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Bundesamt für Energie BFE
Office fédéral de l'énergie OFEN
Ufficio federale dell'energia UFE

n|w Fachhochschule Nordwestschweiz

Scuola universitaria professionale della Svizzera italiana
SUPSI

Lucerne University of Applied Sciences and Arts
HOCHSCHULE LUZERN

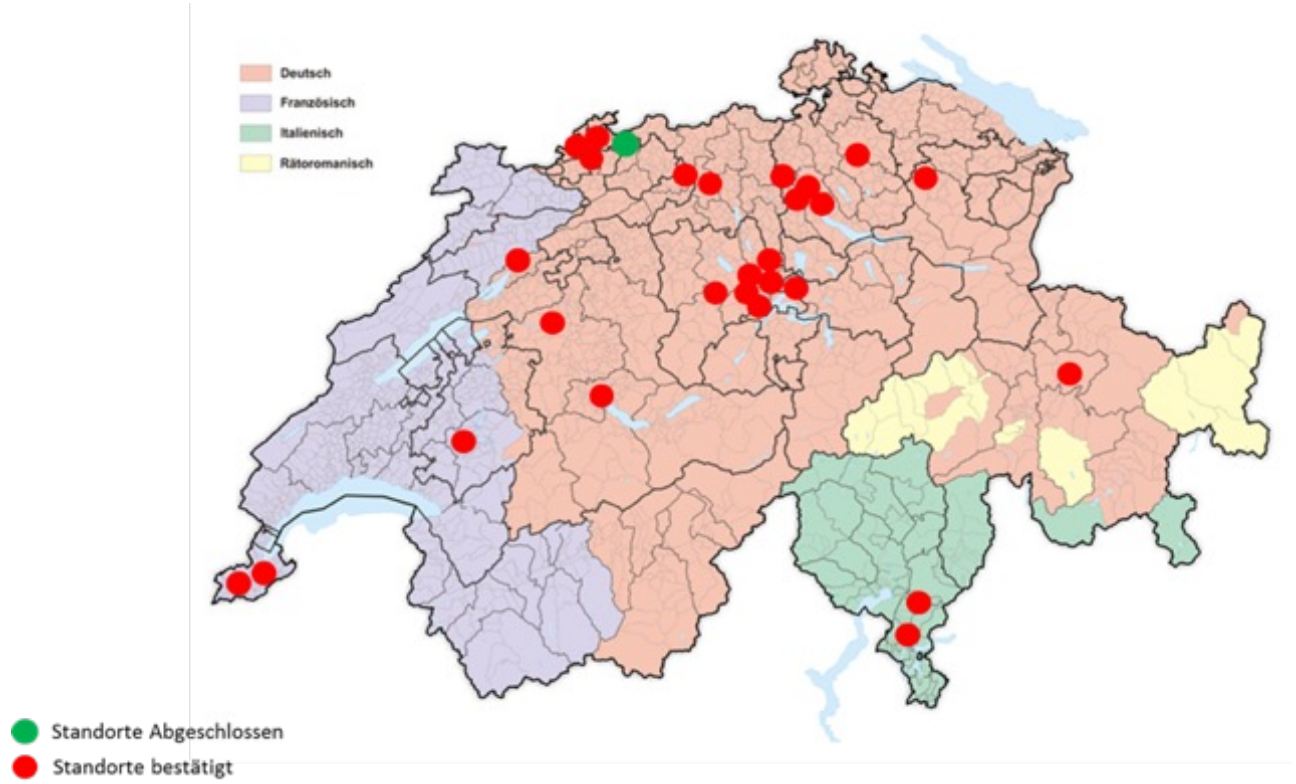
MIE lab
Mobility Information Engineering Lab at ETH Zurich

HIVE POWER

Berner Fachhochschule

Key Facts I – 40 V2X sites in whole Switzerland

Largest Swiss V2X project with a number of 50 bidirectional BEV and a geographical distribution of 40 locations throughout Switzerland.



Key Facts II – only serial products

- Use of certified series products (**powermanager / sospeso&charge** and **Honda e** based on CCS)
- Normal carsharing operation (no trained users or in restricted operation)
- Up to 20 kw flexibility for each vehicle

HONDA

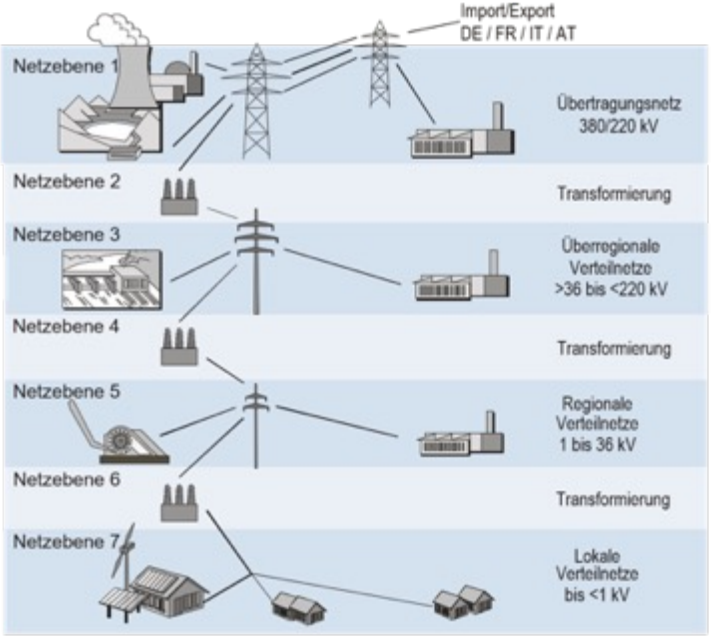
EVTEC

Key Facts III – 3 different flexibility customer

The flexibility offered can be used by 3 different customers at the same time (grid regulation (TSO) / local DSO / Self-consumation).

1. Grid regulation (TSO) — tiko (für swissgrid)
2. Local DSO — nw, ewz, primeo energie, AEM
3. Self Consumation — Helion

	Anzahl MA	Anzahl Netz-betreiber	km Kabel	km Frei-leitung[2]
Übertragungs-netz	389	1	8	6700
Verteilnetz	11'274	23[1]	1980	6918
		369[1]	32'174	11'570
		667[1]	73'382	10'835



Key Facts IV – V2X logic (intelligent fleet platform)

First platform to enable - a **user-oriented priority of charging** based on the scheduling of every single vehicle of the fleet and the demand of the different customer.

Bookings

mobility

TSO tiko DSO

"Flex – Platform"

smarts

Sun (ZEV)

sun2wheel

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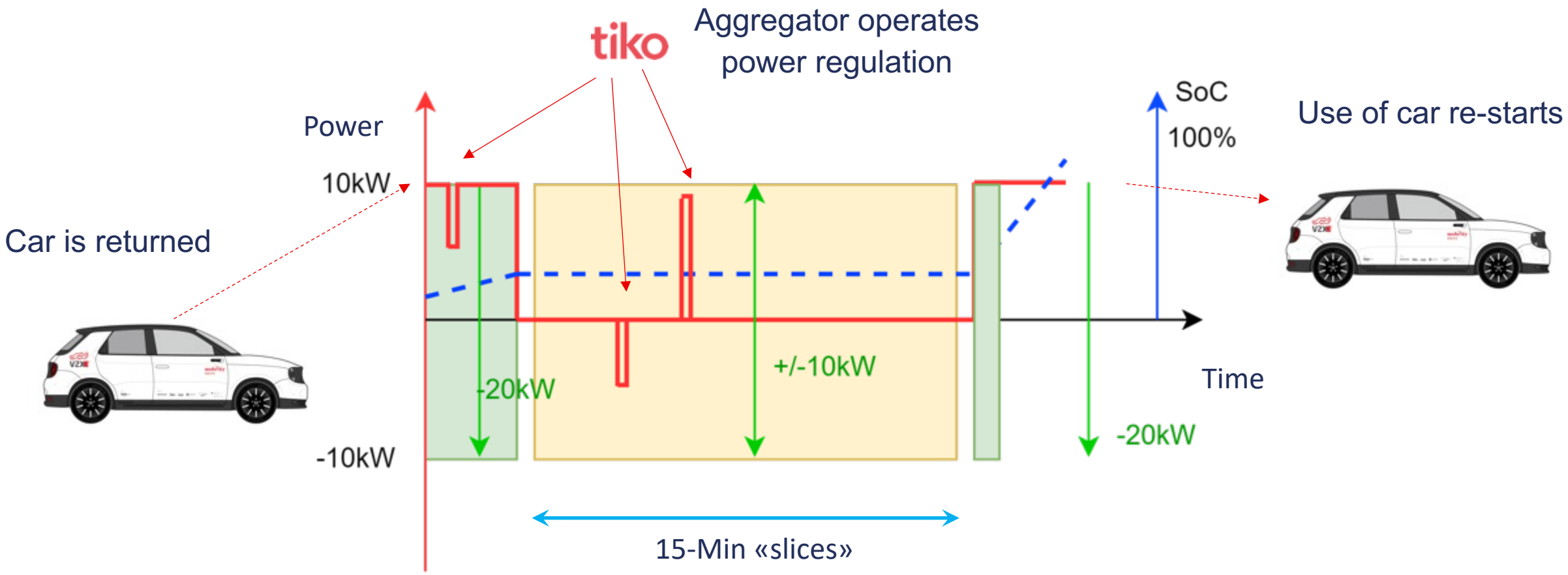
Key Facts IV – How balancing power affects operations



Key Facts V – Answer of many Questions in real live

- **Grid-friendly?**

The project will be exploring **how this technology can help stabilize the electricity grid** and how charging points with photovoltaic production can **optimize their self consumption**.

- **Business case?**

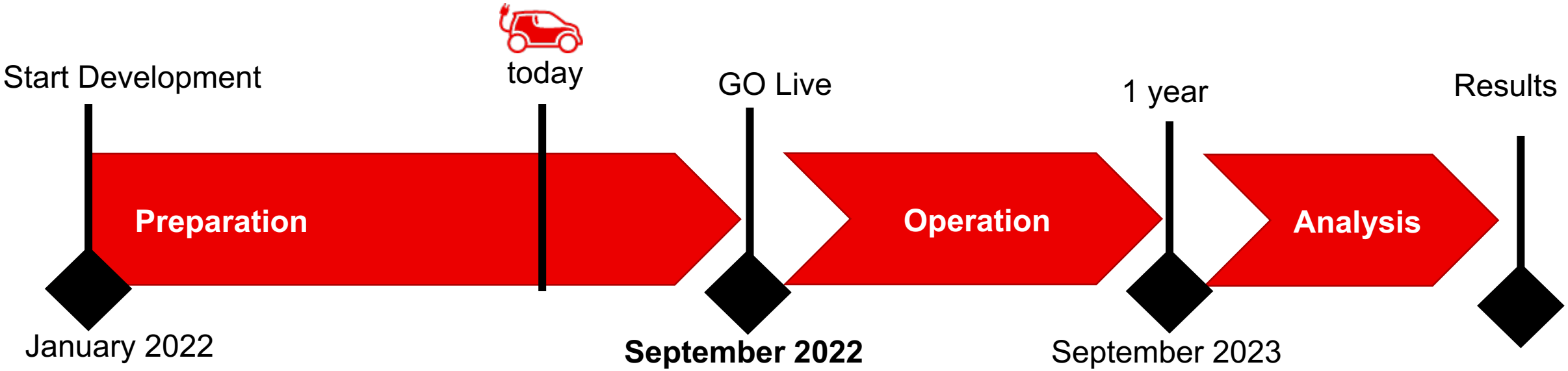
The project will investigate the **business potential of bidirectional charging** electric vehicles in Switzerland.

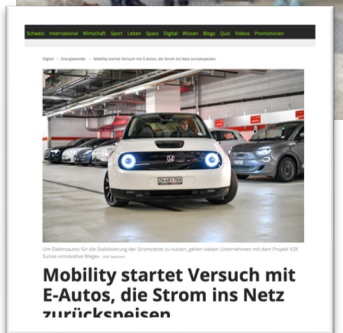
- **Flexibility-Demand**?

The project will test the **competition between the potential flexibility buyers** (Swissgrid, distribution grid operators, and self-consumption associations) and their need.

- **And many more Questions…**

Where does the «V2X Suisse»-Projekt stand?





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mobility
car sharing

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mobility

Thanks!
Questions?

V2X Suisse®

Abstract

V2X at Mobility CarSharing

According to the “Electric Offensive” strategy, the Mobility Cooperative will electrify the entire fleet of around 3,000 passenger vehicles by 2030 at the latest. But despite sharing, electric vehicles (EVs) are mostly “standing vehicles”. Bidirectional Mobility-EVs therefore offer the opportunity be used in large numbers as mobile batteries for V2X services. Mobility would like to test this potential - together with several well-known partners - by means of a P&D project and various research activities.

In the proposed P&D project, technical, organizational and economic solutions are being developed to operate 50 EVs in a grid-friendly manner, without restricting mobility operations and the quality of service for customers, and at the same time offering significant flexibility (10 or even 20 kW per car).

The plan is to test the 50 bidirectional vehicles during normal car sharing operations for 1 year from September 2022. The V2X benefit will be concretized on three grid-levels and the achieved compensation for flexibility will show possible new business models. Thanks to two already approved SFOE research projects, predictive V2X algorithms will be developed together with ETHZ, and - together with HSL - the topic of data quality and security will also be analyzed.

Abbreviations

1. **V2X =** vehicle to “everything”. Vehicle-to-grid (V2G) refers to bidirectional energy flow between an electric vehicle’s battery and the charging station. Energy can be transferred to a building (vehicle-to-building or V2B), or can be sent to the grid (V2G) to earn revenue on energy markets.
2. **V1G =** controlled one-way-charging, or “smart charging”. V1G refers to the ability to dynamically modify the charge rate or the charge time. This can help minimize the cost of charging a vehicle (such as different electricity-tariffs in the middle of the night versus peak demand hours).
3. **BFE =** Bundesamt für Energie = Swiss Federal Office of Energy, https://www.bfe.admin.ch/bfe/en/home.html
4. **TSO =** A **Transmission System Operator** is an entity entrusted with transporting energy on a national (or regional) level. In Switzerland this is https://www.swissgrid.ch/en/home.html
5. **DSO =** A **Distribution System Operator** is an entity entrusted with distributing energy on a regional level to final clients. In Switzerland we do have about 600 different DSO. They are reppresented by VSE, https://www.strom.ch/de . In German = **VNB =** Verteil-Netz-Betreiber
6. **ZEV = “**Zusammenschluss zum Eigenverbrauch» = Local prodction & consumtion of solar energy. See https://www.etrends.ch/detail/zusammenschluss-zum-eigenverbrauch-erklaerung.html
7. **FLEX =** is a MOBILITY carsharing-site operated in combination with a local partner. See: https://www.mobility.ch/en/business-customers/offers-and-prices/mobility-flex