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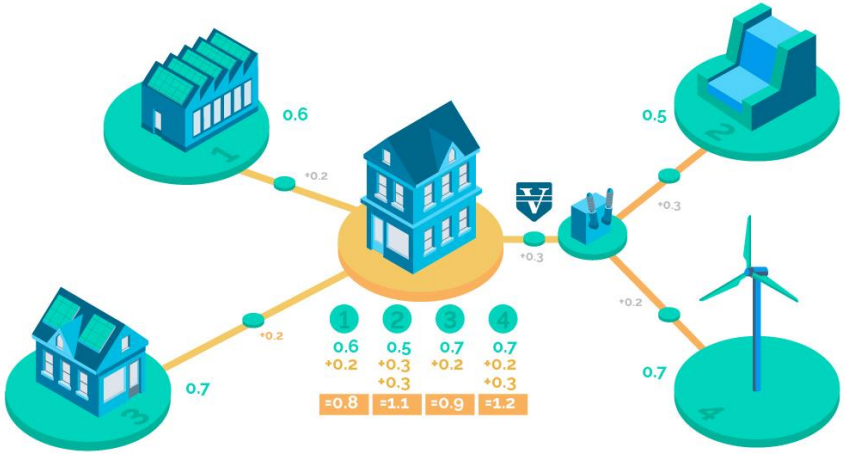
IEA PVPS



Dynamic grid pricing with VGT's proprietary solution (www.vgt.energy)

Innovation in self-consumption

Lionel Perret, Swiss IEA task1 Representative, Director for Renewable Energy, Planair SA

September 2020

Innovation in self-consumption

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- Self-consumption: Our future
- Self-consumption: Innovation Roadmap
- SunnY-Parc: An Applied Case Study

New energy systems = new policies needed

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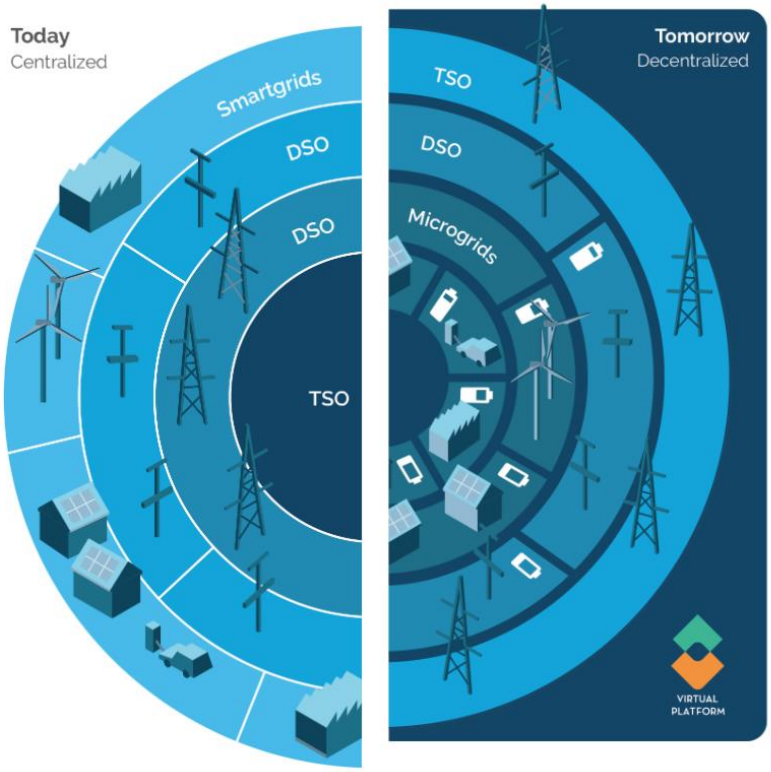
- Decentralized energy creates complete paradigm shift for the energy system
  - Markets
  - Grid pricing
  - Liberalization
  - Grid sizing
  - Role of DSO/TSO



@ VGT solution (www.vgt.energy)

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Anticipate business models of storage

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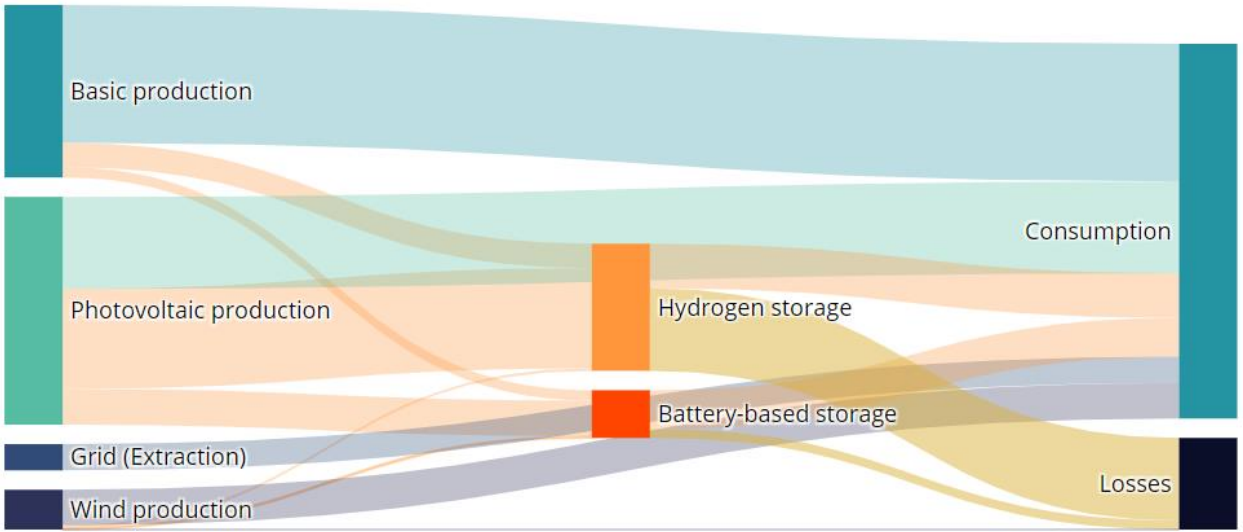
To be competitive, battery and hydrogen storage systems need surplus green electricity, which would be otherwise curtailed.

The future security for rate of return on PV & seasonal storage comes from self-consumption model. The lowest possible cost for the green electricity sold into seasonal storage is key. Fixed annual PV renumeration prices kill this innovative business model of the future - from the start.



@ Planair, Scenarios for carbon neutral Switzerland in 2050

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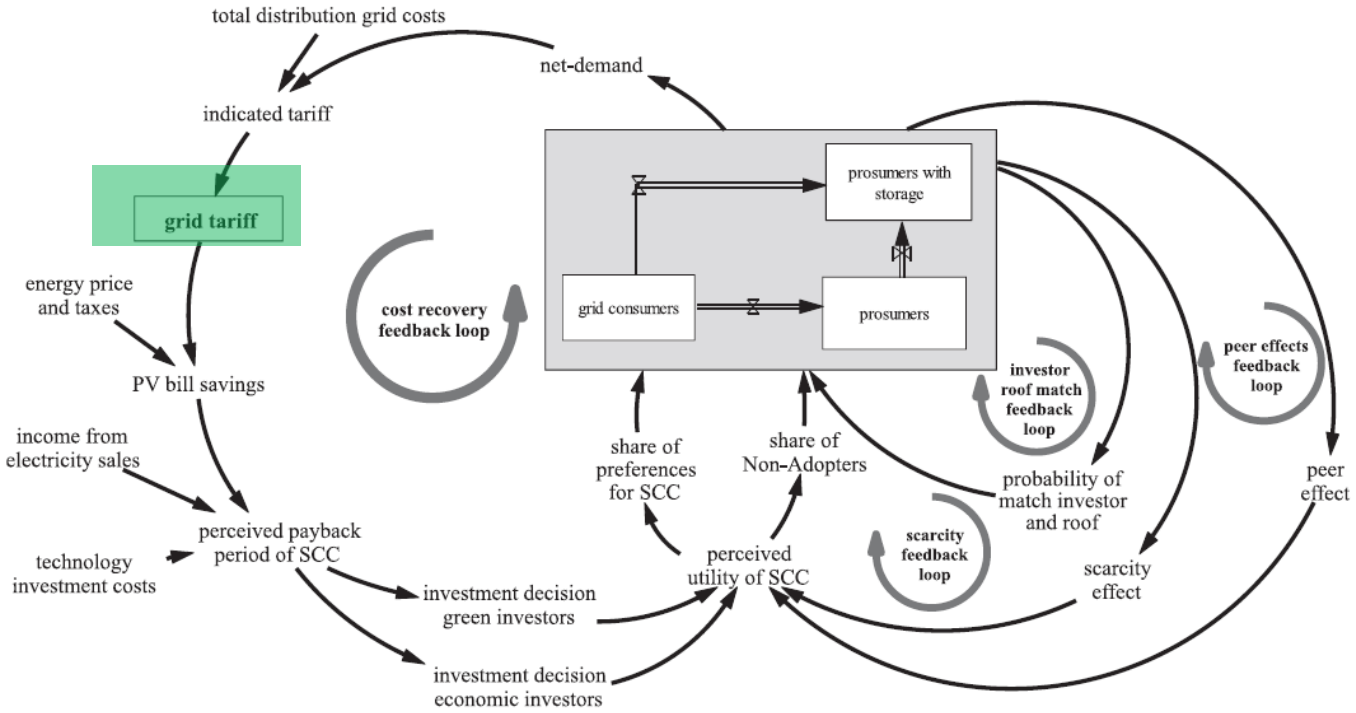
Sunny circles with self-consumption

The central driver for self consumption is grid pricing and regulation. Innovative and expanded **self-consumption policies** have the potential to be the central driver for decentralized energy.



Energy Policy, Kubli 2018, Squaring the sunny circle? On balancing distributive justice of power grid costs and incentives for solar prosumers

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Innovation in self-consumption : a roadmap

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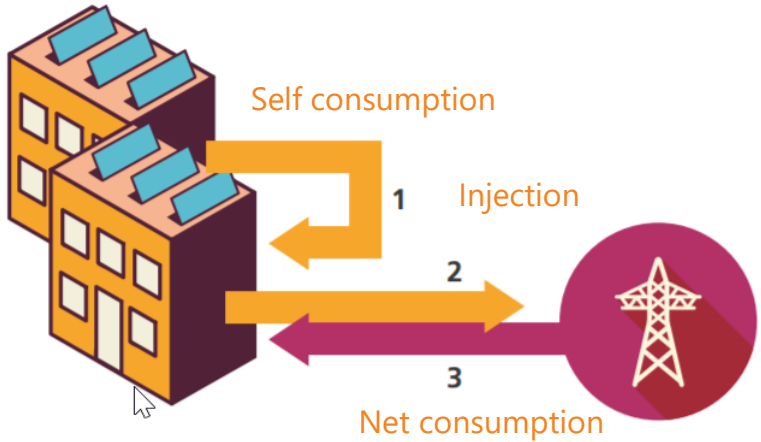
- Innovation roadmap
  - Meter Self-consumption
  - Collective self-consumption
  - Grid levels self-consumption
  - Dynamic self-consumption



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Innovation in metering self-consumption

New product from Swiss DSO : an optional net metering in addition to real-time meter self-consumption

Virtual storage product from DSO to avoid new battery systems „Flexisolar“ : a subscription price for net-metering

1. Subscription price (from 499 to 999 CHF)

2 + Low monthly subscription price (5,4 CHF/month)

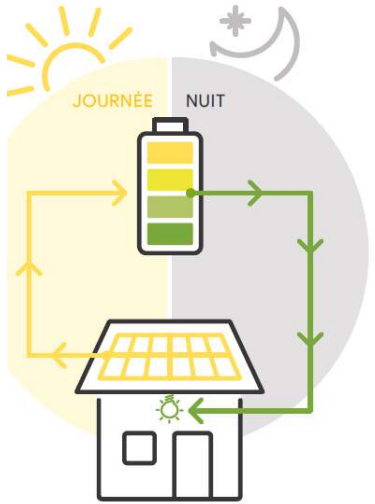
3 = Yearly storage of your excess PV electricity „within the grid“ and opportunity to consume it

Excess electricity is sold to the DSO/Market price.

Provide more safety for feed-in price into the grid (injection price usually subject to annual change)

TARIFS DES FORFAITS DE MISE EN ŒUVRE

PUISSANCE	TARIF
0 - 9.9 kVA	CHF 499.- TTC
10 - 19.9 kVA	CHF 749.- TTC
20 - 29.9 kVA	CHF 999.- TTC



Innovation in self-consumption : a roadmap

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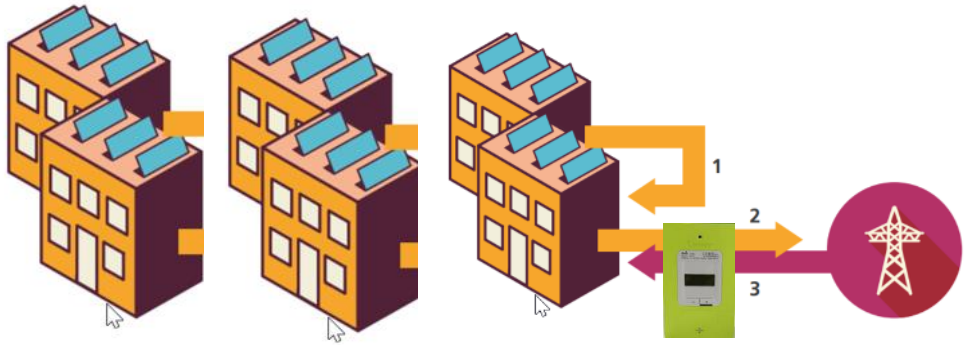

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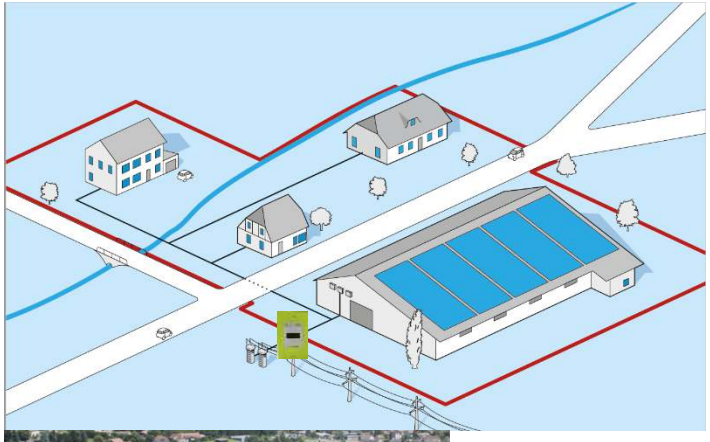
Collective Self Consumption in Switzerland

In Switzerland, collective self-consumption opportunities are unlimited as long as you are behind a unique public grid connection point (grid meter)

You can build a private electrical network behind the meterm, creating a collective self-consumption community, fully exempted from public grid costs and taxes.

Potential for new buildings and new districts

- Development of competitive solutions for managing self consumption
- Regulation on fair pricing between consumer, PV owner & grid owner (50/50 rule)
- Low appeal for existing collectives : usually not cost effective to build a new grid



Innovation in self-consumption: A roadmap

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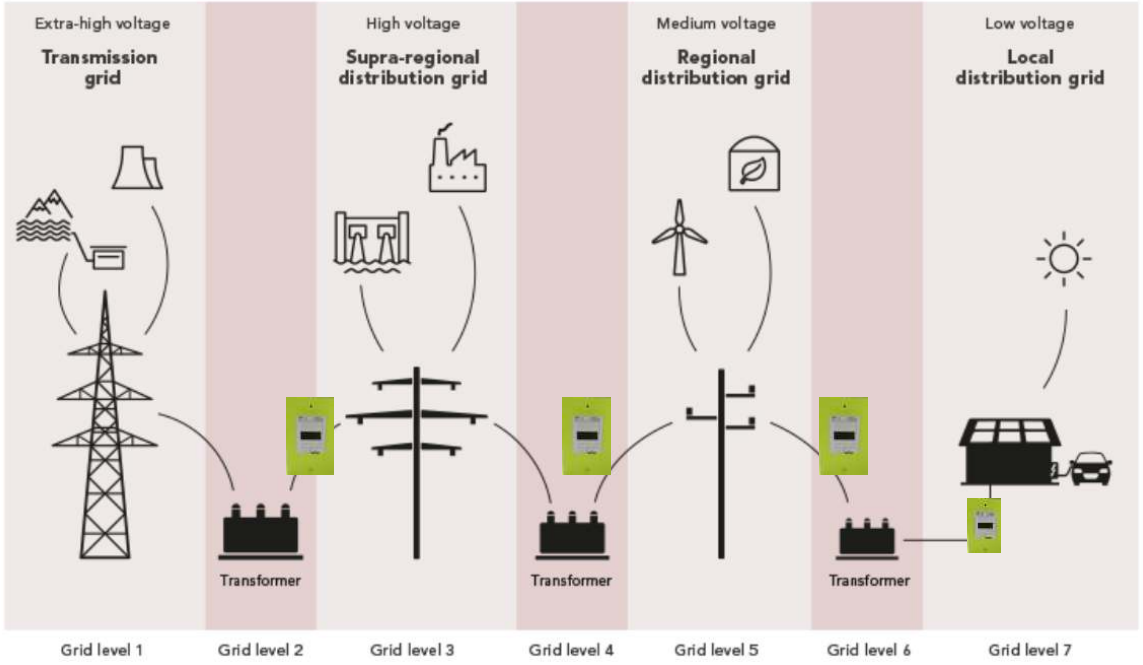

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Incentives with grid level self consumption

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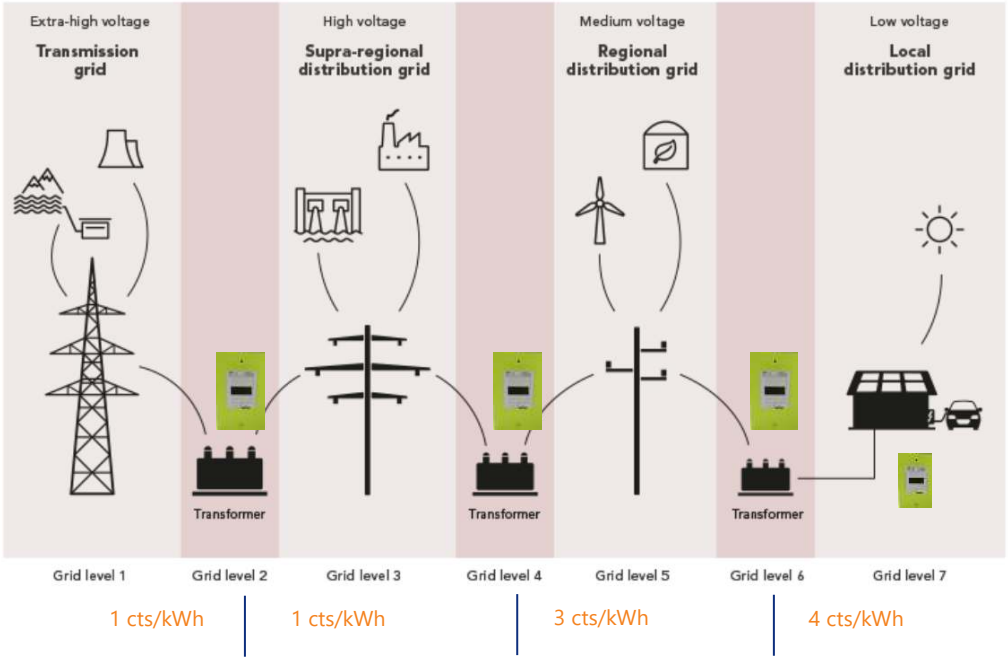
Grid level self-consumption with grid level fees based on the real physical use of network can provide strong incentives for regional energies and storages



Representative bill for an household (4'500 kWh/an) with grid level fees

kWh cost : 25 cts/kWh as today reference

Local energy : 1'350 kWh (PV) 19 cts/kWh
Local grid fee : 4 cts/kWh
Local taxes : 2 cts/kWh
+
Regional energy : 500 kWh (Wind) 14 cts/kWh
Regional and local grid fee: (4+3) cts/kWh
Reg. and local taxes : 4 cts/kWh
+
National energy : 2'650 kWh 10 cts/kWh
System grid fee : (4+3+1+1)cts/kWh
Taxes : 6 cts/kWh

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Innovation in self-consumption : a roadmap

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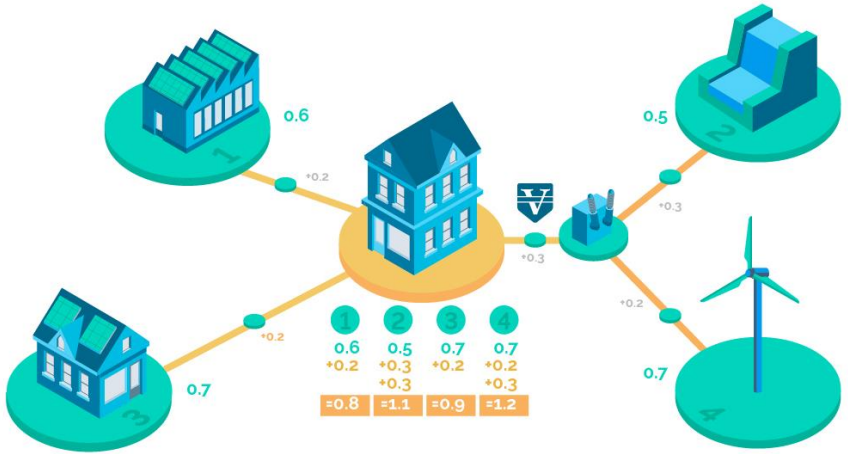

@ VGT solution (www.vgt.energy)

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SunnY Parc: Applied Case Study

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- An advanced microgrid in the middle of Y-PARC (Tech Park)

Y-PARC Swiss Technopole:

- 200 companies
- 1800 employees in 2019, 3000 planned in 2025
- Strategic located between French-speaking Swiss and German-speaking Swiss

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View of the microgrid

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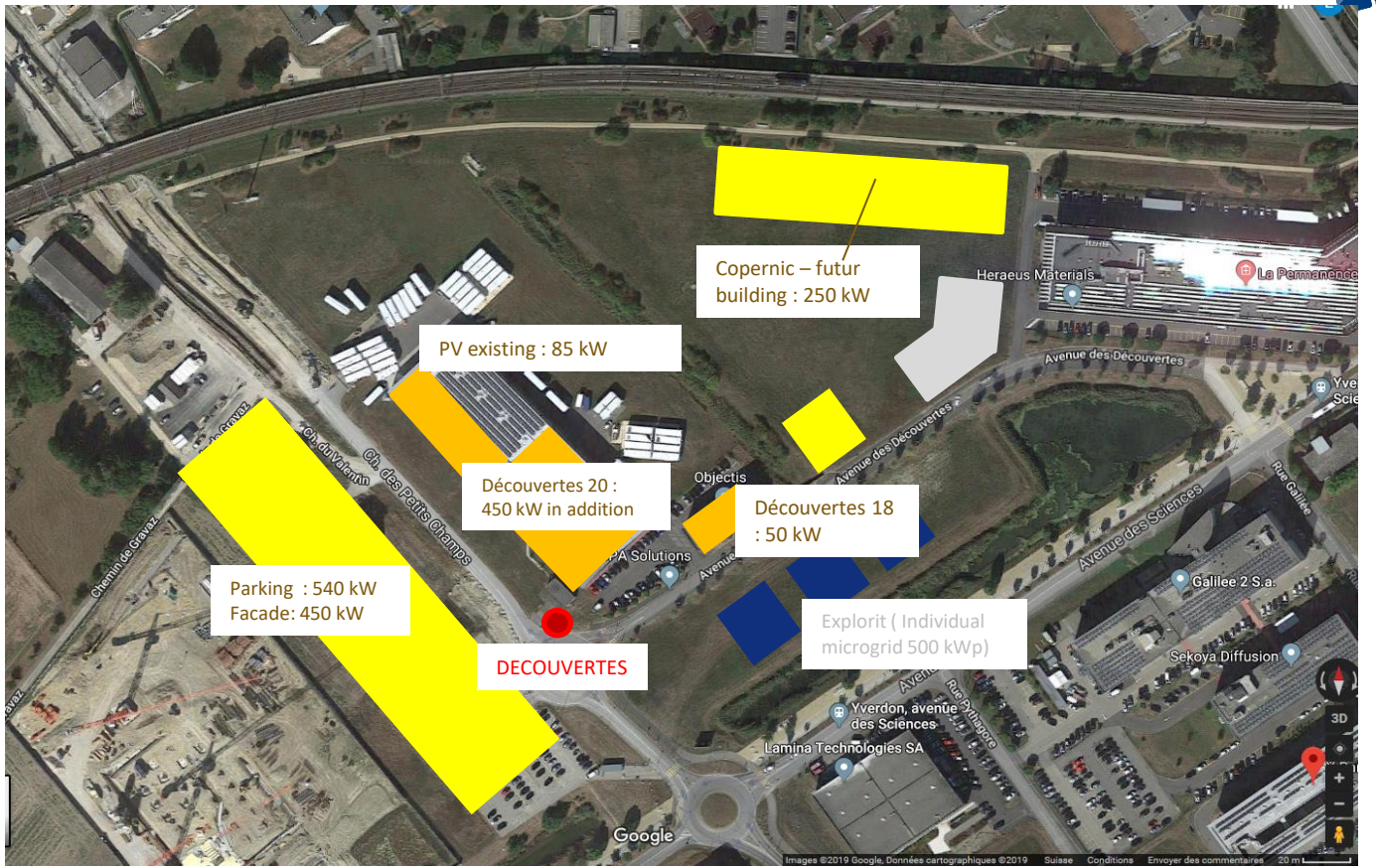

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A unique project scale

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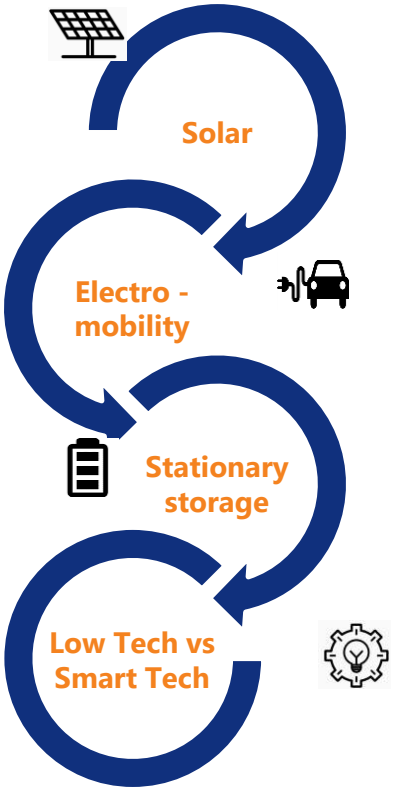
1.8 MW: Covering the roofs of the industrial zone, including a solar facade, with the creation of solar generation surplus on site

Experimentation with new V2G models in Switzerland, massive discounts from car manufacturers to target the deployment of **375 electric vehicles**, including **75 V2G** in a centralized site



In the same microgrid, massive deployment of electric vehicles and V2G and **400 kWh** of stationary batteries to identify complementarities and competition between these solutions in association with renewable generation surpluses

A modular microgrid architecture allowing to test different management strategies and to identify the interest and the role of hundreds of users

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A flexible asset: a new centralized car park

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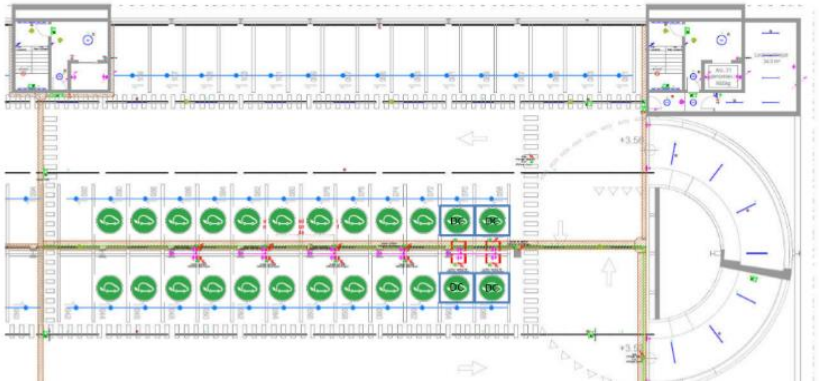

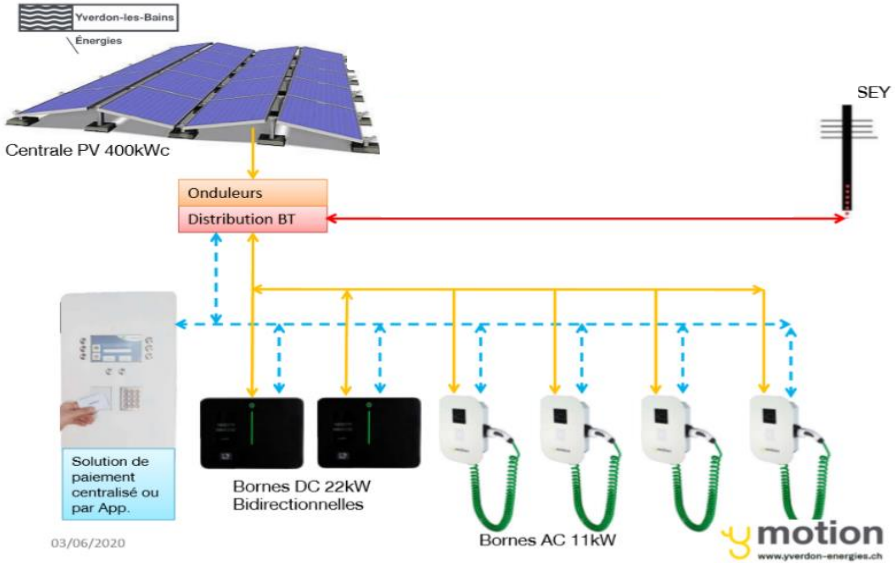

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Testing different microgrid architectures

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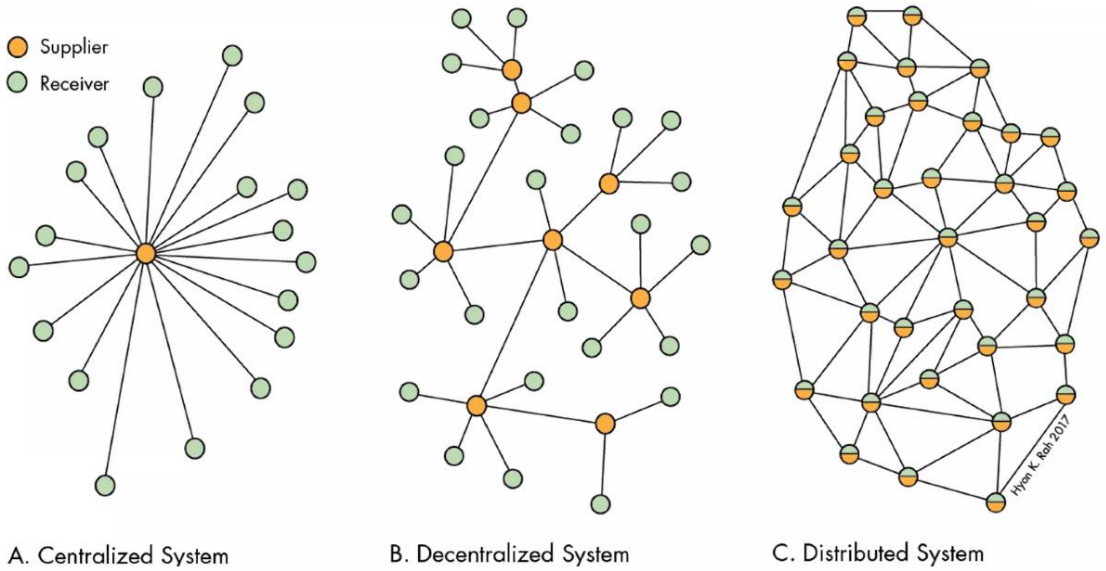
Deployment and study of the modes of piloting the smart grid of tomorrow according to an evolving scheme



Unique grid fee

Collective / Grid level self-consumption

Dynamic self-consumption

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Providing answers for Prosumer

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Testing the 3 strategies at each stage of the microgrid development as part of the demonstration project

	Step 1 : Keep it simple	Step 2 : Keep it local	Step 3 : Make it smart
Microgrid architecture	Centralized standard grid	Decentralized grid prioritizing the local	Intelligent distributed grid "SmartGrid Ready", optimization of flexibilities
Microgrid tarification	Permanently fixed local stamp price	Dynamic local grid fee based on local potential surpluses	Real-time grid fee optimization integrating markets
Charge strategy	I choose my charge point and my speed of charge	Load me up with local	Charge me smart
Customer interaction	No	Basic information	Dynamic information on flexibilities

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The aim is to test strategy acceptability as well as energy and economic efficiency. Additionally the project will refine the potential roles of customers and electric vehicles in the flexibility schemes of tomorrow:
Are prosumers ready to be smartsumers?

Thank you

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Lionel.perret@planair.ch