



University of St.Gallen

Institute for Economy and the Environment

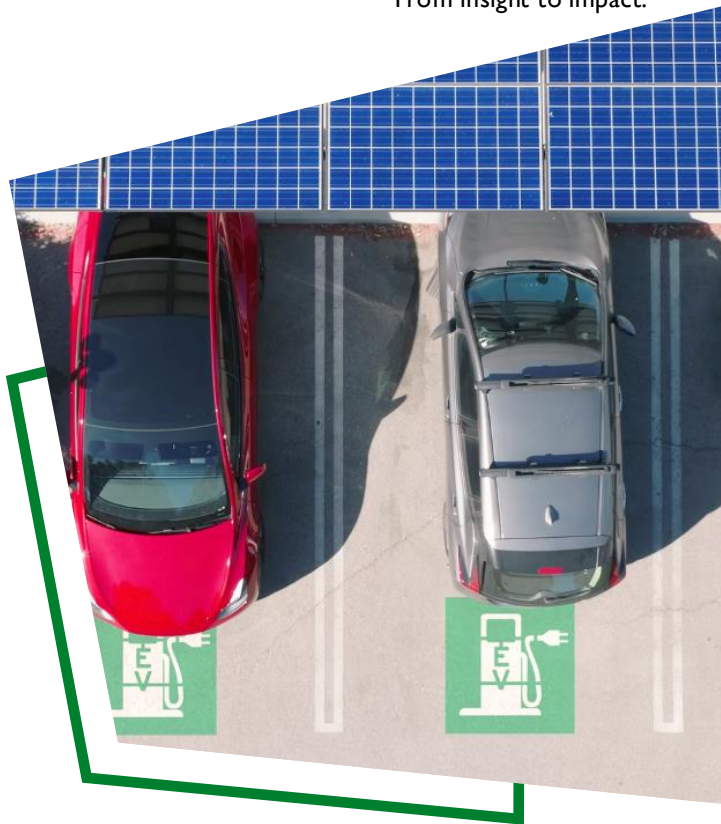
From insight to impact.

Solar V2G charging at work

Exploring corporate user adoption potentials for accelerating sustainability transitions across sectors

16th IST Conference

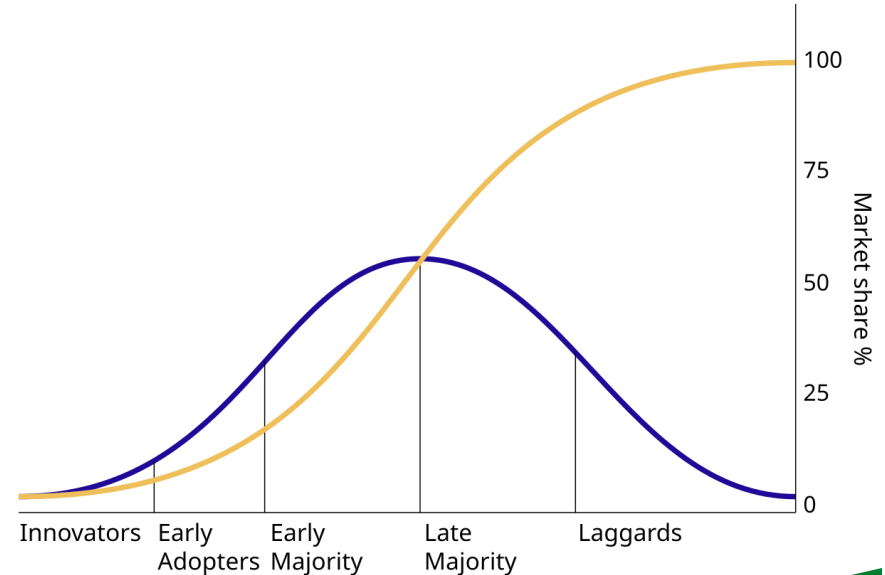
Lisbon – 24.06.2025



Dr. Cristian Pons-Seres de Brauwer

Users in Sustainability Transitions

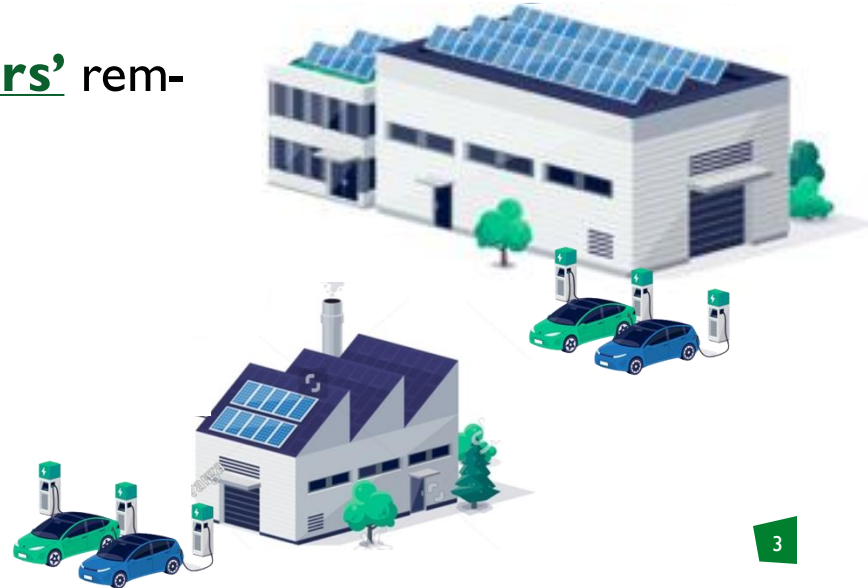
- Critical actor driving market uptake of tech. innovations → e.g. RES, EVs.
- Transitions research mostly focused on residential users (i.e. households).



Companies in Sustainability Transitions.

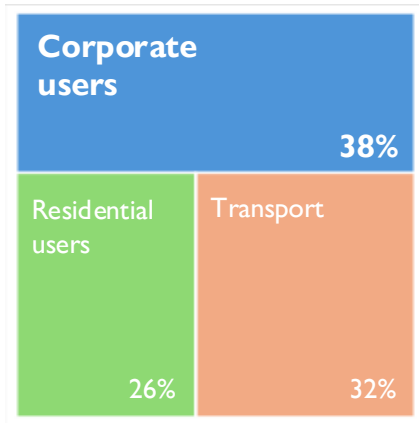
- Key actor in the 'delivery' of societal services such as clean energy & e-mobility.
- Transition research → mostly focused on firms operating on the 'supply-side' of value chains (i.e. production, commercialisation, distribution...).
- 'Demand-side' role as 'innovation users' remains largely ignored.

Final energy consumption

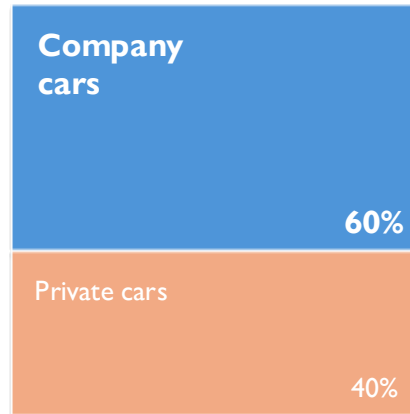


Companies in Sustainability Transitions.

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Final energy consumption

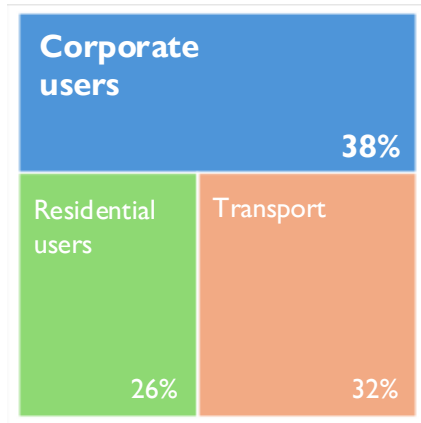


New car sales

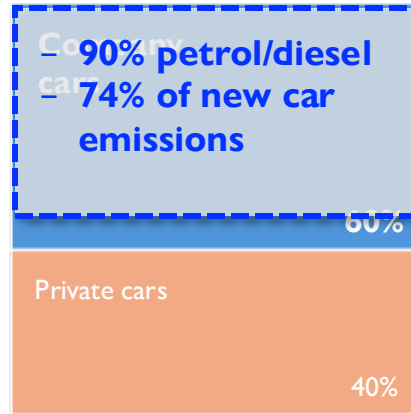


Companies in Sustainability Transitions.

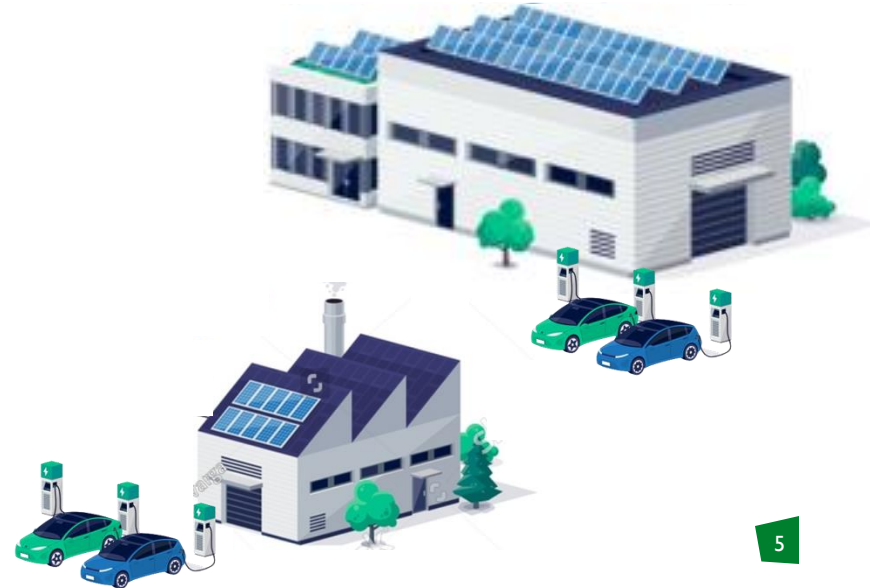
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Final energy consumption

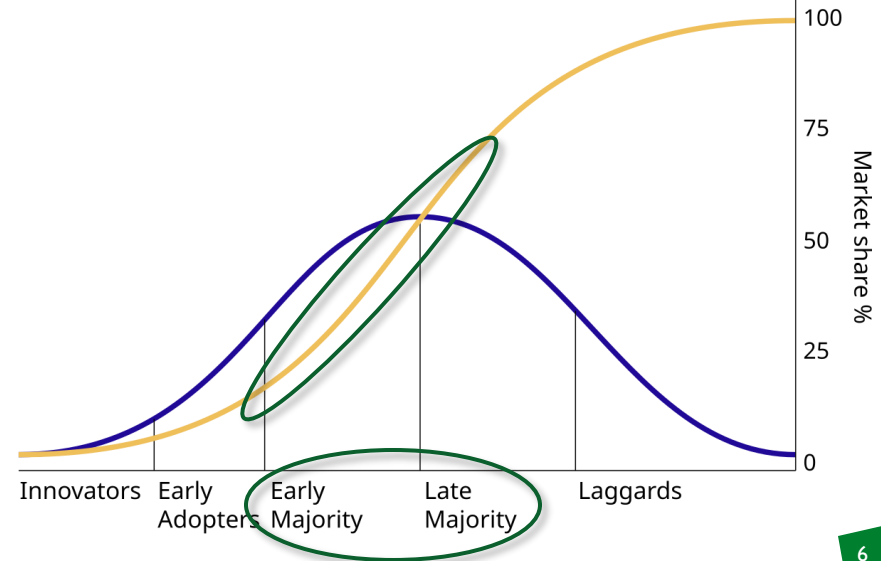


New car sales



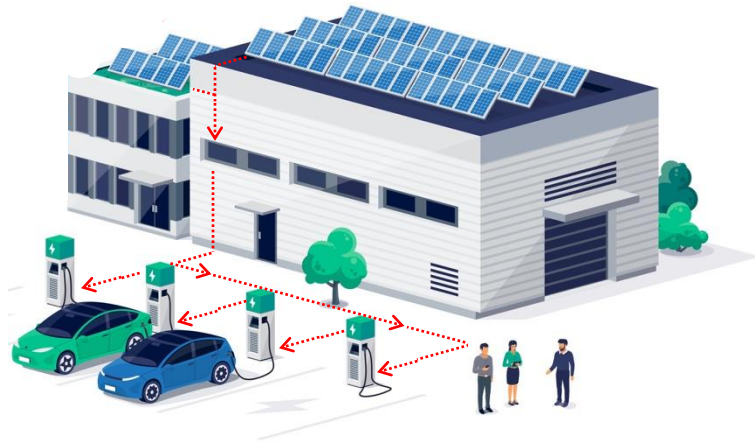
Companies in Sustainability Transitions.

- Crucial player for expediting mass adoption of clean tech. innovations.
- However, companies 'user-side' remains overlooked in transitions research.
- Its multifaceted role in accelerating sustainability transitions poorly understood.



Research aim...

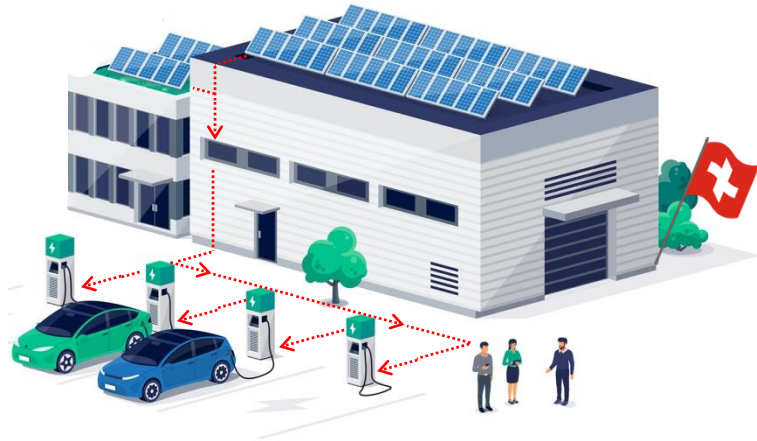
Examine the role of companies as **‘innovation users’** at the intersection between the electricity and (road) transport sectors.



- 1) Both sectors undergoing profound changes to **decarbonise** (electricity) and **electrify** (transport) societal functions.
- 2) **Cross-sectoral** focus allows to investigate how the corporate actor can **accelerate** transitions by **adopting** innovations that **couple** different systems.

Research aim...

Examine the role of companies as **‘innovation users’** at the intersection between the electricity and (road) transport sectors.



Switzerland as case study country

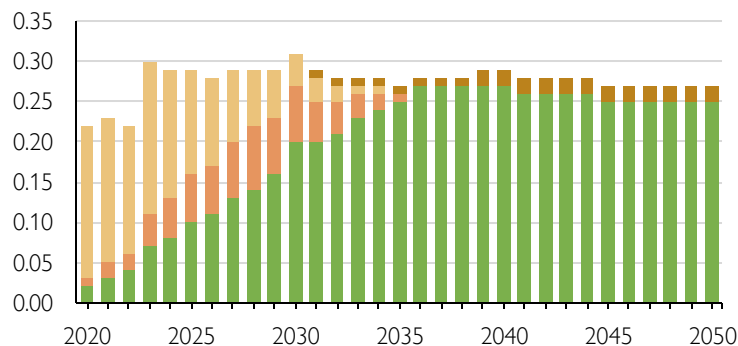
- 1) Ambitious decarbonisation objectives on renewables and electromobility.
- 2) Affluent society w/high solar PV penetration & growing EV shares.
- 3) Increasing challenge regarding the grid integration of RES+EVs.

Switzerland's goals to decarbonize road transport

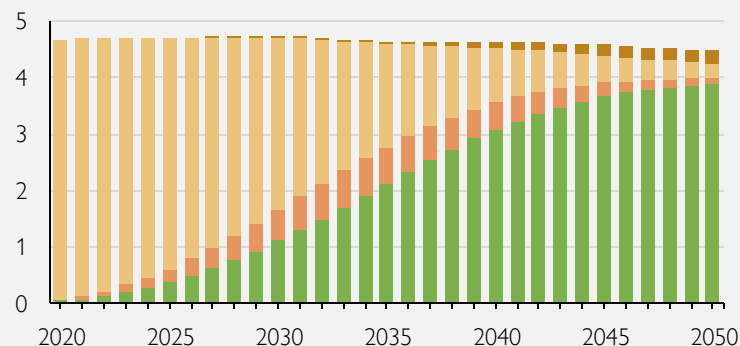
- Swiss Gov. targets at least **90%** share of plug-in EVs for **new car sales** by 2035
- *In 2025: share of 30%*
→ **'adoption gap' of 60%**

- **9-fold increase** to reach total volume of 2.8 million EVs in 2035
- In 2024: 303,448 EVs

New vehicle registrations (in millions)

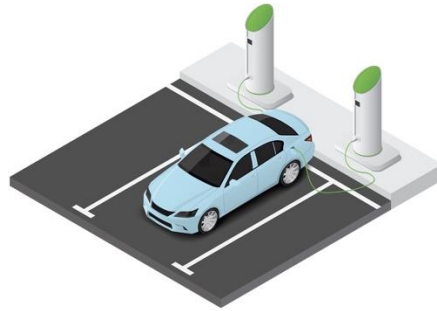


Total vehicle stock (in millions)



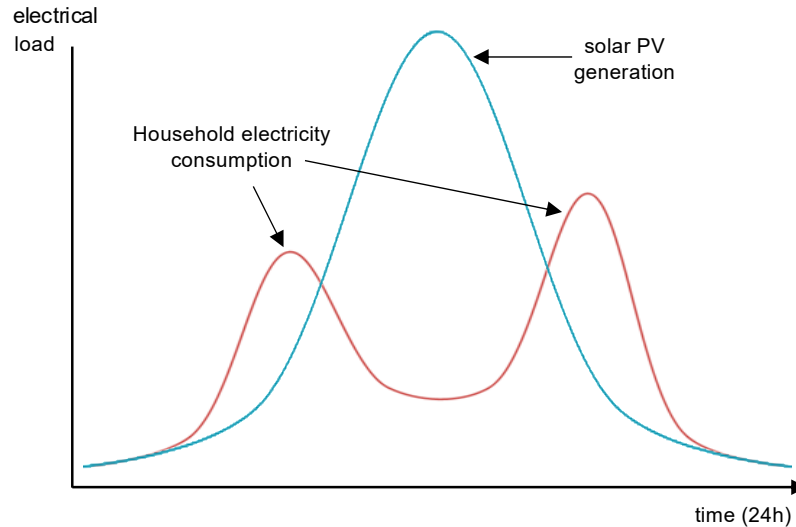
EV charging requirements: implications

- To charge future EVs in a **user-friendly** manner, Government is promoting:
 - *Build-out of 2 million homeplace charging points by 2035.*
 - *6-fold increase of public EV charging stations throughout next 10 years.*
(15,250 in 2024 → 84,000 in 2035)



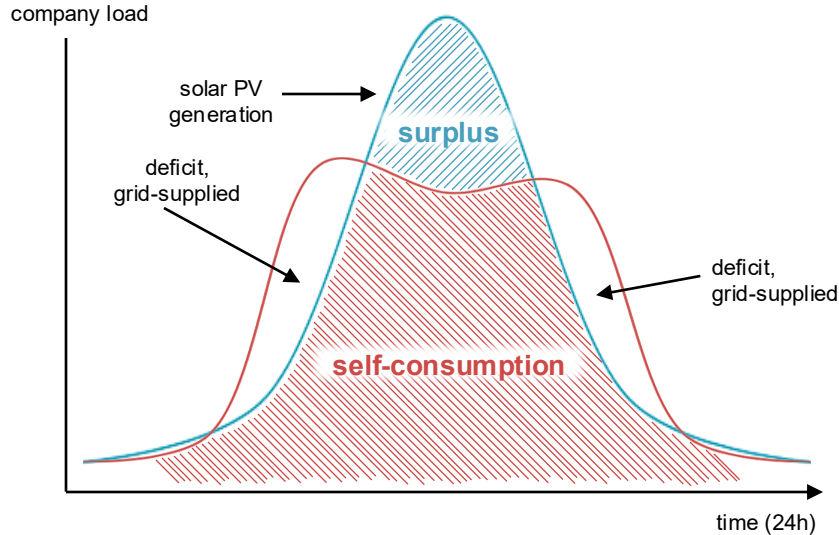
EV charging requirements: implications

- +7.3 TWh increase in electricity demand by 2035 + 30 TWh increase in solar PV by 2035 → **Grid integration of VRE emerges as bottleneck.**



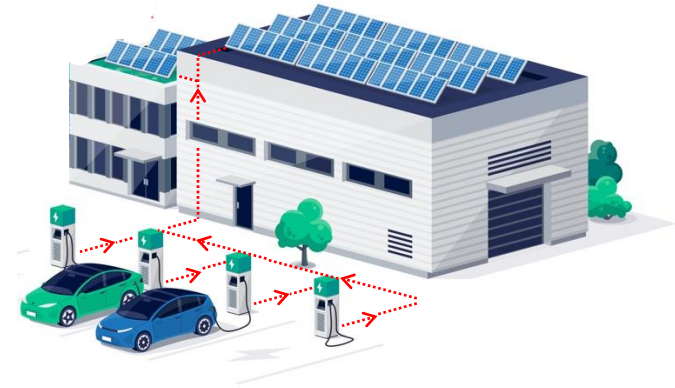
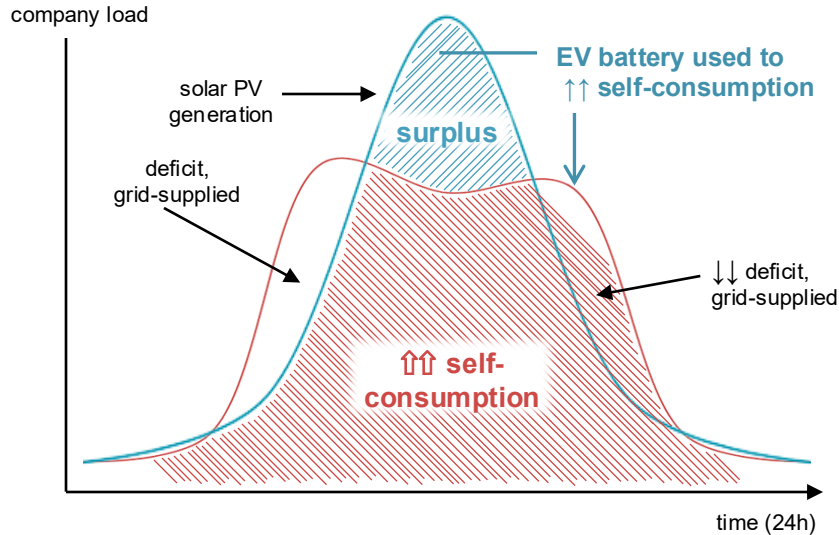
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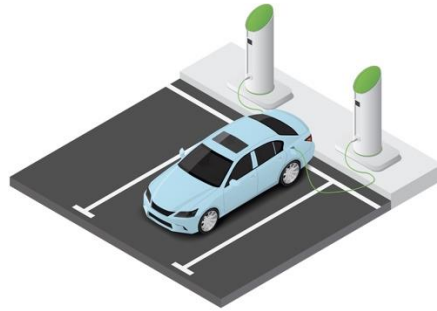
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- **Workplace charging** emerges as third pillar of Swiss EV charging strategy



Switzerland has suitable conditions supporting widespread uptake of workplace EV charging

~50%

of Switzerland's active
workforce commutes by car

<14km

avg. commuting distances

+73%

of workforce has car parking
at the workplace

23 h/day

(5.3 hours@work)

cars parked on average

~6%

of time cars used
for mobility purposes

~10%

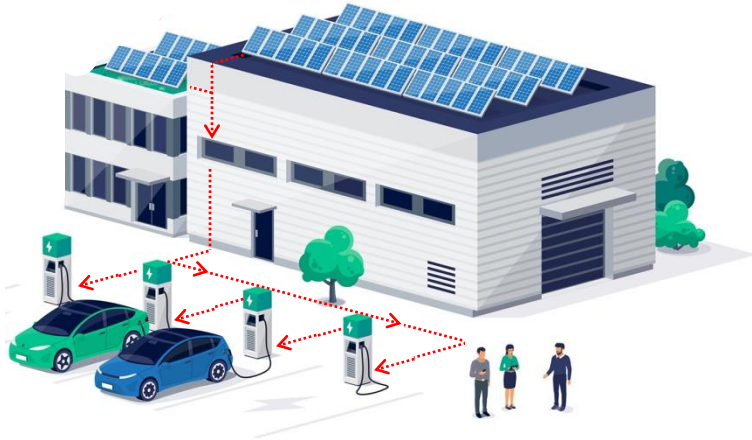
of workforce commuting by
car has EV charging available
@ workplace

Research aim... and guiding questions

Uncover & assess the direction & strength of influence that different factors have in fostering/undermining the willingness of corporate users to adopt multi-purpose innovations.

Guiding questions

- 1) What economic and 'non-price' factors do companies consider when assessing whether to invest in smart solar EV charging at work?
- 2) Are the perceived drivers incentivising adoption stronger than the perceived barriers hindering it, or not?



Conceptual framework: adoption chain & co-innovation risks

 'Focal' sector

Path to market for **single-purpose** innovations (e.g. conventional EV charging)

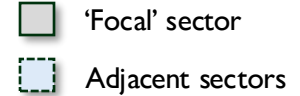


← Adoption chain risks →

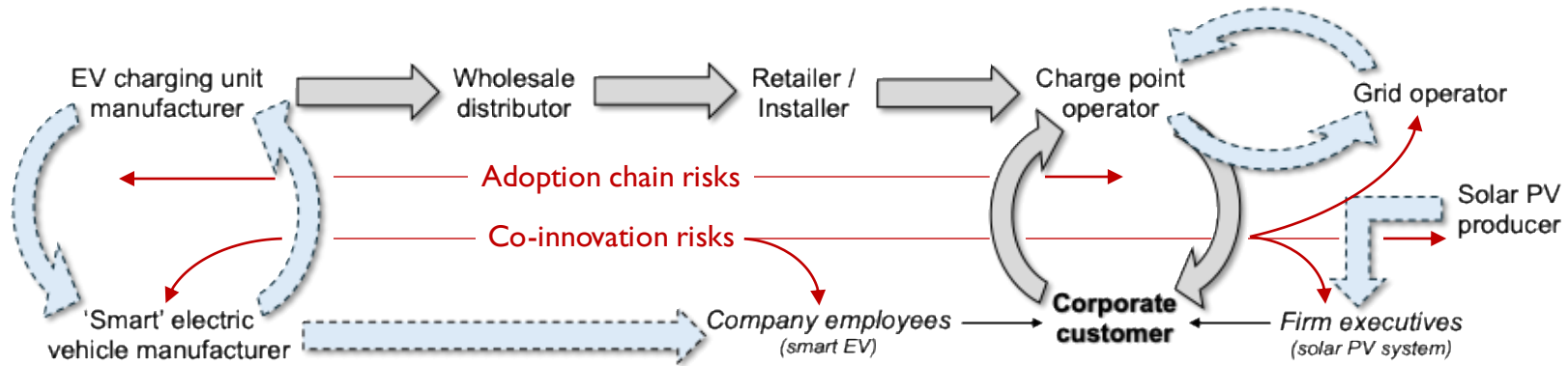
(emerge from the likelihood that the focal innovation is endorsed and adopted by all partners along the adoption chain).



Conceptual framework: adoption chain & co-innovation risks

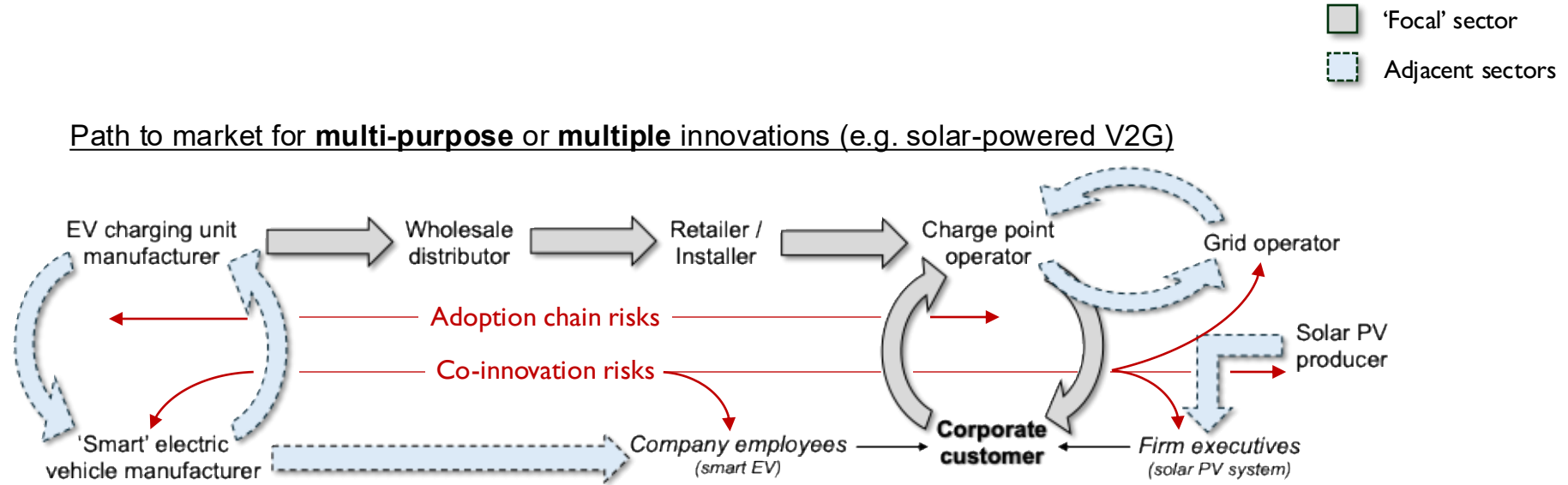


Path to market for **multi-purpose** or **multiple** innovations (e.g. solar-powered V2G)



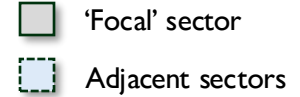
(reflect the uncertainty related to the extent in which the successful diffusion of a 'focal' innovation (e.g. V2G charging) depends on the successful commercialization of other 'complementary' innovations (e.g. smart EVs, solar PV).

Conceptual framework: adoption chain & co-innovation risks

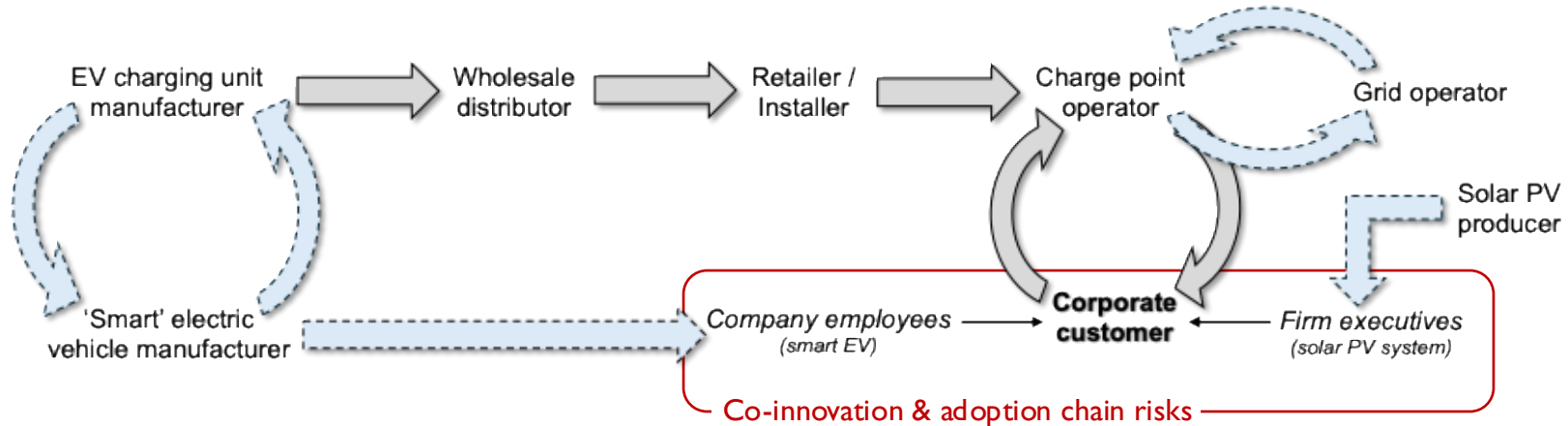


Managing these risk co-dependencies is crucial for bringing any innovation to market successfully

Conceptual framework: adoption chain & co-innovation risks



Path to market for **multi-purpose** or **multiple** innovations (e.g. solar-powered V2G)



Methods and analytical protocol



Academic & grey literature reviews.

Output: initial set of 'adoption factors' on workplace EV charging.



31 semi-structured interviews w/ 28 companies operating a solar PV system.

Output: scope knowledge, motivations & perceived challenges form corporate users.



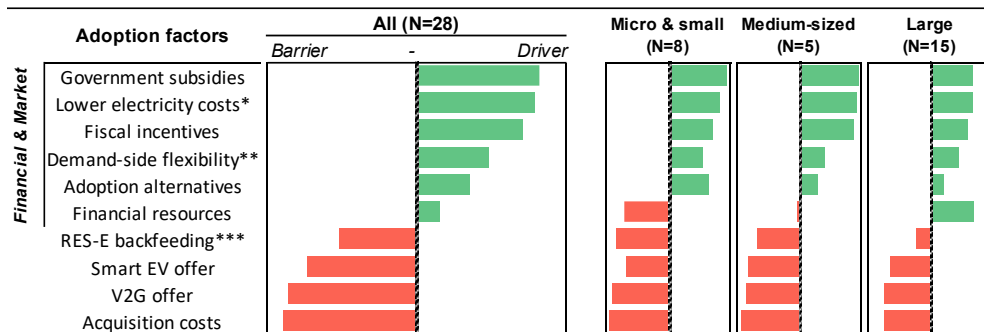
Interview transcriptions & qualitative content analysis.

Output: ranked categorization of recurrent 'adoption factors'



Output: typology of 'adoption factors' fostering/undermining the willingness of corporate energy consumers to partake in 'solar EV charging at work'

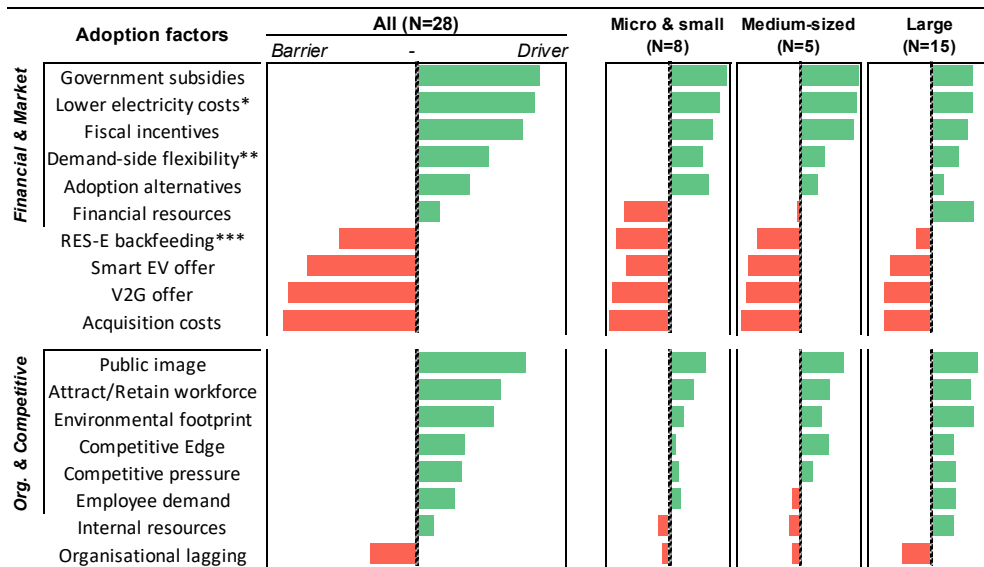
Results: factors influencing the willingness of corporate users to partake in solar EV charging at work



Electricity & grid **cost-savings**
countered by FIT revenue losses
 from solar surplus

Positive views on direct purchase
subsidies, but just offered by three
 cantonal authorities and **for residential**
users only

Results: factors influencing the willingness of corporate users to partake in solar EV charging at work

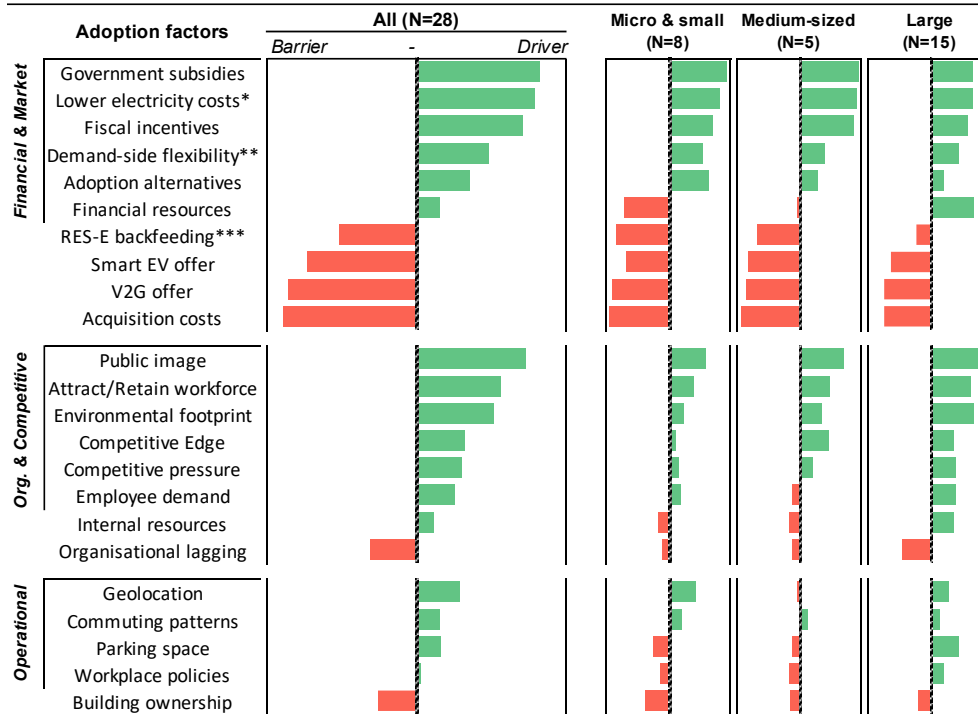


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relations** as important 'non-price' drivers

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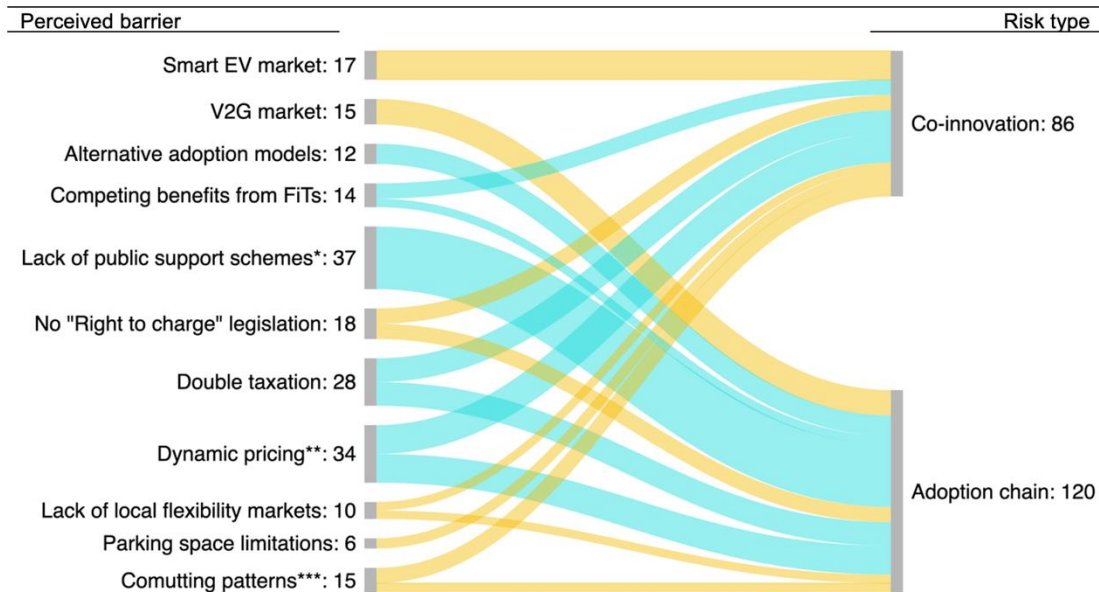
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Corporate image & workforce relations as important 'non-price' drivers

Building ownership vs. rental & the need for **'right to charge'** legislation

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Key take-aways...



- **Non-price factors** emerge as equally salient risk factors hindering the adoption potentials of corporate users, and hence the path to market of cross-sectoral innovations.



- Policy mixes targeting **sector-specific** as well as **multi-system risk factors** related to companies' adoption potentials.



- Acceleration efforts should **prioritise tackling** those co-innovation risks undermining path to market of **both focal and complementary innovations** alike (e.g. 'right to charge', flexible grid tariffs, dynamic pricing,...).



- Study provides **entry point** to start examining **how** the **corporate actor** can accelerate transitions by adopting clean tech. innovations that couple different sectors under an **integrated adoption model**...



- ...allows to start unravelling how **user-mediated multi-system interactions** occur in sustainability transitions, and how such interactions can in turn serve **acceleration purposes**.

Thank you!



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