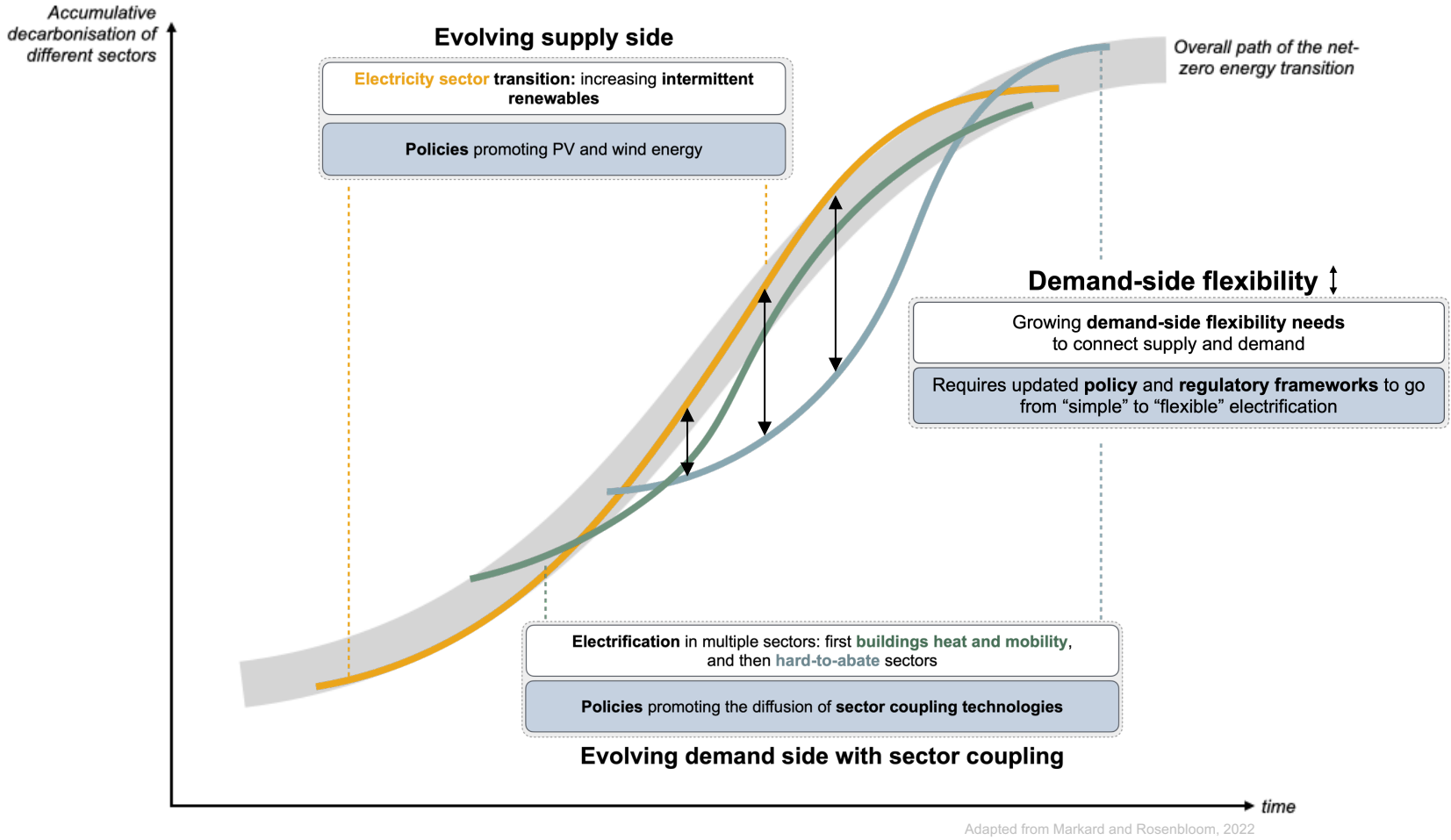
Energy Week 2024
PATHFNDR CONFERENCE

Input presentation

Adrien Mellot, ETH Zurich

Are policies shifting from solely promoting electrification to meeting demand-side flexibility needs?

sweet swiss energy research for the energy transition
PATHFNDR



→ **Flexibility regulations must evolve in line with electrification and renewables penetration**

Are policies shifting from solely promoting electrification to meeting demand-side flexibility needs?

Review of policies and regulations over 2016 — 2024

- ✓ New
- ✓ Sector coupling
- ✓ Flexible
- ✓ Growing fast
- ✓ Growing big

Diffusion

Sector coupling technologies
- Electric vehicles
- Heat pumps
- Electrolysers
- New industrial loads

Flexibility

Mechanisms:
- Tariffs
- Direct Load Control
- Markets

sweet swiss energy research for the energy transition
PATHFNDR

Electrification policies are at different stages across technologies but rather consistent across countries

← Instruments →

← Countries →

← Technologies →

Technology	Policy instrument type	Policy instrument sub-type	Instrument details	CH	FR	IT	AT	DE
Electric Vehicles	Framework policy	Roadmap	Transport decarbonisation strategy	✓	✓	✓	✓	✓
		Targets	Targets of EV numbers	✓	✓	✓	✓	✓
			Targets of EV chargers	✓	✓			✓
	Economic	Fiscal/Financial	Purchase subsidy	✓*	✓	✓	✓	
			Tax credit, reduction or exemption	✓*	✓	✓	✓†	✓
			Tax on polluting cars		✓	✓		
			Social leasing programme		✓			
			Charger subsidies	✓*	✓	✓	✓	✓†
			Charger tax credit, reduction or exemption		✓	✓		
		Market-based	CO2 pricing as ETS					✓
		Direct investment	Govt. support for highway fast charging	✓**	✓			✓
	Regulatory	Codes & Standards	Vehicle standards	✓	✓	✓	✓	✓
			Charger requirements in building codes		✓	✓	✓*	✓
			Domestic right to charge laws for owners		✓		✓	✓
			Domestic right to charge laws for tenants		✓			✓
Industrial loads	Framework policy	Roadmap	Industrial decarbonisation roadmaps		✓			
		Targets	-					
	Economic	Fiscal/Financial	Subsidy programme for industrial heat pumps	✓				
			Energy economy loan programmes for companies		✓			
		Market-based	ETS	✓	✓	✓	✓	✓
			Energy economy certificates		✓	✓		
		Direct investment	Govt. support for ind. electrification projects		✓			
	Regulatory	Codes & Standards	-					

sweet swiss energy research for the energy transition
PATHFNDR

* Mellot et al., 2025 - Preliminary results

Demand-side flexibility mechanisms are uneven across countries

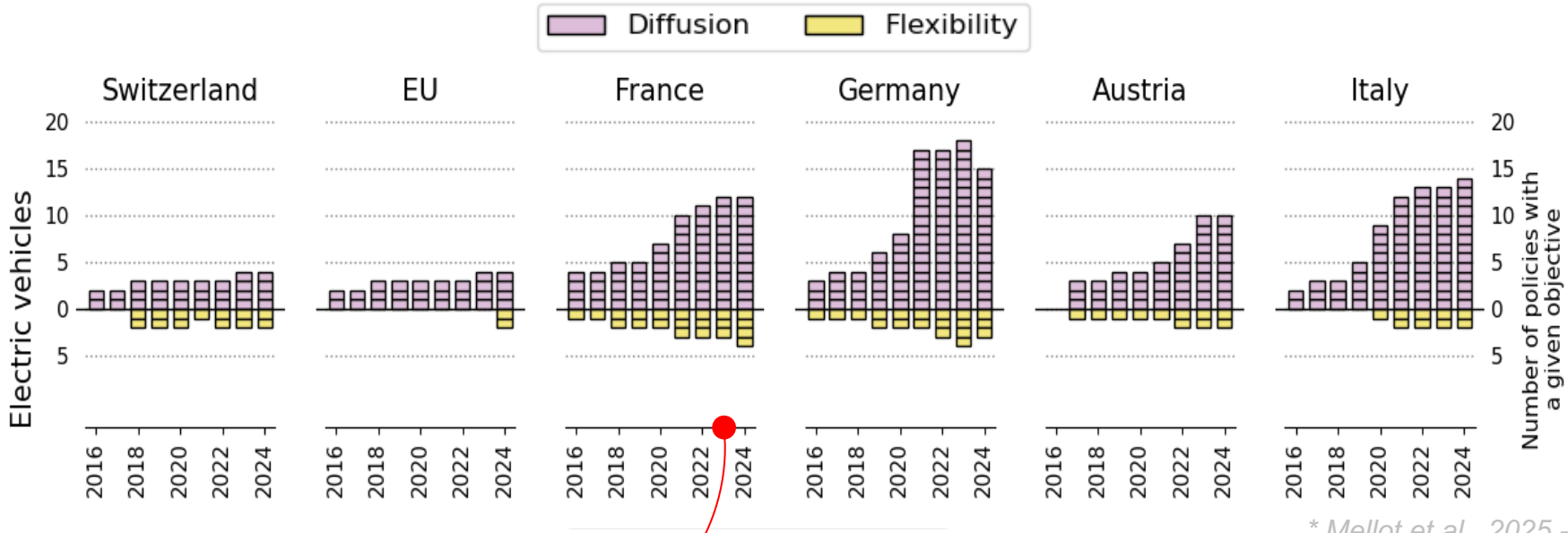
		Tariffs			Markets		
		Time-varying grid tariffs	Time-varying electricity tariffs	Direct load control / Flexible connection agreements	Local / DSO	Wholesale	National / TSO
CH	EV Heat Pump	TOU allowed RTP unclear	TOU & RTP allowed, but no free choice of supplier	Loads can be accessed by contract by the DSO, or without consumers' consent for emergencies	Pilot stage	Through aggregators	No participation in energy reserves allowed, aggregators allowed in ancillary services
	Electrolyser Industry		TOU & RTP allowed, free choice of supplier		-		Participation in energy reserves allowed, aggregators allowed in ancillary services
DE	EV Heat Pump	No TOU	Technically TOU and RTP must be offered by suppliers with over 100'000 customers, but limited by deployment of smart meters	Any load 4.2 kW must be controllable in exchange for reduced grid tariffs	Pilot stage	Through aggregators	FCR, aFRR, mFRR directly, Interruptibility scheme, Strategic reserve
	Electrolyser Industry			-			
FR	EV Heat Pump	Mandatory TOU with seasonality	Flat, TOU, RTP, Peak-day Pricing all possible. RTP must be offered starting 2026	DLC allowed in grid emergency, and through contracts with aggregators	Yearly auctions for local flexibility since 2020. Bid 500 kW, 30 mins.	Through aggregators, including through the NEBEF Market mechanism	Demand response call for tenders Capacity mechanism, Ancillary
	Electrolyser Industry		TOU, Peak-day pricing or peak-day power reduction	Flexible connection agreements offered by Enedis & RTE. DLC allowed in emergencies or through contract with aggregators			Demand response call for tenders Interruptibility schemes Capacity mechanism, Ancillary

⚠ Some things may be "technically" possible, but in practice barriers may remain!

sweet swiss energy research for the energy transition
PATHFNDR

** Mellot et al., 2025 - Preliminary results*

Flexibility policies arrived late, but that was not a real problem... so far



** Mellot et al., 2025 - Preliminary results*

France stops subsidising "conventional" chargers and increases the tax credit for "smart" chargers

Until 2024...

- Low renewables penetration
- Few EVs on the road

→ Low demand-side flexibility needs so far.

Policy should follow and anticipate future flexibility needs, e.g. Hydrogen RFNBO directive

sweet swiss energy research for the energy transition
PATHFNDR

Swiss and European policymakers are increasingly combining **sector coupling technology diffusion** policies with regulations to facilitate **demand-side flexibility provision**, for example by subsidizing smart electric vehicle chargers only instead of conventional ones.