

Impact of new edge technology and recent flexibility code development to improve grid flexibility management

Laurent SCHMITT

Copenhaguen, September, the 12th 2024

CAPACITY
A dc&el COMPANY

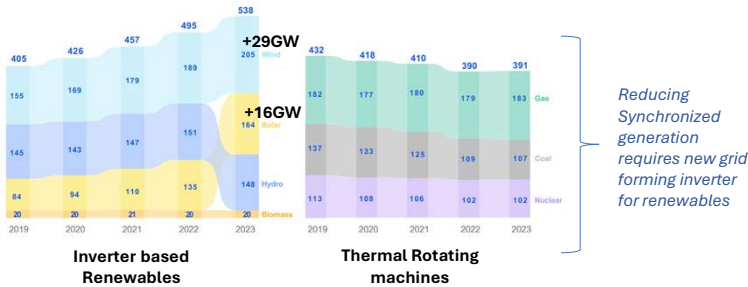


Why now? A pivotal moment for DER integration in Grids

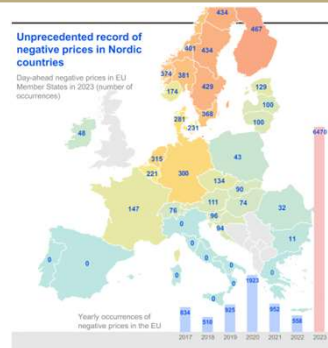
Grids at the tipping point of grid stability challenges

Installed electricity capacity: in 2023, solar overtakes hydro

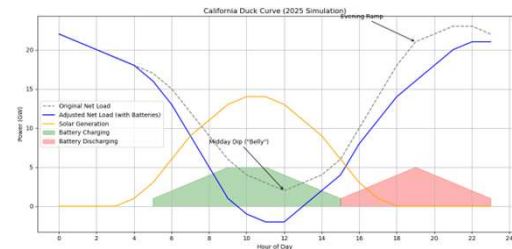
Evolution of installed capacity for renewable (left) and conventional (right) generation technologies, in the EU-27 (EEA/Norway), Switzerland – 2019-2023 (GW)



Most rewarding opportunities for storage based DERs based on dynamic pricing

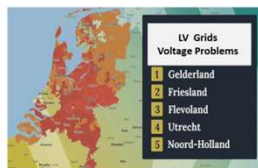


Exponential growth of numbers of hours of negative prices in Europe



California duck curve turning a reference price profile

Sky rocketing Grid technical congestions on both High and Low Voltage



All new renewable interconnections expected to turn to flexible non firm

Significant rewards expected in case of avoided reinforcement up to 400GBP/kw/Year in the UK

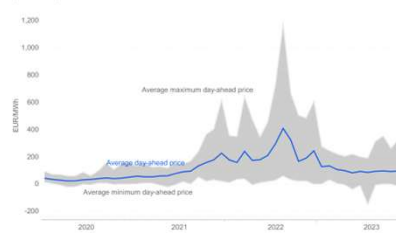
Province	#Port codes	#Connections	#Cables	#Port codes & PC junctions	#Impacted connections	#Impacted citizens	% Port codes	% Impacted connections	% Impacted citizens
Gelderland	66926	786423	2581047	8779	121536	340790	14.52%	16.36%	38.19%
Noord-Holland	72448	784961	2673446	5076	48876	243526	7.22%	38.69%	6.32%
Friesland	22509	276871	696021	2933	40716	106433	13.03%	15.03%	15.29%
Noord-Brabant	67662	876335	2611047	2850	50410	133170	4.21%	5.74%	5.02%
East-Brabant	90357	941218	3770909	2153	40719	143433	2.39%	8.27%	3.82%
Utrecht	34414	355436	1354659	2587	35023	117990	8.93%	8.93%	8.48%
Overijssel	36785	419020	1304685	1522	23244	79685	4.14%	6.07%	5.87%
Limburg	31854	399209	1101581	1289	22513	57960	4.02%	5.70%	3.15%
Flevoland	11748	137247	438414	1039	16507	52800	8.84%	12.09%	12.04%
Overijssel	16485	186386	581398	1007	15870	46450	6.41%	8.51%	8.92%
Overijssel	15818	187103	497211	699	16768	27410	4.48%	5.70%	5.51%
Overijssel	14254	175034	554050	558	10511	27040	3.78%	6.05%	5.82%
Total	470678	5488073	17999055	35402	487484	1374005	6.38%	6.88%	7.68%

Source: www.prcen.nl
May 2024

Growing intraday trading opportunity for VPP

Day-ahead prices and variability remain higher than pre-crisis

Evolution of the average of the minimum, average and maximum day-ahead electricity prices per month and Member State in the EU-27 (EEA/Norway), Switzerland – 2019 – 2023 (EUR/MWh)



Strong intraday liquidity offer new energy program opportunities up to 150E/Kw/Year

Unbankable Grid investment plans

- Doubling Grid investment plan up to 30-40BE annual Grid investment in US and 70BE in Europe
- Strong regulatory pressure to develop non wire alternatives and flexible interconnections to minimize impact on consumer bills



New key Regulations to be deployed by 2030

Improve demand elasticity to steer energy power flow

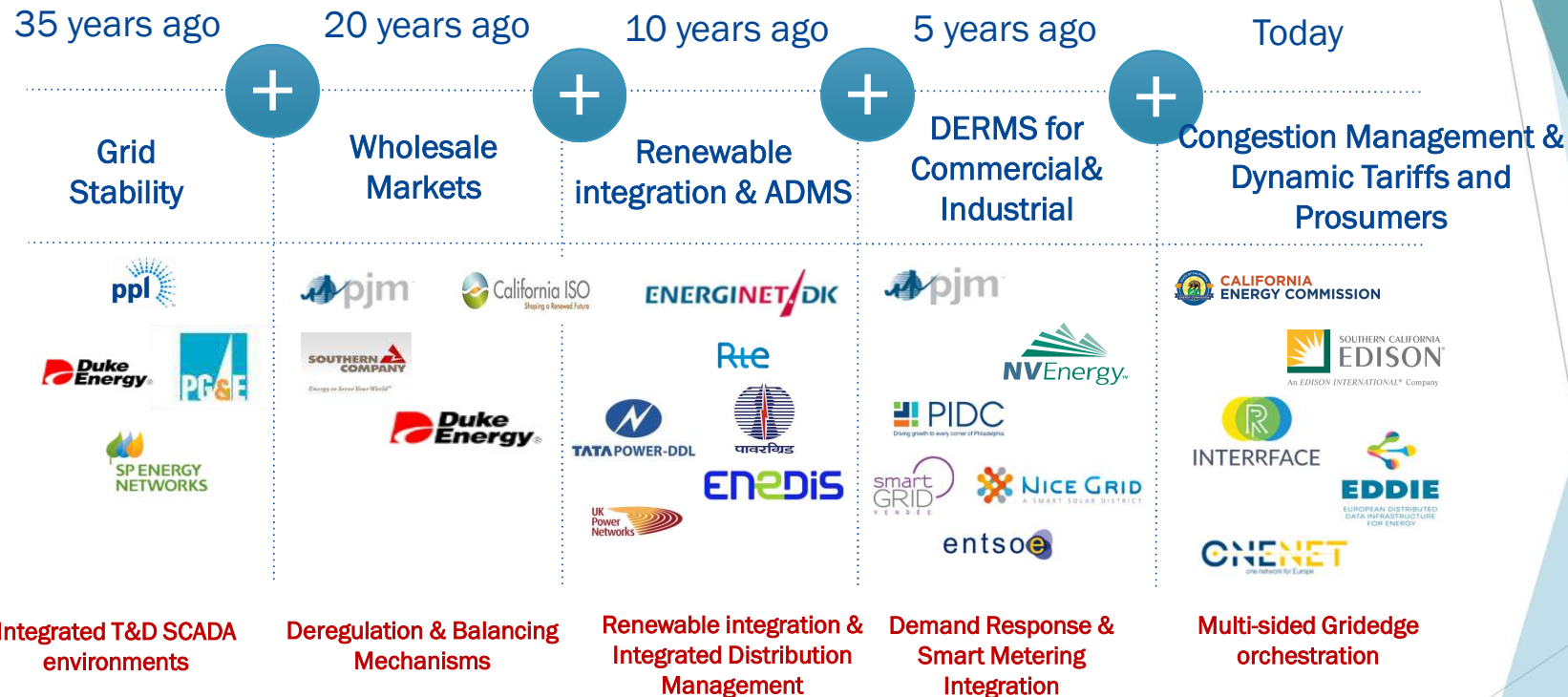
- Integrate wholesale and retail market, automate flexible residential DER implicit participation, foster energy data exchanges from submetering
- Establish specific backstop regulations to protect energy poor populations



1. New hybrid tariffs : Flat tariffs combined with dynamic tariffs on flexible DERs
2. Home exports (PV and storage) based on dynamic export tariffs
3. Revenue stacking with Grid services

Evolution in Grid optimisation strategies

CAPACITY
A dcbet COMPANY



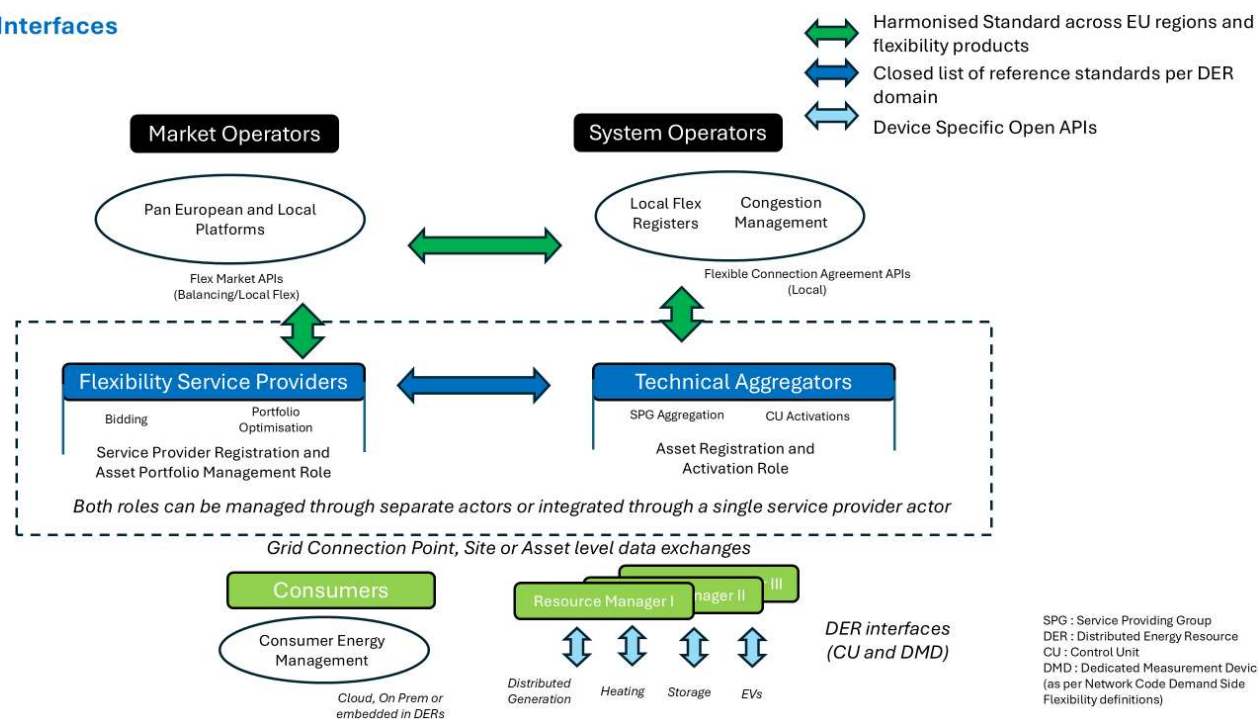
Crucial need to accelerate Control Room transformation



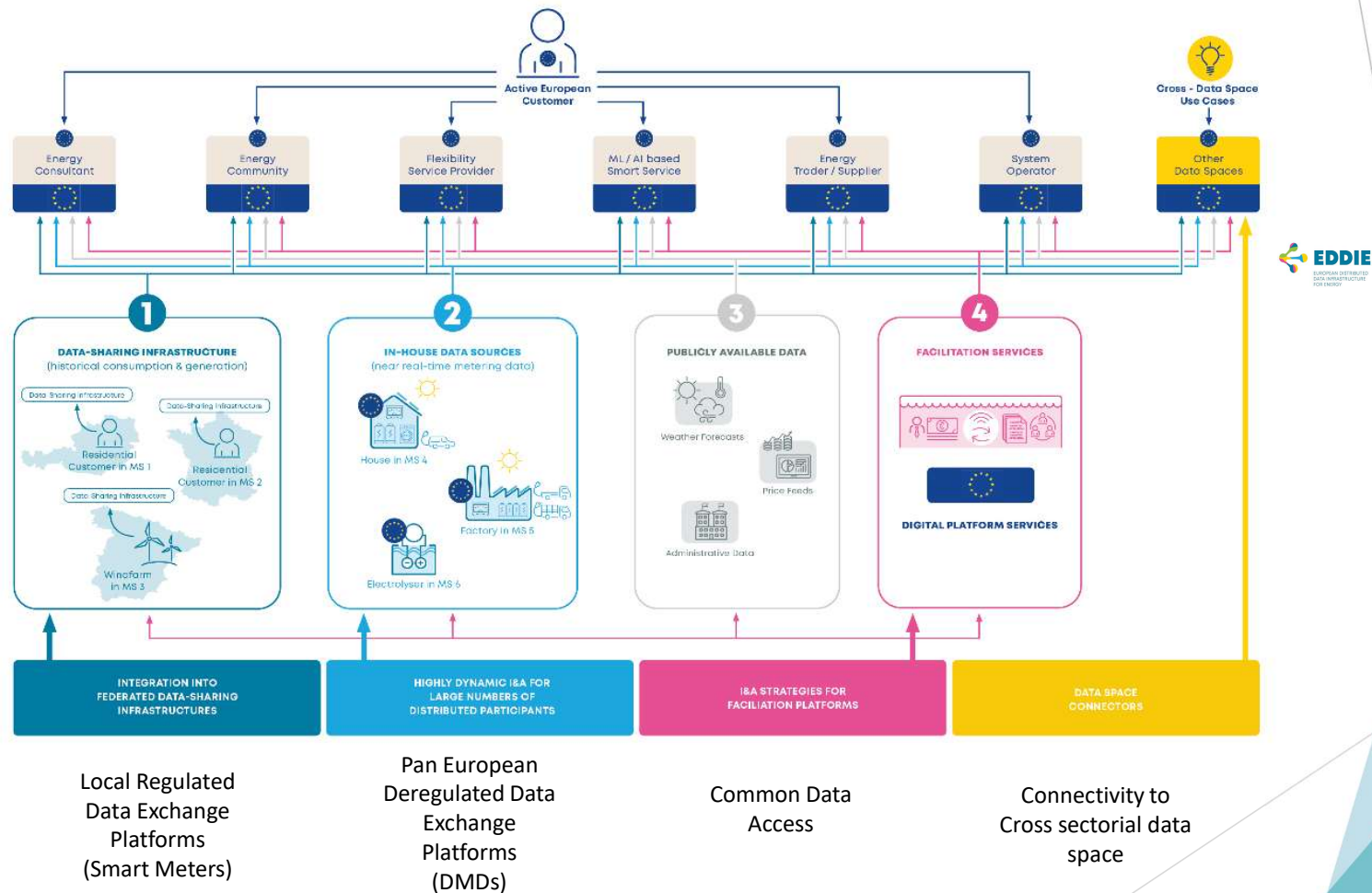
Key Strategic data exchanges to orchestrate

Reference data exchanges for flexibility Activation

Key Actor Interfaces



New dataspace architecture available



Accelerated renewable integration

- Secured Cloud Based data exchanges with " Behind-the-meter HEMS and flexible DERs
- Grid connection active management (Emergency Response, Flexible operating envelopes)
- Commercial aggregator and ISO interfaces for wholesale and ancillary service markets
- Advanced bottom up forecasting integrating persona based digital twins

Improved market liquidity and cascaded Revenue share

- Configurable end-consumer flexibility programs for all residential DER orchestration
- Analytics for behind the meter bill savings and new grid flexibility revenues
- Revenue sharing per program with end-customer through advanced app portals
- End to end automation, transparency and consent management

Lower cost access to distributed flexibility

- Interoperable data definitions and data structures
- Real-time multisided data exchanges with Grid-ops (EMS/ADMS) and Flexibility Service Providers
- Control room technology agnostics integration

Thank You

Decarbonisation



Digitisation



Decentralisation



Democratisation

