GRID INFRASTRUCTURE CHEAT SHEET

Multiple **terawatts** of renewable energy (RE) are standing in line to connect to the electrical grid. In order to decarbonize the power sector, we need to **deploy and optimize** grid infrastructure. We are looking for startups that unlock higher RE utilisation at the edges through: (i) **planning and finding** optimal grid interconnections, and (ii) **forecasting and analytics** to balance and enhance the grid

Transitions

Shift from fossil fuels to RE

- Decentralized & new (remote) generation locations
- Fluctuating generation
- Reversal of dependency – demand to follow supply
- Bidirectionality – DERs feed the grid
- Electrification of sectors – 3x demand

Constraints

- Curtailment
- Inter-connection queues

Needs

- Increase overall capacity
- New transmission lines to interconnect regions
- Better visibility into capacity and control of flows
- Faster planning and deployment

Sources: McKinsey, Financial Times, Clean Energy Wire

The Impact Problem

- **40% of CO2** emissions are caused by burning fossil fuels for electricity and can be reduced through the expansion and upgrade of grid infrastructure to support more RE
- Grid software technologies can help **avoid up to 500MT** of direct CO_2 emissions through efficiency in planning and energy distribution

Sources: Indigo Advisory Group, IEA

Business Opportunity

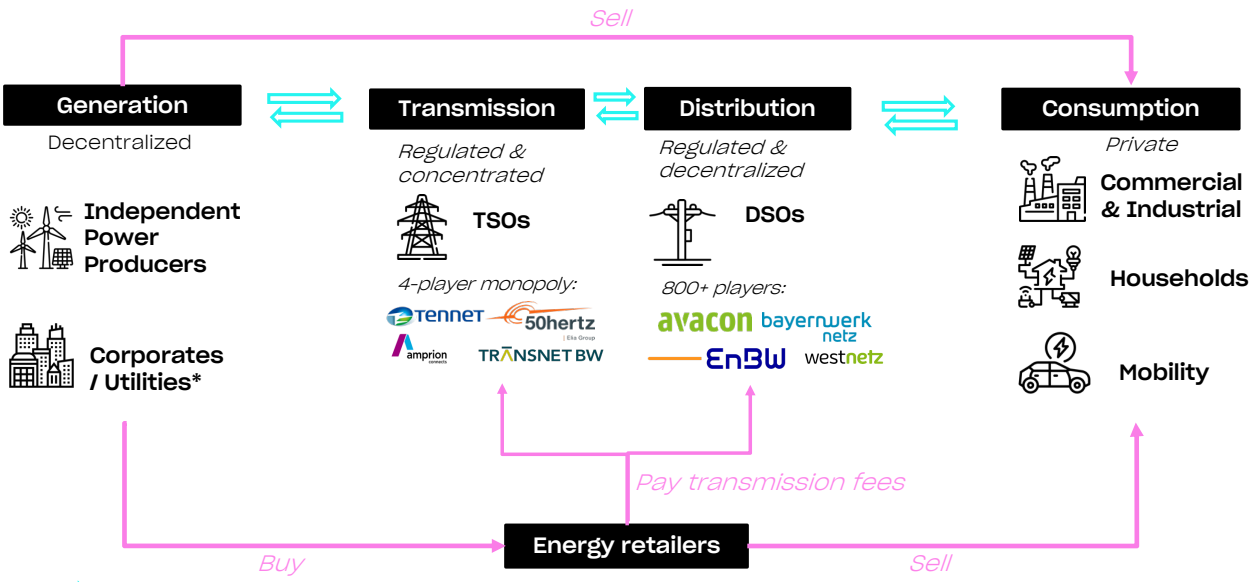
- **80 million km** of new grid infrastructure will have to be built by 2050
- Every dollar invested in RE, needs to be matched with one dollar for expanding the grid
- Beyond investing in infrastructure, **digital solutions are crucial** for planning, maintaining and optimizing the grid
- Digital solutions account for **20%** of grid spending in the EU
- Contracts with TSOs / DSOs / utilities have the potential to be **large, sticky and expandable**
- In the past 2 years, **$8 billion** has been invested globally in grid tech startups

Challenges & Limitations

- The grid's stakeholder system is **complex,** and includes several players, making the go to market difficult
- There is a high degree of **customer concentration** in certain geographies (e.g. 4 TSOs in Germany)
- Since the grid is considered critical infrastructure, decision processes are lengthy, with sales cycles ranging from **12 to 18 months**
- Regulation favors **Capex over Opex** investments, distorting decision-making for software solutions.

Sources: IEA, Indigo Advisory Group, Financial Times, Bloomberg

Simplified Stakeholder Map (Germany)



Solutions

Interconnection / expansion planning

Solutions to better plan and optimize grid deployment and interconnections for RE and EVs

Monitoring & maintenance

Sensors and imagery to inspect grid infrastructure and identify faults for effective maintenance

Grid enhancing technologies

Technologies like dynamic line rating that allow to enhance capacity of existing grid

Forecasting & orchestration

Services forecasting demand and supply and solutions to balance and orchestrate the grid

Startups to Watch

Check our full market map here

PST · VOLTQUANT · RHIZOME · Nira · Hepta · Buzz Solutions · SKYQRAFT · LINEVISION · Zaphiro Dynamic. Smart. Grid. · DTR · CAMUS · rb. rebase.energy · Ogre