Distribution Utilities of Future: Advanced Technologies for Business Transformation (Track 4)

Experience of Leipzig Municipal Utility in the Business Transformation Process

Thorsten Körner

Division Manager of Trading Department (2017-2022)
Agenda

1. Short Introduction
3. Impact of Development electricity Prices
4. Capacity Business Management/Technologies
5. New Products and Advanced Technologies
6. Business Product PPA for Renewable
7. Business Product Midstream
8. Summary
Thorsten Koerner

- Engineer in Process Technology / Energy Management Technical University Merseburg
- MBA, University Augsburg / University of Pittsburgh, Gradual School of Business/USA
- 30 years of experience in the European Energy sector in different positions (Managing Director, Board of Directors, Heads of Departments, Area Manager)
- 2007 - 2022 Division Manager Energy Trading at Leipzig Municipal Utility responsible for:
  - Trading floor (power, gas, CO2, EEX, OTC, spot and futures trading, asset and sales portfolio management/contracts (gas, electricity, district heating, oil, wood, hedging, CO2 wholesale distribution (gas, power, services and renewable midstream), balancing management
  - Chairman of the Trade/District Heating Steering Committee of the German Association of Energy and Water Industries (BDEW) in Central Germany
  - Member of the Steering Committee Trade of BDEW
1. Topics Advanced Technologies for Business Transformation

• Experiences of Leipzig Utility

• What are the results?

• Challenges of the future
2. Transformation Process since 1990 (1)

**Phase 1: Foundation**
1990 – 92 Post-Reunification

**Phase 2: Investment**
1993: Extensive investment program based on market orientated concepts
1995: New Gas fired Power Plant (GuD)
100kV/30 kV, Natural Gas and District Heating Network expansion

**Phase 3: Liberalisation**
1998: EU Liberalisation
2000: Start Energy Trading at Leipzig Exchange EEX

**Phase 4: Renewables**
2006: Start Investment Program in Renewables (Biomass)
2010: Start wind farm and solar projects
2011: Post-Fukushima, accelerated energy transition
2. Transformation Process since 1990 (2)

**Phase 5: Flexibility**
- 2012: Investments in growing flexibility (i.e. turbine tuning to ensure the power grid stability)
- 2013: Participating on German Capacity Markets

**Phase 6: Digitalisation**
- 2017: Start smart grid / intelligent measuring systems
- 2018: Test machine learning systems / KI
- 2019: Trading test with blockchain technology (peer to peer)

**Phase 7: Decarbonisation**
- 2019: Resolution of the city council (100 % owner) on the climate emergency / coal phase-out
- 2020/21: Commissioning of further CHP units
- 2022: Commissioning of hydrogen-capable modern CHP

(since 2007 European Power Exchange, base-year-future and peak-year-future price, rolling)

- Monopol (phase 2)
- Liberalisation / battle for customers (phase 3)
- Liberalisation / trading power exchange (phase 4)
- Global Financial Crisis
- Ukraine War
- Corona Pandemic

Quelle: EEX

- Jahresfuture Baseload (rolling)
- Jahresfuture Peakload (rolling)
4. Capacity/Flexibility Management/Technologies (phase 5,6)

- Wind farms
- CHP
- Industrial
- E-Mobility
- Residential buildings
- Power plants
- Solar
- Storage
- Weather prices
- Residential areas
- Markets (examples):
  - Wholesale (EEX): Intraday, day ahead, forward markets
  - TSO: Energy market balancing (PCE, SCE)
  - Utility: Load Management
  - Renewables: Direct Marketing

Capacity management
5. New Products and Advanced Technologies (phase 5)

1. Market Integration of existing CHPs and emergency power generators

2. Market integration of existing renewable power plants (EEG-Direct Marketing)

3. Steerable heat electricity (heat pumps, electric heating)

4. Solar power production used as on-site power and for residential buildings

5. Electricity and heat generation in small CHP units for on-site power and for residential buildings

6. Battery bundling (construction of new photovoltaic systems)

7. Energy audit, implementing and operating energy management systems

8. Energy saving contracting solutions
5. New products and Technologies - generating value around the customer electricity metering points (phase 5-7)

1. Solar power generating, electromobile house-owner

2. Block of flats having solar and CHP power production + car sharing pool

3. Solar power generating supermarket chain having refrigeration system and power charging stations

4. Block of flats providing power for tenants through solar and flexible CHP power production + power storage

5. Community power and others ...
6. Business product: PPA for (private) financing renewable investments (phase 7)

Power Purchase Agreements are long-term contracts between a buyer (off taker) and a seller (producer) of renewable energy that allow the buyer to purchase electricity directly or indirectly on a long-term basis at a price level agreed upon by both parties and to receive the associated guarantees of origin.

- **Product**
  - **Power + GoO**
  - **PPA**

- **Offtaker**
- **Utility**

- **Main Features**
  - **GoO**: Guarantees of Origin
  - **Conventional power procurement process**

- **Physical PPA**
  - The seller provides the physical supply for the buyer (onsite or offsite).

- **Financial (virtual) PPA**
  - Seller and buyer enter into a contract in which one party pays the other the difference between the market price and the contract price.
6. Business product: Midstream (phase 7)

- **Upstream (assets)**
- **Midstream (trading)**
- **Downstream (customer)**

1. Origination back-to-back green power (customer balancing)
2. Transfer, mismatch
3. Residual power supply

**Trading book Midstream (Leipzig Utility)**

Assume residual risks

- **EEX / OTC**
- **Structured hedging**
- **Power Transmission Operator**
- **Bilancing**
7. Summary Business Advanced Technologies for Transformation Megatrend Green Energy in Europe

- **E-mobility and Charging**
  - The number of charging stations in DE grew by almost 20% last year. Alternative drives will account for ~70% of drive types in 2030.

- **Decarbonization**
  - Green Hydrogen
    - H₂ is a central component of the EU New Green Deal initiative. Already by 2030, 10 million tons of green H₂ are to be produced within the EU.

- **Generation**
  - The share of renewable energies in gross electricity consumption in Germany is currently around 40%. By 2050, this is to increase to at least 80%.

- **Load Management**
  - The technical potential in “Demand Side Management” in Germany is estimated at up to 15 GW (industry/commerce & trade/households).

- **Direct Delivery**
  - Private energy generation in DE has increased by more than 20% in recent years. Digital direct delivery solutions show significant growth.

- **Internet of Things (IoT)**
  - IoT accelerates the energy transition by optimizing the energy supply chain in real time.

- **Heating/Sector Coupling**
  - Studies predict that sector coupling will deliver ~20% of CO₂ savings targets in 2050.

- **Micro Grids / Neighbourhood Solutions**
  - In order to relieve the distribution grid by decentralized generators, the installation of microgrids is increasing. In the EU, a growth of more than 10% is expected until 2030.

- **Platforming / Marketplaces**
  - Digital ecosystems enable new business and cooperation models. In addition to offers in the area of smart and flexible energy, entirely new sales channels are also activated via cross-selling.

- **Implications**
  - The share of aggregators in trading is expected to rise.
  - Real time demand response management in trading and portfolio management requires new technology.
  - Data Analytics and Automation are key in order to fully utilise the available data.

---

June 2022 / BoS 22
Thank You

For discussions/suggestions/queries email: thorsten_koener@t-onlione.de