QANTIC

AI-Based Approaches for Optimization in Microgrids

TIF 2021 - Session VI: “Data-driven and automation approaches for rural electrification projects with decentralised renewables”

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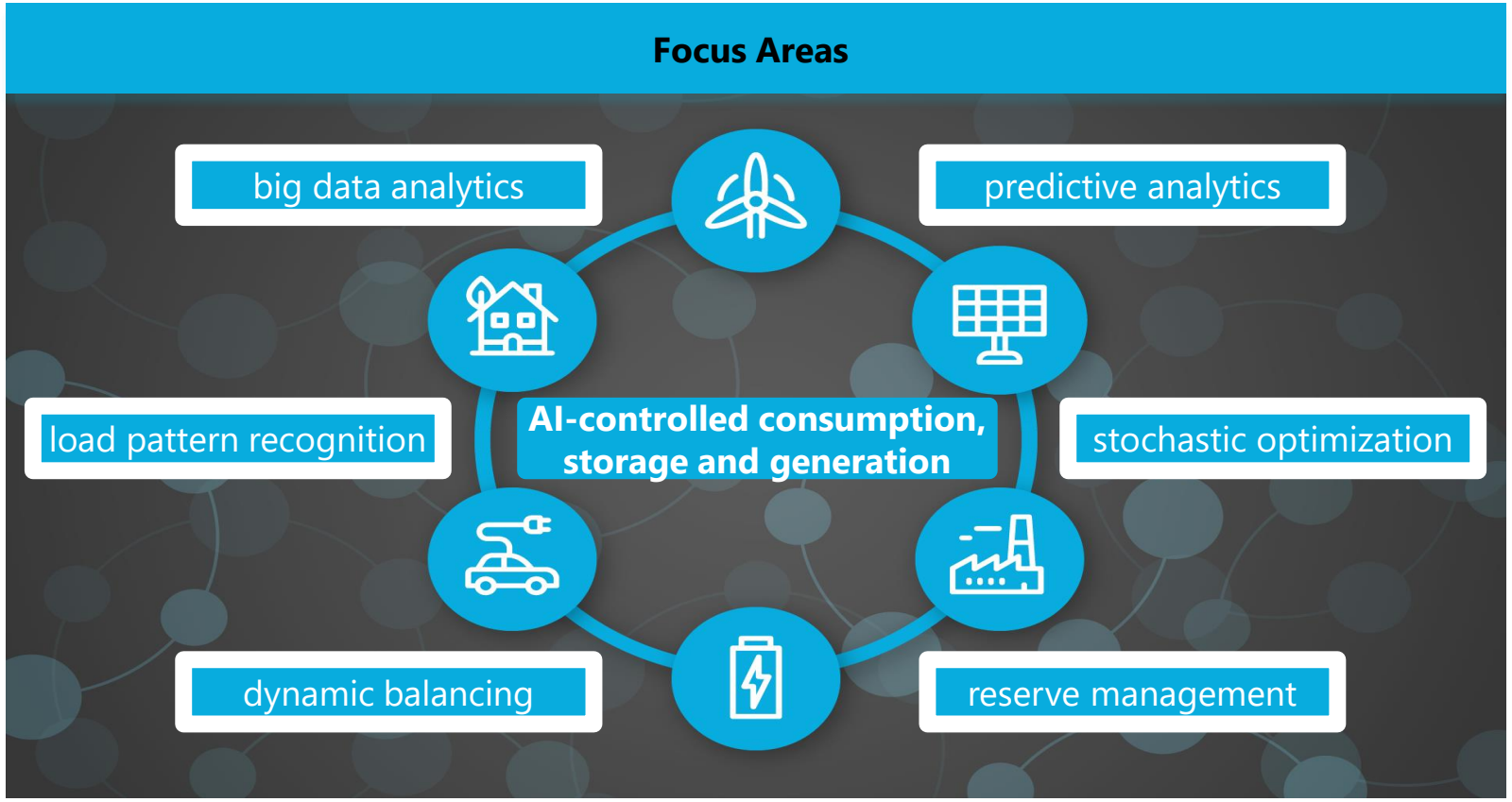
Qantic is developing AI-algorithms for the design and control of energy systems in order to reduce costs and emissions



Company

- Founded in 2018 in Berlin
- Privately owned

Products

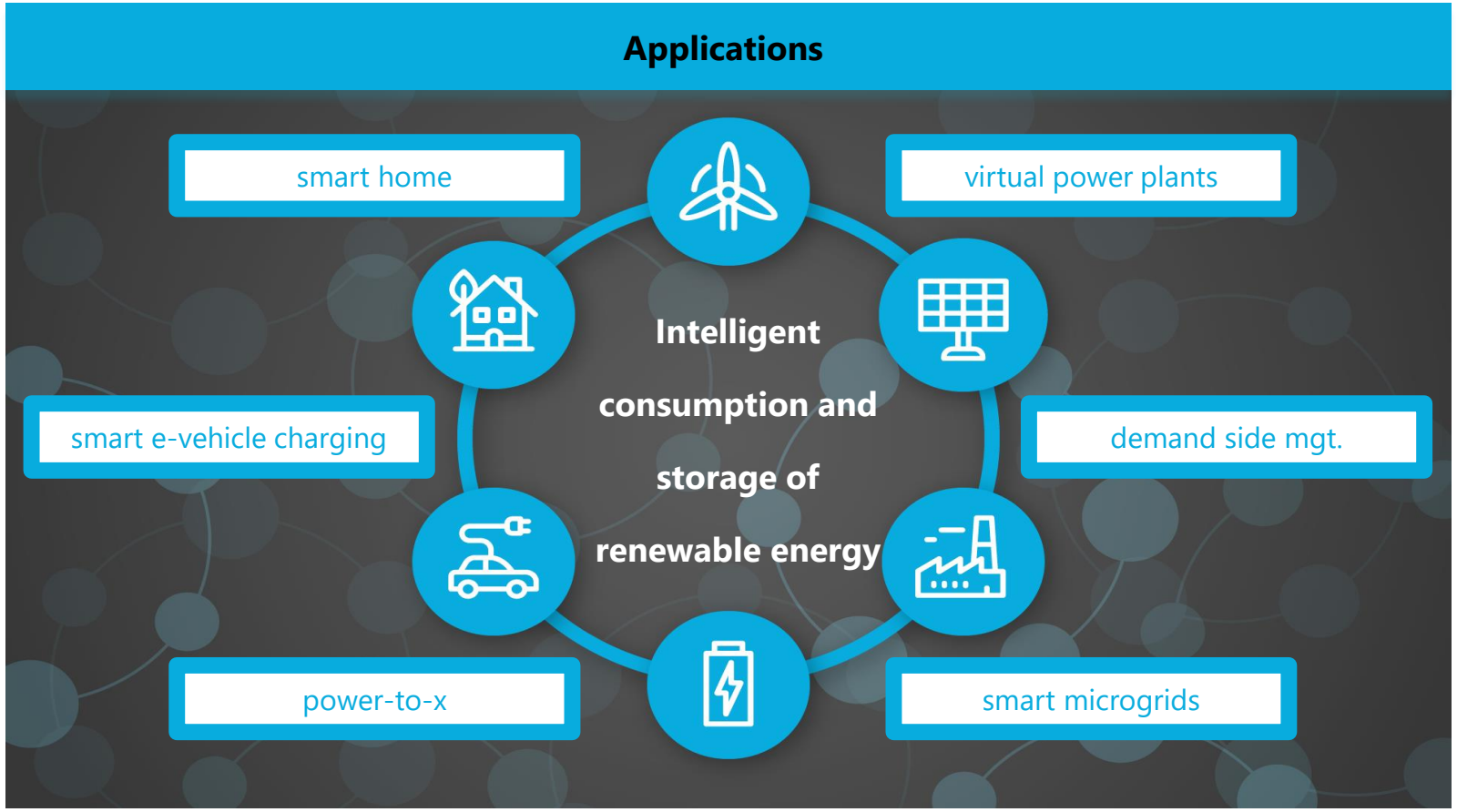
- Q-System:
  - Microgrid planning tool
  - Sizing of components to minimize LCOE under site-specific restrictions
- Further applications coming soon

Applying AI-based-techniques (Reinforcement Learning) to energy optimization tasks…

What makes it difficult?	Complex system dynamics and intertemporal effects; Physical restrictions; High requirement on reliability (critical infrastructure)
How would we normally solve it?	Heuristics or techniques for deterministic or stochastic optimization (e.g. dynamic programming) to provide an approximation
What can AI do better?	Optimizing energy systems with complex system dynamics at high computation speed using large amounts of input data

AI can yield benefits if energy systems exceed a certain level of **complexity**, **computation speed** is crucial or **large amounts of input data** (e.g. measurement data, forecasts) have to be processed

… can unleash the full potential in smart energy applications



Benefits

- **Coordination of consumption, generation and storage:** Optimal dispatch to ensure efficient use of components and maximize usable RES production
- **Foresighted system control:** Not only considering present but also future costs e.g. system fallout
- **Extracting value from data:** Recognizing typical patterns in the data. Get better foresight e.g. on demand and production and expected future costs
- **Dealing with uncertainty:** Preparing for different possible future developments → Also considering events with low probability but high costs (e.g. events leading to fall-out)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