SMART GRID

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Why a smarter grid?

- Reduce CO2 emission (The 20-20-20 targets)
- Energy self sufficiency
- Enhance reliability
- Reduce capex and opex costs
- Advanded service models

Means

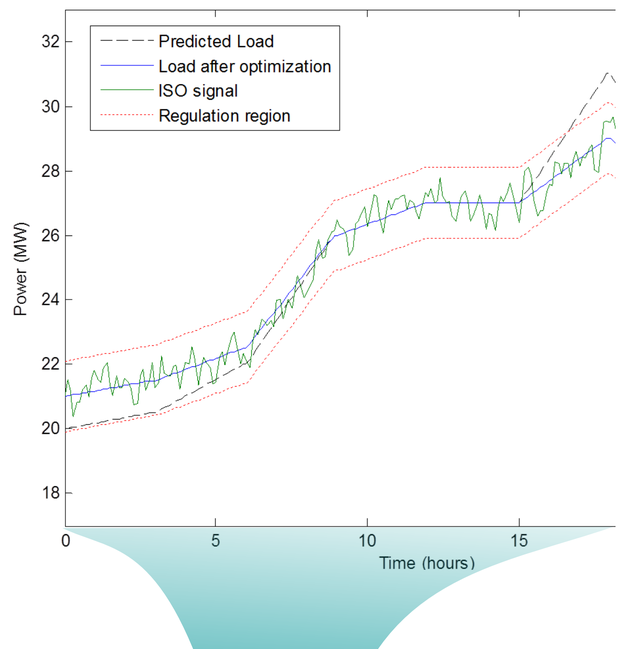
- Change the load curve shape (reduce peak, lower consumption)
- Distributed energy resources
- Renewable energy sources (eolian, PV,…)
- Enhance efficiency

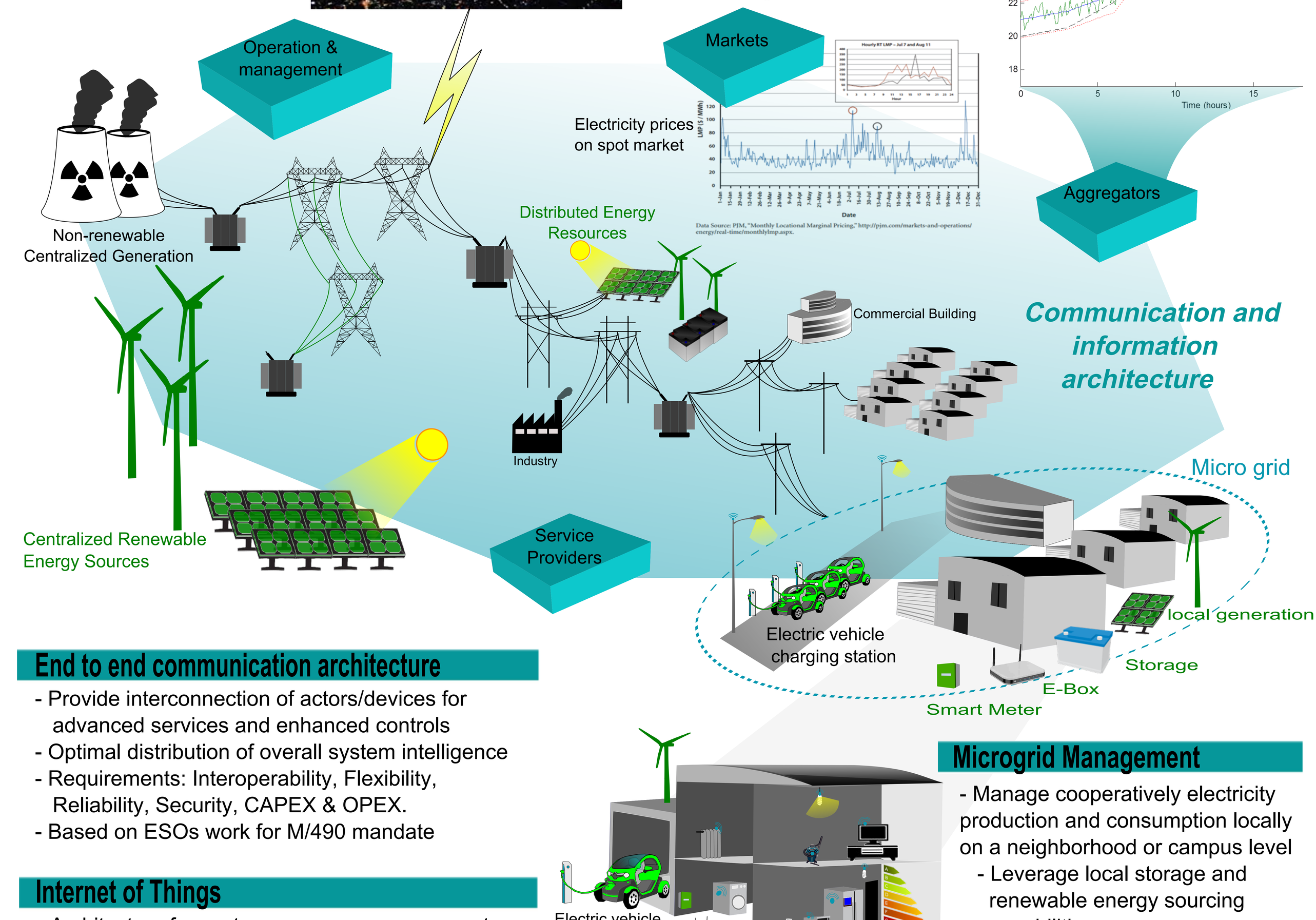
Crisis management (power shortage)

- Traditional approach: Rolling blackout
- Our approach: **Differentiated services**
  - Continuous supply for **critical** loads
  - Take into account **utility** for users depending on their characteristics, environmental conditions and appliances' operation
  - **Fairness**

Aggregators

- Provide advanced DR mechanism to leverage consumers' storage capabilities and load and generation flexibility
- Enable prosumers' participation in the electricity market, including ancillary market
- Dynamically optimize Aggregator's decisions based on: Load forecasts, Client policies, market prices, Flexibility capabilities and ISO signals





End to end communication architecture

- Provide interconnection of actors/devices for advanced services and enhanced controls
- Optimal distribution of overall system intelligence
- Requirements: Interoperability, Flexibility, Reliability, Security, CAPEX & OPEX.
- Based on ESOs work for M/490 mandate

Internet of Things

- Architecture for customer energy management system targeting autonomic policies' implementation:
  - auto-discovery, self-configuration and self-healing
- Solutions for advanced grid monitoring and control
- Smart grid, vehicles, cities and homes convergence

Microgrid Management

- Manage cooperatively electricity production and consumption locally on a neighborhood or campus level
  - Leverage local storage and renewable energy sourcing capabilities
  - Enhance efficiency (e.g., less transport losses)
- Ensure overall system visibility, stability and predictability