

INTELLIGENT GRID- CONCEPTS

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MOTIVATION

- Massive interconnection of power network has posed an operational challenge
- The concept of intelligent control for regulating the power network variables has been realized.
- The intelligent agent based control can be a solution in today's power network to maintain the dynamics such as adequate power balance along with quality voltage under changing system conditions such as load and power injection

Concept of multi-agent intelligent grid control

- The technology with multi-agent intelligent control may be main module of Smart Grid architecture
- Micro grid comprises of a power system, which belongs to the wider concept of Smart grids, and is likely to become a part of the future power system architecture
- Micro grids may be operated either as interconnected mode or islanded depending of requirements

Micro Grid Model



Intelligent Grid

- An integrated array of technologies, devices and systems that provide and utilize digital information, communications and controls to optimize the efficient, reliable, safe and secure delivery of electricity

Characteristics of an Intelligent Grid

- **Self-Healing Grid** - rapidly detects, analyzes, responds, and restores
- **Empowers and incorporates the consumers**- Ability to incorporate consumer equipment and behavior in grid design and operation
- **Tolerant of attack**- Grid mitigates and resilient to physical and cyber attacks

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- **Provide power quality needed by 21st-century users-** Grid provides quality power consistent with consumers and industry needs
- **Accommodates wide variety of supply and demand-** Grid accommodates variety of resources (including demand response, combined heat and power, wind, photovoltaic, and end-use efficiency)
- **Fully enables and is supported by competitive markets**

Innovative Technologies

- Auto-balancing, self-monitoring power grid that accepts any source of fuel with minimal human intervention
- It is a grid that has the ability to sense when a part of its system is overloaded and reroute power to reduce overload and prevents a potential outage situation

- A grid that enables real-time communication between the consumer and the utility, allowing the consumer to optimize energy usage based on environmental and/or price preferences.

Thank You