



Smart Microgrid & System Integration

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In this video you will learn:

- ❖ What smart microgrids are
 - ❖ The main features of smart microgrids
 - ❖ Their applications
 - ❖ Benefits and risks of smart microgrids

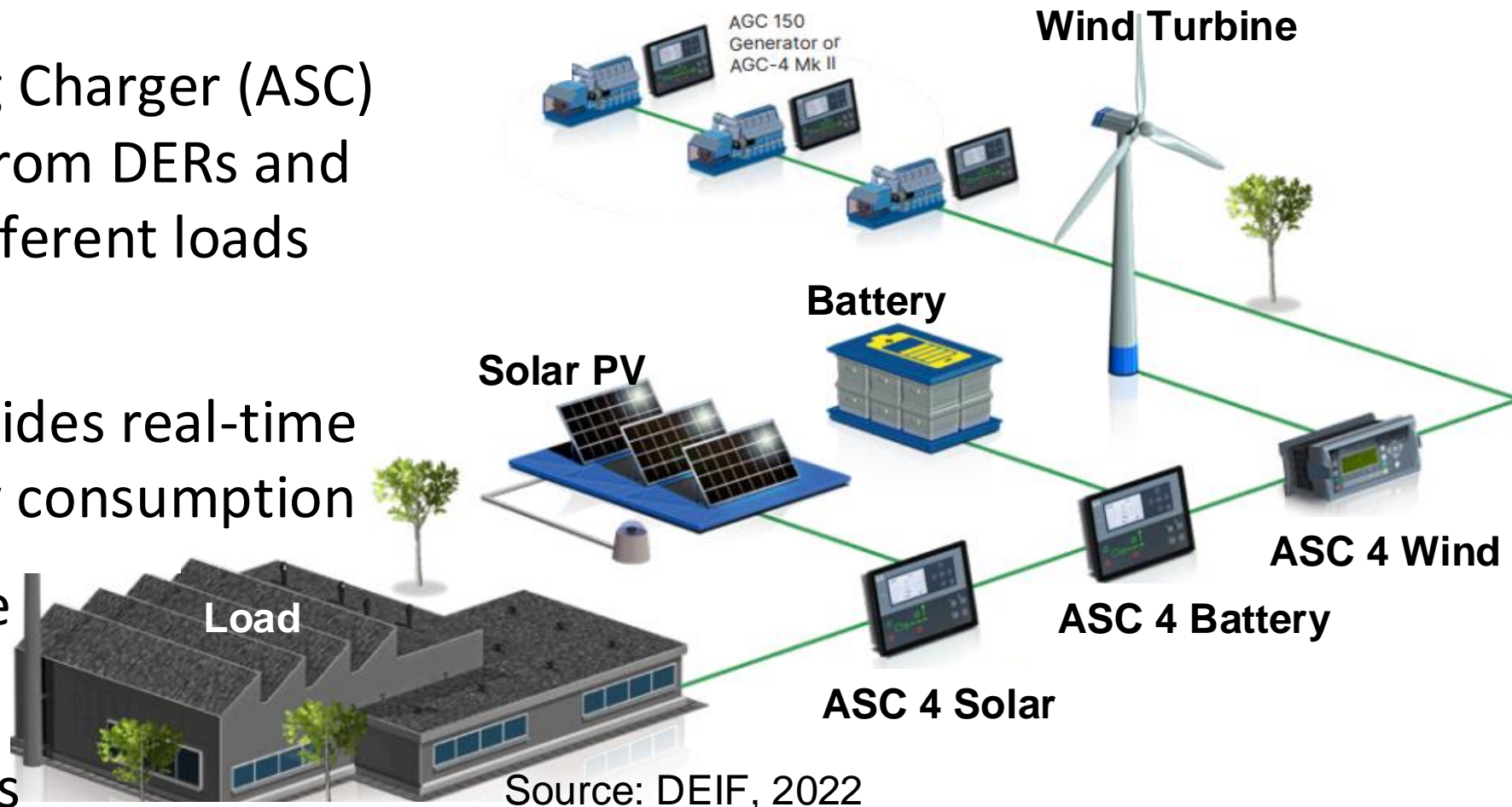


What are Smart Microgrids?

- ❖ They are small, localized, and automated electricity generation, storage, and distribution networks within clearly defined electrical boundaries (Nair et al., 2022).
- ❖ They use digital technology/software and intelligent sensors to automatically monitor, predict, control, and dynamically balance available electricity supply with demand across multiple end-users, thus avoiding any disruption in electricity service.

The main features of smart microgrids

- ❖ Distributed Energy Resources (DERs)
 - Solar PV, CHP, Wind Turbine
- ❖ Automatic Sequencing Charger (ASC) that manages power from DERs and distributes it to the different loads that need it
- ❖ Smart meter that provides real-time information on energy consumption
- ❖ Battery energy storage for use when needed
- ❖ Load: Home appliances



Applications of Smart Microgrids

- ❖ Solar Irrigation
- ❖ Info-spot
- ❖ Cold Storage
- ❖ Electric Vehicle Charging Stations
- ❖ Solar Homes

Benefits of Smart Microgrids

- ❖ Enhance energy resilience by avoiding power outages or quickly recovering if they occur
- ❖ Reduced cost associated with energy lost through transmission
- ❖ Contribute to GHG emissions reduction
- ❖ Provide socio-economic development to underserved and rural communities

Smart Microgrid Operational Risks

Risk Categories	Examples
Technical	Equipment failures
Economic	Market fluctuations
Environmental	Natural disasters
Social	Public opposition
Legal	Regulatory changes
security	Cyberattacks

Summary

- ❖ Despite these challenges, smart microgrids hold great promise as an effective off-grid solution to close the energy poverty gap and enhance energy resilience in rural communities.
- ❖ They significantly improve grid efficiency through automation, advanced monitoring and control systems, and renewable energy integration.

THANK YOU

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