Smart microgrid & system integration

Energy Management Systems for PV electricity self-consumption optimisation

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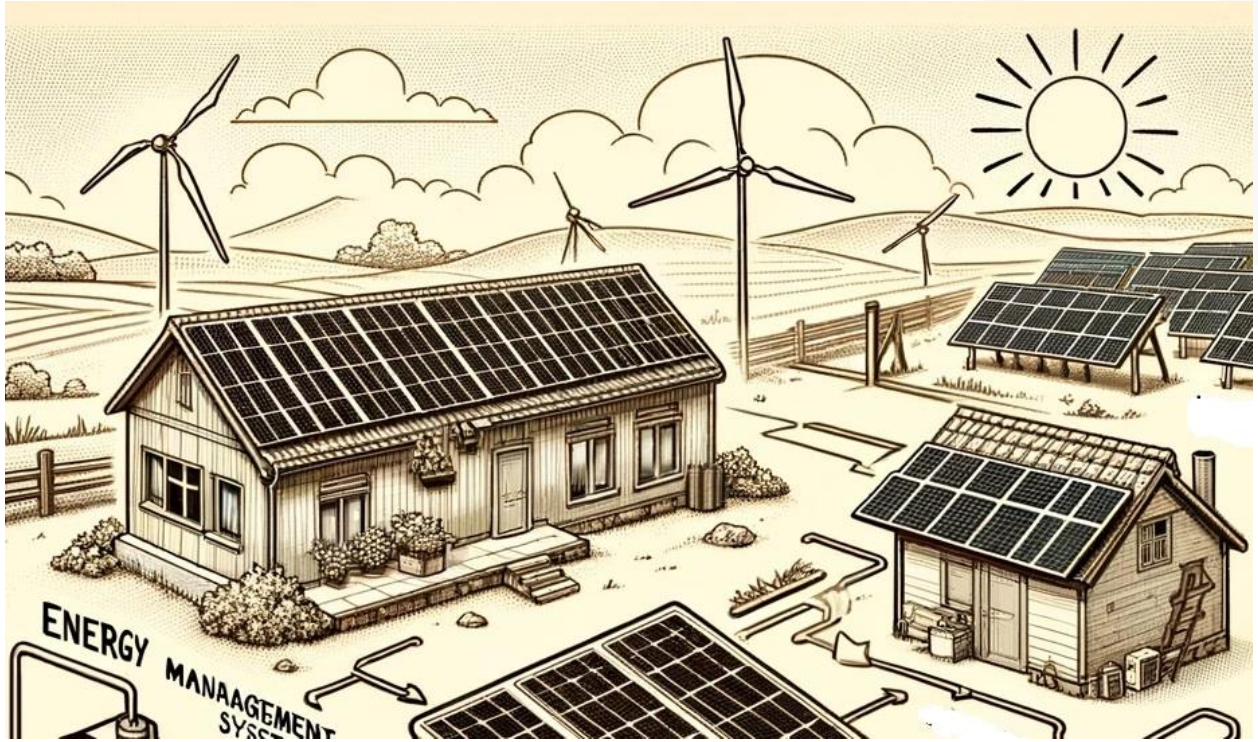
This project has received funding from the European Union's Horizon 2020 research and innovation programme under the grant agreement No. 101037141. This material reflect only the views of the Consortium, and the EC cannot be held responsible for any use that may be made of the information in it.

In this video you will learn

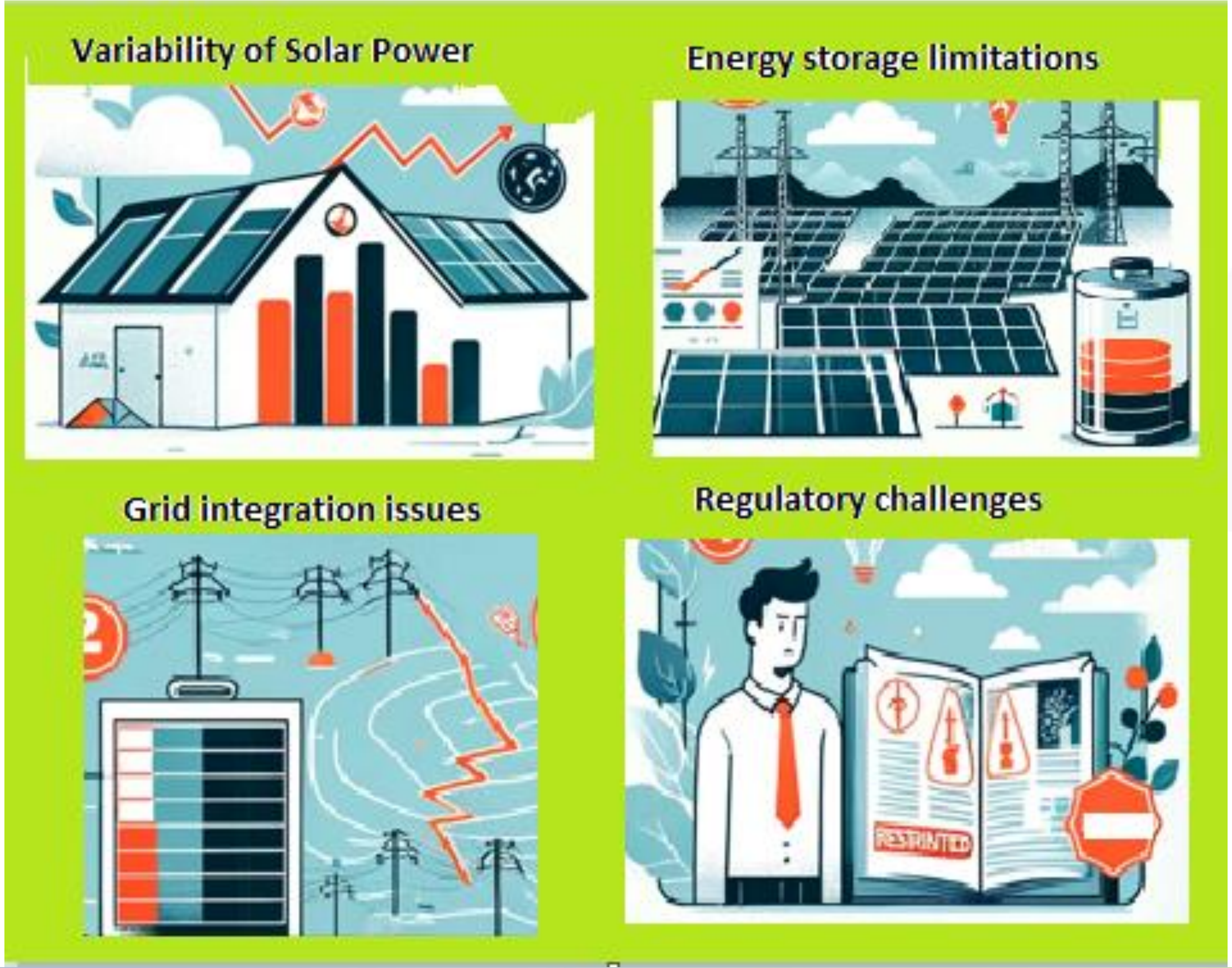
- About the Significance of EMS in the context of PV
- The Challenges in PV Electricity Self-Consumption
- Benefits of Implementing EMS .
- Optimization Strategies for Profitability
- Future Trends and Innovations

Introduction to EMS

- Definition of EMS
- Role of EMS in PV electricity self-consumption
- Purpose of optimization



Challenges in PV Self-Consumption



Benefits of Implementing EMS

- Increased Energy Efficiency
- Cost Reduction
- Environmental Impact
- Grid Independence

Optimization Strategies for Profitability

Load Shifting

Peak shaving

Off-peak consumption

Battery Management

Charging/Discharging strategies
SOC

Demand Response

Grid interaction

Incentive programs

Predictive Analytics

Weather forecasting
Consumption patterns

Optimization Strategies for Profitability

1. Load Shifting

Peak Shaving. aims to reduce power consumption during peak demand times.

Off-Peak Consumption. Encourages shifting energy usage to off-peak hours.

To shift energy consumption from peak demand times to off-peak periods.

Benefits: Reduces energy costs, decreases stress on the grid during peak hours, and Increase efficiency of use of RES.

Strategies :

Optimization Strategies for Profitability

2. Battery Management

To efficiently manage the charging and discharging of battery storage systems.

Benefits: Extends battery life, optimizes energy storage from renewables, and provides backup power.

Strategies:

Charging and Discharging Strategies

State of Charge (SOC) Optimization

Optimization Strategies for Profitability

3. Demand Response

To adjust energy consumption in response to supply conditions or price signals from the grid

Benefits: Balances the grid's supply and demand, reduces operational costs, and can provide additional revenue through participation

Strategies:

Peak Shaving

Off-Peak Consumption

Optimization Strategies for Profitability

4. Predictive Analytics

use data-driven insights for forecasting and managing energy needs.

Benefits: Enhances decision-making, improves energy efficiency, and reduces costs through better demand forecasting and maintenance planning

Strategies:

Weather Forecasting

Energy Consumption Patterns

Future Trends and Innovations

Technological advancements

Policy developments

Integration with emerging tech

Future Trends and Innovations

- Technological advancements in EMS
- Policy developments promoting PV electricity self-consumption
- Integration with emerging technologies (e.g., Artificial Intelligence, Internet of Things)

Summary

Smart grid definition and importance in updating the electrical system for efficiency, reliability, and sustainability.

Key components covered include AMI, distribution automation, communicatio n networks, smart sensors, and energy storage.

Definition and purpose of AMI, stressing its role in two-way communication and smart meter integration for better grid management.

Examined smart meter functions, including real-time energy monitoring, remote control, and interaction with home automation systems.

Requires consideration of privacy and security concerns, early implementation costs, and public awareness and acceptability.

Emerging developments , such as AI integration, edge computing in grid management, transportation electrification, and renewable energy growth.

THANK YOU

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Further Reading

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