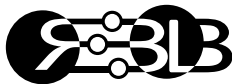


TITLE

AUTHOR

INSTITUCIÓN

DATE



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1 Introduction

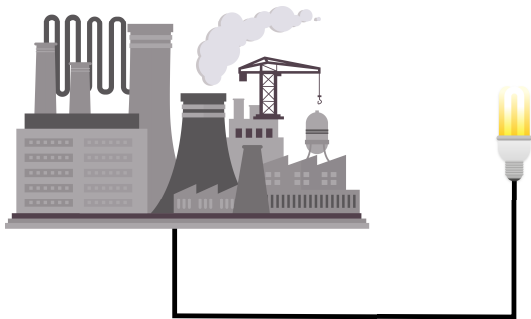
2 Conclusions

Problem Statement



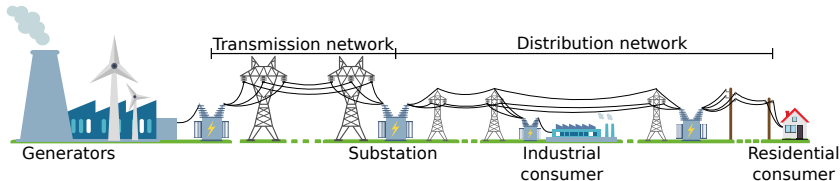
Golden Rule

$$\text{Generation} = \text{Consumption}, \forall t$$



Origin of major problems...

Electric system



- **Generators:** produce electric power from primary sources.
- **Transmission network:** from power plants to substations.
- **Substations:** power conditioning and safety mechanism.
- **Distribution network:** from substations to consumers.
- **Consumption:** transforms electric power into work.

Problems

Generation must adapt to consumption, but ...

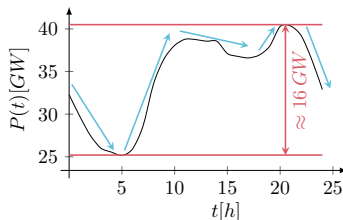


■ Grid:

- Centralized system
- Ageing infrastructure
- Generation far from consumption
- Losses \rightarrow Efficiency \downarrow

■ Consumption:

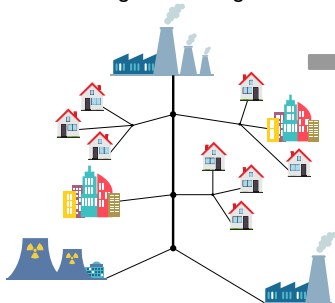
- High variability
- High responsiveness
- System stress
- Grid oversizing



Solution(I): Evolution of the grid

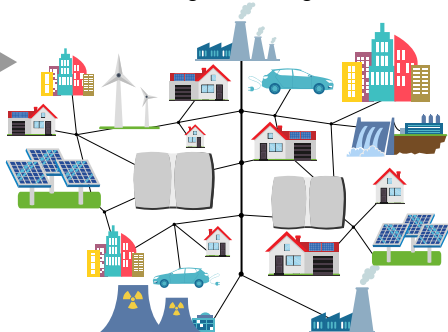


Old generation grid



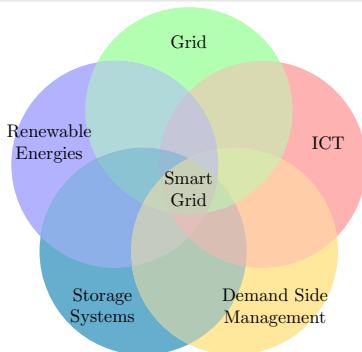
- Centralized
- ↓ Efficiency
- ↓ Communication

New generation grid



- Distributed
- ↑ Integration
- ↑ Participation

Solution(II): Smart Grid



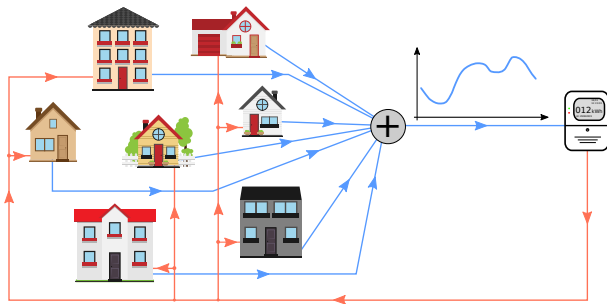
Definition

An electricity network that uses communication technologies to coordinate the needs and capabilities of all grid members to operate efficiently, minimising costs and environmental impacts while maximising reliability, resilience and stability.

Variability reduction: DSM



Thesis Aim



Objective

Development of an adaptive algorithm to manage the consumption of a collective of individuals with the presence of distributed energy resources (PV + local storage).

The algorithm enhances the efficiency of a grid by reducing the variability of the aggregated consumption.

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Conclusions



Questions



