

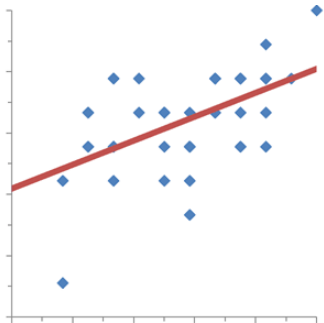
International workshop on energy storage in the Grid: Low, medium and large scale requirements

UPC

8th - 10th January 2014

- 1- Main features within the rural environment**
- 2- What do we need ?**
- 3- How do we do it?**
 - 3.1-At secondary substation level**
 - 3.2-Community strategic locations**
 - 3.3-Isolated farm or rural houses**
- 4-Cycles.**
- 5-Criteria.**

Main features rural environment



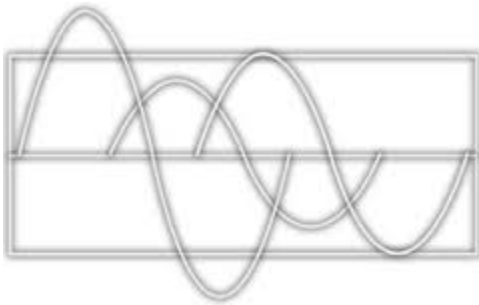
Dispersion



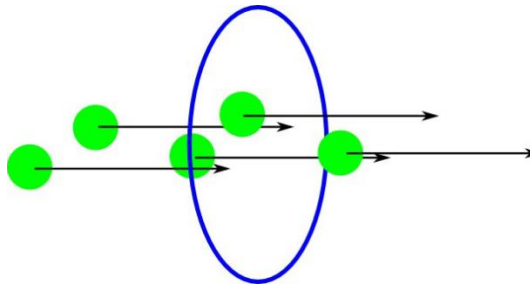
Large areas



Vulnerability



Imbalanced loads



Low current



One way



What do we need ?

Utilities will need to develop and apply technologies based on storage and their management, to be able to provide the minimum requirements to achieve conditions of work, thus having the conditions for the distributed micro generation operation development.





How do we do it?

According to their location



Secondary substation



Isolated farm

Strategic location between farms



Secondary substation



Transformer

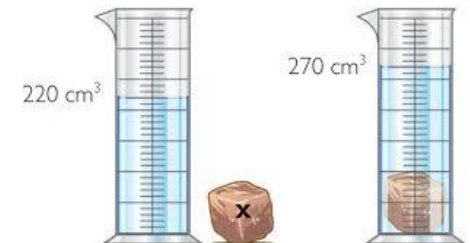
item	Value
Transformer	50 to 160 kVA
K_{simult}	150 % (Average)
Discharge time	maximum 60 min
Capacity	20 to 50 kVAh



Electric discharge time

$$K_{simult} = 1/\sqrt{n-1} \geq 0,2$$

**Simultaneity
coefficient**



Capacity



Community strategic locations

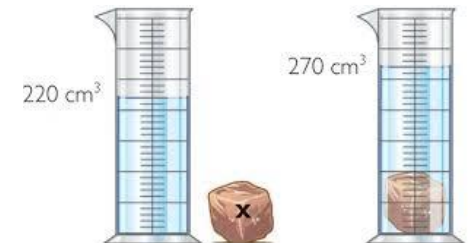


Communities

item	Value
P.Contract (kW)	5,5 · meter (Avg)
K_{simult}	200 % (Average)
Discharge time	maximum 60 min
Capacity	20 to 40 kVAh



Electric discharge time



Capacity

$$K_{simult} = 1/\sqrt{n-1} \geq 0,2$$

**Simultaneity
coefficient**



Isolated farm or rural houses



**Power
contract**

item	Value
P.Contract (kW)	5,5 (Average)
kWh/ day	694 (Average)
Discharge time	maximum 60 min
Capacity	10 to 20 kVAh



Electric discharge time

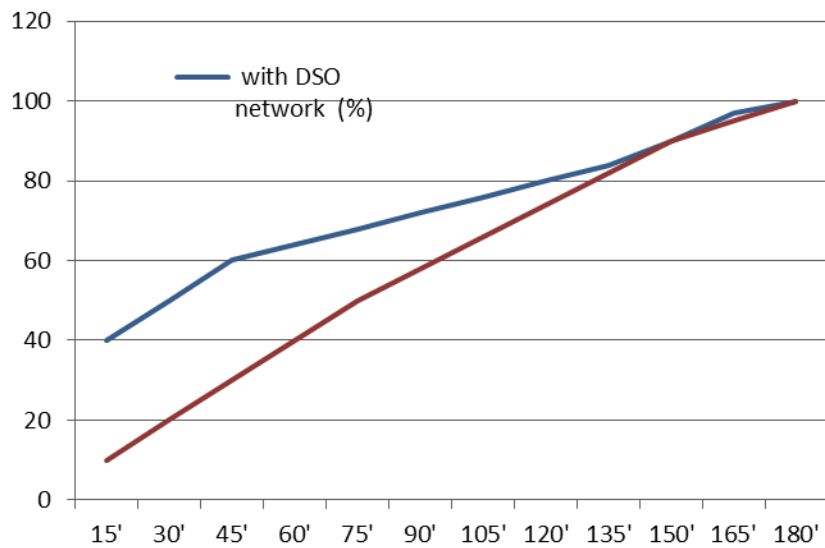
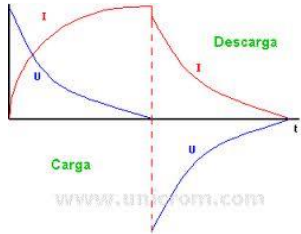


Capacity



kWh / day

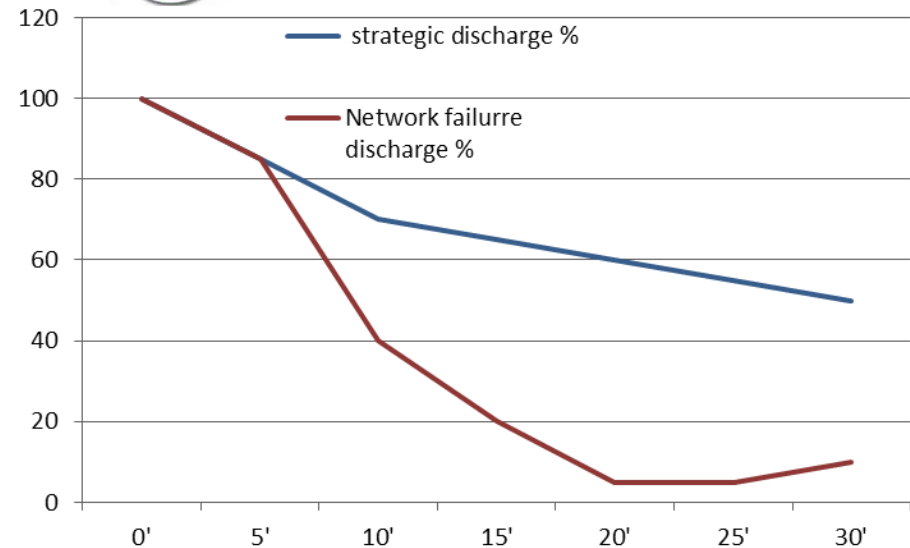
Cycles



Charging cycle



If battery = 0%



Discharge cycle



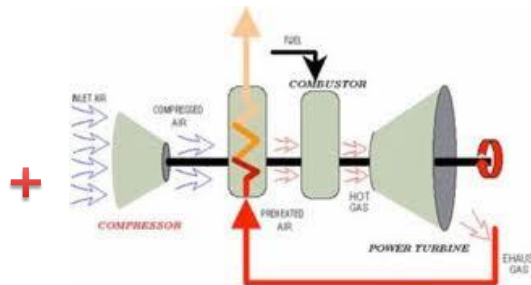
Criteria

Charging when:

- **Battery is unloaded**
- **Low price energy**

Discharging when:

- **Expensive energy price**
- **Electrical failures**
- **Other short restrictions**



But we need μ G for keeping the electrical network operational in island mode.

Thank you

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