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**PV GRID**  
Make it smart!


**Project PV-GRID**  
**Barriers and recommendations**

18/03/2014



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# 1

## List of barriers

## Rules forbidding RES energy curtailment except for security issues



- ❑ Currently only an exception.
- ❑ Curtailing small quantities of energy could increase significantly the hosting capacity of PV.
- ❑ Analyze whether slightly increasing the conditions could be beneficial.
- ❑ Compensate the PV agent for the curtailment.

Source: <http://www.louyeh.com>

## Insufficient Self-consumption Framework

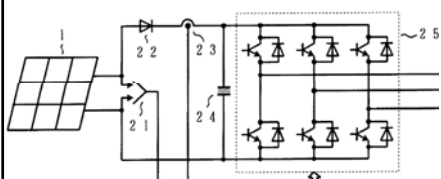


- ❑ Necessity to be legislated.
- ❑ Net metering.
- ❑ Legal uncertainties.
- ❑ Direct or indirect incentives.
- ❑ Review the tariffs.



Source: [www.iit.upcomillas.es](http://www.iit.upcomillas.es)


## Insufficient DSO access to advanced PV Inverter Capabilities




- ❑ Technically available.
- ❑ DSO has no access.
- ❑ Access to inverters and control over their capabilities should be granted to DSOs.
- ❑ Boundary conditions.

Source: <http://www.freepatentsonline.com>

## Insufficient Framework for Prosumer Storage Solutions




- ❑ Fluctuations.
- ❑ Natural technical solution.
- ❑ Allowed and regulated.
- ❑ Economic compensation.




<http://blog.carritus.com/2012/01/pilas-cuales-elegir/>

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## Insufficient Framework for DSO Storage Solutions



- ❑ DSOs compensation of the fluctuations.
- ❑ Unbundling policies.
- ❑ Impacts in the market.
- ❑ How the DSOs can make use of this technology.



Source: <http://www.saftbatteries.com>

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## Insufficient Framework for Demand Response



- Local network conditions.
- Voluntary basis.
- Possibility of contracting load reduction and load activation with the consumers.
- Presently DSOs are not expected to exchange information with final customers.
- Communication system.
- Smart meters
- A detailed regulation.



Source: <http://www.millennialliving.com>

## Incoherent Metering Framework



- Foster a quicker implementation of some of the technical solutions.
- Directive 2009/72/EC. Target 80% for 2020 depending on a cost benefit analysis.
- Required not only for consumers, but also for the photovoltaic installations

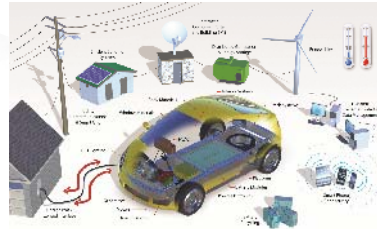


Source: <http://www.cypresscreekestates.com>

## Regulatory Frameworks that do not Incentivise “Smart Grid” Development



- ❑ Communication infrastructures.
- ❑ Favor technologies with high potential impact and good readiness, which find regulatory barriers.
- ❑ DSO should be incentivized for using smart solutions instead of just conventional solutions.
- ❑ A regulatory framework.



Source: <http://www.myseek.org>



# 2

## List of recommendations

### DSO investments recovery



- 1) Avoid that the DSO have an **excessive delay**  
Prevent at least a financial risk of DSO.
- 2) Ensure DSOs are remunerated by the **efficient investments**.

	Austria	Belgium	Bulgaria	Czech Republic	France	Germany	Greece	Italy	Poland	Portugal	Slovakia	Spain	Sweden	U.K.
1		X			X	X					X	X		X
2		X		X					X			X	?	

### Grid Connection Charges



- 1) Clear methodology based on **simple and transparent rules**
- 2) Provide an **indication of the connection cost** in advance

	Austria	Belgium	Bulgaria	Czech Republic	France	Germany	Greece	Italy	Poland	Portugal	Slovakia	Spain	Sweden	U.K.
1		X	X		X		X				X			X
2			X		X		X	X				X		

### Rules Forbidding RES Energy Curtailment Except For Security Issues



- 1) Debates on whether the **conditions** should be **slightly increased**.  
 Conditions **transparent** and **non-discriminatory**.  
 Ensure an adequate **compensation**.

	Austria	Belgium	Bulgaria	Czech Republic	France	Germany	Greece	Italy	Poland	Portugal	Slovakia	Spain	Sweden	U.K.
1	X	X			X		X	X		X		X	X	

### Insufficient Self-consumption Framework



- 1) A **legislation** should rapidly be approved
- 2) Proper **economic incentives** should be introduced
- 3) The use-of-system tariffs should be reviewed.
- 4) It may further evaluated to introduce **net-metering**

	Austria	Belgium	Bulgaria	Czech Republic	France	Germany	Greece	Italy	Poland	Portugal	Slovakia	Spain	Sweden	U.K.
1									X					
2			X	X	X		X	X	X	X	X	X		X
3	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	X		X	X	X	X		X	X	X	X	X	X	X



### Insufficient DSO access to advanced PV Inverter Capabilities



- 1) Provide DSOs the right to use or impose **functions** to **PV inverters**  
 Define boundary conditions.  
 An **economic compensation** for DG operators.  
 Avoid **conflict of interests** with the TSOs and energy providers.
  
- 2) Define the framework for **advanced reactive power controls**.

	Austria	Belgium	Bulgaria	Czech Republic	France	Germany	Greece	Italy	Poland	Portugal	Slovakia	Spain	Sweden	U.K.
1	X						X	X	X		X	X	X	X
2	X	X					X		X		X	X	X	X

### Insufficient Framework for Prosumer Storage Solutions



- 1) Prosumer storage solutions should be **regulated** and **allowed**.  
 Ensure not posing the system into a security problem or interfering with the metering.
  
- 2) Establish mechanisms for **incentivising** the storage solutions, when applied to reduce the peaks of PV installations.

	Austria	Belgium	Bulgaria	Czech Republic	France	Germany	Greece	Italy	Poland	Portugal	Slovakia	Spain	Sweden	U.K.
1			X		X		X	X	X	X	X	X		
2	X	X	X	X	X		X	X	X	X	X	X	X	X

### Insufficient Framework for DSO Storage Solutions



- 1) There should be a reflection on **how to** activate this potential;  
**Roles, rights and limitations** must be clearly defined;

	Austria	Belgium	Bulgaria	Czech Republic	France	Germany	Greece	Italy	Poland	Portugal	Slovakia	Spain	Sweden	U.K.
1	X	X			X	X	X	X	X	X	X	X	X	X

### Insufficient Framework for Demand Response



- 1) Technical features for **Demand Response** should be assessed. However, the main focus must be on the customers' side  
 Establish a **compensation scheme** for users participating voluntarily.
- 2) DSOs should be allowed to manage **load activation** services
- 3) The **communication** between DSO and final customers, should be defined.

	Austria	Belgium	Bulgaria	Czech Republic	France	Germany	Greece	Italy	Poland	Portugal	Slovakia	Spain	Sweden	U.K.
1		X		X	X			X	X	X	X	X		
2		X		X	X	X	X	X	X	X	X	X		X
3	X		X	X		X	X	X	X	X		X	X	X

### Incoherent Metering Framework



- 1) It should be analysed whether also **DG installations** should also be equipped with these devices.
- 2) It should also be ensured that their **potential** is used.

	Austria	Belgium	Bulgaria	Czech Republic	France	Germany	Greece	Italy	Poland	Portugal	Slovakia	Spain	Sweden	U.K.
1		X	X			X	X		X					X
2	X	X	X	X	X	X	X	X	X	X	X	X	X	X

### Regulatory Frameworks that do not Incentivise “Smart Grid” Development



- 1) Adaptation of national regulatory frameworks to **promote** “Smart Grid” investments  
 A **stable** and **transparent** regulatory framework  
 Where necessary, **explicit incentives** should also be established:  
 To innovative **projects** in smart grids or **generalized**.

	Austria	Belgium	Bulgaria	Czech Republic	France	Germany	Greece	Italy	Poland	Portugal	Slovakia	Spain	Sweden	U.K.
1	X	X	X	X			X		X	X	X	X	X	

## Regulatory Frameworks that do not Incentivise “Smart Grid” Development



- 2) DSOs and NRAs should **evaluate** the regular collection of **measurement data** in **MV** and **LV** networks, to decide on whether start increasing the monitoring in the medium voltage, and then change to low voltage grids, by making use of smart meter technology.
- 3) DSOs and NRAs should **evaluate** the regular collection of **measurement data** in **LV** networks, to decide on whether start increasing the monitoring of the low voltage grids, by making use of smart meter technology.

	Austria	Belgium	Bulgaria	Czech Republic	France	Germany	Greece	Italy	Poland	Portugal	Slovakia	Spain	Sweden	U.K.
2	X	X	X	X	?	X	X	X	X	X	X	X	X	X
3	X	X	X	X	X	X	X	X	X	X	X	X	X	X



Thank you for your attention

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