

# Operationalising regional adequacy

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## The challenges ahead

19 January 2017

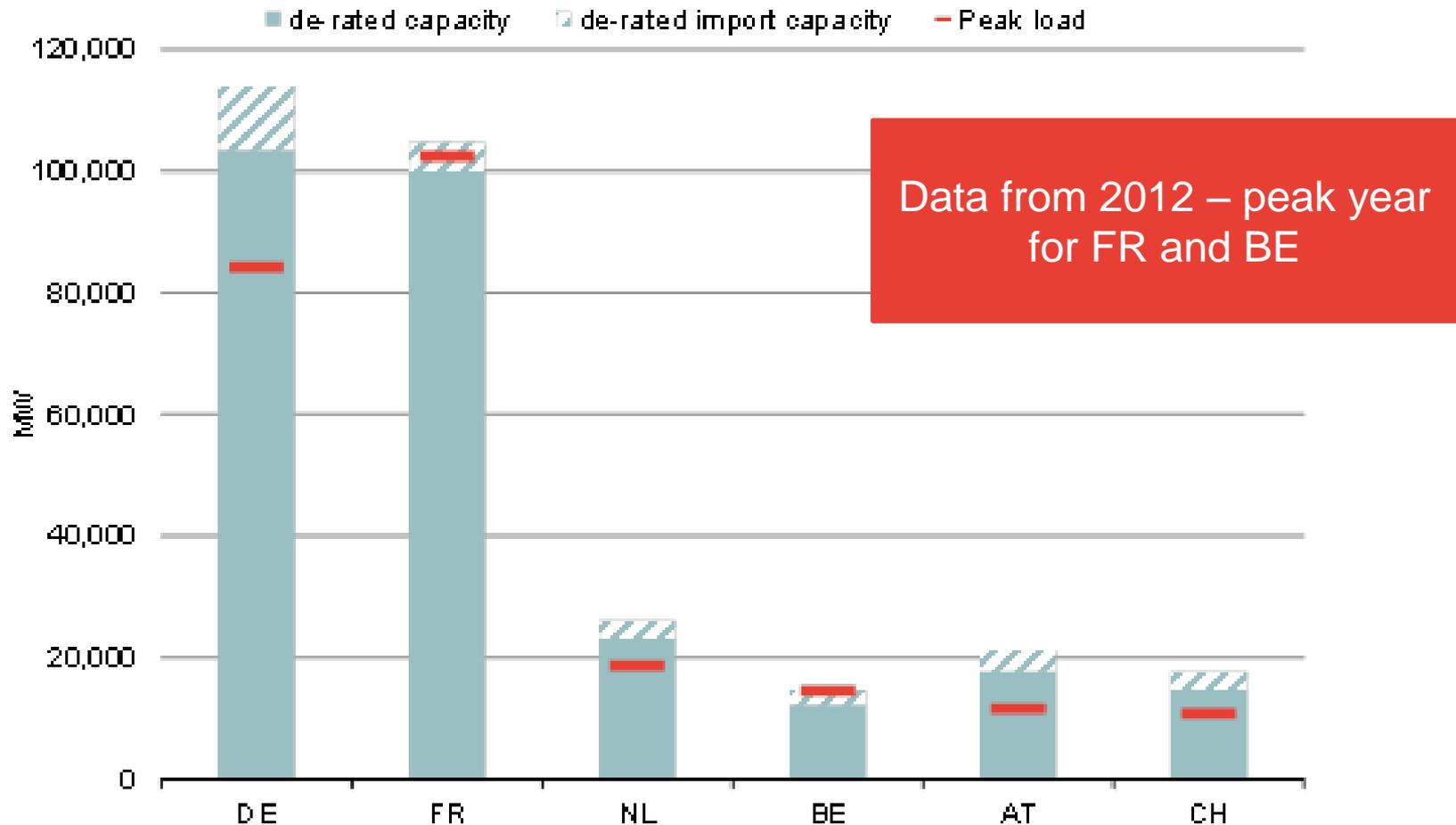


# The winter package places regional adequacy centre stage...

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- “A robust medium to long-term Union level resource adequacy assessment should be carried out by the ENTSO for Electricity to provide an objective basis for the assessment of adequacy concerns. The resource adequacy concern that capacity mechanisms address should be based on the EU assessment”
- “Prior to introducing capacity mechanisms, Member States should assess regulatory distortions contributing to the related resource adequacy concern”

# ... though we start from nation-centric position (NB national regulation even in future?)



# Operationalising (national) security of supply can be divided into four steps

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1  
Define security  
standard

- Define standard
- Convert to a measurable product

2  
Decide on  
market failure

- Regulatory & political environment
- Physical setting (e.g. small market)

3  
Define  
mechanism

- Energy only (scarcity pricing)
- CRM (design!)
- Process, responsibilities & penalties

4  
Define  
emergency

- Define operating rules for stress

# A regional context adds more complexity at each step

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1  
Define security  
standard

- Common standard?
- Which regions?

2  
Decide on  
market failure

- Regulatory & political context across region
- Free riding?

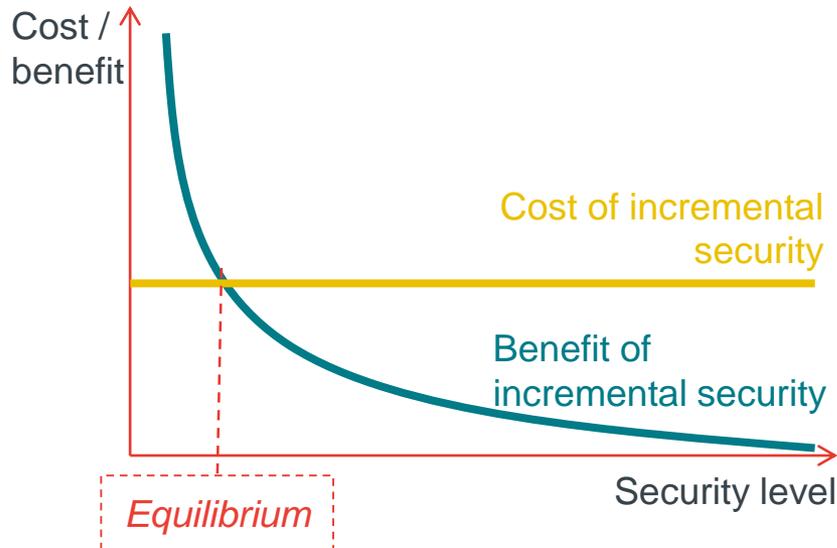
3  
Define  
mechanism

- National or regional?
- X-border participation
- Distributional issues

4  
Define  
emergency

- Nations or region?

# Economic theory says security of supply should relate to VoLL and CONE



- Cost of incremental capacity = CONE
- (Security) benefit of new capacity is a function of total capacity
- Total benefit of security = EEU x VoLL
- Benefit of incremental capacity\* = LOLE \* VoLL
- So equilibrium\*\* when  
CONE = LOLE x VoLL
- So equilibrium condition is when  
LOLE = CONE / VoLL

## GB values

Equilibrium Reliability Standard in LOLE (hrs/yr)		CONE (£/kW)		
		Low (£31.89)	Medium (£47.18)	High (£66.21)
VoLL (£/MWh)	£35,490	0.90	1.33	1.87
	£16,940	1.88	2.78	3.91
	£10,290	3.10	4.59	6.43

# Defining standard might be the easy bit. Then ask whether regions are nations or averages

## Individual national standards

- Logical that countries could choose different standards – different levels of VoLL drivers (e.g. GDP/capita)
- But how to operationalise?
  - Low VoLL market in stress benefits from build in high VoLL country
  - Region in stress needs “rule” for load reduction in low VoLL country first

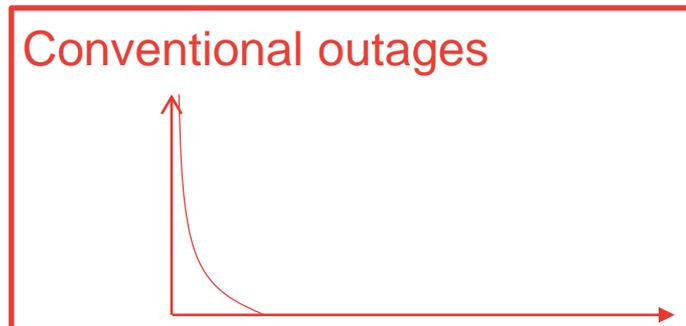
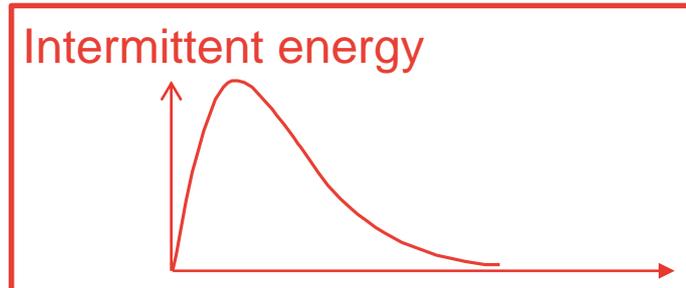
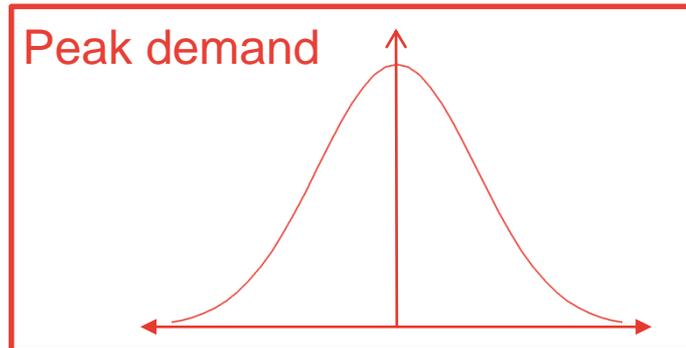
## Regional standard

- More realistic to assume a regional standard
- Means some countries will not be at their optimum level...
- ... but empirically differences may not be that significant, esp. if regions optimally designed?



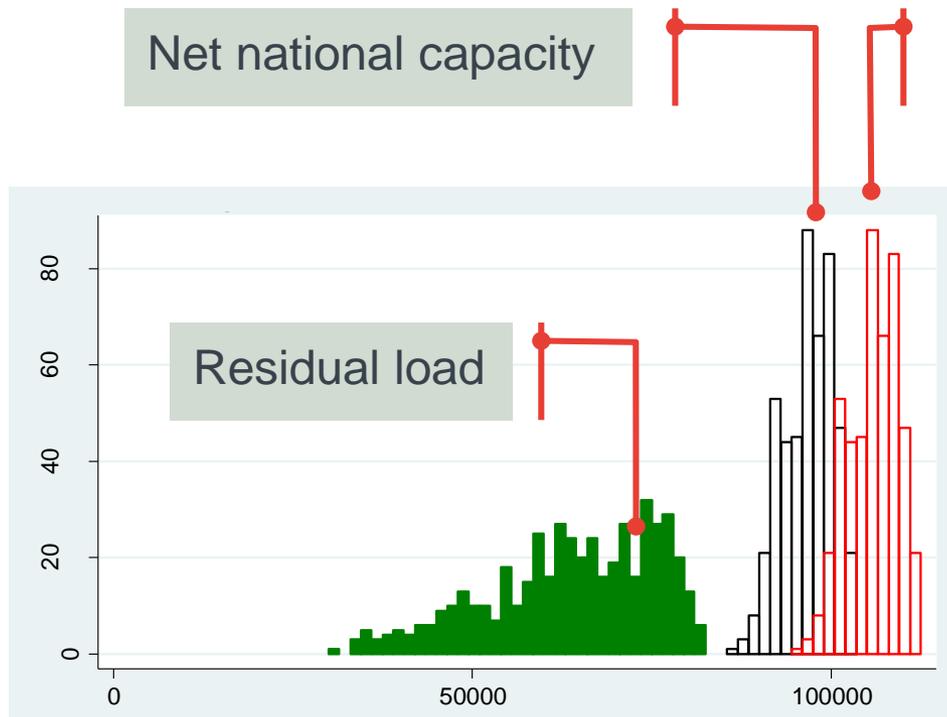
Different standards between regions may be more of an issue?

# Converting any security standard to MW will require some subjective judgements...



- Evolution of demand out to T+4
- Definition of peak (e.g. ACS) given security standard
- Rate of RES build out
- Technology mix
- Evolution of reliability
- Plant retirements
- Hydro

# ... with even more complexity moving to the regional level...



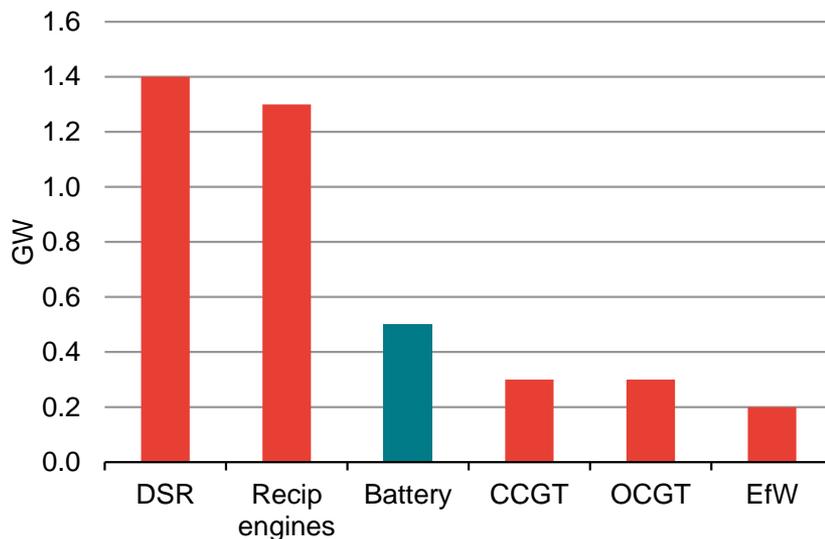
Net capacity with interconnectors

- Correlation of variables across jurisdictions – esp.
  - Demand
  - RES
- Availability of interconnections

# ... and including new technologies

200MW of battery capacity secured  
Enhanced Frequency response  
contracts with National Grid

500MW of batteries secured capacity  
agreements



- Is 1MW of generation the same as 1MW of battery storage?
- What if it is not charged in stress conditions?
- What about if it has low storage capacity (MWh)?
- (All comes down to CRM penalty regime – is it worth investors “taking the risk”?)

# Market failure cannot just be judged nationally

Range of  
(national)  
reasons for  
market failure...

- Market failure would lead to an energy only market not delivering a secure system
  - Inability to express willingness to pay
  - Perceived threat of regulatory intervention in pricing
  - Non-market driven supply uncertainty (e.g. RES build out)
  - Inefficient price formation (e.g. non-marginal scarcity pricing, failure to consider impact of reserve)

...but also risk of  
regional  
“contagion”

- Consider two well interconnected countries
  - In one, government is *laissez faire*, clear on RES interventions, and supportive of investment climate
  - In the second, government investigates price spikes, often changes RES support policy, and is not investment friendly
- Prices in the first can, if interconnection is uncongested, materially influence the price in the second
- So the “badly behaved” country can increase the risk of market failure in the region

# Whatever the “mechanism”, regional design considerations are important

Harmonising EOMs to ensure efficient energy pricing

- Intraday markets & coupling
- DSM
- Imbalance pricing (c.f. Winter package)
- Accounting for reserve / scarcity pricing?

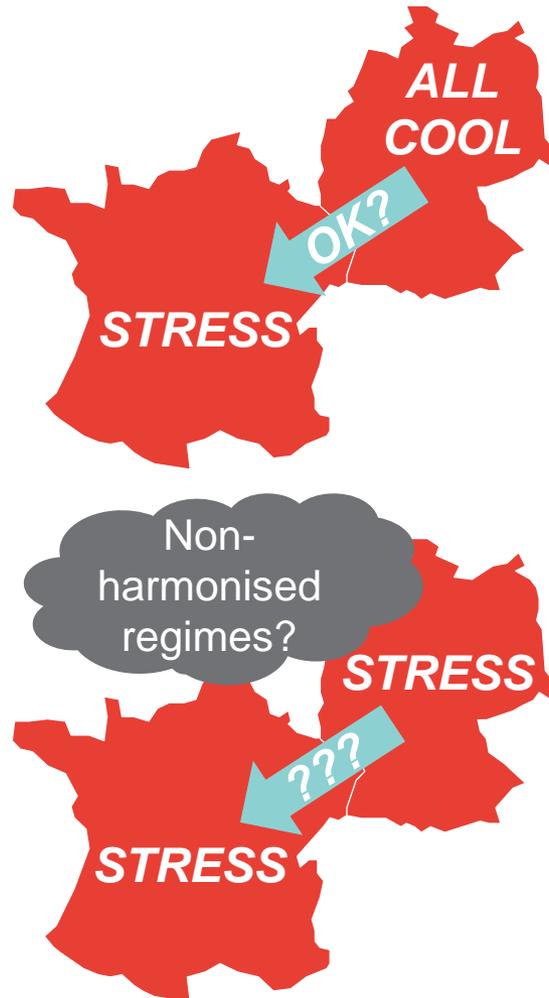
With CRMs, the x-border participation issues are becoming well understood...

- Derating & coincident stress
  - Generator vs. interconnector
  - Availability vs. delivery
  - Harmonisation of critical details (e.g. penalties)
- ... though the feasibility of an efficient regional outcome from “coupled” mechanisms has yet to be tested**

... issues around free riding have been debated less

- Different security standards (or countries which diversify)
- CRM vs. EOM
- Harmonisation differences

# Regional adequacy implies obligations for nations to stand together



## **Article 14** *Cooperation and assistance*

- Member States shall act and cooperate in a spirit of solidarity in order to prevent and manage electricity crisis situations, with a view to ensuring that electricity is delivered where it is most needed with a view to protecting public safety and personal security.
- Where necessary and possible Member States shall offer each other assistance to prevent or mitigate an electricity crisis. Such assistance shall be subject to compensation.



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