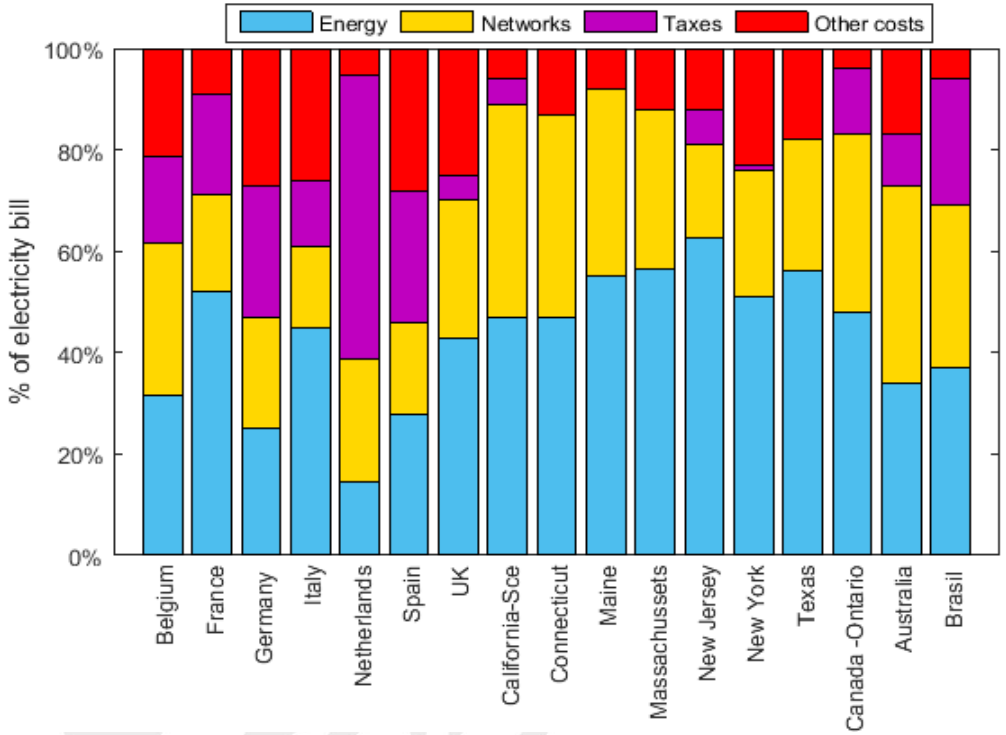
How to recover fixed costs of network infrastructure ?

Setting the scene

Tomás Gómez
tomas.gomez@comillas.edu

CEER Workshop on Emerging Issues in Network Tariffs
Brussels, 19 October 2018

Policy costs & network costs are an important part of the electricity bill in many jurisdictions.

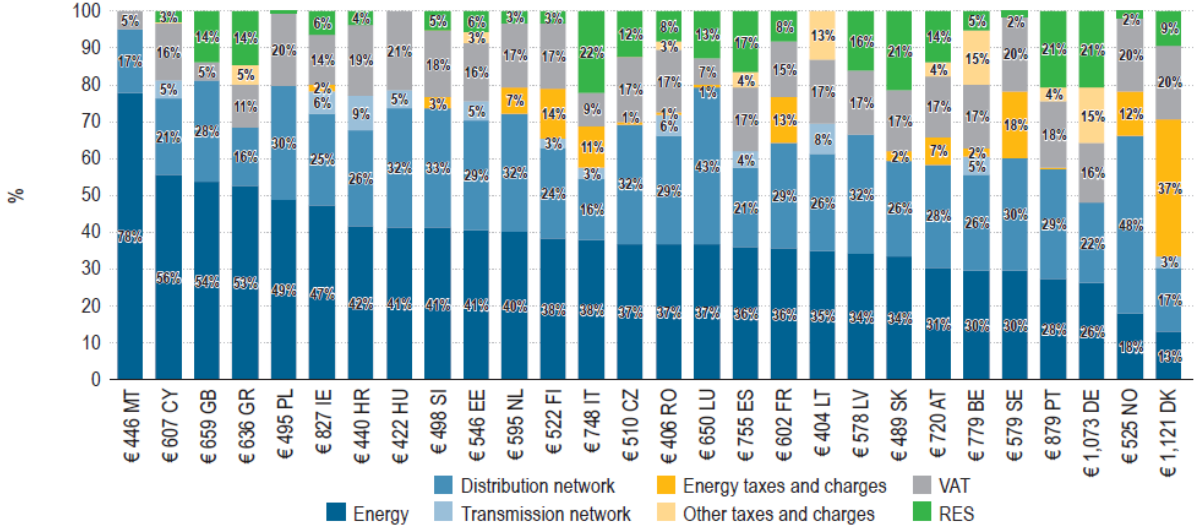


Breakdown of residential electricity bills in different jurisdictions in 2014-2015

Source: MIT Utility of the Future

Breakdown of households electricity retail prices

Figure 9: POTP electricity breakdown of incumbents' standard offers for households in EU capital cities – November–December 2016 (%)



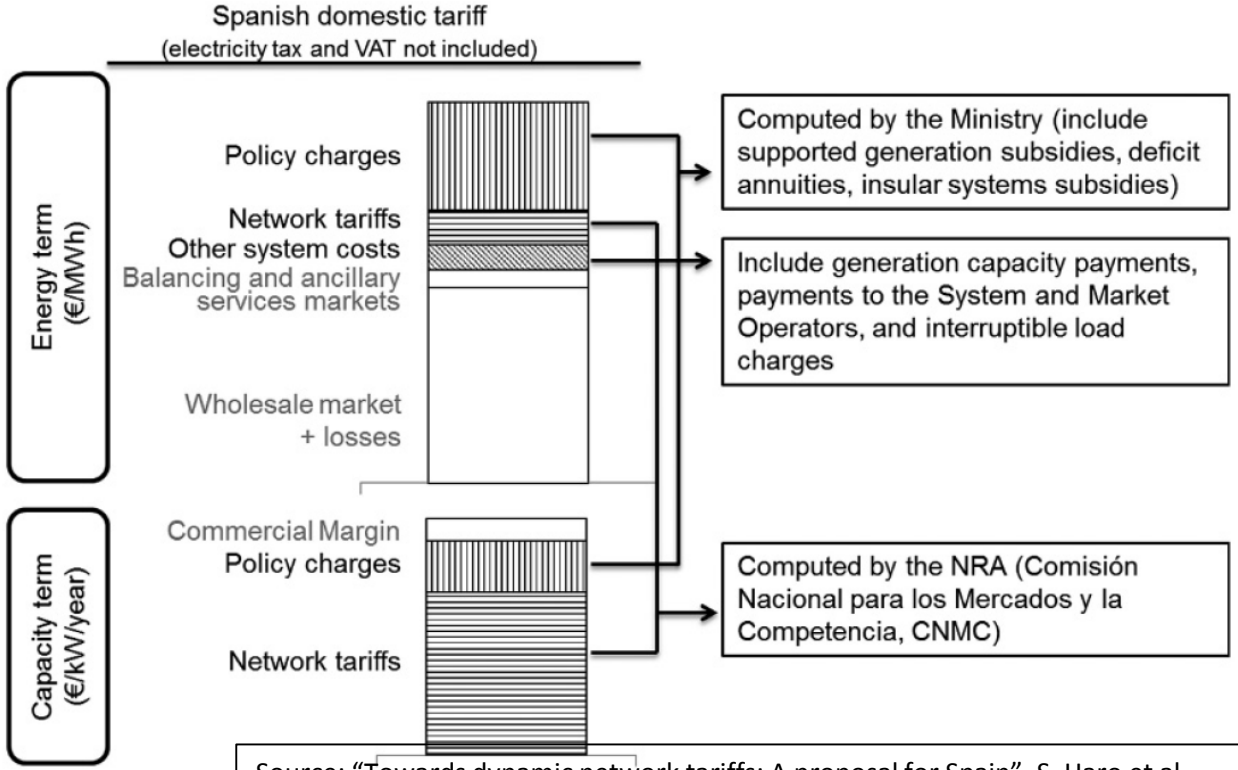
Source: ACER calculations based on price comparison tools (PCTs), incumbent suppliers' websites and NRAs, collected via AREA[18] (2017).

Note: The breakdown for Germany refers to the national average, instead of the standard incumbent offer, which is collected by the German NRA. The NRA of Bulgaria did not provide the required data for calculating the electricity price breakdown for 2016.

Source: ACER/CEER Market Monitoring Report 2016

How electricity costs are recovered differs from country to country

Residential tariffs in Spain



Source: "Towards dynamic network tariffs: A proposal for Spain", S. Haro et al. Ch. 12 in Innovation and disruption at the grid´s edge, Ed. F. Sioshansi, Elsevier, 2017

Active consumers are reacting to reduce electricity bills

Investment and operation of Distributed Energy Resources

- **Active consumers**: Consumption, generation & storage including flexibility
- **Self-generation &/or energy efficiency** reduce volumetric payments (avoid recovery of fixed network and policy costs – cross-subsidies)
- **Local energy communities** reduce contracted power payments (similar)
- **Flat constant tariffs** do not incentivize efficient flexibility: storage, demand response
- **Distorted competition** between centralized and distributed resources

European legislative context

- Clean Energy Package:
  - *Proposal for a Directive on the promotion of the use of energy from renewable sources*

    Art.21-22 : promotion of renewable **self-consumers** without being subject to disproportionate procedures and **charges that are not cost-reflective**, including energy communities
  - *Proposal for a Directive on common rules for the internal market in electricity*

    Art.15 Active consumers entitled to generate, store, consume and sell self-generated electricity

    Art.16 Local energy communities are subject to fair, proportionate and transparent procedures and **cost reflective charges**
  - *Proposal for a Regulation on the internal market for electricity*

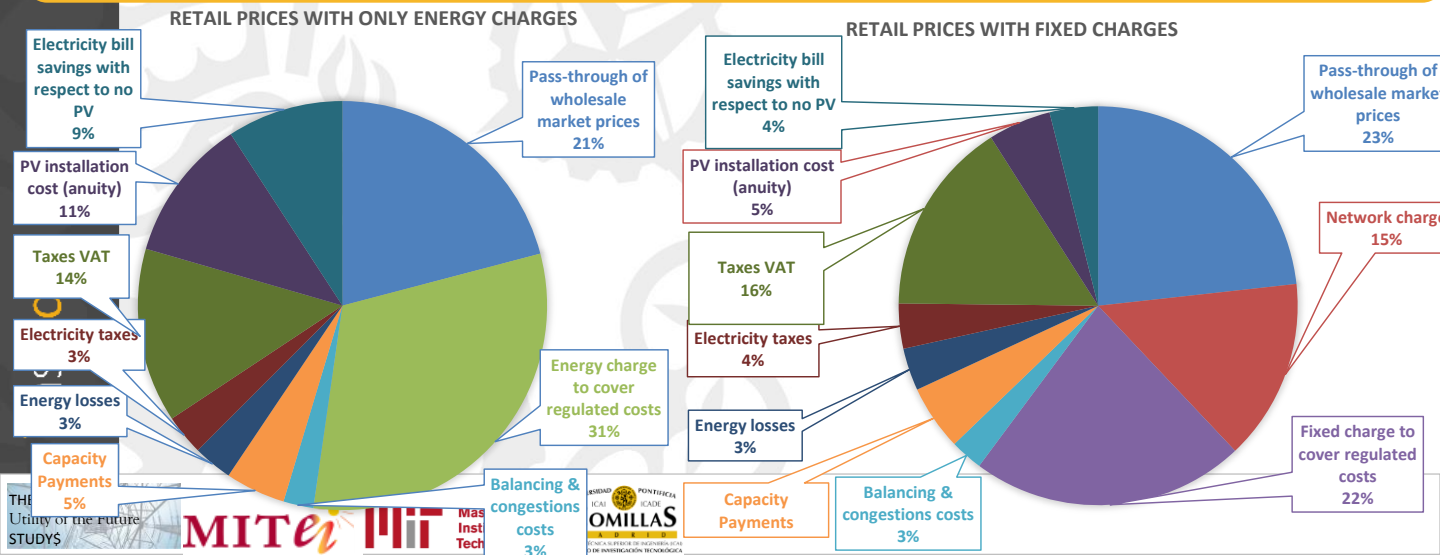
    Art.16: **Distribution tariffs** shall reflect the cost of use of the distribution network by system users including active customers, and may be differentiated based on **system users' consumption or generation profiles**. With **smart metering** systems, regulatory authorities may introduce **time differentiated network tariffs**, reflecting the use of the network, in a transparent and foreseeable way for the consumer

- CEER papers:
  - *CEER (2017). Electricity Distribution Network Tariffs. CEER Guidelines of Good Practice*
  - *CEER (2017). Distribution and Transmission Network Tariffs and Incentives. CEER White Paper series on the European Commission's Clean Energy Proposals*
  - *CEER (2016). CEER Position Paper on Renewable Energy Self-Generation*

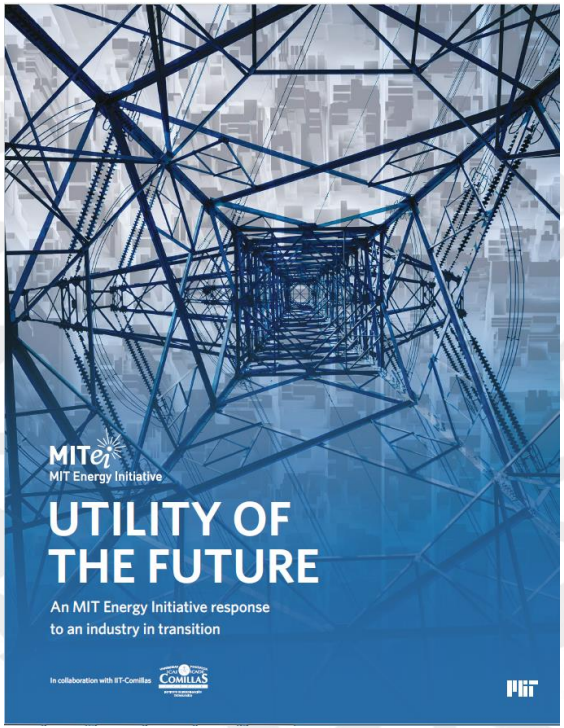
Electricity costs with PV self-generation (Spanish case)

Case studies	Wholesale market Prices (€/kWh)	Network charge (€/kW/year)	Energy fixed charge (€/kWh)	Capacity Payments (€/kWh)	Balancing and Congestions (€/kWh)	Fixed charge (€/year)	Losses (% of wholesale market prices)	PV Installed (kW)
Fixed charge	Hourly values	37,56	-	0,01	0,005	5068	15%	8,16
Only energy charge	Hourly values	-	0,066	0,01	0,005	-	15%	19,22

The optimal PV size for the consumer depends on the terms in the electricity bill. High volumetric charges (€/kWh) incentivize higher sizes of PV despite that is not the efficient solution for the system



The Utility of the Future study proposes recommendations for efficient design of prices and charges

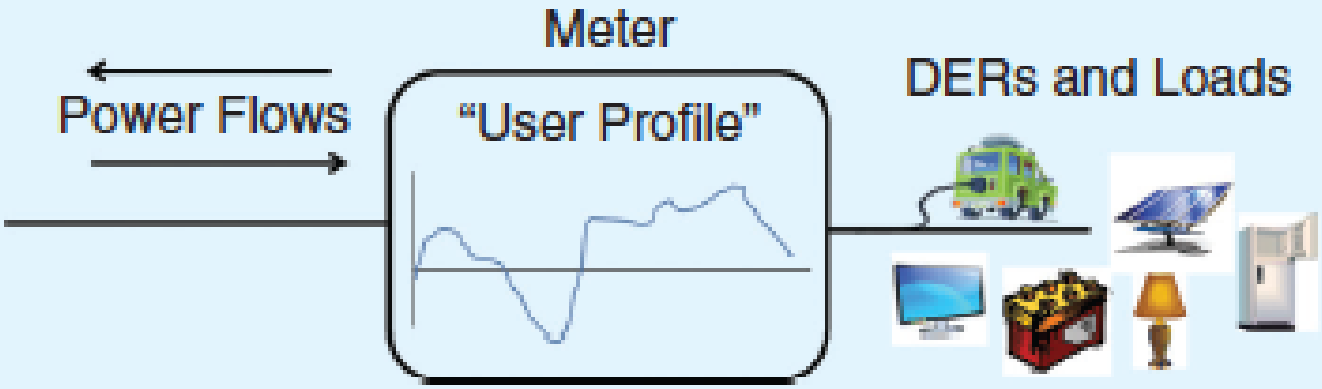


- An important **evolution in the provision and consumption of electricity services** is now under way, driven by a confluence of factors affecting the **distribution side** of the power sector
- **Distributed technologies** — *including flexible demand, distributed generation, energy storage, and advanced power electronics and control devices that are enabled by information & communication technologies* — are creating **new options for the provision and consumption of electricity services**

Create a comprehensive and efficient system of prices and charges

Any cost-reflective component of prices & charges should be exclusively based on the individual **injection & withdrawal profiles** at the **network connection point** & should be **symmetrical**.

This requires the use of **advanced smart meters**



Source: MIT Utility of the Future

Efficient prices and charges

Increase the **locational component** of prices and charges

Apply forward-looking **peak-coincident capacity network charges**

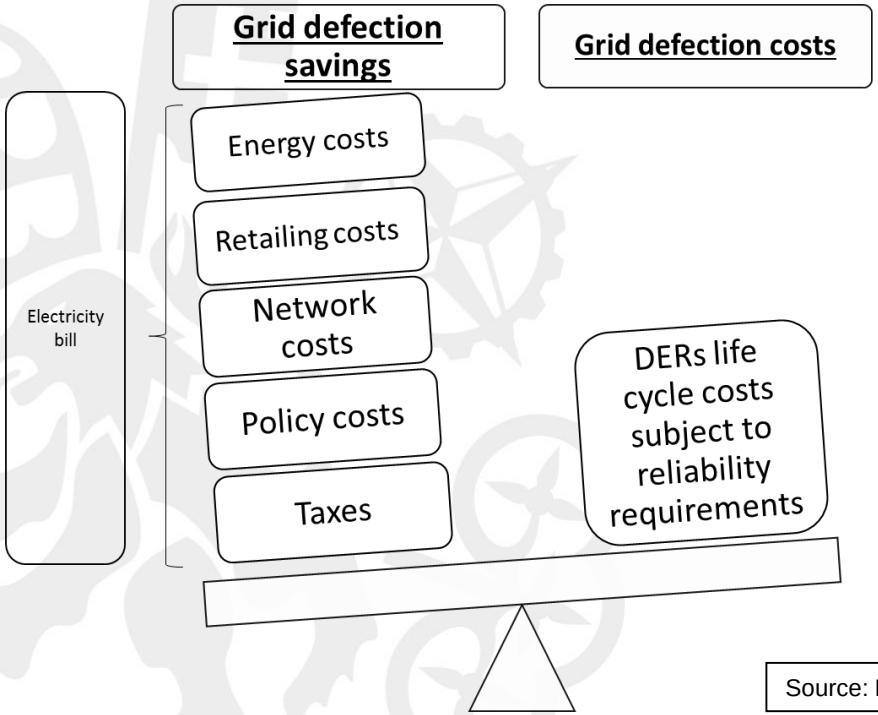
Collect **policy and residual network costs** in a minimally distortive way

Ensure **time differentiation** in energy prices

To avoid inefficient **grid defection** reconsider which costs are included in the electricity tariff

Depending on the seriousness of the **threat of grid defection**, which costs are included in the electricity tariff must be carefully considered.

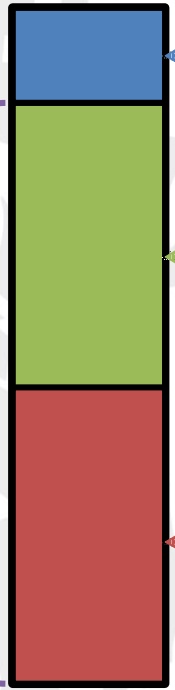
That is also relevant for **competition between end-use fuels** (electricity, gas, oil) under decarbonization



Source: MIT Utility of the Future

Network cost recovery

- **Network charges**



DLMP Surplus

DLMPs can be used to price energy consumption/ injection at each node.

The surplus would be used to partially recover part of the network costs (implicit in energy charge €/kWh)

Incremental Network Cost (INC)

Forward-looking peak-coincident charges

Allocate to network users following cost-causality principle

€/ kW (at critical hours)

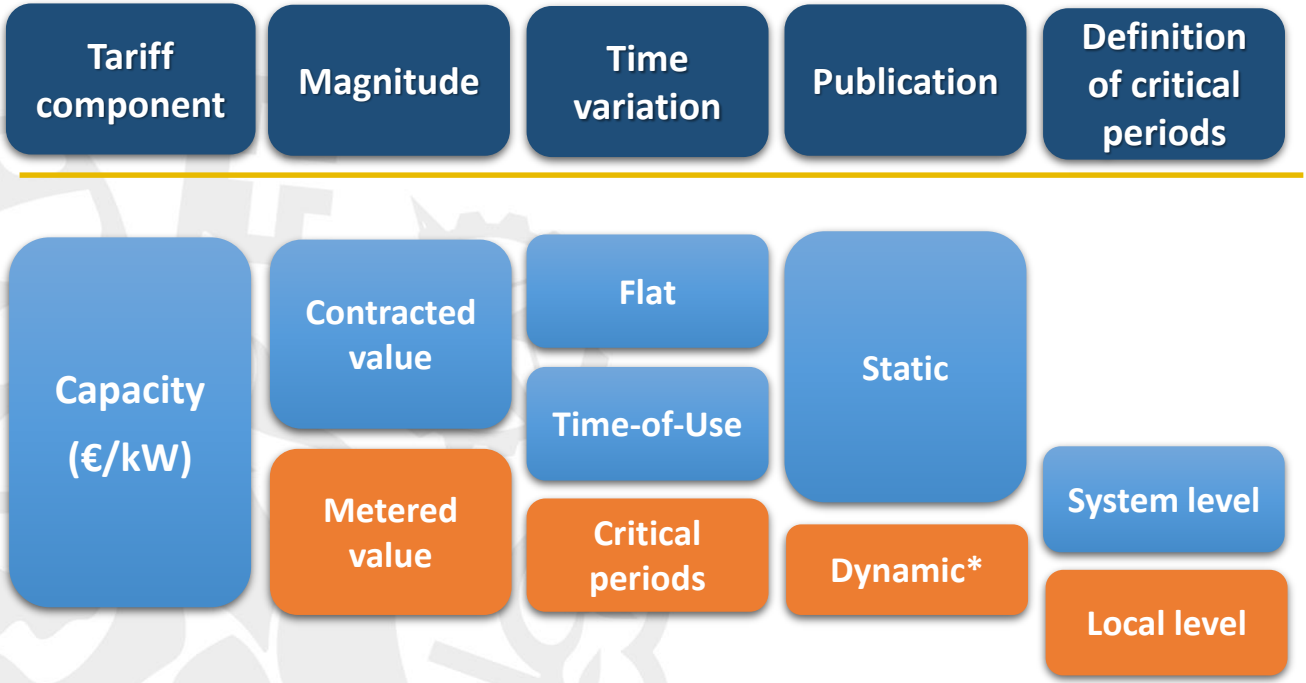
Total Remaining Network Cost (TRNC)

Fixed Residual Network Cost (RNC)

Allocate to network users following some "Ramsey-like" approach

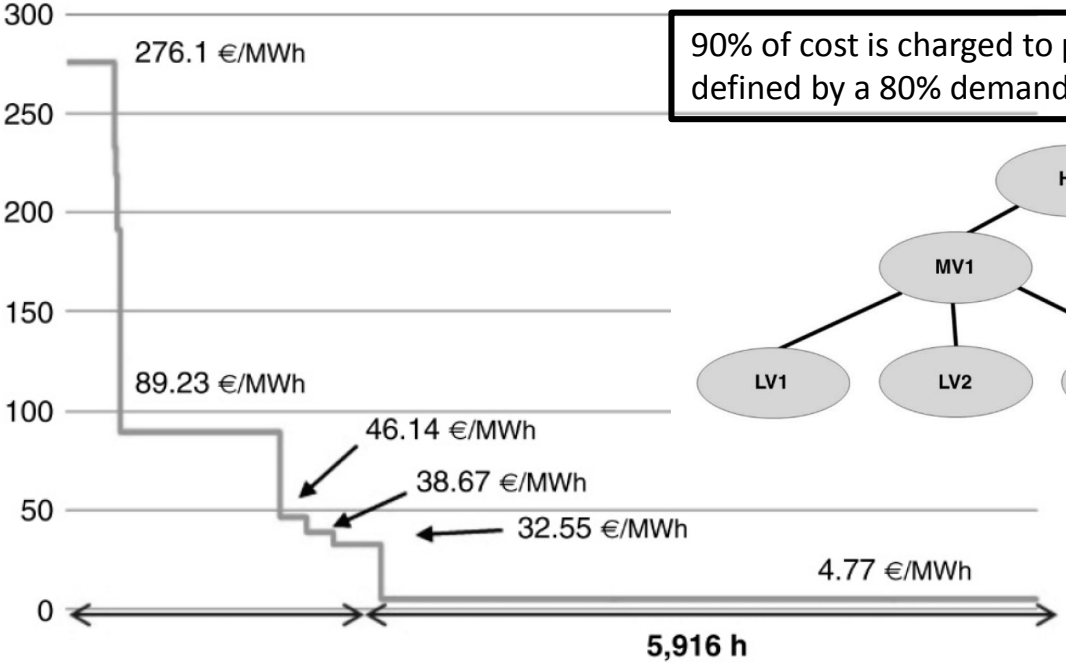
€/ Network User

Options to design peak network charges (recovery of incremental network costs)



*Some information/criteria notified ex-ante

Cost-reflective peak coincident network charges (LV consumer)

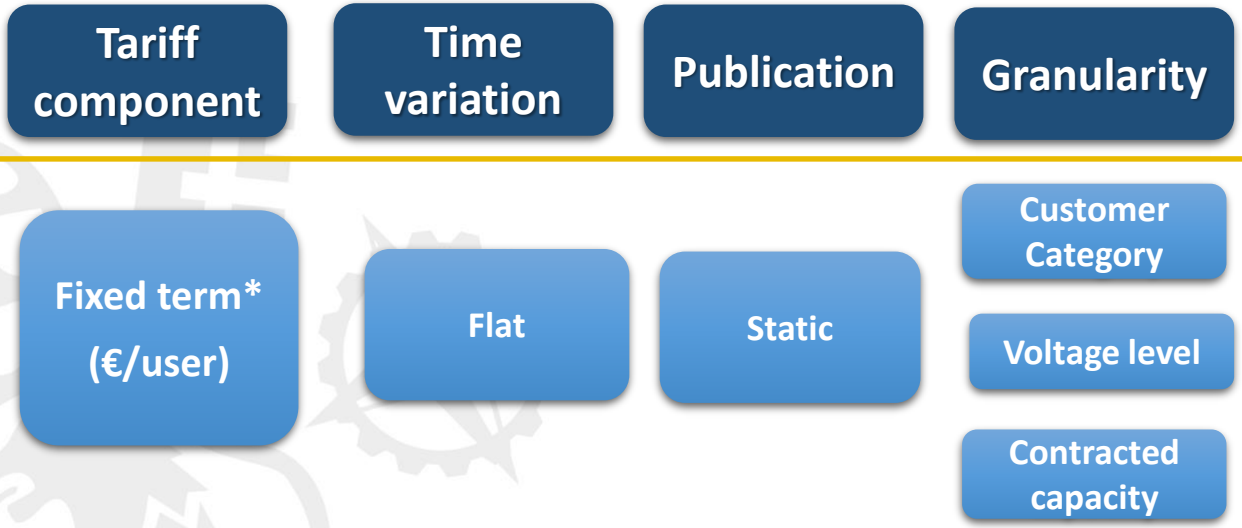


90% of cost is charged to peak hours defined by a 80% demand threshold

Source: "Towards dynamic network tariffs: A proposal for Spain", S. Haro et al. Ch. 12 in Innovation and disruption at the grid´s edge

Options to design fixed network charges

(recovery of fixed residual network costs -Ramsey proxies)



*To avoid distortion of energy prices and cost-reflective peak network charges. This charge should not be reduced by installing generation or storage behind the meter.

Questions for the panel

- What are the **pros and cons** to move from **volumetric** charges to **fixed or peak-coincident** charges to recover network costs in a context of more self-production and local energy communities? Is this transition really needed and how fast should be implemented?
- How regulators can determine what portion of the total network costs should be recovered by **dynamic network charges** (incremental costs) and what other by fixed charges (fixed residual costs)?
- How to apply the Ramsey principle to allocate fixed charges among different customer categories ? What are the best proxies for customer size: **Contracted powe**r or **installation size** in kW, **property tax** or value?
- How relevant is to recover incremental network costs through **time-of-use** or **dynamic** charges using **smart meters** for residential consumers ? What is the level of time and locational granularity needed? Pros and cons of ex-ante or ex-post critical use periods?
- What level of harmonization is needed to share **common guidelines** in network tariff design and allocation of policy costs among different energy uses (electricity, gas and oil)? Should the recovery of **policy costs** be a responsibility of regulators? How much of the policy costs should kept in the **electricity bill** or allocated to **taxpayers**?

Thank you for your attention !!!

Instituto de Investigación Tecnológica
Santa Cruz de Marcenado, 26
28015 Madrid
Tel +34 91 542 28 00
Fax + 34 91 542 31 76
info@iit.comillas.edu