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Report on Electricity Transmission and Distribution Tariff Methodologies in Europe

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Agenda

- **EU legal provisions and ACER role regarding electricity network tariffs**
- **Process and general principles of tariff setting**
- **National practices on various network tariff aspects**

  Including: cost models, cost cascading, withdrawal charges, injection charges, emerging network users, time-of-use tariffs, reactive energy charges, connection charges

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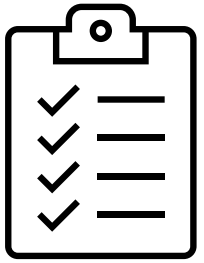
EU legal provisions

Binding harmonisation of electricity network tariff structures is NOT foreseen

- No network code, but several existing EU legal provisions:
  - National regulatory authorities' (NRAs) role in tariff setting
  - Tariff setting principles
  - Net metering and double-charging
  - Price signals to network users
  - Unrelated policy costs
  - Cap on annual average transmission charges for generators



Note: the list is not exhaustive

ACER's role

Focus is on increasing transparency and comparability in tariff-setting and identifying and sharing best practices

- ACER shall issue at least every 2 years a best practices report
- NRAs shall duly take the report into consideration

Latest ACER report on transmission and distribution tariff methodologies (Jan. 2023) is available at its website: https://www.acer.europa.eu/en/Electricity/Infrastructure_and_network%20development/Pages/Tariffs.aspx

Cf. Article 18 of Regulation (EU) 2019/943

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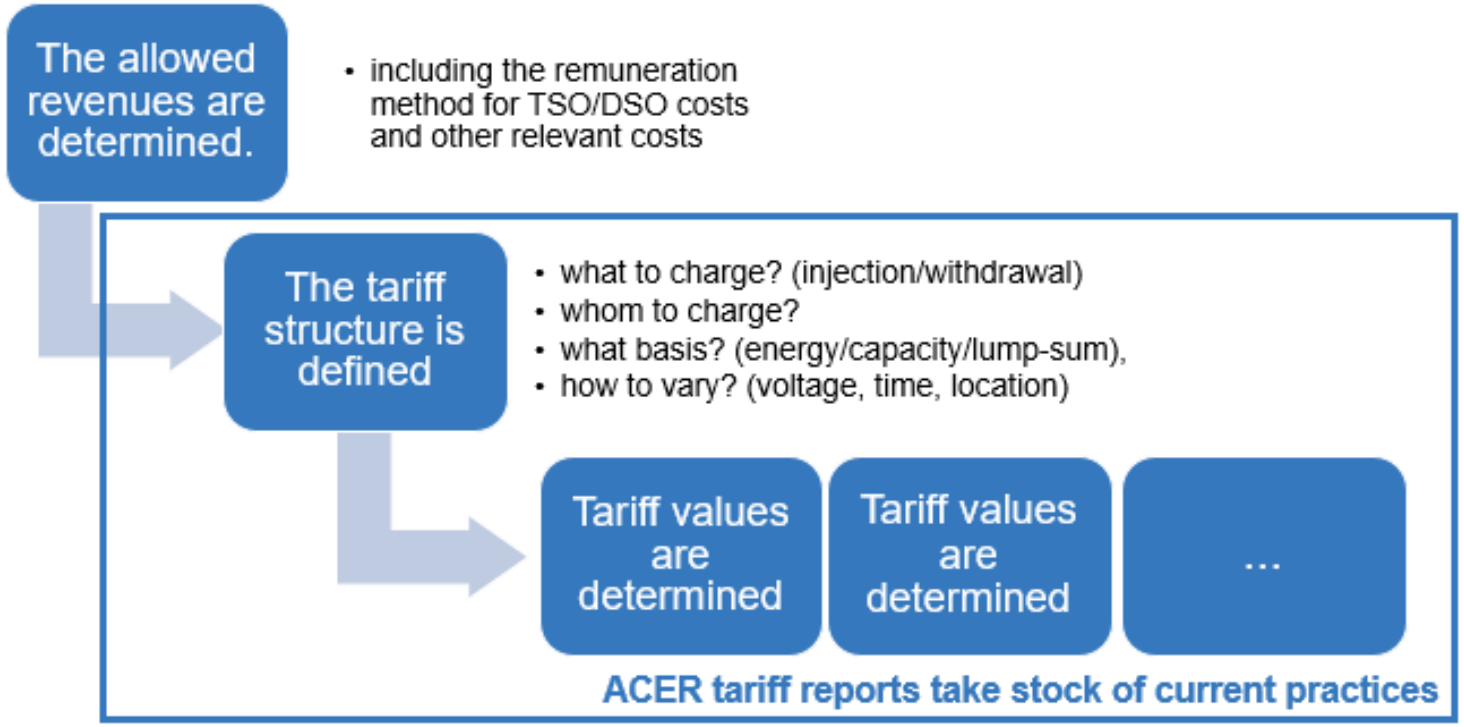
Subject matter of the past ACER tariff reports

Network tariff setting is a 3-step process

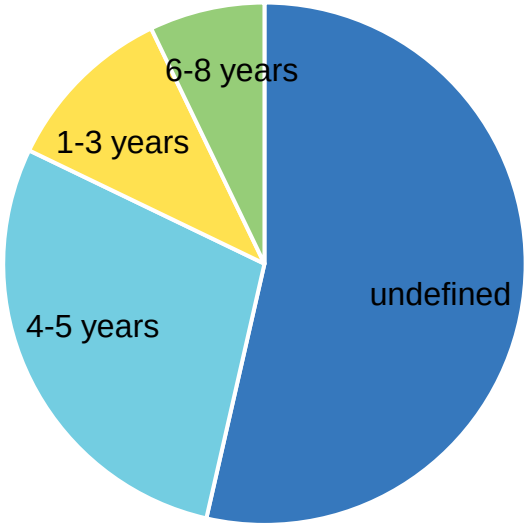


The term “tariff” in the ACER report refers to the regulated component of the final electricity bill, which is paid for “transmission / distribution costs”

Revision of tariff methodologies

Tariff stability appeared as a key objective so far. Energy transition triggered several ongoing and planned changes.

- Most NRAs set or approve the tariff methodologies for a fixed multi-year period
- NRAs usually consult the public or (at least) specific stakeholders



Frequency of setting distribution tariffs (2023)

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Some general recommendations regarding the tariff setting process

ACER Recommendation

- *(In light of the benefits of multi-year tariff methodologies), set the tariff methodology period at least for 4 years (revision possible before due to rapid changes in the sector).*
- *Update network tariff values at least yearly based on variations of the drivers defined ex-ante*
- *Apply a multi-year transition process when significant impact for individual grid users*
- *Use public consultations systematically to interact with stakeholders*

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Trade-off in tariff setting principles

Tariff setting aims at recovering the costs incurred by a monopolistic system operator, while pursuing efficiency and other objectives

- Cost recovery is the core objective
- Efficiency mainly relates to cost-reflectivity and the economic signals sent to the network user
- Other principles, such as non-discrimination, transparency, non-distortion, simplicity, stability, predictability and sustainability, are also pursued, but **difficult to meet all the principles simultaneously and fully.**

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Findings on tariff structures and related costs

Variety in tariff structures across the Member States makes the comparison of network tariffs a difficult task and risks of being misleading

ACER identifies the following distinct elements of TSO/DSO charges:

- Building, upgrading, maintaining infrastructure
- Grid losses
- System services
- Metering
- Reactive energy charges

Use-of-network charges

- **Connection charges** (or charges for the upgrade of the connection)
- **Charges for user's requested individual services**

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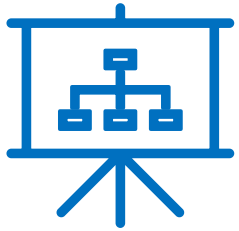
Recommendations on tariff structures and related costs

ACER Recommendation

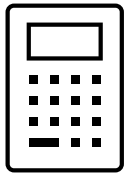
- *Differentiate the network costs according to the different categories proposed by ACER*
- *Identify for each of these cost categories the most appropriate cost drivers;*
- *Obtain sufficiently granular data on network development and system operation*
- *Provide transparency on tariff structure, cost amounts recovered by each tariff element and the network tariff values for each network user group*



Cost model

In most Member States an “average cost model” is used to determine the tariff values despite the economic theory suggests otherwise

- Incremental or forward-looking cost models can better signal the true cost of using the network, if the residual cost is recovered in a non-distortive way.
- Information on the effectiveness / impact of these cost models in national contexts, their risks and barriers is often missing.



ACER Recommendation

➢ *Evaluate the advantages and disadvantages of the different models and consult the results with stakeholders*

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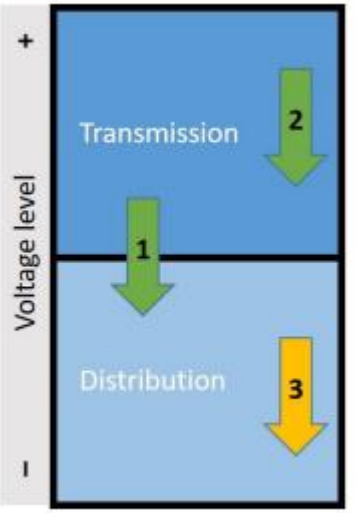
Cost cascading

"Top-down" cost-cascading is applied in the Member States

- Mainly from transmission to distribution (more than 90% of the costs) and inside distribution.
- Lack of cost differentiation per voltage level is a barrier
- Non-cascaded costs and exemptions exist
- Inverted power flows → reverse cost cascading?



Forms of cost-cascading*

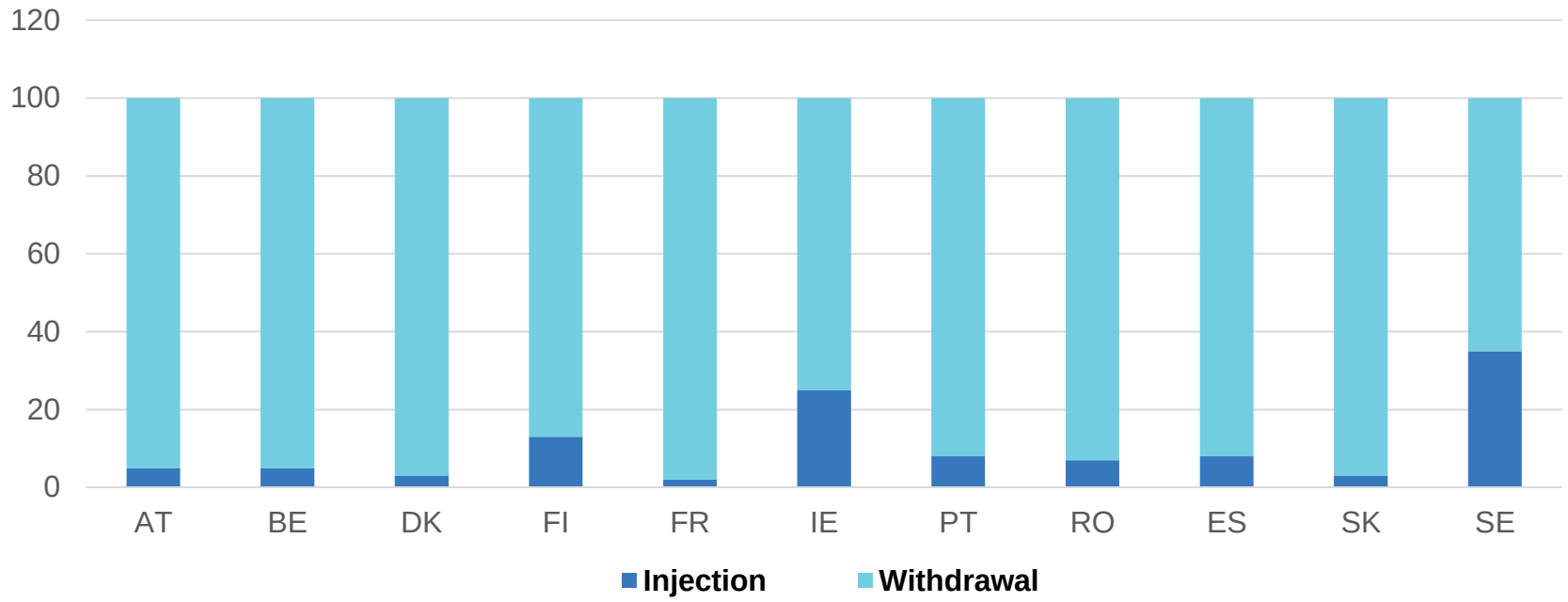
ACER Recommendation

- *Ensure that network users contribute to the costs of each network level used by them*
- *Collect data on network costs, power flows, volume of injection/withdrawal (where feasible and adequate, per voltage level), to determine whether cost-cascading is still an adequate approach*
- *Ensure transparency on non-cascaded costs and the economic rationale behind. Justify and re-evaluate any exemptions*

*1 – from transmission to distribution,
2 – from higher transmission voltage level to lower transmission voltage level,
3 – from higher distribution voltage level to lower distribution voltage level

Split of costs between injection and withdrawal

The recovery of system operators' costs is based heavily on withdrawal charges. The method to split the costs between injection and withdrawal takes various forms.



Generation/Load split for transmission costs (ACER tariff report, 2019)

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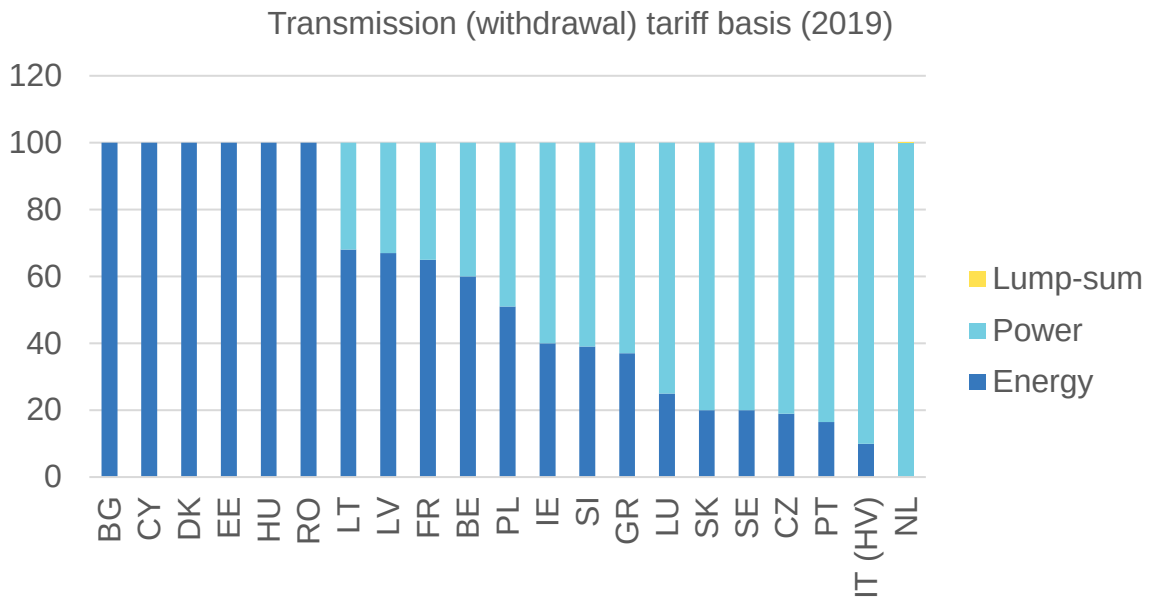
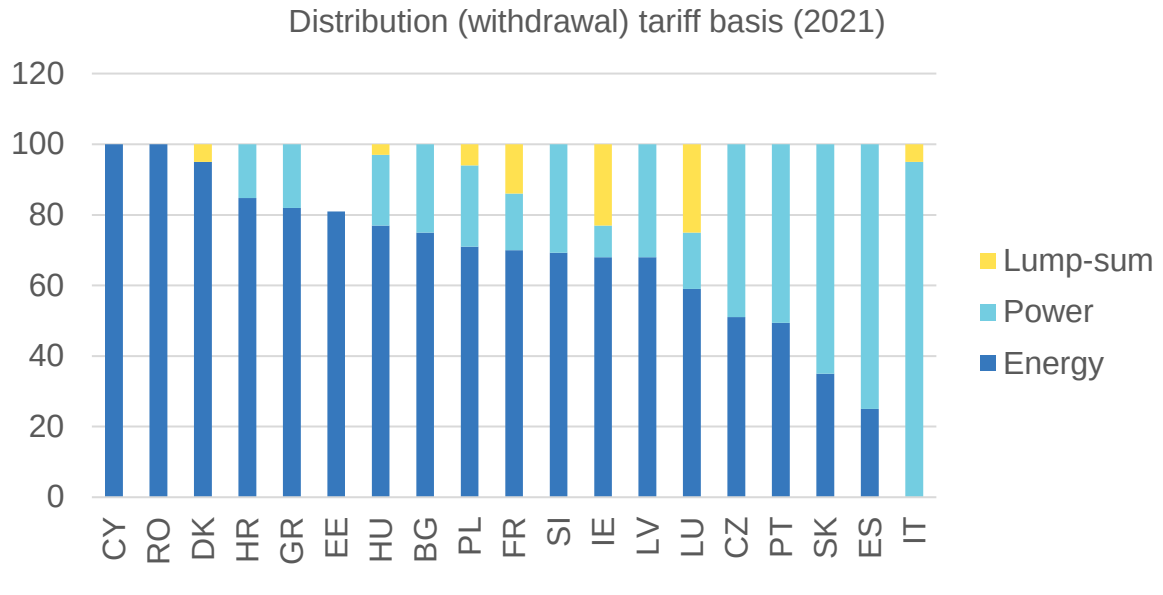
Withdrawal charges

Most Member States apply a combined tariff basis. Gradual move to increasingly power-based tariffs is appropriate.





Typical tariff variation is based on voltage level and time of use. Locational signals are very rare

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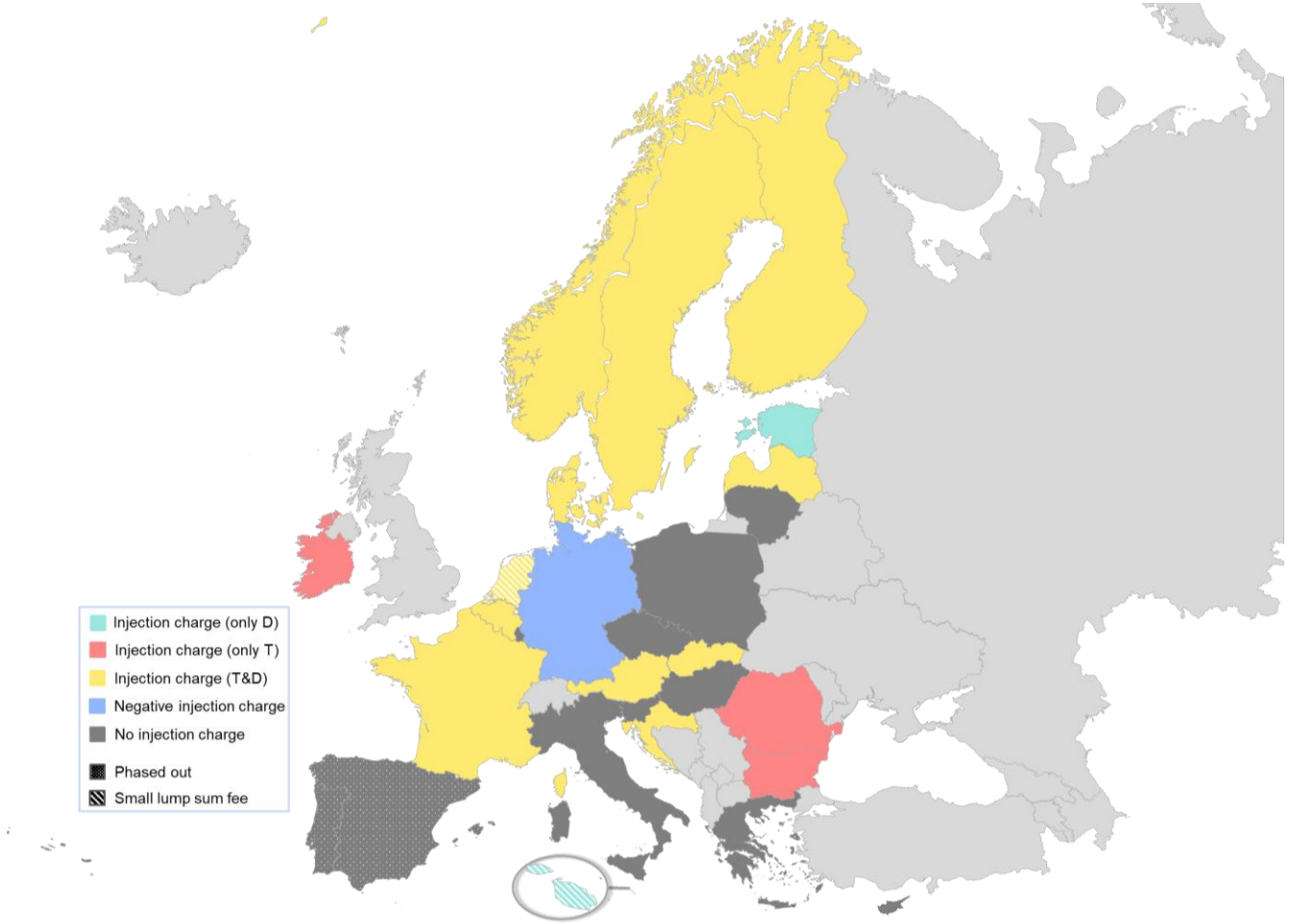
Findings on injection charges

About half of the Member States apply some network charges related to injection



- Other payments by producers
- Variety of recovered costs
- Tariff basis correlation with cost driver
- Some variations per voltage level and based on location
- Exemptions and discounts often apply
- Negative injection charge in Germany

Note: In France (in distribution), Malta and the Netherlands, the respective charge is only a small lump sum fee for metering, administrative and/or management costs. In Belgium, injection charge in distribution applies only in Flanders and Wallonia regions, but not in Brussels region.

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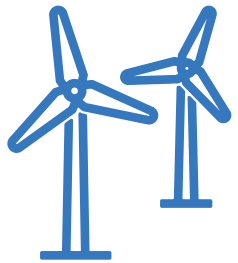
Recommendations on injection charges

ACER Recommendation

- *Don't use energy-based charges to recover infrastructure costs. Energy-based charges can provide efficient signals for recovering the costs of losses and system services. Recover costs, which do not show correlation with neither capacity nor energy, via lump sum charges*
- *Injection charges should be consistently defined across transmission and distribution to avoid undue incentives for connection towards one of the network levels*
- *All network-related cost-burdens on the concerned network users should be considered, to avoid any double-charging*
- *Consult neighbouring NRAs before substantial change*



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Charges for network users who both inject and withdraw

Storage facilities and prosumers both use the grid in both directions, but they have different nature and role in the system

Storage facilities

- Balanced profile of injection and withdrawal
- Typically pay for withdrawal, often also for injection, where such charge applies
- In some instances, exemption from both charges for all or some users

Prosumers

- Final energy users
- Typically pay for withdrawal, often also for injection, where such charge applies
- No general exemption, but often net metering / partial exemptions for some users

ACER Recommendation

- *Properly reflect the costs caused by a network user in its tariffs:*
  - *if only withdraws/injects, reflect only the costs relevant for withdrawal/injection;*
  - *if both withdraws and injects, reflect both costs, accounting for potential cost-offsetting and overall network impact*

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Energy transition & Emerging network users

Emerging network users have gained attention for their potential to improve overall system efficiency

- Some Member States implemented specific measures → require closer focus in future tariff work

Power-to-X:
- Exemption from withdrawal charges for 15 years (AT).

EV-charging points:
- Specific tariff for public EV recharging points (SK)
- Different tariff structure or weight of components (IT, PT, ES)
- Off-peak withdrawal charge for EV recharging (CZ, MT)
- DSO interruption in case of network congestion (CZ)
- Increase of “technically available capacity” for private EV charging (IT - experimental initiative)
- Vehicle-to-grid (PT - pilot project in Azores).

Energy Communities:
- A specific tariff regime (PT)
- Reduced system utilisation charges (AT)
- Exemption for RES produced and consumed within (LU)
- Tariff exemptions for a limited duration (BE-Brussels region - pilot projects)

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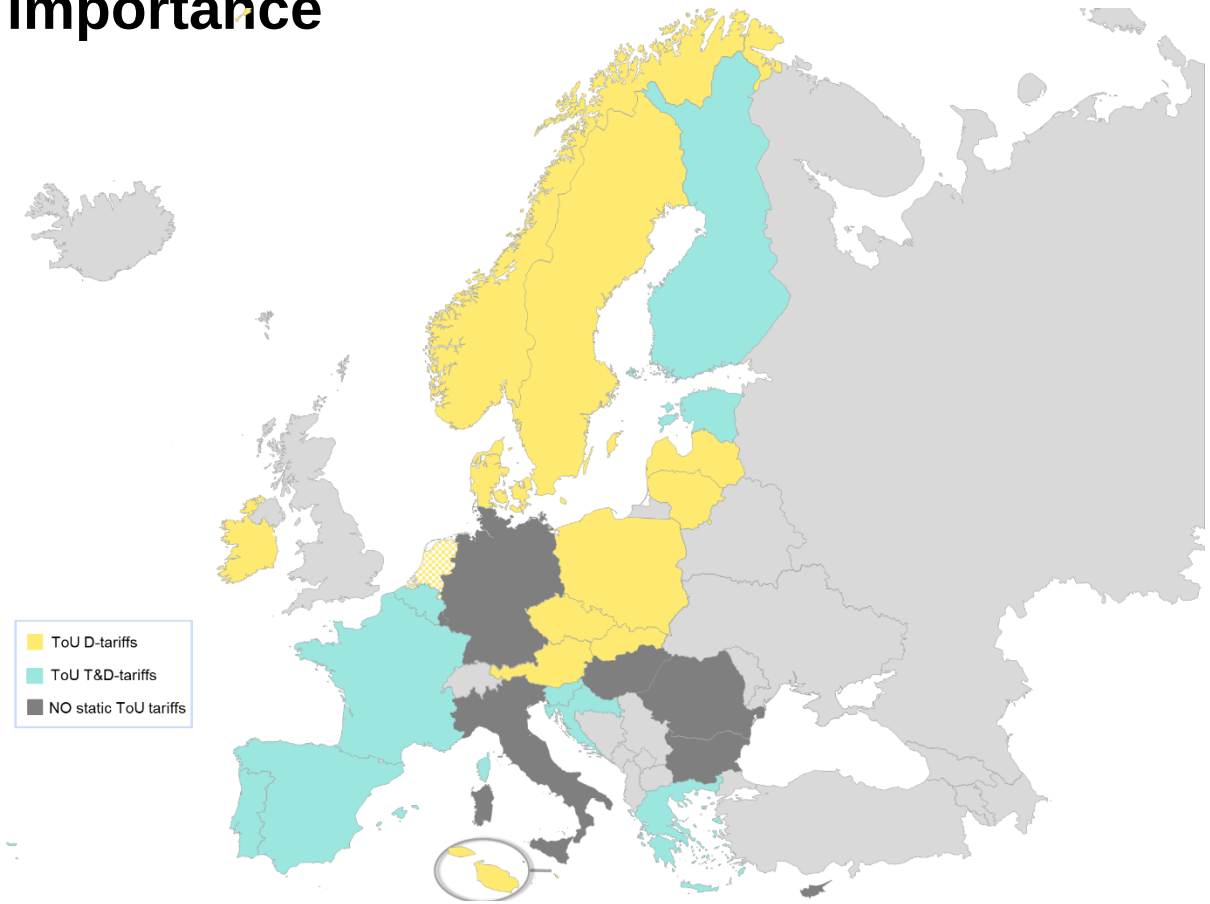
Findings on time-of-use signals

Time-of-use is widely used in the EU, mainly in distribution, and gains a higher importance



- Tool for reducing system peak-load, but effectiveness depends on multiple factors
- Peak/off-peak tariffs often coexist with other signals (weekend, season).
- Mostly embedded in the energy-based tariff component.
- Static vs. dynamic tariffs
- Alternatives and complements

Note: In the Netherlands time-of-use distribution tariffs apply, but to a very limited extent. Dynamic tariffs or market-based elements in network charging only in France, Norway and Sweden

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Recommendations on time-of-use signals

ACER Recommendation

- *Investigate the need to introduce time-of-use signals and regularly evaluate their impacts and appropriateness (require improved data collection and analysis regarding individual network users)*
- *Where required meters are largely missing, as a temporary solution, consider to design network tariffs by determining for different user profiles their contribution to the system peak*
- *Where time-of-use signals were introduced to reflect system costs, don't make them optional (except temporarily during transition)*

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Reactive energy charges

The costs related to controlling network voltages and managing reactive power increased over the last years in several Member States → increasing relevance for reactive energy charges

- More common at the distribution level than transmission (70% vs. 50%)
- Most apply it for both withdrawals and injections, some only for withdrawal (above a threshold)
- Frequent threshold for withdrawal: a power factor of 0.95, for injection: a power factor of 1
- Value range: 3-20 Euro/Mvarh. In few instances, differentiated by voltage level or time-of-use

ACER Recommendation

- *Monitor the evolution of costs due to voltage control and reactive energy management*
- *Where such costs are deemed significant, consider a review of reactive energy charging and the frequently used thresholds and values for reactive charging across Europe.*

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Connection charges

Great variety of one-off connection charges across Member States

- Mainly “shallow” or a mix of “deep” and “shallow”, few instances only “deep” (pros and cons)
- Cost driver: actual costs (typical in transmission) vs. pre-determined charges based on voltage level, capacity, distance (more common in distribution)
- Differences between network users / exemptions and discounts

ACER Recommendation

- *Where deep connection charges apply and the connection of a network user serves future network users, consider cost-sharing between current and future network users*
- *Evaluate the advantages and disadvantages of enabling interruptible or flexible connection agreements*

***Shallow charges:** grid users pay for the infrastructure connecting its installation to the transmission or distribution grid (line/cable and other necessary equipment); **Deep charges:** grid users pay for the shallow category plus all other reinforcements/extensions in existing network, required in the transmission or distribution grid to enable the grid user to be connected.

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Take-aways

- Network tariffs have the **core objective to recover the costs** incurred by system operators
- Finding balance between tariff-setting principles is a **complex task** and **involves trade-offs**
- Tariffs can be designed in multiple way and **regulators follow different approaches**
- No binding harmonisation for electricity network tariffs, but **sharing of best practices**
- ACER may identify **shortcoming in tariff practices** and make **recommendations**
- **Work to be continued…**

Thank you.
Any questions?

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