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Injection tariffs (G-Component)

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

Comprehensive Technical-Regulatory Advisory to enhance RE-based share in electricity grids of Western Balkans

March 2024

Western Balkans

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1. Introduction

This report discusses the economic and policy rationale for implementing injection charges (G-component). Fair cost allocation, cost recoverability, and reflectivity principles prevail.

Implementation of injection charges at the European and Energy Community level is summarised based on information reported in the: 1) ECRB Report on Electricity Transmission and Distribution Tariff Methodologies in the Energy Community, November 2023 and 2) the ACER Report on Electricity Transmission and Distribution Tariff Methodologies in Europe, January 2023.

2. Network charges

2.1. Basic principles for setting network charges

A vital element of an open, liberalised market is the Third-Party Access principle, which allows third parties, on both the generation and consumption sides, to connect and use the transmission and distribution systems. These systems are considered natural monopolies, and competition does not improve economic efficiency.

Third-party access regime includes two main elements: a) the ability to connect and use the network, for which users should pay the operators an installation and an operation cost (network charges), and b) the ability to participate in procedures for the scheduling of the use of the systems (dispatching schedule), which in open markets are connected with the operation of organised markets for that purpose.

The first element, the cost of connecting and the ability to use the system, includes the costs related to equipment and labour for the physical connection of the users to the Networks, which include:

a) The cost of connection, which includes all equipment and labour for the user's direct connection to the network, mainly refers to the equipment that will only be used by the specific users for its connection to the grid. Some regulators sometimes implement a “cost-sharing scheme” in which a new user can use existing connection infrastructure and pay a “participation fee” to the user that has already constructed this infrastructure or its use. The operator allows the new entrant to use the same infrastructure to improve the efficiency of the existing infrastructure.

b) The cost of expansions (or reinforcements) needed to increase the capacity of the existing system to connect new generating or consumption points to the grid. In many jurisdictions, these expansion costs are taken by the Grid and Network operators and socialised through the Network tariffs.

When Network Operators are designing the network charges that users need to pay for using the systems, they usually consider the following costs:

1. Infrastructure costs, which usually refer to the cost of expansion projects, are required for the strengthening of the system to serve increasing numbers of users from both generation and consumption sides.
2. Infrastructure costs related to the maintenance and replacement of existing equipment required for the efficient operation of the systems.
3. Operation costs related to the costs of services required to be purchased by the system, including ancillary services, balancing services, and others. For these services, the system operator can recover costs in alternative ways, e.g., through uplift accounts that charge system users directly rather than through network tariffs.
4. Costs related to energy purchases to cover network losses. In some jurisdictions, these costs are directly taken by the system users (i.e., suppliers and consumers), who must purchase the additional energy needed to cover network losses analogous to the energy transmitted and distributed to their end customers. In some other network

losses, the network operators manage costs; in these cases, energy purchase costs are recovered through network tariffs.

2.2. Tariff structure

The Network Charges tariff structure provides a two-part tariff, including a capacity and an energy component. The charges are calculated based on the network's installed or used capacity or the energy flown on the network.

The guiding principle for setting the structure of network tariffs is equity and treating different groups of users fairly. However, fairness has many interpretations, including economic, social, and implementation arguments.

A vital element of the methodology for structuring the network tariffs is allocating the cost to be recovered by the capacity and the energy component.

In many jurisdictions, cost reflectivity is the guiding principle for structuring network charges, promoting the efficient use and development of the grid. Tariffs are paid by network users designed to reflect the cost they impose on the system and give appropriate incentives to avoid future costs, applying variations of the Ramsey pricing principle.

According to the Ramsey Pricing principle, the postage stamp approach has been developed and is widely used to structure network tariffs, especially for recovering infrastructure costs.

The postage stamp approach allocates network costs between users based on their share of the system's total peak load. As a result, the transmission charge is independent of the power transfer distance, and consumers face a flat transmission charge per unit of demand equal to the total transmission costs divided by peak load.

The approach is simple and easy to implement, achieving full historic cost recovery. It is also considered to ensure the long-term objective of constantly developing adequate transmission capacity to secure the delivery of electricity. However, it does not consider the actual system utilisation (for example, users are not discouraged from building power plants in remote areas of the network). As a result, it does not send efficient signals to develop projects in specific locations and improve the system's usage (load factor).

However, a common variant of the postage stamp approach is to “commoditise” a part of the charge (e.g., based on the volume of energy consumed and not the peak load). This variant is usually applied to customers with a lower load factor. The overall transmission cost is firstly allocated within the major groups (i.e., industrial customers with higher load factors and low voltage domestic and small commercial customers with lower load factors) based on the peak load use of the system. After this first stage of the allocation process, the cost of each group is further distributed among the group members based on their actual volumetric consumption. This “commoditisation” approach only refers to how the cost is allocated between the users of the same group, usually used for the low voltage, low load factor customers, for which no detailed, individual information for their profile is available (for example as no smart meters are installed).

Furthermore, the nature of the costs to be recovered defines the design of the network charges. Infrastructure costs should be recovered based on capacity charges to ensure recovery of the costs, not dependent on the actual use of the network in terms of energy flows but based on the request of the user for specific capacity availability, which is reflected by their share of total peak load on the system. On the other hand, network charges designed to recover operational costs, including the provision of system services and losses, should be retrieved by energy-based tariffs, ensuring cost reflectivity between the users.

Finally, the allocation of the overall recoverable cost between the two main groups of users, namely, the withdrawn users (consumption) and the injecting users (generators), also follows the cost reflectivity principle, considering, however, the impact the application of network tariffs in the two main groups of users may have to competition in generation and consumption sides.

Table 1: Summary of network charges

	Consumption/ Withdrawal tariffs	Generation/Injection Tariffs	Network Charges Structure
Connection Cost	One-off payment	One-off payment	-
Reinforcement Costs	Direct payment or through Network tariffs (when the cost is socialised)	Direct payment or through Network tariffs (when the cost is socialised)	Capacity Charge
Maintenance cost	Network Charges	Network Charges	Capacity Charge or Energy Charge
System Services	Network Charges (or alternative market-based schemes)	Network Charges (or alternative market-based schemes)	Energy Charge
Network Losses Cost	Network Charges (or alternative market-based schemes)	Network Charges (or alternative market-based schemes)	Energy Charge

2.3. Injection charges

An injection charge, if applied, is levied on network users for the costs associated with using the network for injection or merely because the network user can inject into the grid.

The costs reflected on injection charges are classified as:

1. Infrastructure development and equipment investment costs are required to ensure the user's continued ability to inject energy into the grid.
2. Cost related to the provision of system services (ancillary, balancing, etc.)
3. Costs related to energy procurement to balance network losses, which need to be procured by the system operator and recovered by the users.

Definitions of injection charges:

- Energy-based injection charges are charges payable on every unit of energy produced and injected into the grid (€/MWh), applied mainly for the recovery of costs for the provision of services and losses.
- Power-based injection charges are charges payable on the capacity connected to the grid, on yearly or multi-year peak output or output under peak conditions (€/MW), applied mainly for the recovery of infrastructure costs.
- Lump-sum injection charges are fixed at the start of the relevant charging period and do not (in general) depend on connected capacity, yearly or multiyear peak output, or output under peak conditions.

The definition of the injection charge does not include:

- The off-charges paid for the connection to the grid or for an upgrade of that connection;
- The cost of specific TSO/DSO services on individual requests of the network users.

3. Considerations

3.1. Locational signals

Before the increasing number of RES producers requesting terms to connect to the system, implementing G charges for conventional and hydro units mainly involved providing adequate locational signals to producers about where to develop their units.

Locational signals at that time were crucial for geographically large power systems, where electricity was transmitted over long distances. Network operators wanted to incentivise power generators to install their units at locations that could benefit the efficient grid operation. Even during that time, questions concerning fair competition between location-dependant units (lignite, hydro) and less location dependent units (Natural Gas, which, however, was evaluated complimentarily with the development of the natural gas system) had driven several regulators at the EU level to minimise the G element, and 100% of network costs were allocated to the withdrawal side (L component). In some cases, eliminating the G component was also an incentive for installing RES units, mainly wind, which are highly location-dependent, at the early stages of RES generation development (’00 – ’10).

However, the rapidly increasing numbers of RES-generating units requesting connection terms to the Grid and Network have led to the implementation of G charges as a tool to control better the penetration of RES, especially the less location-dependent solar plants, and to incentivise their installation in locations enhancing the efficient expansion and operation of the Grid and the Network.

By implementing injection tariffs, network operators are seeking to better coordinate the development of RES capacity with the development plans of the transmission and distribution systems. These plans are now required to consider not only existing requests for connection terms, which (until today) were managed through marginal improvements and additions to the systems but also to better understand how the networks will be developed in the coming years.

The limited or no-free grid capacity for connecting RES resources at both transmission and distribution levels requires an entirely different approach to the grid and network development, introducing anticipatory investments in grid infrastructure. This is particularly pertinent at the distribution level, as distribution grids are currently ill equipped to manage the integration of many gigawatts (GWs), and this is not possible to happen without the efficient coordination between the development of the grid and distribution system and the development of RES both at transmission and decentralised level.

Injection tariffs may better align the development plans of the networks and the business plans of RES generating capacity to the more efficient use of existing and future grid and distribution system infrastructure.

In that sense, implementing injection tariffs needs to be aligned with development plans and anticipatory investments to ensure adequate network development at both transmission and distribution levels. However, this task is critically complex and socially sensitive. While anticipatory investment may increase existing network tariffs, it is necessary to ensure much lower energy and network tariffs in the future.

3.2. Cost recovery and fairness

Adequate network development requires scaling up investment needed for the expansion and reinforcement of the system and the digitalisation infrastructure, including smart grids and meters. This approach would increase the annual cost to be recovered by the consumers. Questions concerning how these costs are allocated today between the groups of users are being reviewed. Many regulators are reviewing their approaches to cost allocation and need to align cost recoverability and reflectivity.

Fairness between consumers and producers is considered the guiding principle for allocating the costs related to the connection of RES generating capacity and Distributed resources to producers by implementing injection tariffs. However, injection tariffs are not only linked with allocating costs between producers and consumers (G&L part). Any of the costs, directly or indirectly, will be paid through the end supply tariff paid by the consumption.

Injection tariffs are primarily related to fair competition between RES producers, especially between producers that developed their installations when different support schemes were applied.

For example, old vintage, existing RES units have been developed in more convenient locations (low-hanging fruits). New installations can only be installed in less favourable and remote areas facing increased connection costs. That means that their competitiveness is hindered by these increased costs, and older vintage projects, located in more favourable places, will continue to be more competitive, even after repowering, in economic terms, continuing to receive a locational rent.

However, new projects are required, and regulators must develop a mechanism to fairly allocate costs between producers and consumers and protect competition between RES producers, especially between old and new ones.

A mechanism to achieve that is: a) socialise the cost of expansion and reinforcement required to connect increasing requests for RES generation and b) distribute these costs to all producers by applying injection tariffs. In this manner, the Regulator can fairly allocate the costs triggered by the increasing number of new RES-generating installations. At the same time, these costs are not paid by each project but are socialised and paid by all RES producers, bringing them to a level playing field.

4. Legal and regulatory basis in EU and energy community

4.1. EU area

As per Part B of the Annex of Regulation (EU) No 838/2010 (Guidelines for A Common Regulatory Approach to Transmission Charging), until 31/12/2024, the value of annual average transmission charges paid by producers (G-Charges) in each Member State had to comply with the following provisions[1]:

- Value of annual average G-charges: 0 - 0.5 EUR/MWh, except those applying in Denmark, Sweden, Finland, Romania, Ireland, Great Britain and Northern Ireland.
- Value of annual average G-charges in Denmark, Sweden and Finland: 0 - 1.2 EUR/MWh.
- Value of annual average G-charges in Ireland, Great Britain and Northern Ireland: 0 – 2.5 EUR/MWh.
- Value of annual average G-charges in Romania: 0 to 2.0 EUR/MWh.

According to Recital (10) of Regulation (EU) No 838/2010, the values of annual average G-charges across the EU should not undermine the internal market. They should be kept within a range, which helps to ensure that the benefits of harmonisation are realised.

According to Regulation (EU) No 838/2010, the Agency had to provide its opinion to the Commission by 1 January 2014 regarding the appropriate range of charges after 1 January 2015.

In its Opinion 09/2014, ACER came to the following conclusions regarding G-charges for the period from 1/12/2015 to 31/12/2018:

- The increasing interconnection and integration of the European market implies a rising risk that different levels of G-charges paid by producers distort competition and investment decisions in the internal market.
- To limit this risk, the Agency deems it essential that G-charges paid by producers are cost-reflective, applied appropriately and efficiently, and harmonised across Europe to the extent possible.
- In particular, the Agency considers that:
  - energy-based G-charges (€/MWh) shall not be used to recover infrastructure costs; and, therefore;
  - except for recovering the costs of system losses and the costs related to ancillary services, where cost-reflective energy-based G-charges could provide efficient signals, energy-based G-charges should be set equal to 0 €/MWh.
- Different levels of power-based G-charges (€/MW) or of lump-sum G-charges, as long as they reflect the costs of providing transmission infrastructure services to generators, can be used to give appropriate and harmonised locational signals for efficient investments in generation, e.g. to promote locations close to load centres or where the existing grid can accommodate the additional generation capacity with no or minimal additional investments.

[1] Notes:

(1) Annual average G-charges are calculated as annual total transmission tariff charges paid by producers divided by the total measured energy injected annually by producers to the transmission system of a Member State.

(2) Regarding the above provisions, G-charges shall exclude:

a. charges paid by producers for physical assets required for connection to the system or the upgrade of the connection;

b. charges paid by producers related to ancillary services;

c. specific system loss charges paid by producers.

- Therefore, the agency considers it unnecessary to propose restrictions on cost-reflective power-based G-charges and lump-sum G-charges.
- The Agency notes that even power-based G-charges may significantly distort investment decisions if they are not cost-reflective, lack proper justification, or are not set appropriately and harmonised.

As per Regulation (EU) No 838/2010 provisions, ACER continues to monitor the appropriateness of the ranges of allowable transmission charges paid by electricity producers in each Member State.

4.2. Energy community

Annex B of Regulation (EU) 838/2010, as adapted and adopted by Decisions 2013/01/PHLG-EnC and 2021/01/PHLG-EnC, sets the maximum value(s) of the annual average G-charges in the Contracting Parties.

In this framework, the G-charge should be no higher than 0.5 €/MWh in all Contracting Parties, except for Montenegro, whose cap is 2.5 €/MWh.

5. International practice [2]

5.1. General overview

More than half of the countries assessed by ACER (AT, BE, BG, DK, EE, FI, FR, IE, LV, MT, NL, NO, RO, SK, SE) apply a (non-negative) injection charge[3] to at least one group of network users. In most instances, the injection charge has already been used for several years, while it has recently been introduced in Latvia. From 1 January 2023, an injection charge applies to Croatia (for transmission and distribution). From the same date in Denmark, the application of injection charges has also been expanded to distribution.

Specifically:

- In France (for distribution), Malta (only a distribution network exists) and the Netherlands (for both transmission and distribution), the injection charge is only a small lump sum fee for the metering, administrative and management costs, which recovers a small part of the TSO or DSO costs.
- Most countries apply transmission and distribution injection tariffs (AT, BE, FI, FR, LV, NL, NO, SE, SK).
- In some cases, injection tariffs are applied only for transmission but not for distribution (BG, DK, IE, RO) or distribution but not for transmission (EE).
- Germany is the only country that applies a ‘negative injection charge’ only to account for avoided network charges. This is because DSOs can avoid drawing the amount of electricity from the upstream grids injected into their grid by decentralised generators.
- The remaining ten countries (CY, CZ, GR, HU, IT, LT, LU, PT, SI, ES) do not apply an injection charge to recover transmission or distribution costs. Such charges have never been applied in most countries, while they have been phased out in Italy, Portugal, and Spain. In Lithuania, there have been initial discussions about using an injection charge in the future.

[2] Source: ACER Report on Electricity Transmission and Distribution Tariff Methodologies in Europe, January 2023.

[3] Only the charges for active energy injections are considered in this section.

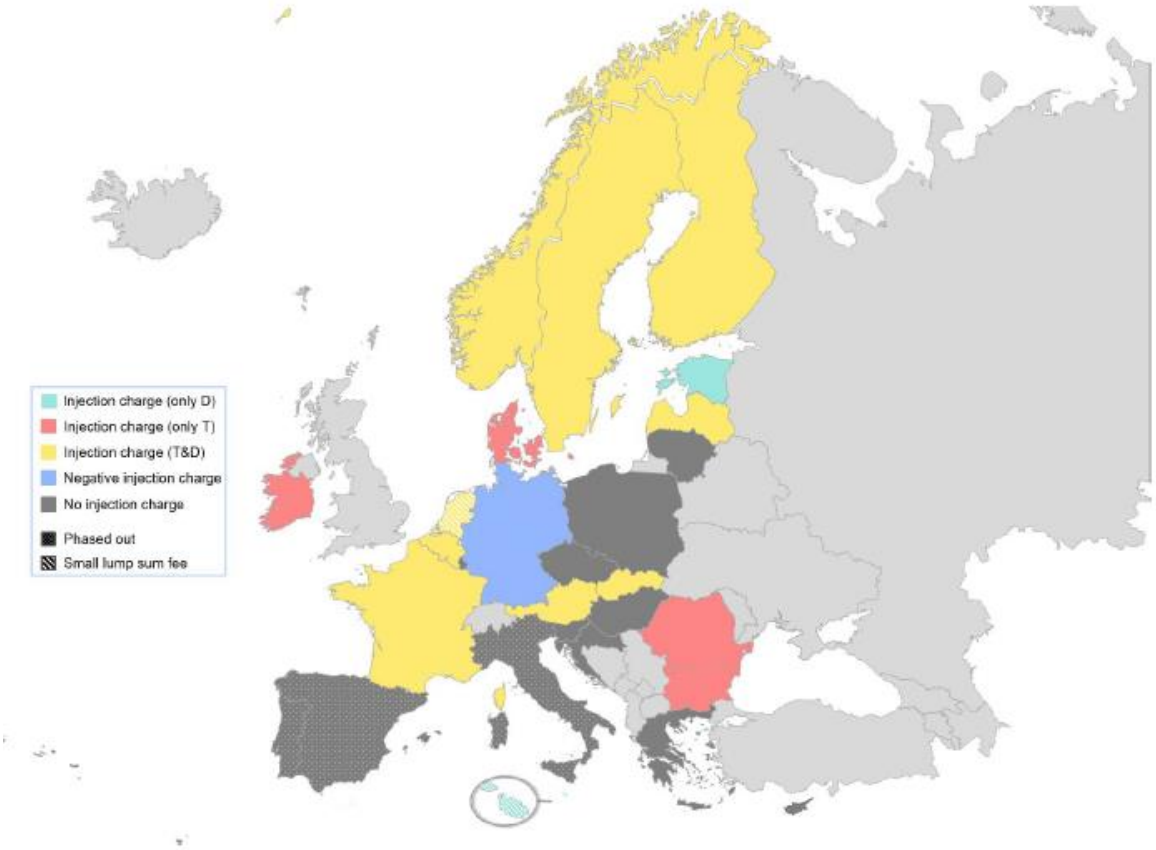

Figure 1: Application of injection charges in Europe (2022)

5.2. Motivations behind the practice of MS regarding injection charges

NRAs typically motivate the use of injection charges by referring to the principle of cost-reflectivity.

In the countries where the injection charges apply, either only to the transmission-connected (T-connected) network users or only to the distribution-connected (D-connected) network users:

- One NRA explains this difference by the different choices of the respective system operators (EE).
- Another NRA explains this by the aim not to discourage distributed generation, which is not yet sufficiently developed and has beneficial effects on the networks (RO).[4]

The most frequently reported reasons by NRAs for non-application of an injection charge are:

- Risks of creating distortions in competition (and disadvantages for national producers) in the EU internal market (CZ, PT, LU).
- Cost reflectivity, i.e. the network costs caused by producers are already recovered through other means (e.g. through licence-holder charges or deep connection charges), **lack of generation surplus in the network** (LT)[5] or lack of significant structural inefficiencies due to location of generation and demand (GR).

[4] Definition of country codes is available in this link.

[5] Which is, however changing rapidly with all new applications for connection terms to small and larger scale generating RES units requesting access to the network

- Support for higher penetration of renewable energy (RES) generation and energy storage (CY) or due to concerns of adequacy of conventional generation (HU).
- In some countries (DE, PL, SI), the NRA reported that the law prohibits the application of an injection charge.
- In some other countries (RO, ES), national law allows the injection charge. Still, it significantly restricts its design (e.g., no locational differentiation is permitted to ensure the same network tariffs within the country irrespective of the place of network use).

5.3. Consultations and studies

Only in a few countries (BE, FR, LV, NO) was a study carried out to assess the costs triggered by the generators and the ultimate impacts (e.g. cost efficiency of the system) of introduction, change or phase-out of injection charges.

None of the NRAs identified any of the following:

- Remarkable competitive disadvantage for the producers within the country vis-à-vis producers of other countries due to the applied injection charges.
- Distortion in competition within the country, often referring to the fact that the exact injection charges are applied to all producers.

5.4. Cost recovery

Distribution-connected users who inject into the grid pay for:

- Both transmission and distribution costs in five countries (AT, BE, FI, NO, SE).
- In the remaining countries, the distribution-connected network users either pay:
  - a small fee for the possibility of injection (FR, MT, NL)
  - only distribution costs for injection (EE, LV, SK)
  - only transmission costs for injection (DK, RO, IE)

	AT	BE[58]	BG	DK[59]	EE	FI	FR	DE	IE	LV	MT	NL	NO	RO	SK	SE
Transmission costs	●	●	●	●		●			●				●	●		●
Distribution costs	●	●			●	●	●			●	●	●	●		●	●

Figure 2: Payment of network costs by distribution-connected network users who inject into the grid

Countries apply different practices about which cost categories are recovered via injection charges. They may contribute to the recovery of:

- Specific cost categories, such as infrastructure costs (SK);
- Losses and system services (AT, BE (transmission), FR (transmission), RO);
- Only metering, administrative and management costs (FR (distribution), MT, NL);
- Multiple cost categories in several countries (BG, DK, EE, FI, LV, NO, SE);
- Part of the TSO and/or DSO costs without any segmentation of the injection charge for specific cost categories (e.g. based on their main cost drivers).

Overall, the injection charge is slightly more frequently related to paying (short-term) variable costs, such as losses and system services, than recovering infrastructure costs (CAPEX, OPEX).

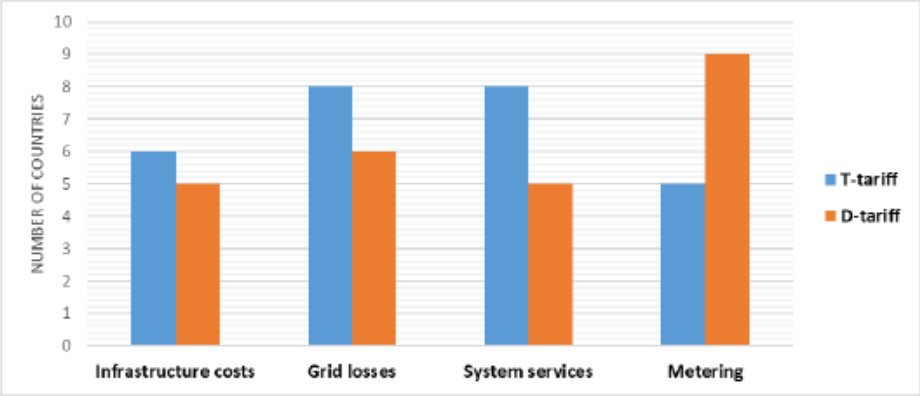

Figure 3: Recovery of specific cost categories via injection charges

5.5. Generation vs. load split

The injection charges tend to recover only a tiny part of the transmission and distribution costs.

The share of injection charges in transmission cost recovery:

- Is relatively low (for the vast majority of the countries, it is below 7%);
- There is a significant variation across the countries, ranging from 3% of the transmission costs to 35%.

In the case of distribution costs, the share of injection charge is even less (i.e. below 5%) than in the case of transmission costs, except in Sweden.

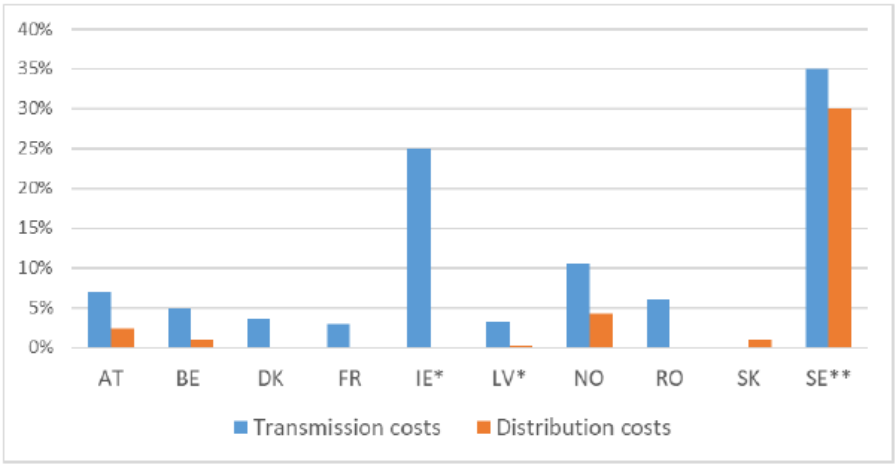

Figure 4: Share of network costs recovered via injection charges

The split of the costs allocated to generation can be obtained in various ways:

- The split can start by setting the level of the injection charges, while the remaining costs are allocated to withdrawal charges:
  - Administratively set injection charge at the value of the ceiling set by the Commission Regulation (EU) No 838/2010 (in Latvia);

- Determined based on an international benchmarking method (e.g. using the weighted average of the injection charges applied in neighbouring countries, in Belgium's Wallonia region).

- The split can be based on a decided fixed percentage of the relevant costs (i.e. ancillary services reservation costs in Belgium are allocated 50-50% to injection and withdrawal).
- The split can result from identifying the costs directly related to injection (for distribution costs in Belgium's Flanders region, for transmission costs in Romania).
- The split can be made by using the same unit prices of charges for injection and withdrawal:
  - In Slovakia, the energy-based and the power-based unit prices of the charges are the same for injection and withdrawal, but for the power-based charges, in the case of injection, only 15% of the contracted capacity is taken into account in the calculation;
  - In Estonia, the exact power-based and lump sum charges are applied to producers and consumers in distribution.

5.6. Tariff structure

In transmission:

- Six countries (AT, BE, BG, DK, FR, RO) apply only energy-based charges;
- Three countries (IE, LV, SK) apply only a power-based charge;
- Three countries (FI, NO, SE) apply a mix of energy-based charges with a power-based and/or lump sum charge.

In distribution:

- One jurisdiction (BE's Flanders region) applies only an energy-based charge;
- Three jurisdictions (LV, SK, SE) apply only a power-based charge;
- Remaining jurisdictions (AT, BE's Wallonia region, EE, FI, NO) apply a mix of tariff basis.

		AT	BE	BE BRU	BE WAL	BE FLA	BG	DK	EE	FI	FR	IE	LV	MT	NL	NO	RO	SK	SE
Transmission tariff	Power-based									•		•	•					•	•
	Energy-based	•	•				•	•		•	•					•	•		•
	Lump sum														•	•			
Distribution tariff	Power-based				•				•	•			•					•	•
	Energy-based	•				•				•						•			
	Lump sum	•			•				•	•	•			•	•	•			

Figure 5: Tariff basis for injection charges

For the recovery of the cost of losses and the system services, which typically show a correlation with the volume of injected energy:

- In most countries, energy-based injection charges apply (AT, BE, BG, DK, FR, NO, RO, SE);
- In some countries, power-based injection charges apply (LV, EE).

For the recovery of the infrastructure costs (CAPEX, OPEX), which typically show a correlation with the system peak:

- Energy-based charges apply in two countries (BG, DK);

- Power-based injection charges are applied in four countries (EE distribution, LV, SK, SE);
- One country (NO) applies a lump sum charge based on a ten-year historical production average.

The metering, administrative or management costs, which are mainly unrelated to the injected volume of energy or the level of capacity, are recovered via:

- The same energy- and power-based tariff element as other network costs (BG, FI, LV, SE);
- A lump sum charge (AT-distribution, EE, MT, NL).

The power-based injection charges are set based on:

- The installed capacity (LV);
- Annual capacity subscriptions/contracted power (EE, SE);
- Yearly peak power (SE);
- Both rated power and the maximum output capacity (SK).

5.7. Injection tariff variation

Injection charges can be differentiated: (a) between voltage levels or (b) based on time-of-use or location to provide appropriate economic signals for efficient dispatch of energy generators.

Injection charge variations based on voltage levels:

- Frequent for distribution (AT, BE, EE, FR, DE, NL, SK, SE);
- Not frequent for transmission (NL).

Injection charge variation based on location (not related to different DSO areas) in three countries (AT, IE, NO, SE):

- In Austria, the energy-based distribution tariff is different in different network areas, which are unrelated to the DSO areas;
- In Ireland, the power-based transmission tariff provides a locational signal regarding losses;
- In Norway, marginal pricing for losses apply, associated with the node where the producer is connected;
- In Sweden, the transmission tariff is set based on nodes, and the distribution tariff also provides locational signals in some of the DSO areas.

Injection charge variation based on the use time was hardly observed in any assessed countries.

5.8. Level of G-charges

The application of G-charges as defined in Regulation (EU) No 838/2010 has been reported to ACER for eight countries (DK, FI, IE, LV, NO, RO, SK, SE).

In the other countries which have reported injection charges at transmission:

- They cover only costs related to system losses and ancillary services (AT, as defined in Regulation (EU) No 838/2010), sum fees (NL, MT) for administrative and/or metering costs, and are well under the ceilings of G-charges.

5.9. G-charges for different stakeholders

- In the vast majority of countries applying injection charges, producers—i.e. network users who only inject into the grid—are subject to a tariff for injection, regardless of

whether they are connected to the transmission or distribution grid (AT, BE, BG, FI, IE, LV, NL, NO, RO, SK, SE).

- In most countries (BE's Brussels region, BG, HR, CZ, FR, DE, GR, HU, IE, LT, MT, NL, PL, PT, SK), transmission and/or distribution storage facilities are generally only subject to withdrawal charges.
- In about one-third of the countries (AT, BE's Flanders and Wallonia regions, DK, FI, FR, IE, SK, NO, RO, SE), transmission and distribution storage facilities are generally subject to injection and withdrawal charges.
- In the countries where injection charges apply, prosumers typically pay both injection and withdrawal charges (either for transmission and distribution costs), with a few exceptions, where they pay only an injection charge (BG) or only a withdrawal charge (FR-distribution, MT, NL).

5.10. Injection charges in energy community [6]

Error! Reference source not found. shows producers' G-charge levels in 2020, 2021, and 2022 in Bosnia, Herzegovina, Montenegro, and Ukraine.

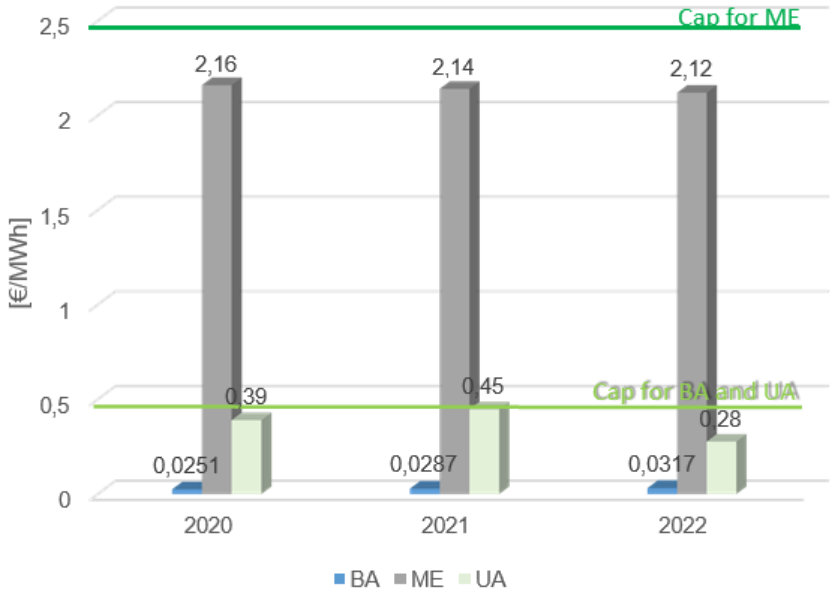

Figure 6: Level of G-charge in Bosnia and Herzegovina, Montenegro and Ukraine in 2020, 2021 and 2022

[6] Source: ECRB Report on Electricity Transmission and Distribution Tariff Methodologies in the Energy Community, November 2023.

Injection charges for transmission

	AL	BA	GE	XK*	MD	ME	MK	RS	UA
T-connected RES producers	-	I	-	I	-	I	-	-	I
T-connected non-RES producers	-	I	-	I	-	I	-	-	I
T-connected consumers	W	W	W	W	W	W	W	W	W
DSOs whose systems are connected to the transmission system	W	W	-	W	W	W	W	W	W
CDSOs whose systems are connected to the transmission system	W	n/a	n/a	n/a	W	W	W	W	W
T-connected non-storage network users that both inject into and withdraw from the grid (e.g., prosumers)	W	W	W	n/a	n/a	n/a	n/a	W	W
T-connected storage network users that both inject into and withdraw from the grid (e.g., PHES, battery storage, etc.)	n/a	I	n/a	n/a	n/a	n/a	n/a	-	W
T-connected producers: Auxiliary services of generators[32]	-	W	W	n/a	-	W	W	W	W
D-connected RES producers	-	-	-	I	-	-	-	-	I[33]
D-connected non-RES producers	-	-	-	I	-	-	-	-	I[33]
D-connected consumers	W	W_I	W	W_I	W	W_I	W_I	-	W
D-connected producers: Auxiliary services of generators	-	W_I	W	n/a	-	W_I	n/a	-	W
CDSOs whose systems are connected to the distribution system	W	n/a	n/a	n/a	W_I	W_I	n/a	-	W
D-connected non-storage network users that both inject into and withdraw from the grid (e.g., prosumers)	W	W_I	W	n/a	W_I	W_I	W_I	W	W
D-connected storage network users that both inject into and withdraw from the grid (e.g., PHES, battery storage, etc.)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-	-

Legend:

I	*Subject to injection charge*	*W*	*Subject to withdrawal charge*	-	*Not subject to any network charge*
n/a	*Not applicable*	W_I	*Subject to withdrawal charge for T-costs that is integrated into distribution tariff*		

Figure 7 shows the transmission injection and withdrawal charges paid by different groups of network users, i.e., network users that participate in recovering transmission costs, per Contracting Party.

- In all WB Contracting Parties, the treatment of RES and non-RES producers is the same – either both categories pay the transmission injection charge (Bosnia and Herzegovina, Kosovo*, Montenegro), or none of them.
- Only in Kosovo the producers connected to the distribution system cover transmission costs, i.e., pay transmission injection charges.
- Network users injecting and withdrawing from the grid usually pay the charge only for withdrawing.
- In many Contracting Parties, the consumers and prosumers connected to the distribution system are directly or indirectly subject to the transmission withdrawal charge.

	AL	BA	GE	XK*	MD	ME	MK	RS	UA
T-connected RES producers	-	I	-	I	-	I	-	-	I
T-connected non-RES producers	-	I	-	I	-	I	-	-	I
T-connected consumers	W	W	W	W	W	W	W	W	W
DSOs whose systems are connected to the transmission system	W	W	-	W	W	W	W	W	W
CDSOs whose systems are connected to the transmission system	W	n/a	n/a	n/a	W	W	W	W	W
T-connected non-storage network users that both inject into and withdraw from the grid (e.g., prosumers)	W	W	W	n/a	n/a	n/a	n/a	W	W
T-connected storage network users that both inject into and withdraw from the grid (e.g., PHES, battery storage, etc.)	n/a	I	n/a	n/a	n/a	n/a	n/a	-	W
T-connected producers: Auxiliary services of generators[52]	-	W	W	n/a	-	W	W	W	W
D-connected RES producers	-	-	-	I	-	-	-	-	I[53]
D-connected non-RES producers	-	-	-	I	-	-	-	-	I[53]
D-connected consumers	W	W_I	W	W_I	W	W_I	W_I	-	W
D-connected producers: Auxiliary services of generators	-	W_I	W	n/a	-	W_I	n/a	-	W
CDSOs whose systems are connected to the distribution system	W	n/a	n/a	n/a	W_I	W_I	n/a	-	W
D-connected non-storage network users that both inject into and withdraw from the grid (e.g., prosumers)	W	W_I	W	n/a	W_I	W_I	W_I	W	W
D-connected storage network users that both inject into and withdraw from the grid (e.g., PHES, battery storage, etc.)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-	-

Legend:

I	Subject to injection charge	W	Subject to withdrawal charge	-	Not subject to any network charge
n/a	Not applicable	W_I	Subject to withdrawal charge for T-costs that is integrated into distribution tariff		

Figure 7: Categories of network users subject to injection and withdrawal charges for recovering transmission costs

Injection charges for distribution

	AL	BA	GE	XK*	MD	ME	MK	RS	UA
D-connected RES producers	-	-	-	-	-	I	-	-	-
D-connected non-RES producers	-	-	-	-	-	I	-	-	-
D-connected producers: Auxiliary services of generators[41]	-	W	W	n/a	W	W	W	-	W
D-connected consumers	W	W	W	W	W	W	W	W	W
CDSOs whose systems are connected to the distribution system	W	n/a	n/a	n/a	W	W	n/a	W	W
D-connected non-storage network users that both inject into and withdraw from the grid (e.g., prosumers)	W	W	W	W	-	W	W	W	W
D-connected storage network users that both inject into and withdraw from the grid (e.g. PHES, battery storage, etc.)	-	n/a	n/a	-	n/a	n/a	n/a	-	W

Legend:

I	Subject to injection charge	W	Subject to withdrawal charge	-	Not subject to any network charge
n/a	Not applicable				

Figure 8 shows the injection and withdrawal charges paid by different groups of network users per Contracting Party.

	AL	BA	GE	XK*	MD	ME	MK	RS	UA
D-connected RES producers	-	-	-	-	-	I	-	-	-
D-connected non-RES producers	-	-	-	-	-	I	-	-	-
D-connected producers: Auxiliary services of generators[41]	-	W	W	n/a	W	W	W	-	W
D-connected consumers	W	W	W	W	W	W	W	W	W
CDSOs whose systems are connected to the distribution system	W	n/a	n/a	n/a	W	W	n/a	W	W
D-connected non-storage network users that both inject into and withdraw from the grid (e.g., prosumers)	W	W	W	W	-	W	W	W	W
D-connected storage network users that both inject into and withdraw from the grid (e.g. PHES, battery storage, etc.)	-	n/a	n/a	-	n/a	n/a	n/a	-	W

Legend:

I — Subject to injection charge

W — Subject to withdrawal charge

\- — Not subject to any network charge

n/a — Not applicable

Figure 8: Categories of network users subject to injection and withdrawal charges for recovering distribution costs

- Montenegro is the only CP from the Western Balkan in which RES and non-RES producers are subject to injection charges for recovering distribution costs.
- In all Contracting Parties, prosumers are subject to charges for withdrawal from the grid.
  - In Bosnia and Herzegovina, Kosovo, North Macedonia and Serbia, the withdrawal charge is applied to the total withdrawn energy without considering the injected energy.
  - In Montenegro and Albania, prosumers apply a withdrawal charge to net withdrawn energy, i.e., to determine the difference between withdrawn and injected energy.