Electricity Network Tariffs Regulation and Distributive Energy Justice
Balancing the Need for New Investments and a Fair Energy Transition

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I. Introduction

The purpose of this chapter is to investigate how the regulation by law of electricity distribution network tariffs can accommodate the concomitant needs of new investments and distributive energy justice to ensure a fair energy transition for both operators and energy consumers.

The electricity prices paid by final consumers are commonly structured around three main components: the energy cost, that is, the price of electricity generation, trade, and supply; network charges, for both transmission or distribution; and taxes and other surcharges, including Value Added Tax (VAT), various tax contributions, and support measures.

Network charges relate to the costs of using the networks to transport electricity. For public networks, they are usually fixed by the competent authorities through tariff regulation to ensure fair access and avoid any abuse of dominant position by operators in a position of natural monopoly. They are therefore termed ‘network tariffs’. The regulation of network charges also aims to provide a careful balance between the coverage of grid maintenance, operation and development costs for the operator, and a fair access price for the grid users, both electricity producers and consumers. Network tariffs represent the main source of revenues for network operators, and a cost recovery shortfall may put them in a difficult financial situation or cause them to refuse new requests from users. The share of the network charges in the electricity bill vary from country to country, ranging from 20 to 40 per cent according to the International Energy Agency (IEA) estimates. For example, in 2018, network charges for household electricity bills represented 27 per cent in France and 25 per cent in Norway.

2 Source: CRE.
3 Source: NVE.
It is expected that electricity consumers, both households and large consumers, will face an increase in grid costs associated with their consumption in the years to come due to the need for investments in grid infrastructures. Both ageing infrastructures and new production/consumption patterns that rely increasingly on distributed and alternative sources will require transmission and distribution operators (TSOs and DSOs) to make significant financial investments. In particular, DSOs are in the front line of the energy transition and distribution network tariff design will be the focus of this chapter. Ninety per cent of variable renewable energy generation is already connected to the distribution grid. New consumption patterns related to local flexibility management, demand response, aggregation, batteries, electrification of transport, and peer-to-peer trading are among the factors adding complexity to the traditional tasks of the DSOs. All these new tasks may represent business opportunities for DSOs, but they also add a financial burden which is not always reflected in the structure of network tariffs. This requires a reconsideration of the remuneration model of the DSOs, including the provision of incentives to make them rely on new factors such as flexibility and not only on investments where appropriate.

Traditionally, the network costs are transferred to final consumers, who will bear the financial burden. This is added to a continuous increase during the past decade of the contribution to renewable energy source (RES) support as part of the tax component of the bill. The application of network tariffs to new renewable energy generators feeding the grid has also varied. This raises a fundamental question of distributive energy justice, where final consumers will have to pay higher electricity prices to finance the energy transition, while not always being incentivized or rewarded for a change in consumption behaviour under current legislation. Customers may react to the changing network tariff parameters by adapting consumption, developing prosumption, or even storing electricity. Therefore, network tariff structure could send signals to consumers and enable them to adapt their use of the network (consumer empowerment). With a correct tariff design, network costs may even be reduced due to the optimization of investments and a more efficient use of distribution networks.

In the framework of the energy transition, the existing tariff structures are being challenged. Therefore, a reflection has started in several jurisdictions to address the need for revising distribution network tariff structure(s) in order to ensure a fair transfer of costs between primarily DSOs and electricity producers and consumers. It aims at developing the right incentives through tariff regulation. This chapter reviews theory and practice of distribution network tariff regulatory reforms at EU-level and in selected European countries in the context of the energy transition, focusing on residential consumers. It starts by detailing the components of network tariffs (section II) and the common principles governing their design (section III). It then reviews the guiding principles proposed for the re-design of network tariff structure with the

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4 For a discussion on the fundamental changes in how distribution networks are used, see Council of European Energy Regulators (CEER), ‘The Future Role of DSOs’ A CEER Conclusions Paper, Ref. C15-DSO-16-03 (2015).
purpose of balancing the need for new investments and a fair energy transition. Next, the question of the need for coordination and even harmonization of network tariff structure is raised, looking at the attempts made through the EU Clean Energy Package for all Europeans to advance a common methodology (section IV). Finally, the chapter discusses aspects of procedural justice when tariff structures are subject to adjudication and judicial review (section V). The chapter ends with some concluding remarks (section VI).

II. Understanding Electricity Network Tariff Components and Their Effects on Distributive Energy Justice

A. General Definition of Network Tariff Components

Tariff structures can generally be organized according to two alternatives: volume-based tariff and capacity-based tariff. In practice, many hybrid models exist, and offer a combination of these two. They also integrate some fixed components. Additional variables, such as customer categories and other mechanisms to recover grid costs, will also affect grid tariff design. The effects on distributive energy justice will vary accordingly.

1. Volumetric Network Tariff

A volumetric tariff is based on the volume of electricity consumed by the final customer and is expressed in €/kWh. The customer is charged for the electricity—the commodity—consumed (consumption-based tariffs). A majority of European countries apply tariff models based on volume or having a dominant volume component.

Volumetric tariffs can be designed according to several alternatives. They can be proportionate, progressive, degressive, or based on time-of-use. The choice of alternative will depend on the status of the market as well as technology deployment. These models are notably easier to implement with traditional metering systems. If the volume tariffs are proportionate, consumers pay per kWh or m³ consumed, irrespective of volume level. If they are progressive, the tariffs per kWh will increase proportionately with an increasing consumption level. At the opposite end of the spectrum, degressive tariffs per kWh will decrease with an increasing consumption level. If based on time-of-use, volume tariffs will reflect the available capacity in the grid and are intended to move consumption from peak time (with high tariffs) to off-peak times (with lower tariffs). A day/night tariff may also be applied, even without smart meters, whereas more complex peak and off-peak tariffs will require smart metering.6

This model has both advantages and disadvantages for the DSO and consumers in terms of distributive energy justice. Volumetric tariffs provide good incentives for

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customers to adjust their behaviour by reducing or relocating energy consumption during the day, as well as using energy efficient appliances. With self-generation and self-consumption, customers feed less electricity into the grid. Consequently, less electricity will be transported to the grids connecting those types of customers. Having a tariff based on volume consumed seems advantageous for those final customers, but can create important financial uncertainty and balancing challenges for DSOs, in particular in a scenario of massive solar photovoltaic (PV) deployment.

2. Capacity-based Network Tariff
A capacity tariff is based on the capacity of the connection to the grid. It reflects peak load, with the consequence that consumers with high peak loads pay high network costs. Currently, there is a general support for moving towards more capacity-based tariffs so as to better adapt to the changes in the energy system and reflect operating expenses (OPEX).

The most common design options for capacity tariff are to be flat, variable, or dependent on the time of use (TOU). If the capacity tariff is flat, a fixed fee will be charged according to the connection capacity (kVA) or the measured capacity (kW). If the capacity tariff is variable, different tariffs will apply to the different capacity levels. A capacity tariff based on the TOU will vary to reflect the available capacity in the grid (with peaks and off peaks), and will require a smart meter.\(^7\)

In terms of distributive energy justice, several reports stress the regressive effect that capacity tariffs can have on the price per kWh, with the result that small consumers will proportionally pay more and be those who are impacted most. However, DSOs will find the model advantageous as it will better reflect varying capacity usage of the grid. It may reduce their costs related to grid capacity management.\(^8\)

3. Fixed Components
Fixed components are independent of individual consumption factors, such as demand or consumption. They are expressed in €/point of delivery.

4. Multiple Component Tariffs
Multiple component tariffs are hybrid solutions combining elements from both capacity and volume-based tariff models, with fixed and/or variable components. Examples of such hybrid models applied to industrial customers can be found in Belgium, France, the Netherlands, and Italy.

The organization CEDEC has conducted a comparative analysis of the volume and capacity models, measuring their performance based on the extent to which they respect the guiding principles of tariff structures (see section below) on the one hand; on the other hand, they achieve general policy objectives (energy markets, climate policies, and security of supply). CEDEC concludes that, ‘apparently, capacity driven

\(^8\) CEDEC, ‘Distribution Grid Tariff Structure’. 
tariffs bring the most appropriate answer to the guiding principles for tariff setting' while 'volume driven tariffs are more in line with the formulated energy and climate policy objectives.” Therefore, hybrid tariffs with multiple components could be the most appropriate solutions to balance these apparently contradictory effects.

B. Examples of National Network Tariff Regulation and Distributive Effects

The structure of network tariffs varies widely within Europe. It reflects both historical energy policy choices, the set-up of the energy system, and the pace at which network users and operators react to new technologies.

In Italy, more than 150 DSOs operate the distribution grid and report data to the regulator, who in turn is competent for setting the distribution tariffs. The regulation defines different tariff classes corresponding to different customer types (household, commercial) as well as the voltage levels (low, medium, high, and extra high). For all types, the distribution network tariff consists of the three above mentioned components: a flat component, a capacity component at connection point (€/kW), and a progressive energy or volume component (€/kWh). The volume component will be more predominant for household consumers (66 per cent) than for industrial tariffs (17 per cent). Another feature is that the tariffs are not geographically differentiated.

In France, the operation of the distribution grid is dominated by one main company, Enedis (95 per cent), but many local distribution companies are operating at lower levels. The French Energy Code provides for the criteria and methodology for elaborating the distribution tariffs. It defines their elaboration and approval procedure. Details regarding implementation are determined and set by the Energy Regulatory Commission (CRE) and/or by Decree. The acronym of the network tariff model for electricity networks and related installations is TURPE (tarifs d’utilisation des réseaux publics d’électricité). There is not one, but several TURPE-tariffs, according to the type of installation (distinguishing source and location) and the type of network user. The methodology for setting the tariffs must be based on transparent, non-discriminatory criteria. The elaboration of tariffs shall reflect three main principles: (i) the ‘postage stamp’ tarification principle (timbre-poste), which means that the same tariff applies whatever the distance of transportation; (ii) the same tariffs apply to the whole French territory (so-called péréquation tarifaire); and (iii) the operating costs covered are those corresponding to the costs of an efficient operation. For each update of the tariffs, the TSO and the main DSOs will submit provisional trajectories.

10 Article L.341-2, Energy Code (France).
11 In accordance with Article 14.1 of Regulation (EC) nr. 714/2009, which provides that ‘charges shall not be distance-related.’
12 Article L. 121-1, Energy Code (France).
In Norway, more than 130 DSOs operate the distribution grid, traditionally comprising a regional grid (33–132 kV) and a distribution grid (up to 22 kV). The distribution grid is itself divided into high-voltage and low-voltage segments. Distribution tariffs have traditionally been mostly volume-based (70 per cent) with some fixed components. They are fixed by the DSOs in accordance with the criteria and the methodology defined by law and supplemented by guidance from the Norwegian Water Resources and Energy Directorate (NVE). The tariffs must be set in a non-discriminatory manner, but can include some differentiation based on objective and verifiable criteria. Another fundamental principle of optimal tariff design is that all grid users should pay a price that is equal to the short-term marginal cost incurred through their use of the grid. The marginal loss can be positive or negative, depending on whether changes in electricity fed into or tapped from the grid increase or decrease the energy loss. For small energy customers, the legislation defines two main components of the network tariffs that also apply to producers, that is, the energy component (NOK/kWh) and the fixed component (NOK/year).[^13] The energy component, or usage-dependent energy component, corresponds to compensation for the energy losses in the network system. The energy component for producers who feed into the distribution grid is set based on marginal losses in the network system as a whole. The energy component from the distribution grid may therefore be used to cover a share of the other fixed costs of grid operation. The energy component is not sufficient to cover all grid operation costs and must therefore be supplemented by a fixed component (about 30 per cent of the network tariff).[^14] Grid operators use other tariff components to cover the remaining costs and to provide a fair return on grid investments in the form of a fixed charge. The fixed component is paid by metering point, and the metering data is used to adjust the fixed component.[^15]

The Netherlands appears almost as an exception, since there is no volumetric component in the distribution network for households.[^16] This situation results from a reform implemented in 2009, whereby the system transitioned from mainly volume-based tariffs (at 77 per cent), to a capacity-based tariff. The invoice differences for household customers caused by the introduction of the capacity tariffs were neutralized as much as possible through the energy tax, termed the ‘neutralization tax’. The principle of the tariff structure is set by the Minister of Economic Affairs. The tariff principles are further detailed by the National Regulatory Authority (NRA) in a ‘tariff code’ based on a proposal by DSOs after consultation with other stakeholders.

[^13]: Customers with an installed capacity exceeding a set limit, e.g. over 80 or 125 amperes, or customers with an expected annual consumption exceeding 100,000 kWh, usually have a capacity charge (NOK/kW) in addition to the fixed and energy charges. The capacity charge is based on used capacity within defined periods of time.


[^15]: See Regulations on metering and settlement (Norway).

C. Network Tariffs and Other Tools to Recuperate Distribution Network Costs

Network tariffs for the use of the networks are the main but not the only way for operators to recover their costs. In addition to the network tariff charge on the consumer’s electricity bill, distribution network costs can be recovered via connection charges, taxes, regulated services, and contractual arrangements with industrial customers and generators. In most cases, they will be recovered by a combination of network tariffs and connection charges. These variables will differ according to the user groups, for example, industrial or residential customers, generation or consumption, traditional consumers or prosumers. The complex equation between these multiple parameters is normally calculated by the NRA. This combination of tools to recuperate distribution network costs makes it even more complex for NRAs to ensure distributive justice.

III. How Principles of Network Tariff Design Address Distributive Justice

When discussing the regulation of the electricity grid, a distinction should be made between the regulation of distribution networks in general and the regulation of network tariffs in particular. Network tariffs are tools that contribute to the fulfilment of more general objectives. The challenge is to send incentives through network tariffs that will be consistent with the overall objectives of network regulation, and, beyond that, energy policy objectives. Historically, a core objective defined for distribution network regulation has been and still is to ensure quality of service, sufficient investment, and non-discriminatory access. Network tariffs should aim at optimal use and development of the grid. Over time, other guiding principles have been added, such as fairness.

A. The Principles of Good Tariff Design

A review of the abundant literature on tariff design enables to identify the following principles of good tariff design: a tariff should be cost-reflective, enable infrastructure and operational cost-efficiency, enable revenue adequacy, be transparent, and be fair.

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18 T. Schittekatte and L. Meeus, 'Introduction to Network Tariffs and Network Codes for Consumers, Prosumers, and Energy Communities' (2018) European University Institute, Technical Report (Florence), 3 (hereafter Schittekatte and Meeus, 'Introduction to Network Tariffs and Network Codes').
19 IEA, 'Re-powering markets', 207.
1. Cost-reflectiveness
By being cost-reflective, tariffs should reflect the cost that network users impose on the system and that are incurred by the operator when serving them. They should provide appropriate incentives to avoid unnecessary costs.\(^20\) This principle requires a clear identification of the costs to be reflected and communication of them to the users imposing those costs. Consumers thereby have the opportunity to adapt their behaviour; such as moving their consumption to a certain time of day, or investing in energy saving appliances, or producing their own renewable energy. In the absence of cost-reflectiveness, grid users will not perceive the correct trade-off between using the network and adjusting production/consumption.\(^21\) For the DSOs and the NRAs, this will require identifying the cost drivers, such as investments, operation and maintenance costs, and also energy losses. It might not be possible to recover all grid costs through tariffs, and this should be adjusted for through other supplementary mechanisms, as explained above.\(^22\)

2. Infrastructure and Operational Cost-efficiency
According to this principle, network tariffs should contribute to reducing infrastructure costs by reducing or shifting peak demand, as well as reducing operational—including administrative—costs.

3. Cost Recovery
Network tariffs should ensure full recovery of all allowed network costs that have been efficiently incurred.\(^23\) They should also enable a reasonable return on capital. This results in a balancing exercise between costs and reasonable return on capital. What is considered to be reasonable return on capital will usually be regulated and a revenue cap set.

4. Non-discriminatory
In principle, network tariffs should be non-discriminatory, meaning that there should be no undue discrimination among network users.\(^24\) Indeed, tariffs should aim to ensure equal treatment for all customers, and all users of the network should contribute to cost recovery. Therefore, some countries apply network charges on generation, including at the distribution level. The extent to which a non-discriminatory tariff achieves distributive justice can be subject to debate, because, under certain circumstances, a difference in treatment serves to repair a difference of situation and would therefore appear to be fairer as long as it does not provide an unjustifiable advantage for the beneficiaries and a greater burden on the other users. Therefore, exemptions from

\(^{21}\) Schittekatte and Meeus, ‘Introduction to Network Tariffs and Network Codes’, 7.
\(^{22}\) See section II.C.
\(^{24}\) CEER ‘Guidelines Good Practice Tariffs’, 7.
network tariffs, in part or in full, or a differentiated network tariff reflecting different types of users, may be justified.

5. Transparency, Simplicity, and Predictability
The three separate but related criteria of transparency, simplicity, and predictability contribute to good governance in network tariff policy. When the methodology for calculating tariffs is transparent, it will contribute to a better understanding of the allocation of costs between the different users, and will help to prevent any non-justifiable preferential or discriminatory treatment.

The tariff design should be simple so as to enable customers to understand the purpose and structure of the tariff—and thus to respond to its signals—as well as to contribute to implementation. Simplicity in network design may prove to be demanding to achieve, in particular with the new dynamics observed in the energy system. As pointed out in section II.A, there is a wide variety of design solutions for network tariffs. Tariffs have also become increasingly differentiated, with more and more hybrid systems having multiple components, with the view of better reflecting the diversity of users and thereby contributing towards energy justice. The diversity of network users will only continue to increase as the energy system diversifies. A simple methodology for network tariffs could help to decrease the risk of perceived injustice among network users, and in particular among households. It will facilitate the implementation of the tariffs and the achievement of its different objectives. A simple methodology for network tariffs will also support the principle of cost-efficiency, as users will better understand the basis for the tariffs, enabling them to adjust their use of the network. Simplicity of network design enhances accessibility to all user categories.

With a predictable regime for network tariffs, network users can better estimate the costs of their network use. The tariff may represent a lower burden on energy consumers as it will also enable DSOs to better plan grid operation and development that adheres to a sound economic model. Predictability is nevertheless challenged as a principle of good network design by the changing nature of the energy system. As changes are happening more rapidly and to a greater extent than before, network tariffs will also need to evolve and adapt.25 Maintaining a predictable network tariff structure will also be a complex task for the NRAs and the DSOs.

6. Fairness as a Necessary Balance of Interests
Fairness is recognised as one of the guiding principles of good network tariff design. A central requirement will be to strike the right balance between different interests and different objectives. The concept of fairness in network tariff design has been debated by the economic theory, with reference to the other affiliated concepts of distributive effects, transparency, and graduality.26 In that sense, fairness encompasses the objectives defended by the principles of cost-reflectiveness, non-discrimination, transparency,

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26 Schittekatte and Meeus, 'Introduction to Network Tariffs and Network Codes', 12.
simplicity, and predictability, but adds a distributional dimension with elements of affordability.

Being fair may require network tariffs to be even more differentiated, and even sometimes discriminatory to compensate for an unfair situation at the outset. For example, not all customer usages of the network are flexible, and consumption may not be reduced or relocated. Similarly, the different purposes for using the network are not easily categorized without being discriminatory. Certain uses may appear to be unnecessary (e.g. charging expensive electricity-powered recreational appliances), while others will be vital for the users (e.g. medical appliances, work equipment). As pointed out by some authors, higher network tariffs would be neither fair nor have an effect on consumption.\textsuperscript{27} Moreover, network tariff structures should not distort market signals intended to indicate when it is efficient for individual power plants to run.

National methodologies for network tariffs very commonly include some differentiation parameters aimed at ensuring fairness. One way to do this is to distinguish between different categories of customers by defining them in terms of different tariff classes. A tariff class will refer to a customer segment or category. It may be defined by voltage level (kV) as a measure of capacity, by customer types (e.g. household or industrial), by geographical locations (definition of zones), or by type of metering solutions (e.g. whether metered or unmetered and type of meter). A recent study, performed for the European Commission, reveals that in the EU, tariff classes are mostly defined by voltage level.\textsuperscript{28} At the same time, cross-subsidization between consumer groups should be avoided.

Distribution network tariffs can also take into account the different types of charging base. The charging base will reflect individual variables such as varying volumes and time-of-use, and could include flat rate and non-linear rates.\textsuperscript{29}

A point of divergence in national legislation is whether the tariff should be uniform or should differ between locations within the national territory. For example, in France, the legislation requires that the network tariff shall be uniform throughout the whole national territory in accordance with the notion of ‘territorial solidarity’, which is defined in the Energy Code. Likewise, the ‘postage stamp’ principle aims to ensure that the price does not take into account the distance covered by the energy between the production site and the consumer site, reflecting ‘individual solidarity’.

In the context of the energy transition, with a more diverse and complex energy system, one may wonder whether the meaning of fairness in network tariff design has changed. One might also remark that achieving fairness in network design has become an increasingly complex exercise.

\textsuperscript{27} Ibid.
\textsuperscript{28} Refe, Mercados, and Indra, ‘Study on tariff design for distribution systems’, Final Report, prepared for Directorate-General for Energy (28 January 2015), 7 (hereinafter Refe, ‘Study on tariff design’).
\textsuperscript{29} Under a flat rate tariff, all consumers pay the same unit price regardless of capacity reached or volume consumed. A non-linear tariff differentiates unit prices according to capacity or volume consumed.
B. Safeguards: Unbundling Requirements and the Role of National Regulatory Authorities (NRAs)

Two legal requirements indirectly serve as safeguards for good network tariff design, namely: the unbundling requirement and the role of the NRAs in determining network tariff methodology.

First, the unbundling requirements aim at: (i) preventing DSOs from abusing their natural monopoly position over the distribution network in the situation where they are part of a vertically integrated undertaking; and (ii) preventing market distortion through cross-subsidization. Unbundling requirements can take several forms (legal, ownership, and functional unbundling) and be applied vertically or horizontally. At EU level, the Electricity Directive defines minimum requirements in terms of legal unbundling of distribution activities from other activities not related to distribution where the DSO is part of a vertically integrated undertaking. Ownership unbundling can also be applied. Finally, functional unbundling requirements in terms, inter alia, of management separation and independent and effective decision-making will influence the manner in which network tariffs are designed. Notably, the basis for cost recovery calculation and optimal operation of the grid should be the focus of the DSO when considering the design and calculation of network tariffs.

Second, the NRAs should play an active role in elaborating the methodology for network tariffs. Indeed, to ensure that the DSO will not abuse its position of natural monopoly, the DSO itself should not set the tariff for using the network — although it often can make proposals — and should be regulated. The methodology criteria for network design are often already defined in the legislation. The NRA will apply those criteria when elaborating the tariffs. In some countries, the NRA and the DSOs share the responsibility for designing, with the NRA setting overall principles and ensuring compliance, while the DSOs propose the exact tariff structure. The NRA will notably assess the revenue a DSO can expect — often with a cap — and will ensure that overall policy objectives are taken into consideration. In this sense, the NRA is a more appropriate entity to address concerns such as energy justice than the DSOs themselves, and will thereby serve as a safeguard. This also presupposes that those considerations and policy objectives are defined in the national legislation.

Under EU law, the Electricity Directive provides that the NRA ‘shall’ have the duty of fixing and approving distribution tariffs or their methodologies, on the basis of transparent criteria. The independence that the NRAs shall have in setting and approving tariffs works as an important safeguard, that the European Commission is eager to see implemented. As an example, in 2018, the European Commission referred Germany to the European Court of Justice of the EU (CJEU) for not having ensured that the rules concerning the powers and independence of the NRA were fully respected, and

in particular the full discretion that the regulator enjoys in setting network tariffs and other terms and conditions for access to networks and balancing services. The details of network tariff setting were laid down to a large extent in detailed regulations adopted by the federal government, and not enough left to the discretion of the NRA.\textsuperscript{32}

The 2019 recast of the Electricity Directive contains a precise list of policy objectives which ‘shall’ guide the action of NRAs, including in the matter of tariff design and approval. Article 58 of the Directive (EU) 2019/944 refers, inter alia, to the objectives of: promoting a competitive, flexible, secure, and environmentally sustainable internal market for electricity within the Union, and effective market opening for all customers and suppliers; helping to achieve, in the most cost-effective way, the development of secure, reliable, and efficient non-discriminatory systems that are consumer-oriented; ensuring that customers benefit through the efficient functioning of their national market, helping to ensure a high level of consumer protection; helping to achieve high standards of universal service and of public service in electricity supply, contributing to the protection of vulnerable customers. These objectives are not the only ones defined in Article 58 and the Electricity Directive in general, but they specifically target consumers’ interests, which was indeed one of the focus areas for the whole ‘Clean Energy Package for All Europeans’. The long list of ambitious objectives provided in the Directive proves the complexity of the task given to the NRAs when balancing those different interests in the elaboration of network tariffs.

C. Re-designing Electricity Tariff Structure for Increased Fairness: Possible Legal Approaches

1. Balancing Interests in the Re-design of Network Tariffs

Traditionally, consumers and other grid users have relied exclusively on the network for their electricity supply. Network costs have therefore been mainly recovered to reflect network usage through a volume-based charge. With the changes currently taking place in the energy system, network costs are more driven than before by the growth of embedded generation, demand response, and use of flexibility. Consequently, DSOs face a higher volume and revenue risk.\textsuperscript{33} DSOs are increasingly exposed to volume risk because of lower than expected demand. Indeed, many European countries have been experiencing significant reductions in energy usage.\textsuperscript{34} For consumers, new energy production, storage, and saving solutions change the volume of electricity consumed on the grid. Both DSOs and consumers expect that network tariffs reflect these new realities and provide for a fair balance of interests. Therefore, there is a general consensus

\textsuperscript{33} Centre for Competition Policy, ‘Designing distribution network tariffs that are fair for different consumer groups’, report for BEUC, 2018, 13.
\textsuperscript{34} According to Eurelectric, total distributed energy fell by 6.8 per cent in Spain and 8.6 per cent in Italy between 2011 and 2014. Source: Eurelectric, ‘Network Tariffs—A Eurelectric Position Paper’, 2016.
on the need to move from volumetric tariffs to capacity-based tariffs—often with TOU tariffs—which will better reflect the main drivers of network costs.

Network tariffs are identified by the Agency for the Cooperation of Energy Regulators (ACER) as a key instrument and an area of further action.\(^\text{35}\) According to ACER, 'distribution tariff structures will be reviewed to ensure the efficient use of distribution networks, including through an assessment of whether the costs imposed on networks by their usage at peak times should be reflected in tariffs.'\(^\text{36}\) One step in that direction has been the publication by the Council of European Energy Regulators (CEER) of Guidelines of Good Practice for Distribution Network Tariffs.

Re-designing network tariffs in the context of the energy transition does not mean starting from scratch. It will be necessary to build on existing models and the principles of good tariff design. The novelty will be the increased complexity of the task as the number of parameters and objectives increases. Proposing a whole new structure may negatively affect the customers who made investments based on the previous tariffs and would be perceived as unfair. Those challenges can be accommodated by setting transition periods or temporary exemption regimes, but this will also increase the complexity of tariff implementation.

Thereafter, not all consumers will become active, and tariffs should certainly incentivize consumers, but not penalize those who are not in a situation to invest in new smart energy solutions. Therefore, network tariffs should reflect fairness between active and passive domestic consumers. Similarly, fairness should be applied along the voltage chain, and cost allocation should be balanced between voltage levels. The ‘cascading principle’ in terms of payment of distribution network tariffs has been proposed as a solution.\(^\text{37}\)

Even more fundamentally, changes in grid structures (central vs decentralized grids; unbundling and end of vertically integrated companies) and ownership (public vs private) raise the question of ascertaining whether the grid still delivers a social good that requires socializing its costs.

2. Possible Legal Principles and Regulatory Approaches in Network Tariff Re-design

The question for law makers is to ascertain which regulatory approach to pursue. Based on the reforms engaged so far, a preliminary list of legal principles of network tariff re-design can be identified and are presented below. If these are not principles per se, the mechanisms identified below can serve as benchmark regulatory approaches.

In accordance with the hierarchy of legal norms (lex superior), general objectives are best set in the legislation as they will serve as guidance for NRAs in the elaboration of tariff methodologies and supervision. Those general objectives will also serve the interpretation of tariff provisions in case of judicial review.\(^\text{38}\) Objectives of energy justice,

\(^\text{36}\) Ibid.
\(^\text{37}\) Schittekatte and Meeus, 'Introduction to Network Tariffs and Network Codes', 13.
\(^\text{38}\) See section V.
consumer protection, and core principles of good tariff design should therefore be defined at the level of the law.

Methodology components for tariff setting can also be defined directly in the law or by administrative decision, and a clear legal basis in the legislation is preferable. Likewise, the rights of DSOs and the different ‘system users’ should be clearly set by the legislation.\(^{39}\) The definition of a ‘duty to consult’ interested parties on proposed network tariffs and/or methodology is also common practice in several countries.\(^{40}\) It derives from general public consultation obligations and permits a better assessment of the needs of the load, proposed solutions and in fine reinforces the acceptability of network tariffs.

The structure of the distribution tariffs needs to be regularly updated, and this need will become more important in the future. A rapidly changing energy system and technological developments will require regular updates of the tariff structures.\(^{41}\) This will require regulatory flexibility and legal innovation. Long legislative processes for amending tariff methodologies are not well suited for addressing those rapid changes, and the idea of using a ‘regulatory toolbox’ and ‘Guidance of best practice’ is gaining momentum, as reflected by ACER in its ‘Bridge to 2025’ Paper. A toolbox could rank the different tariff options according to policy objectives and desired effects.

IV. Need for Coordination and Even Harmonization: Towards a Common Tariff Methodology?

A common approach to tariff methodology may be needed for several reasons. First, it can help in sharing best practices. Second, it may be necessary in the event of integrated markets such as the European internal energy market. The EU is taken hereafter as an example of the discussions on harmonization of network tariff methodology, the question being to ascertain whether harmonization is desirable in the EU context, and if yes; which level of harmonization is the most adequate and consistent with EU law principles. As a starting point, it must be recalled that distribution grid tariffs are the competence area of the Member States, implemented by the NRAs. Their structure will consequently vary from country to country, including within the EU. Meanwhile, certain provisions of secondary EU law already harmonize some criteria of distribution network tariff design. Those questions have been discussed in the framework of the Clean Energy Package for All Europeans.

\(^{39}\) See section V.

\(^{40}\) See also Article 37.12, Electricity Directive 2009/72/EC. The ‘duty to consult’ on proposed distribution tariffs is for example defined in the French Energy Code, Article L. 341-3.

\(^{41}\) Certain tariff structures, including e.g. elements of time-of-use tariffs, will be dependent on the use of IT/digital tools such as smart meters.
A. EU Harmonized Provisions on Principles of Distribution Network Tariffs

The EU legal framework already contains a series of requirements related to the design of network tariffs in line with the principles identified above. General requirements are derived from primary EU law, while more specific network tariff design criteria are defined in the Electricity Directive, the Electricity Regulation, and the Energy Efficiency Directive.

Primary EU law contains general provisions which are relevant for network tariff design. Internal market rules will apply when national measures represent, or may represent, direct or indirect barriers to trade. The principle of non-discrimination in network tariff design finds legal basis in treaty provisions on competition. For example, exemption from network tariffs has been an issue for consideration under state aid rules. The European Commission reached in 2018 a negative decision against a German measure fully exempting certain large German electricity users from network charges in 2012–2013. The costs incurred by the exemption were financed by a special levy imposed on final electricity consumers. Because electricity consumers were obliged to pay the surcharge under German law and the German State has control over the funds, the measure constituted state aids, and could not be justified. The European Commission requested changing the regime and ordered the recovery of the illegal aid perceived.42

The Electricity Directive and the Electricity Regulation contain a series of requirements on the design principles for distribution network tariffs. The Directive requires that tariffs for access to networks should be transparent and non-discriminatory.43 They shall be cost-reflective, and take into account the long-term, marginal, avoided network costs from distributed generation, demand-side management measures44 and enable active consumption.45 Based on the objective of consumer protection, all European industry and commerce, including small and medium-sized enterprises, and all citizens of the Union, should be able to enjoy ‘reasonable tariffs’, for reasons of fairness, competitiveness, and job creation. The interests of the DSOs are protected by provisions on remuneration and the need to allow the necessary investments in the networks.46 The Directive requires NRAs to ensure that, when fixing or approving network tariffs and methodologies, DSOs are provided with appropriate incentives ‘...to increase efficiencies, foster market integration and security of supply and support the related research activities’47 The CJEU can conduct a judicial review of those provisions and Case C-771/18, Commission v Hungary, is a case to follow. In this case, the Commission has brought Hungary before the court after it found that Hungarian law excluded certain

42 SA.34045—Exemption from network charges for large electricity consumers ($19 StromNEV) in Germany, 28 May 2018.
43 Recital 32, Directive 2009/72/EC.
44 Recital 36, Directive 2009/72/EC.
45 Article 15, Directive 2009/72/EC.
46 Article 37.6(a), Electricity Directive 2009/72/EC.
47 Article 37.8, Electricity Directive 2009/72/EC.
types of costs from the calculation of network electricity tariffs, in violation of the principle of cost recovery of tariffs provided for in the Electricity Regulations. In addition, the Commission found that Hungary adopted amendments to its energy legislation which jeopardize the right of market operators to a full judicial review of the national regulator’s decisions on network tariffs.48

The Energy Efficiency Directive 2012/27/EU requires Member States and their NRAs to respect a series of requirements when developing distribution tariffs, that is: provide incentives for grid operators to enable energy efficiency improvement measures at the level of network users;49 permit components of tariff structures with a social aim;50 and ensure that network tariffs allow suppliers to improve consumer participation in system efficiency, including demand response.51 The Directive also requires Member States to ensure that network tariffs fulfill a series of criteria set out in Annex XI to the Directive, also taking into account the relevant network codes and guidelines. Inter alia, Annex XI requires that network tariffs may support dynamic pricing for demand response measures by final customers, such as time-of-use tariffs; critical peak pricing; real time pricing; and, peak time rebates.

B. The Clean Energy Package for all Europeans and Further Harmonization Attempts

In its original proposal for revised Electricity Directive and Regulation, the European Commission developed several arguments in favour of further harmonization of distribution network tariffs. The Commission notably argued that: uncoordinated national policies concerning the principles for distribution tariffs may distort the internal market; distributed generation or energy storage services will face very different incentives to participate in the market; new technologies and energy services will be increasingly traded across borders; and ‘uncoordinated national policies concerning the principles for distribution tariffs may distort the internal market to an extent that distributed generation or energy storage services will be under very different incentives to participate in the market’.52 Market fragmentation was identified as another risk.53 In the proposal for revised Electricity Regulation, the Commission proposed to include the harmonization of distribution tariff structures on the list of network codes or guidelines.54 This would have resulted in the possibility of drafting a network code on distribution network tariffs.

49 Article 15.1, Directive 2012/27/EU, as amended.
50 Article 15.3, Directive 2012/27/EU.
51 Article 15.4, Directive 2012/27/EU.
52 COM(2016) 864 final/2.
53 The risk of market fragmentation as a consequence of the lack of harmonized tariff methodology is also referred to in Article 18.9 of the Electricity Regulation (EU) 2019/943.
54 COM(2016) 864 final/2.
Any proposal for EU harmonization must comply with the necessity and subsidiarity principles. In the present case, several stakeholders challenged the need for a harmonized approach. Notably, CEER opposed the idea, arguing that: costs vary between different systems, both within and between Member States, making tariffs difficult to harmonize at EU level; ownership of distribution grids vary, and so the underlying economic model; generation and consumption patterns vary widely between countries; and finally, there are differences between the degrees of interconnection.\(^{55}\)

C. The Compromise Solution Adopted in the Revised Electricity Regulation

Article 18 of the Electricity Regulation (EU) 2019/943 contains the most detailed provisions on tariff methodologies, supplementing the general criteria defined in the Electricity Directive. Those provisions must be applied without prejudice to the provisions of the Energy Efficiency Directive, to which they refer.\(^{56}\)

Article 18 enounces a series of general principles for tariff design, that both reiterate and elaborate on the principles defined in the Electricity Directive and the Energy Efficiency Directive. Charges for use of networks\(^{57}\) shall be cost-reflective, transparent, reflect actual costs incurred in accordance to an efficient operation of the network, and shall take into account the need for network security and flexibility. They shall be applied in a non-discriminatory manner. The Regulation also requires (‘shall’) that the charges for use of the network do ‘not include unrelated costs supporting unrelated policy objectives’.\(^{58}\) This requirement narrows the scope of the objectives that can be reflected in network tariff regulation. Furthermore, Article 18 requires (‘shall’) that use of network charges be elaborated in such a way that they do not discriminate, positively or negatively, against producers or consumers. They shall not discriminate either against energy storage or aggregation, and shall not create disincentives for self-generation, self-consumption, or for participation in demand response.\(^{59}\) These provisions refer directly to the new production and consumption patterns observed in the energy system, and translate distributive energy concerns relevant for network tariff regulation.

Article 18 provides for some few general requirements as to the possible content of tariff methodology. It both repeats general principles, such as cost-reflectiveness,\(^{60}\) infrastructure, and operation cost-efficiency,\(^{61}\) and introduces two new possible methodology

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\(^{56}\) Article 18.1, Regulation (EU) 2019/943.

\(^{57}\) Often, when referring to charges for the use of networks, both the Electricity Directive and the Electricity Regulation also refer to charges for related network reinforcements. The present chapter only refers to charges for use of networks.

\(^{58}\) Article 18.1, Regulation (EU) 2019/943.

\(^{59}\) Article 18.1, Regulation (EU) 2019/943.

\(^{60}\) Article 18.2 and 18.7, Regulation (EU) 2019/943.

\(^{61}\) Article 18.8, Regulation (EU) 2019/943.
components. First, the level of the tariffs applied to producers and/or final customers 'shall provide locational signals at Union level'\textsuperscript{62} The Regulation does not explain how this requirement can be applied, but one can interpret it as a way by which to promote the European dimension in the assessment of cost-efficiency, and to send signals to both producers and consumers, to the extent that they can relocate. Second, the Regulation provides that national distribution network tariff methodologies 'may' introduce 'performance targets' for assessing DSO cost effectiveness and operative efficiency.\textsuperscript{63} The idea of introducing 'performance indicators' was already promoted in a 2015 study for the European Commission.\textsuperscript{64}

However, the Electricity Regulation does not harmonize the methodology components themselves. The compromise reached resulted in a minimum solution on this point.\textsuperscript{65} Within a very short time frame (by 5 October 2019), ACER had to provide a 'best practice report on transmission and distribution tariff methodologies' which had to cover eight mandatory points: (a) the ratio of tariffs applied to producers and tariffs applied to final customers; (b) the costs to be recovered by tariffs; (c) time-differentiated network tariffs; (d) locational signals; (e) the relationship between transmission tariffs and distribution tariffs; (f) methods to ensure transparency in the setting and structure of tariffs; (g) groups of network users subject to tariffs including, where applicable, the characteristics of those groups, forms of consumption, and any tariff exemptions; and (h) losses in high, medium, and low-voltage grids.\textsuperscript{66} ACER shall update the report at least every two years. The methodology components listed focus on the types of signals that can be used for the different types of system users as well as the incentives used for DSOs. They can contribute to distributive energy justice by levelling the playing field between the different system users, by insisting on the ability of those users to react to signals (transparency) and by insisting on cost-recovery through tariffs (cost-basis).

Beyond the information value of this report, NRAs will be obliged to take it into consideration when fixing and approving network tariffs or their underlying methodologies. This requirement is relatively weak in terms of enforcement, since the Commission will hardly start infringement proceedings for lack of implementation of this provision. This requirement must therefore be seen as a first step towards a more coordinated approach between Member States in terms of tariff methodology. It will also certainly contribute to the elaboration of the 'regulatory toolbox' as a regulatory approach.\textsuperscript{67}

\textsuperscript{62} Article 18.3, Regulation (EU) 2019/943.
\textsuperscript{63} Article 18.8, Regulation (EU) 2019/943.
\textsuperscript{64} Refe, 'Study on tariff design', 7.
\textsuperscript{65} See comments in section IV.B.
\textsuperscript{67} See section III.C.2.
V. Procedural Justice and Network Tariffs Adjudication

The legal basis for network tariff principles and methodology can be found in different instruments. Network tariff design principles and methodology are usually defined in legislation and implementing acts. Tariff methodology and specific tariff setting decisions can be adopted by NRAs (administrative decisions). Finally, DSOs will apply the methodology in their contractual arrangements with system users.

Access to dispute settlement mechanisms and judicial review for challenging the legality of the network tariff will vary according to the type of legal act in question, but most jurisdictions define some basic rights for operators and network users in terms of dispute resolution and access to justice. It is beyond the scope of this chapter to review the question of procedural justice applied to network tariffs in detail, but some general observations can be made.

First, most legislation has provisions for dispute settlement mechanisms, either in general terms or specifically for network tariffs. In the EU context, the Electricity Directive requires NRAs to act as the dispute settlement authorities when an affected party wants to complain against a DSO in relation to that operator’s role, which includes implementation of network tariffs.\(^\text{68}\) The Electricity Directive refers explicitly to the right to complain concerning a decision on tariff methodologies.\(^\text{69}\)

Second, most legal systems ensure a system of judicial review for administrative decisions. The EU Electricity Directive refers to the right to judicial review of NRAs’ decisions, including tariffs. The right of market operators to a full judicial review of the NRAs’ decisions on network tariffs is subject to current legal proceedings in a case brought by the European Commission against Hungary.\(^\text{70}\)

Third, when reviewing the legality of the tariff decisions, the point will often be to know the extent to which the tariff complies with the principles and methodology defined in law.\(^\text{71}\) One issue courts could be confronted with is the intensity of the judicial review in such cases, and, in particular, how far they aim to go in the interpretation of the tariff methodology. Another general point is to ascertain which principles the judicial review should be based on, and whether it should be limited to the objectives of network tariff setting or if it should extend to broader objectives of energy policy, and even climate and social policy. It can be noted that the 2019 Electricity Directive provides that NRAs can require DSOs to change their terms and conditions if they are not in accordance with the tariff principles defined in Article 18 of the 2019 Electricity Regulation.\(^\text{72}\)

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\(^\text{68}\) Article 37.11, Directive 2009/72/EC and Article 60.1 Directive (EU) 2019/944.

\(^\text{69}\) Article 60.3, Directive (EU) 2019/944.

\(^\text{70}\) Case C-771/18, European Commission v Hungary, action brought on 7 December 2018.

\(^\text{71}\) For example, the interpretation of network tariffs structure and methodology has been subject to judicial review in France, with a decision which resulted in the review of the tariffs by the NRA. See the judgment by Conseil d’État, 9th and 10th Chambers jointly, 09 March 2018, case 407516.

\(^\text{72}\) Article 60, Directive (EU) 2019/944.
Finally, network tariff adjudication could have a reparative justice dimension when the NRA or the court can decide on compensatory measures if the final distribution tariffs or methodologies deviate from the provisional tariffs or methodologies proposed by the DSOs. This situation is foreseen by the EU Electricity Regulation.

VI. Conclusion

As demonstrated by this chapter, there is a basic distinction between the principles for network design and the tariff methodology. This distinction is reflected in the legislation itself. The example of the EU shows that it is possible to agree on general common principles, but it is more difficult to agree on a harmonized approach to tariff methodology.

Tariff structure is important in terms of giving correct signals/incentives for energy efficiency (consumption), investment efficiency, and choice between different energies. The general trend followed at the moment is to move towards capacity-based tariffs, with the intention of better reflecting OPEX. In any case, tariffs must follow a clear structure (volume- or capacity-based or a combination), must follow the design principles, and must help to fulfil the objectives of energy, climate, or even social policy.

Distribution tariffs are tools used to achieve a series of goals. However, they cannot solve all problems and achieve all policy goals at the same time, particularly in the more complex energy system of the energy transition. They must be seen as a part of a regulatory puzzle, where their design reflects the objectives set for them. As put by CEER, ‘there are other tools and mechanisms to achieve wider goals’. They primarily give signals, provide incentives, and enable cost recovery.

Finally, distributive energy justice considerations in the context of network tariffs have a specific meaning. In the electricity transport networks, electricity consumers are seen as ‘system users’, together with producers. This makes a difference in both terminology and regulatory approach. In the context of EU legislation, distributive energy justice considerations relate primarily to, on the one hand, the fair treatment of the different ‘system users’, and, on the other hand, the fair balance of interests between general policy goals, operation and development of the systems, DSOs’ financial situations and users’ rights. Thus, there appears to be a clear distinction between general consumer protection issues and distributive energy justice issues for active/responsive consumers, that is, consumer empowerment. Distribution network tariff principles do not aim at consumer protection, but at ensuring a fair balance of interests. Energy transition aspects are directly integrated in that balancing exercise by the recognition of new ways to use or not use the network.