ERGEG Consultation
on the Treatment of Losses by Network Operators

Statement of RWE

Introduction

RWE welcomes the opportunity to submit an opinion in the framework of the ERGEG consultation on the treatment of losses by grid operators. We would like to point out however that the need for any harmonisation in this field is not apparent. The "level playing-field" mentioned in the consultation document would only be of relevance if and as far as grid operators would compete with each other. As far as regulated natural monopolies are concerned this argument is then not longer valid. Furthermore any undistorted comparison of the efficiency of grid operators faces much more significant problems than different regimes for the treatment of losses. For these reasons we recommend that the principle of subsidiarity is applied and any harmonisation regarding the treatment of losses – especially for distribution system operators (DSO) – is scrutinised thoroughly with the focus whether different rules set by different national regulators really pose a problem. Harmonisation should not be pursued for the sake of harmonisation.

Questions and specific answers

1. What is considered an acceptable definition of losses?

Most importantly technical and non-technical losses need to be distinguished. However there is no reliable method available to separate these especially for DSO. For this reason any distinction between technical and non-technical losses has no practical application and is almost purely theoretical.

In principal technical losses occur during the transmission and distribution of electricity and vary with the level of utilisation of the network capacity. Transmission system operators (TSO) are subject to lower levels of losses, while at lower voltages (i.e. with DSO) usually higher levels of losses occur. The reason for this is that higher voltage levels require a lower current to transmit/distribute the same amount of electric energy. This interrelationship can be described as a proportionality of the losses to the square of the current, which should be accepted as a base formula for all network loss calculations. Additionally the length of the lines, the historical development of the grid structure and the historical development of voltage levels should be considered. These factors could form the base for a mathematical deduction of an acceptable level of technical losses.

Non-technical losses are a different issue. They usually result from consumption for operational purposes (non-metered operational current), theft, metering errors and/or deviations in the readout procedure. Furthermore non-metered consumption like public lighting could be the reason for non-technical losses, which should be clearly differentiated from other forms of non-technical losses. So far the process of determining non-technical losses is not finished everywhere. It is evident that the level of non-technical losses depends on various factors that differ from Member State to Member State and are not only the result of different procedures, but also of different historical developments. For these reasons it is very problematic to harmonise an acceptable definition on non-technical losses.

In any case there is no apparent reason to standardise the definition of losses in different Member States. We even assume that any attempt to harmonise a definition of losses would fail due to enormous differences in grids in different Member States. This clearly is an issue that can be left to subsidiarity.

2. Should power losses refer only to technical losses or is it acceptable to include also non-technical losses?

The separate measurement of non-technical losses is very expensive, since for that purpose all medium/low voltage local transformers and connections in low voltage need to be metered continuously. On the DSO level it is for these reasons not feasible to isolate technical from non-technical losses in an efficient way. Additionally in many Member States the amount of non-technical losses compared to the whole amount of losses seems to be negligible. Because of the high ratio of metering costs and the amount of non-technical losses, we suggest to refer to overall losses instead of separating both kinds.

An exception to this should be non-technical losses that can be estimated through appropriate mathematical calculations. The consumption of public lighting can be calculated by reference to the lighting hours, which would also help to clarify that such consumption should not be referred to as losses. Other non-technical losses can in some cases be quantified by reliable estimates. Therefore where reliable quantifications are possible, non-technical losses should be subtracted from the whole amount of losses in order to improve the evaluation of losses.

Again, this is an issue that is best solved according to the individual situation in each Member State.

3. Which are the key components for defining losses?

The first component of course consists of the technical losses that result from transmission or distribution of electricity. In the case of non-technical losses the distinction between losses that can be quantified and attributed to certain causes and those losses that cannot be differentiated from technical losses has to be made. Only for the first group of non-technical losses further detailed research into the causes seems justified.

Basically the amount of technical losses is proportional to the square of the current. The current itself again is influenced by different factors: First it depends on the amount of transits, which in turn depend on the development of the market. Next the current is also a result of the historical development of each grid. It is therefore very difficult to influence the grid structure in the short term.

4. What ways exist to improve the evaluation of losses in distribution networks?

This is a significant challenge. Specific non-technical losses that can be estimated (like public lighting) should be isolated and treated accordingly. These questions are best addressed individually on the Member State level as both the causes for non-technical losses as well as the parameters influencing the magnitude of technical losses are heavily dependent on historical developments.

5. What should be a reasonable and acceptable level of power losses at the distribution level and the transmission level? Which types of losses could be most easily reduced?

The definition of an acceptable level of losses must not only be treated differently for TSO and DSO, but should also be defined individually for every single grid. It is also important to remember that a certain level of technical losses is a an inevitable consequence of operating a grid and not a sign of inferior quality.

In the case of every single TSO an individual determination of the acceptable level of losses is feasible, but has to take several factors into account. Electrically losses increase to the square of the utilisation of a line or a certain infrastructure. Much heavier loads for German TSO were caused by an increase in transits in recent years. The next decade will probably see a northward migration of electricity generation in Germany while the load centres remain in the south. The main reasons for this are the intended phase-out of nuclear energy, the construction of large off-shore wind parks and a general trend to site new plants based on fossil fuels close to the source of import coal. These effects will most probably result not only in the construction of new lines, but also in an even higher use of existing infrastructure. This again will lead to significantly higher losses. All these developments are beyond any significant influence of the TSO.

In addition, although the development of the infrastructure is the responsibility of the TSO, it is not only subject to regulatory approval, but also only effective in the long term. Significant extensions or modifications to the existing infrastructure are certainly long-term issues.

As a consequence, although the losses of a TSO can be measured quite reliably, they are subject to large fluctuations in the short-term beyond the control of the grid operator. The effects of any measures of the TSO are not only of a smaller magnitude, but will only yield results in the long-term. For these reasons it is not possible to set a harmonised value of acceptable losses at the TSO level throughout Europe. Instead losses should be regarded as an external factor resulting from the energy transmitted through the grids. As a consequence, in case TSO are legally obliged to purchase energy to cover losses in their networks they should be allowed to pass through the associated costs.

For the DSO the problem is different. A mathematical formula taking account of the length of the grid, the structure of the grid and the voltage level may result in a typical level of technical losses. However as a large part of non-technical losses cannot be separated from technical losses and non-technical losses are dependent on the individual conditions in each country and for each DSO, a harmonised approach to determine an acceptable level of losses for a DSO is not only unnecessary, but also impossible. Again, an individual formula for each Member State is needed.

Regarding the reduction of losses, it must be kept in mind that the marginal cost of the reduction of losses increases. This implies that DSO with appropriate operational standards and accordingly a low level of losses face proportionally higher costs to reduce their technical losses than DSO with a lower technical standard. Often the further reduction of losses will thus not pose a valid and sensible alternative. In any case however the limitations already mentioned for TSO apply: Any reduction of technical losses by the grid operators is only possible in the long-term.

Furthermore even technical losses also depend on factors like length and cross sections of the lines, which differ between different grids. As a result it is not possible to make a statement about an acceptable level of power losses for TSO and DSO in

general. The acceptable amount of technical losses needs to be defined individually for every single grid through an appropriate calculation regarding length of grid, the historical development of the infrastructure and the historical development of voltage levels. Usually, grids have been developing over decades and it requires significant time to change its basic properties. A general independent cap seems therefore not to be appropriate and would result in an unfair treatment. This also applies to the fact that grids in certain Member States already have a high technical standard what makes further reduction extremely expensive.

As a consequence of the wide range of sources for power losses, the level of power losses differ from country to country and even from grid to grid. For benchmarking purposes, a general determination of level of power losses or even percentages of cost reduction cannot be applied.

6. Who should be responsible for procuring electric energy to cover losses?

This is definitely the responsibility of the grid operators – both TSO and DSO. As the level of losses can to a minor extent be influenced at least in the long term, transferring the responsibility for the procurement would separate grid development from losses. It would then be much more difficult to plan for an optimum in both dimensions. Substitution through the implementation of complex regulatory mechanisms could provide compensation to a certain extent, but will always remain second choice. The much simpler and straightforward solution is to leave all relevant aspects to the responsibility of the grid operator, who will then automatically result in the optimum trade-off between investment and losses.

The alternative that the electric energy to compensate for losses is procured by the grid users directly is not efficient for the following reasons:

- Neither the grid users directly nor the entities responsible for the balancing groups have sufficient knowledge about the current state of losses especially at the TSO level.

- In any case the lower level of flexibility on the part of the grid users would most probably result in some differences remaining with the grid operator in any case, which would result in multiple actors sharing responsibility. This cannot be advantageous.

- Distributing the responsibility for the procurement of losses to various actors provides less transparency than concentrating this task at the grid operator.

- The task of minimising the cost of grid losses and of improvements in the infrastructure is distributed over many actors. Any optimisation will then require complex regulatory estimates instead of the implementation of an incentive mechanism that is directed only at the grid operators. The necessary information that is needed by the regulator to solve this optimisation problem is most probably not readily available.

The responsibility of the grid operator does not exclude however the possibility of outsourcing the procurement of electric energy to a trading unit, e.g. via public tenders or service level agreements. This could be an option which might be explored in more detail.

7. How should electric energy to cover losses be procured in a market-oriented way? Which solution is the most efficient?

The grid operators as regulated entities should be obliged to procure the energy in a transparent way, although confidentiality of relevant information provided by bidders must be maintained in any case.

As shown above, both TSO and DSO can reduce the amount of technical losses only to a small degree and only in the long-term. The fact that the amount of losses thus basically cannot be influenced by the grid operators makes it even more important to have clear rules on how the energy for the compensation of losses is procured and accordingly which price is justified. This is the major reason why market-based procedures are so important. On the other hand if the grid operators adhere to agreed procurement procedures, the cost incurred should be acknowledged on the part of the regulator.

In addition, all procurement should possibly be strictly market-based and non-discriminatory provided there is a liquid wholesale market. A public tender is the preferred method which would comply with all the requirements listed above. The eligible bidders for such a tender would have to be prequalified, which would ensure the viability of any bids submitted. Further restrictions should not apply, which would allow any bidder from the market area to participate. In Germany this principle would imply a tendering procedure from every grid operator on a federal level where any prequalified bidder active in the German market could participate.

Further rules for the tender may be defined by the regulator. In particular the regulator may and should set the size of the individual tender, the period for which it applies and the time frame when bids may be submitted. The regulating agency should also define the criteria which decide the bids that are accepted. The regulator then has to accept the costs incurred by any tender that adheres to the procedure defined because the grid operator is unable to influence the market price paid for the energy.

A number of special characteristics of the TSO should be observed however: The losses of a TSO are dependent on load flow patterns that may change more frequently. TSO can reliably and quickly measure the losses, which makes short-term procurement an option for TSO where DSO purchase the energy further in advance.

In any case the procurement procedures need not to be harmonised and should be left to the subsidiarity of the Member States.

8. Should the costs of losses be covered by a special tariff?

This is definitely the preferred method. If the costs for the compensation of losses are included in the regular network tariff, transparency of the costs of the regulated entity is significantly impaired. A separate tariff would enable all parties involved to discuss any issues in a more focussed manner. In any case however it is most important that the costs incurred can be recovered by the grid operator.

In the case of a single tariff there is in particular the danger that higher costs for losses are compensated by deeper cuts for other costs of the grid operators or vice versa. On the other hand in the case of lower costs for losses it might happen that these are not fully used to the benefit of grid users, but rather to give room for rising costs in other areas.

9. What are the advantages and disadvantages of the aforementioned incentive mechanisms?

In general, a moderate incentive for both TSO and DSO to reduce the cost of losses is an appropriate design element of a regulatory mechanism. The regulator has to be careful however. As outlined above only a small part of the costs of technical losses can be influenced by the grid operator and that only in the long-term. This limits the effectiveness of any incentives to the grid operator. Accordingly, the incentives themselves must be tailored to the influenceable part of the technical losses. Otherwise the incentives will produce inefficient results, which will not help grid users in the long-term. Furthermore, incentive schemes must be fair in the sense that the underlying targets have to be achievable by the regulated entity. Rewards and penalties for out- or underperforming these targets should be balanced. Only in this case the regulated entity would exert the optimal level of effort to achieve the common target of lowering energy losses purchasing costs.

It is of utmost importance to remember that if the grid operator adheres to the procurement procedures set by the regulator, the price of the energy cannot be influenced. The only element that can be influenced by the grid operator is the quantity of the losses – and this only in the long term.

Neither are overly ambitious targets to reduce the cost of losses used to lower grid fees in general helpful for grid users as they will also fail to set proper incentives for the grid operator to obtain an optimum configuration. Here a maximum degree of transparency will help to ensure that the mechanisms are tailored to the targets at hand. Keeping this in mind, the best way would be to install an incentive mechanism that promotes the overall optimum of grid operation instead of focussing on separate targets like the minimisation of losses at the expense of other objectives.

Again different incentive mechanism can exist in different Member States without any harmful effect. The design of incentives is thus best left to subsidiarity.

10. Which key elements should be considered when assessing different regulatory incentive mechanisms?

As mentioned above, the incentive mechanisms must be extremely sensitive to the degree, to which the grid operator can really influence the costs incurred by the compensation of losses. Accordingly, the regulator should set incentives to reduce technical losses very carefully and only with a long-term target.

A fundamental error would it be however to design incentives for either TSO or DSO not only to reduce the amount of losses, but also the price at which the energy is procured. Instead the regulator should set transparent procedures as outlined in the answer to question no. 7. If the grid operators adhere to these procedures, there should be neither a benchmark regarding the procurement price nor any other reductions in the costs incurred, as the procurement price cannot be influenced by the grid operators.

11. Are there advantages in setting separate mechanisms for technical and non-technical losses?

As mentioned above, the design of incentive mechanisms should be drafted along the criteria, to which extent the grid operators are able to influence the costs for the com-

pensation of losses. This ability to influence the costs is obviously dependent on very different parameters for technical and non-technical losses. Accordingly, the incentive mechanisms have to have a fundamentally different design as well. An even better alternative would however be to have an incentive mechanism set for total losses with no distinction of the specific types of losses.

Yet still non-technical losses may be treated differently. However, the reduction of these costs is only rarely the sole responsibility of the DSO. Political targets and country-specific regulatory configurations contribute to the situation. For these reasons, incentives to reduce non-technical losses are to a large part dependent on the situation in the individual Member State and very difficult to harmonise.

12. Are there advantages in setting separate mechanisms for transmission and distribution losses?

The same criteria apply for this problem. TSO and DSO face different challenges in limiting the costs for the compensation of losses. For this reason, the incentive mechanisms should be designed with the respective problems of TSO and DSO in mind. In particular TSO normally have no or only very limited non-technical losses. Technical losses on the TSO level are extremely dependent on the load flows, which might change fundamentally from year to year. As the amount of losses can only be influenced in the long-term, any incentive mechanism faces the challenge to isolate the dominant effects of year-to-year changes from the longer-term effects generated by the actions of the TSO. This makes any incentive mechanism for TSO extremely difficult to design.

As far as DSO are concerned, it should be kept in mind that an increase in decentralised generation and changing load patterns resulting from mostly industrial customers being connected or disconnected also contribute to significant changes in load flows from year to year. These changes will in most cases be larger than any influence the DSO has on losses, which can only be reduced in the long-term. This makes it also for the DSO extremely difficult to isolate the effects of loss reduction in the responsibility of the DSO and to design a mechanism that provides the proper incentives.