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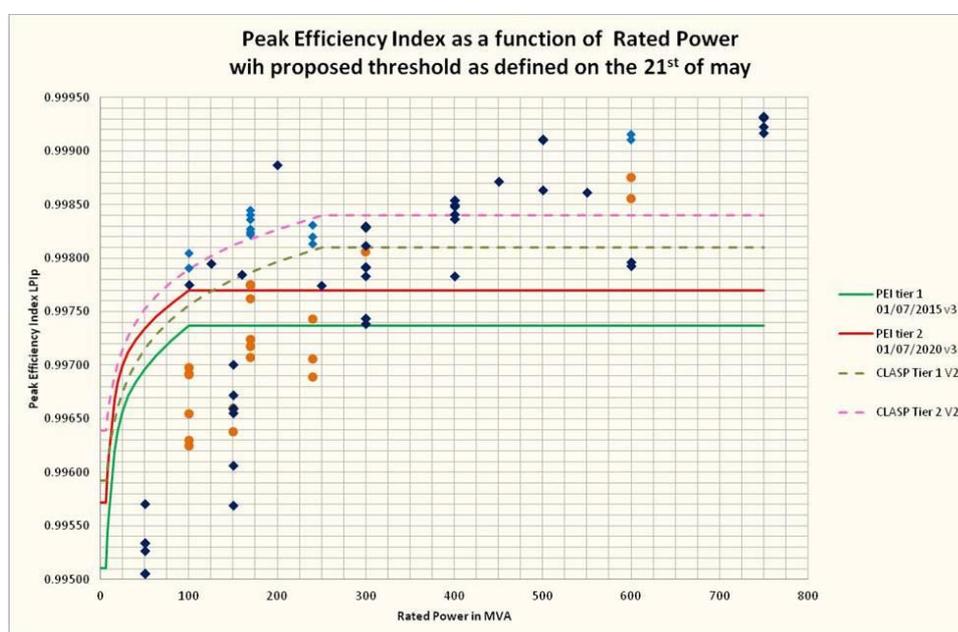
# **ENTSO-E position paper on the European Commission Eco-design regulation on large power transformers**

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ENTSO-E is convinced that a sound and fair regulation in respect of the energy efficiency of transformers will benefit the whole electric energy business. As one of the main actors in the sector, ENTSO-E is ready to take part in the global effort needed to reduce energy spillage. Nevertheless, transformers used by Transmission System Operators of electricity are already extremely efficient and lightly loaded, making their contribution to the total losses of the electricity delivery rather small.

**ENTSO-E members clearly understand the need for setting minimum performance requirements applicable to the general cases in order to avoid inefficient units to be purchased in the future. The findings and proposal of CENELEC CLC TC 14 WG29 are fully supported by ENTSO-E.** A first tier based on actually purchased units eliminating the worst one is a reasonable view given that there is no economic case currently available to determine what level of transformer efficiency is justified. Further data should be collected from the market to inform further review. For a second tier, more ambitious set of values forecasted need to be carefully examined in a more thorough economic and technical review with which ENTSO-E would like to participate and contribute, and provide data from TSOs to check against real cases the opportunity, feasibility and financial viability of such highly efficient units.

As an illustration of the impact on the business of its members, the graph below shows a panel of transformers recently purchased (each dot is a design) by ENTSO-E members against the proposed peak efficiency minimum values. It is obvious that **many of the recently purchased units will not comply with the proposed regulation, which may create under certain circumstances problems for TSOs. This chart also illustrates the importance of the efforts that will need to be made by TSOs in order to meet the new regulation.**



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- On the above graph, the revised proposals from CENELEC have been plotted. Setting targets for further EU ambitions for loss reduction (2<sup>nd</sup> tier) is good in principle, but it is critical that such values are economically justified. As can be seen from the chart, proposals made by other groups (e.g. CLASP<sup>1</sup>) show an ambition which is not supported by the technical and economic reality, as some transformer designs which are below these curves were optimized with a capitalization cost of 14,000 €/kW and were still lower than the efficiency target proposed. Similarly, target levels above the CENELEC levels **will be at least unreasonably expensive and in many cases physically impossible** (due to transport gauge, dimension, weight, exceeding fabrication limits). This of course simply emphasises the fact that the CENELEC curve has been drawn on the basis that it is likely to be both technically and economically justified, and is set to act as a minimum value of efficiency, with higher actual efficiency levels achieved through the use of capitalization in transformer tenders.
  
  - Utilities usually reuse a transformer decommissioned from a substation in another substation. Transformers are sometimes decommissioned well before their end of life. Scraping such units would be unnecessarily expensive and environmentally negative (construction phase being the major cost in the lifecycle analysis, it would ruin the ecological balance initially forecasted for the equipment). This is why **the regulation should allow the reuse of units decommissioned before the end of their physical life.**
  
  - It is also a common practice for utilities to repair a transformer after a minor fault, considering the real life expectancy of transformers. Most TSOs evaluate refurbishment and repair taking into consideration not only the primary cost of the transformers but also taking into account the capitalized cost of the losses.

Repairing transformers usually takes place for transformer damaged well before the end of their physical life expectancy. The life expectancy of transformers varies upon their usage, but experience has shown that transformers, depending on their loading, do not reach their end of life before 60 to 75 years. Repairing very old units is usually uneconomic, and so, the scraping of such old transformers is normal practice.

Refurbishment usually concerns only minor upgrading of equipment and allows for an extension of the physical life of the transformer avoiding major failures caused by fittings.

Repairs are usually carried out on lightly damaged units and are held in order to reduce outage and limit the cost of reestablishing the power. **Repairing also allows in some cases to avoid the scraping of multiple units working in parallel** (which should otherwise all be replaced).

ENTSO-E is conscious that allowing repair of transformers may create a loop hole in the regulation, but **prohibiting repairs will have a big negative impact on the TSOs' business, increasing the time to restore energy in substation and increasing the cost not only of the transformer to be repaired, but also, last and not the least, requiring buy some spare units in case of incidents on strategic transformers**, which would unnecessarily increase the capital employed of companies. This is why **the regulation should allow for the repair of transformers.**

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<sup>1</sup> Collaborative Labelling and Appliance Standards Program

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- For the largest units, transportation from the manufacturing site to the substation is a major concern, and increasing weight to decrease losses may make access to some substations impossible. This is why **the regulation should allow some exemptions for insurmountable transport restrictions.**
  - Many ENTSO-E members operate urban substations. To meet the growing demand of electricity, some of them will need a power increase within their existing footprint. As extending an urban substation may be impossible due to the densely populated neighborhood, it will be in certain cases impossible to meet also the efficiency requirement of the regulation (which would require an additional increase of the size of transformers). Therefore **the regulation should contain provisions for exception in case of existing urban substations.**
  - ENTSO-E would like the Commission to consider including the following text to cater for exemptions. 'The Commission may, following a request by a competent authority of a Member State, by means of implementing acts authorise a limited exemption to exclude from the quota requirement laid down in the legislation Transformers for use in specific applications, or specific categories of products or equipment, where it is demonstrated that, for those particular applications, products or equipment, technically feasible alternatives are not available, or cannot be used for technical or safety reasons, or where the Transformer efficiency required under these Regulations cannot be ensured without entailing disproportionate costs.'
  - Most TSOs purchase their transformers under a blanket framework agreement which guarantees the security and cost of supply over several years (typically 3 to 5). The transformers purchased according to this agreement are in most cases carefully qualified and may be subject to deep type testing, including very long and expensive tests such as short circuit withstand tests. The normal lead-time for the qualification process is about 2 years and TSOs expect to purchase several units manufactured according to the same design. Breaking contracts prematurely will require a large amount of work for issuing tenders and evaluating answers, followed by a lengthy qualification procedure which will prevent the purchasing of any units of transformers within the qualification period.  
 This is why **the regulation should allow ongoing contracts to run until their natural expiration, maybe within a maximum limit of 3 years after the enforcement of the regulation. Actual manufacturing orders in accordance with those contracts shall be allowed until the end of their validity, the delivery of units being allowed as contractually agreed.**

