

3

Accelerated Distribution Transformer Replacement: Early Findings on Barriers and Regulatory Opportunities

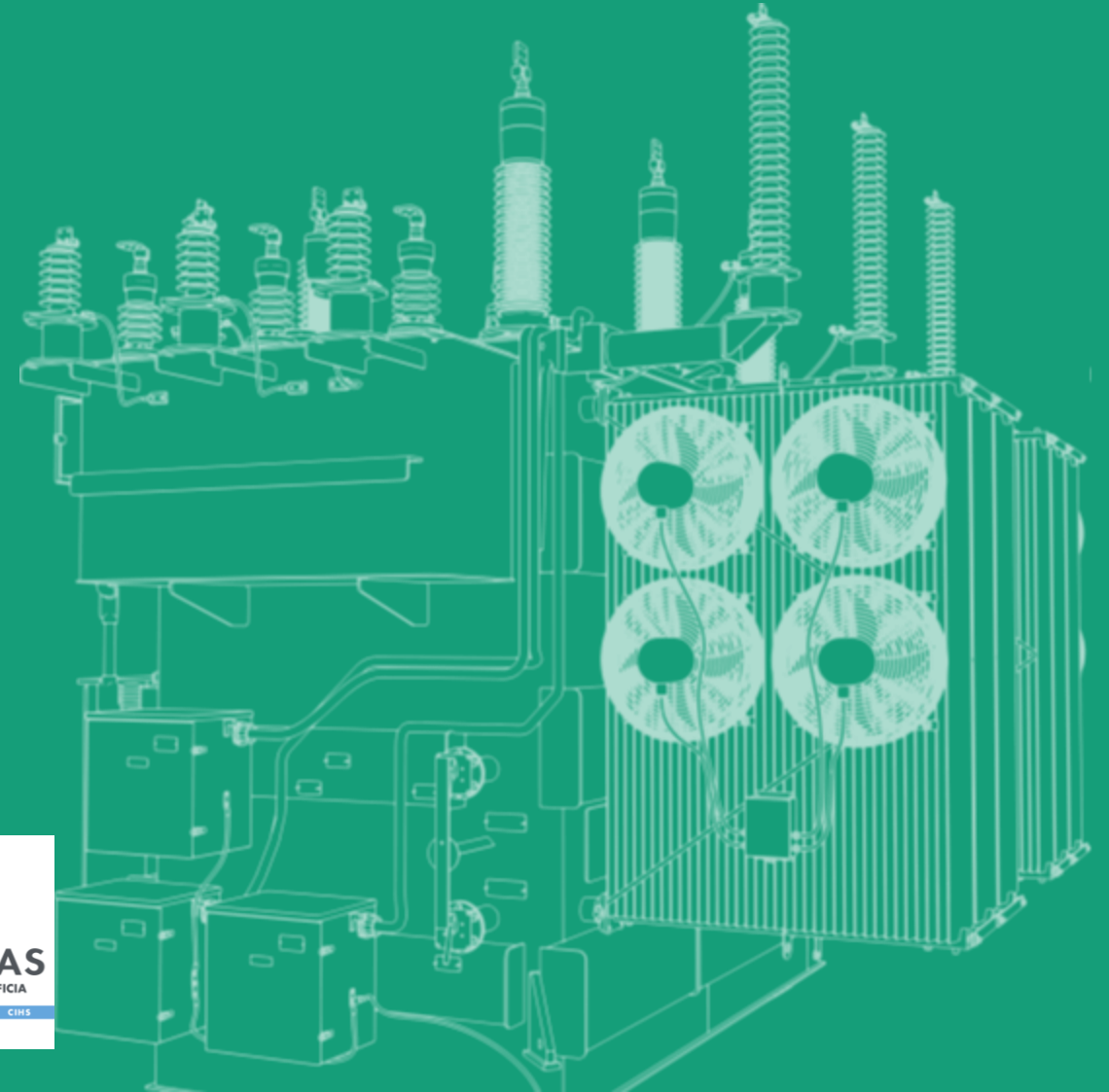


Miguel Martínez Velázquez

Miguel.Martinez@iit.comillas.edu

Research Assistant & PhD student

IIT (*Institute for Research in Technology*),
Universidad Pontificia Comillas



Accelerated Distribution Transformer Replacement: Early Findings on Barriers and Regulatory Opportunities



Utilities (DSOs)

- **Regulated entities**
- Replacement decisions are influenced by allowed returns and regulatory incentives in DSO remuneration schemes



Questionnaire on existing utility-owned transformers population



Questionnaire on electricity distribution regulation



Electricity end-users

- **Private entities** (e.g., industrial, commercial)
- Replacement decisions based on CBA balancing upfront capital costs against expected savings and risk reduction



Questionnaire on electricity-end-user-owned distribution transformers

Utility-owned Distribution Transformers

Electricity distribution is a regulated natural monopoly, with DSO revenues set through remuneration frameworks to balance network investment, efficiency, and affordability

Barriers

- No explicit incentives for early replacement of transformers
- Absence of incentive for energy losses reduction or weak incentives, when losses are estimated rather than measured
- Low priority for accelerated replacement, as it competes with more critical investments (e.g., grid reinforcement)
- No reward for upstream system benefits (e.g., CO₂ reduction)
- Permitting and regulatory approvals increase time and complexity

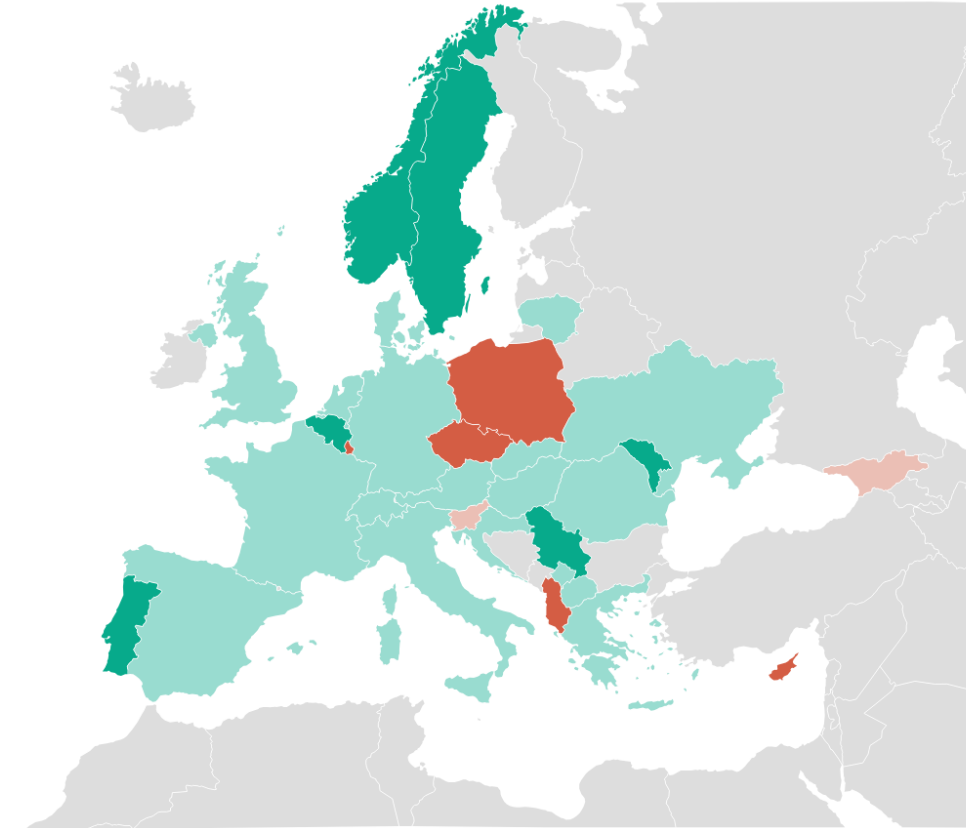
Regulatory opportunities (Art. 27 EED)

Mandate to improve energy efficiency where technically and financially feasible. Accelerated transformer replacement supports this objective.

Regulatory support for innovation, including explicit, asset-level incentives for efficiency-driven accelerated transformer replacement.

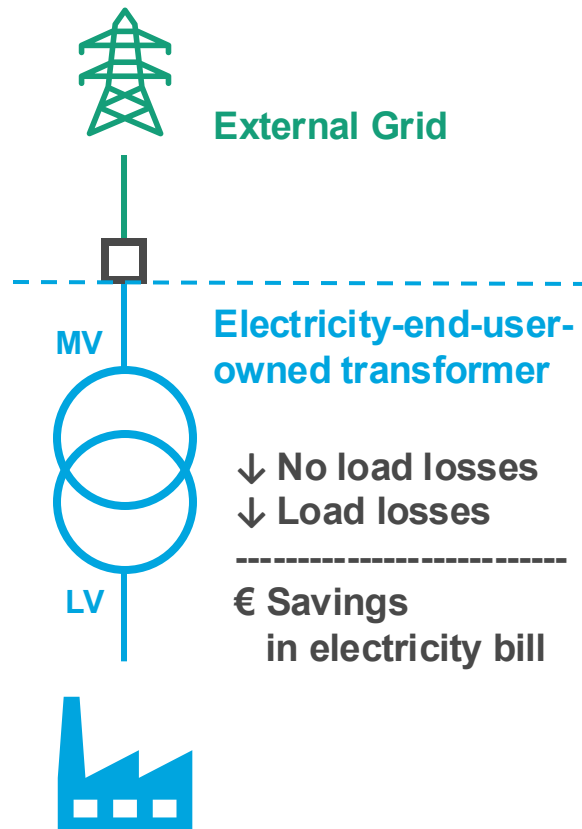
DSO incentives to reduce power losses

■ No incentive ■ Estimates ■ Estimates + Measurements ■ Measurements



Source: 3rd CEER Report on Power Losses • Created with Datawrapper

Electricity-end-user-owned Distribution Transformers



In principle, there is a natural incentive for electricity end-users to reduce transformer losses, as they affect electricity bills

Barriers

- Electricity infrastructure management may not be core activity
- Losses are small relative to consumption and often not measured
- Transformer replacement competes with core business investments
- No reward for upstream system benefits (e.g., CO₂ reduction)
- Split incentives between bill payer and infrastructure investor

Regulatory opportunities

Art 8. EED recognizes as eligible for calculating energy savings all the policies that accelerate the uptake of more efficient products

Under the EED, recognize early distribution transformer replacement as a pre-accepted activity within **white certificate** mechanisms