European Copper Institute
Copper Alliance

Position Paper on Ecodesign for Power Cables in Indoor Electrical Installations

Given the substantial energy savings potential, the numerous additional benefits and the market failure, so far, to secure these benefits through voluntary initiatives, European Copper Institute (ECI) advocates for a cable-sizing regulation and supports the European Commission's efforts to formulate the best regulatory approach.

Brussels, December 15th, 2014: Electrical energy is lost not only in end-use devices (being addressed by Ecodesign regulations) but also in the electricity supply cables. Today's cable losses, which amount to approximately 2% of the EU's total electricity consumption (60 TWh/year), could be halved by increasing the cross section of the conductor up to its economical optimum. In the large majority of cases, minimising the Total Cost of Ownership (TCO) results in a cross section that is substantially greater than prescribed in today's technical standards.

The current standards for cable sizing take safety aspects (thermal impact, short circuit current) and voltage drop into account, but not energy efficiency. A new standard that includes energy efficiency (IEC 60364-8-1) has recently been published, but its scope is much broader than cables and therefore the adoption rate of economically optimum cable sizing is expected to be low. Another standard explicitly dedicated to the economic optimisation of power cable sizing (IEC 60287-3-2) was published several years ago, but, since its application is voluntary, it has had practically no impact on the market.

While the vast majority of electrical installations in tertiary sector buildings or industrial premises are designed using specialised software, economically optimum cable sizing is not common market practice. A survey, conducted as part of the Preparatory Study, shows that engineering companies and installers are often unaware of the many benefits, or miss the incentives to adopt an improved scenario.

The main reason given for the lack of adoption of best practice is split incentives – e.g. between the building owner and the user/occupier, or between the purchasing and operations departments. During a recent interview program by ECI, contractors stated that the lowest investment cost usually wins the bid. This acts as a disincentive to design for minimum total cost of ownership, which would be done relatively easily by modifying current design software. This market failure, due to split incentives, is similar to that of other product categories which have been regulated recently, such as electric motor systems and transformers.

The benefits of improved cable sizing stand out. The Preparatory Study points to savings of about 1% of the electricity consumed which, for the tertiary and industry sectors, currently represents 20 TWh/year. This figure significantly exceeds the estimated annual savings of some Ecodesign measures that have already been adopted, such as domestic refrigerators (4 TWh/year) or air conditioners and comfort fans (11 TWh/year). Consequently, the adoption of mandatory regulatory measures for improved cable sizing would be a logical step to address such a significant savings potential.

The savings in electricity are accompanied by important reductions in Greenhouse Gas Emissions (in the range of 8-10 million tonnes per year). These more than compensate for the increased emissions from the manufacturing phase of the cables (environmental paybacks are generally around one year, as stated in the Preparatory Study).

In addition to these more quantifiable savings, more robust electrical installations will deliver an improved quality of supply (mitigation of harmonics, voltage distortions and flicker), higher electrical and fire safety, and increased operational flexibility (greater tolerance to overloads).

From an economic perspective, the improved scenarios are attractive. The incremental investment remains reasonable, typically less than a fraction of the entire building investment cost, and is generally recovered in less than 4 years. After this time, the ongoing, lower energy costs will benefit entirely the customer until the end of life of the installation (assumed to be 25 years as per the Preparatory Study).

Lastly, when the electrical installation is finally dismantled, the cables can be recycled allowing the building owner to recover an important part of the initial cost (clean copper scrap recovered from cables is valued at +/- 90% of the new copper market price). As at November 2014, this aspect has not been considered in the economic analysis of the Preparatory Study.

These efficient investments will support directly the electrical engineering and manufacturing sectors (electrical installers, cable vendors, cable manufacturers, cable material manufacturers, electrical software developers…). ECI has estimated an employment impact of 22,000 additional jobs, largely local due to the nature of the activity.

A regulation on cable sizing will increase conductor demand. The Preparatory Study estimates a few hundred thousand tonnes per year. Considering that copper is a commodity, traded globally, and that the annual demand for copper exceeds 20 million tonnes, the potential increment would represent a small percentage. The Copper Alliance's statement on long-term copper availability can be downloaded from here.

About the European Copper Institute:

ECI, founded in 1996, represents the copper industry in Europe. ECI is also part of the Copper Alliance™, an international network of trade associations funded by the copper industry, whose common mission is to defend and grow markets for copper, based on its superior technical performance and contributions to a higher quality of life. Read more about us on copperalliance.eu.