

Circular economy concept for power cables

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The “**circular economy**” is a generic term for an industrial economy that is, by design or intention, restorative and in which material flows are of two types, biological nutrients, designed to reenter the biosphere safely, and technical nutrients, which are designed to circulate at high quality without entering the biosphere. Ideally, no new raw materials are needed as the life cycle of a product is a closed circle.

The term encompasses more than the production and consumption of goods and services. It includes discussion of the role of money and finance as part of the wider debate; this can be marked as ‘TCU’: Total Costs of Usage.

Alliander interpreted, within its organization, above definition as follow:

- **Life cycle, value and reusability** of materials are maximized, where waste and energy use is minimized. This is done by:
- purchasing materials focusing on reusability and high quality recycling,
- optimizing maintenance scheme and maximizing life span and cycle of materials and
- recovering end-of-life materials.

DNO Alliander foresees shortages of raw materials for electrical equipment for power distribution for the coming years and believes that the circular economy model will cope with this. For this, Alliander searches for partners and suppliers that are willing to integrate the circular economy model in the design, production, transport, usage and re-use of the supplied components and systems.

Alliander's main target is to be the first DNO in the world with 40% (in weight) of the purchased goods to be marked as part of the circular economy model by 2020. Therefore, Alliander looked at several grid components and in his context, (power) cables are one of the main components. In October 2014 Alliander initiated dialogue sessions with its major cable providers, including Prysmian.

Prysmian Group supplies LV, MV and HV extruded power cables to Alliander and has already introduced a number of inventions which supports the circular economy model such as:

- Replacing the triple layer XLPE insulation and sc-screens with the thermoplastic P-laser concept: not only reducing the carbon footprint during cable production, but also facilitating the re-usage of the insulation material
- Finding alternative solutions for the copper wires screen such as CCA or aluminium wires.
- Usage of black sheath with only a red outer layer for easier recycling instead of the present homogenous red colored outer sheaths.

The impact of these modifications will be analyzed with dedicated Life Cycle Assessment (LCA) software.

As a global leading manufacturer, the Prysmian Group favors the circular economy model and supports Alliander for further exploration of possible upgrading of the cable itself but also look at the logistic concept (re-design of reels, upgrading logistic performance), support on easy jointing of cables (reduction man-independence), and develop more effective recycling techniques.

This paper will detail the actions initiated by the Alliander / Prysmian partnership.