Chain analysis Low and Medium Voltage Cables

Reporting year 2024 & 2025

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1 | Introduction and justification

In the context of achieving level 5 on the CO_2 Performance Ladder, Equans carries out an analysis of a GHG (Green House Gas) generating chain. This document describes the chain analysis of 'Cables'.

1.1 Activities Equans

EQUANS is a leading global player in multi-technical installations and maintenance services. We design, install, and deliver customized solutions and services to improve the infrastructure, equipment, systems, and technical processes of our clients.

We provide our clients with comprehensive and tailored solutions to optimize their operational and energy performance. We do this for the industrial sector, buildings, transport infrastructures, and distribution networks.

We offer technical expertise in a wide range of complementary activities: electricity and HVAC technology (heating, ventilation, air conditioning, and air treatment), mechanics and electromechanics, cooling techniques, safety and fire protection, maintenance, energy optimization, and the digitization of installations and processes. We support our clients from A to Z throughout the entire lifespan of the project: design, study, construction, installation, performance contracts, maintenance, and operation.

1.2 What is a chain analysis

A chain analysis involves calculating the CO_2 emissions of the entire chain for a particular product or service. The entire chain refers to the entire life cycle of the product: from extraction of the raw material to the end of its lifespan.

1.3 Purpose of the chain analysis

The main objective for carrying out this chain analysis is to identify CO_2 reduction opportunities, define reduction targets and monitor progress.

A reduction target is formulated based on the insight into scope 3 emissions and the chain analysis. The energy management system that has been introduced actively aims to reduce scope 3 emissions.

Providing information to partners within your own chain and sector colleagues who are part of a comparable chain of activities is an express part of this. Based on this chain analysis, Equans will take steps to involve partners within its own chain in achieving the reduction objectives.

1.4 Declaration of ambition level

For the time being, Equans is a mid-tier in the chain without really distinguishing itself in the field of CO_2 reduction in the whole chain of materials we use. However-we expressed the ambition to become a leader in that field and we want to take our responsibility as outlined in the 'Equans BeLux Carbon Policy'. An important step is certification on step 5 of the CO_2 performance ladder. In the coming years, Equans will work on the CO_2 reduction of the cable chain being one of its most significant procurement category, partly through the action plan associated with this chain analysis.

1.5 Reading Guide

In this report, Equans presents the chain analysis of 'cables'. The structure of the report is as follows:

- Chapter 1: Introduction
- Chapter 2: Scope 3 emissions & choice chain analysis
- Chapter 3: Product description
- Chapter 4: Identifying links in the chain
- Chapter 5: Quantifying emissions
- Chapter 6: Reduction options
- Chapter 7: Citing Sources

The calculations in this document refer to the following Excel sheets:

- LCA data cables.xls
- Tables chain analysis cables.xls

2 | Scope 3 & choice chain analyses

Before determining which chain analysis will be carried out, the table below provides an overview of the Product-Market Combinations on which Equans has the most influence to limit CO_2 emissions.

PM combination	Activity	Material GHG emission categories	Ranking
Providing electrical services – (semi-) government	**Cables**	Purchased goods and services ~~Use of products sold~~ Upstream transport and distribution End-of-life	1
Providing electrical services – (semi-) government	**Lighting and other**	Purchased goods and services Upstream transport and distribution Use of products sold End-of-life	2
Providing electrical services - industry	**Cables**	Purchased goods and services Use of products sold Upstream transport and distribution End-of-life	3
Providing electrical services - industry	**Lighting and other**	Purchased goods and services Upstream transport and distribution Use of products sold End-of-life	4
HVAC services - public sector	**Heating, cooling, ventilation**	Purchased goods and services Upstream transport and distribution Use of products sold End-of-life	5
HVAC services - industry	**Heating, cooling, ventilation**	Purchased goods and services Upstream transport and distribution Use of products sold End-of-life	6

Table 1: Qualitative analysis

The underlying calculations can be found in the Excel "qualitative analysis".

2.1 Selection chains for analysis

In accordance with the regulations of the CO_2 Performance Ladder 3.1, Equans has to draw up two chain analyses. The first one based on a significant topic within the top two most material product-market combinations, the second one based on a topic within the top 6 most material product-market combinations (see table 1).

Equans has chosen to make one chain analysis of a product from the category "Electrical services 'cables' – (semi-) governments". This is the most significant category in terms of both turnover and possible impact. This concerns the product 'low and medium voltage cable' because this is the main activity of Equans BeLux. Even though the reduction options do not seem simple in advance, especially in the short term, and the degree of influence may be limited, this material flow is so significant that Equans would like to focus on achieving CO_2 reduction here, preferably in line with the goals of the climate agreement (SBTi).

Equans has chosen to make the second chain analysis of a product from the "Electrical Services 'Lighting and other'- (semi-)government" category. Within this category, the second main activity 'public lighting' has been chosen as the subject. This category lends itself to innovation and significant impact on energy consumption and CO_2 reduction in the chain, both upstream and downstream.

2.2 Scope chain analysis

The qualitative analysis assessed which of the 15 GHG categories are material. This chain analysis adheres to the conclusions of this qualitative analysis. The other GHG categories are not taken into account. Furthermore, the chain analysis focuses on the chain partners over which direct or indirect influence can be exerted.

This chain analysis is limited to low and medium voltage cable. High voltage cable are out of scope. The ratio of volumes of applied low and medium cables is subject to big differences per year due to the clients demand. However the volumes of low and medium voltage remain always significant.

Because different types of low and medium voltage cables are processed, it was decided to focus the chain analysis on the most average types. Reduction opportunities identified in this analysis may also apply to the other cable types. Elaboration of this falls outside the scope of this chain analysis.

2.2.1 Out of scope

Chain steps that are outside the sphere of influence fall outside the scope of the chain analysis. This is, for now, also the case for the possibilities after the 'end-of-life' stage in the context of the circular economy.

Furthermore, the CO_2-emissions due to cable losses in the use stage are considered to be out of scope. Since Equans does see chances to reduce cable losses, it is chosen to include this in this document anyway. All data are a rough approximation since there are many unknown variables.

2.3 Application within Equans

Equans has different divisions/segments for different client groups. The line of work varies between the divisions/segments. For this chain analysis, the starting point is the division 'Transport infrastructure and mobility - Road network and mobility'.
https://www.equans.be/en/your-sector/transport-infrastructures/road-network-and-mobility

The outcomes of this chain analysis and the approach plan can very well be applicable for other divisions/segments of the organization that work with cables.

2.4 Primary & Secondary data

The aim is to gather as much primary data as possible for this chain analysis. For all secondary data there is a data improvement plan to be able to substitute this with primary data as soon as this comes available. Top suppliers have been asked for primary data, but have not all been able to provide this mainly because mapping CO_2-emissions is quite new to the market. Also, much of the available primary data has not been found suitable to be related to linear meter of cable.

RATIO OF PRIMARY AND SECONDARY DATA	
Primary data	Amounts of cable purchased; Turnover per supplier; Product description; Process description;
Secondary data	CO_2-emissions (Milieudatabase)

Table 2: Data collection

2.5 Data Allocation

Data allocation is not applied in this document.

3 | Product description

Medium voltage cables are used in the electricity network between high voltage and the transformer houses that convert the electricity to low voltage. From there low voltage cable is used. Furthermore, low and medium voltage is used in the infrastructure and mobility sector.

- https://www.equans.be/en/your-sector/transport-infrastructure-and-mobility
- https://www.equans.be/en/your-sector/distribution-networks

The ratio between the application of medium voltage cable and low voltage cable can vary strongly over the years since it is related to the specific projects that Equans executes. The description of the cables below convers the most commonly applied cable types. Since the cable specifications are strongly related to specific projects, the exact amounts and types of cable can vary a lot over the years.

The table below shows the classification used to break down the cables purchased in 2023 from the 5 main suppliers, as well as the quantities in meters and the volume of copper/aluminum associated with each category.

CABLE SEGMENTATION					
	Meter		**M^3 Cu/Alu**		**S2moyen(mm2)**
Low voltage	6.740.378	99%	162	94%	24
Medium voltage	73.851	1%	11	6%	151
Total	**6.814.229**		**173**		

Table 3 Cable segmentation

Low voltage cables alone account for 99% of the total length and 94% of the total volume of copper/aluminum used. The average copper/aluminum cross-section per cable is 24 mm², which corresponds to 4 conductors of 6 mm² (4G6 or 4x6). This matches the data from Milieudatabase that is used to calculate the emissions.

Although Medium Voltage cables account for only 1% of the total length, the volume of copper/aluminum associated with them represents 6% of the total volume. This is due to the larger cross-section of Medium Voltage cables compared with Low Voltage and Data cables. The average copper/aluminum cross-section per cable is 151 mm², which corresponds approximately to 1 conductor of 150 mm². This matches the data from Milieudatabase that is used to calculate the emissions.

3.1 Cable purchase

Of all purchased cable types (low voltage and medium voltage) in 2023 24% is bought directly from the manufacturers and 76% is bought through distributors. Medium voltage cable is mainly purchased directly from manufacturers, low voltage cable mainly through distributors.

The table below shows that:

- 50% of purchases (€) are made via 2 distributors.
- 75% of purchases (€) are made via 5 suppliers (2 distributors + 3 Manufacturers)

Supplier	Purchase value %
Distributor 1	39%
Manufacturer 1	**15%**
Distributor 2	11%
Manufacturer 2	**7%**
Distributor 3	4%
Others	26%

Table 4: Ratio of suppliers

When purchases are made via distributors, it is not always possible to identify the manufacturer and therefore the brand of the cable. Although a field is available in our data to identify the brand in purchases made from distributors, some cables bear the distributor's brand directly.

The table below shows the quantities for whole Equans BeLux:

- the percentage of meters of cable purchased by brand for the top 5 suppliers,
- that 80% of the cable purchased is directly branded by the distributor, so it is not possible to identify the manufacturer directly.

Remark: One of the top brands has no longer sold directly but only through distributors.

Brand/supplier	%	Meters
Supplier 1	59%	3.792.149
Supplier 2	21%	1.366.566
Supplier 3	10%	675.219
Supplier 4	3%	393.258
Supplier 5	2%	126.730
Others	4%	379.540
Total:	**100%**	**6.814.082**

Table 5: amounts of cable purchased.

In Belgium there is a specific national regulation to comply in order to assure minimal quality and safety of electrical installations (RGIE / AREI Reglement General des installation Electrique en Belgique). This means Equans has to comply with these regulations for projects in Belgium. This of course has a limiting effect on the upstream possibilities for Equans. https://economie.fgov.be/fr/publications/reglement-general-sur-les

3.2 Medium voltage cable

Medium Voltage Cable is the power cable most often used in the commercial, industrial and electrical utility industries. It has a minimum power rating of 1kV and goes up to 36kV. A medium-voltage cable with a conductor of twisted copper wires. This is suitable for installations and can be buried or laid in a cable duct. The insulation of the cable is XLPE and the sheath is PE.

The composition and design of medium voltage cables is defined by the following elements or layers:

Figure 1: Medium voltage cable.

1. CONDUCTOR: This carries the electric current. It is the central element of the cable. The conductors are class 2 and are made of electrolytic copper or high purity electrolytic aluminum.

2. INTERNAL SEMICONDUCTOR SCREEN: This completely covers the conductor. It is made to improve the distribution of the electric field on the surface of the conductor.

3. CABLE INSULATION: Insulation is the critical component of the MV cable, since it has to withstand the high electric field inside. The maximum voltage that a cable can withstand depends on the material and the insulation thickness, which increases with the cable rated voltage. The materials used in the insulation of Medium Voltage cables are: Crosslinked polyethylene (XLPE), High modulus Ethylene-Propylene (HEPR) and Ethylene-Propylene (EPR)

4. CABLE EXTERNAL SEMICONDUCTOR: It completely covers the insulation. This material is cross-linked and in perfect contact with the insulation. Peelable semiconductors, partially bonded to the insulation, are usually used to make the preparation of the connections as easy as possible.

5. CABLE METAL SCREEN: Medium voltage cables have a metal screen in contact with the external semiconductor. This screen is made up of copper fibers placed in a helix, uniformly covering the whole perimeter of the cable.

6. (OPTIONAL) PROTECTION AGAINST WATER: In cables with a longitudinal seal (only certain specific types), a tape of hygroscopic material is placed under the sheath, which prevents the longitudinal propagation of water. In cables with Double Sealing, a series of hygroscopic wires are also placed on the conductor.

7. (OPTIONAL) INNER SHEATH: All armored cables have a separation cover (or armor pad) between the metal screen and the armor. This inner sheath is made of the same material as the outer sheath.

8. (OPTIONAL) ARMOUR: Armors improve the protection of the cable against external aggressions. Their use is recommended in all installations where there is a high risk of mechanical aggression. The armor consists of metal wires or strips arranged on the inner sheath. The metal used in single-core cables is aluminum.

9. CABLE OUTER SHEATH: This is the outermost layer of the cable and protects the cable from mechanical and chemical aggression. It is formed by a uniform and continuous coating, usually red color, which is totally watertight and highly resistant to knocks and abrasions, as well as to the action of the weather. The materials normally used are PVC and halogen-free polyolefins.

3.3 Low voltage cable

Although there are a multitude of low-voltage cables depending on their composition (number of conductors, type of insulation, mechanical protection, etc.), 4 families of cables are usually used:

- The standard Power Cable like XVB or equivalent

The XVB cable consists of a series of VOB wires that are protected by a plastic sheath (XLPE/PVC). They are usually used for indoor/outdoor applications.

- The Power Cable / Halogen Free like XGB or equivalent

The XGB cable is the halogen-free variant of the XVB cable. Unlike the grey XVB cable, the XGB cable is green. The XGB cable must be used in buildings that are more than 25 meters high. The use of the XGB cable is also mandatory in buildings accessible to the public. Since in the event of a fire, halogen-free cables release fewer toxic gases and produce almost no smoke, extinguishing work is more efficient, and the evacuation of people is also facilitated.

- The Power Cable / Halogen Free and Fire Resistant like EmXGB or equivalent.

The EmXGB is a halogen-free and fire-resistant power cable with FR2 Rf1h function retention according to NBN 713-020 Add.3. The cable is used for circuits supplying safety installations and critical installations that must maintain their function in the event of fire, such as sirens, emergency lighting, smoke extraction systems etc.

- The Power Cable / Reinforced like EXAVB or equivalent.

Similar with an XVB cable with additional mechanical protection in the case of laying in the ground (EXAVB). XVB, XGB and EmXGB.

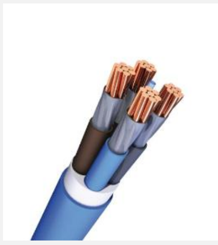
TYPE:	XVB	XGB	EmXGB - Pyrobelca	EXAVB
				
Particularity	-	Halogen free	Halogen Free Fire-resistant	Mechanically Reinforced
Usage	Mainly for outside applications (e.g. public lighting)	Mainly for interior building applications	Mainly for tunnel applications	Mainly in trench
Section	1,5 mm² => 240 mm²	1,5 mm² => 240 mm²	1,5 mm² => 240 mm²	1,5 mm² => 240 mm²

Table 6: types of low voltage cable

The table below shows the sub-classification used to break down the “Low Voltage” cables purchased in 2023 from the 4 main suppliers, as well as the quantities in meters and the volume of copper/aluminum associated with each category.

Analysis of Low Voltage Cable					
	meter		kg copper		S2moyen(mm2)
XVB (or equivalent)	1.304.887	19%	52	32%	40
XGB (or equivalent)	2.053.499	30%	54	33%	26
EmXGB (or equivalent)	236.225	4%	3	2%	14
EXAVB (or equivalent)	366.960	5%	33	20%	89
Other	602.313	9%	10	6%	17
Data	2.176.494	32%	11	7%	5
Total	**6.740.378**		**163**		**24**

Table 7 analysis of low voltage cable

4 | Identifying links in the chain

Equans is the market leader in the installation of cables in Belgium. In short, the process for low and medium voltage involves the purchase of cables, including transport to hubs or project sites, installation of the cables and making the connection to distribution boxes. The placing of the cables is mainly done by subcontractors, Equans operates as a coordinating engineering party and provides personnel to perform higher value-added tasks, such as connections with equipment and commission.

Equans' business activities are part of a chain of activities. For example, materials that are purchased must first be produced (upstream) and the transport, use and processing of delivered "products" or "works" is also associated with energy use and emissions (downstream).

For lifecycle analysis the following phases are used as a standard.

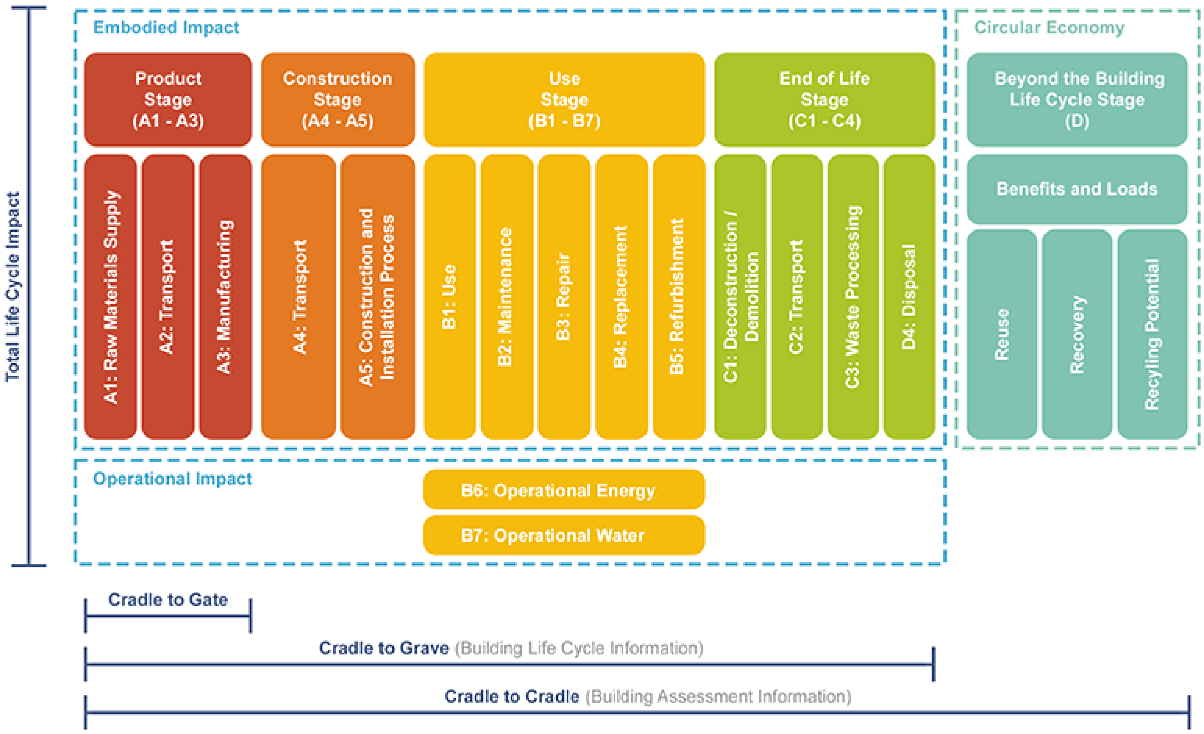


Figure 2: Life Cycle stages.

Not all phases are applicable for low and medium voltage cables. The use stage, for example, is not suitable for cables. Displayed more simply, the chain steps for low and medium voltage cable are shown schematically below. Transport occurs in nearly all stages.

Figure 3: chain steps for medium voltage cable

4.1 Raw materials and production of cables

As stated in chapter 3, various raw materials are required for the production of cables. The most commonly used materials are copper and/or aluminum for the conductor, and diverse types of plastic for the mantle.

4.1.1 Copper

Nearly 28 million tons of copper are used annually. The majority of copper produced worldwide (70 percent) is used for electrical/conductivity applications and communications.

Copper and aluminum are mined overseas (copper mainly in Chile/Peru). The ore is transported by ocean vessel to different European ports and from there on inland waterway vessels to factories such as Aurubis (mainly Germany).

The virgin materials are substituted by recycled materials in different ratio’s. In melting facilities these materials are forged into rods and put on coils (semi-finished product). Forging copper ore into wire is a very energy intensive process.

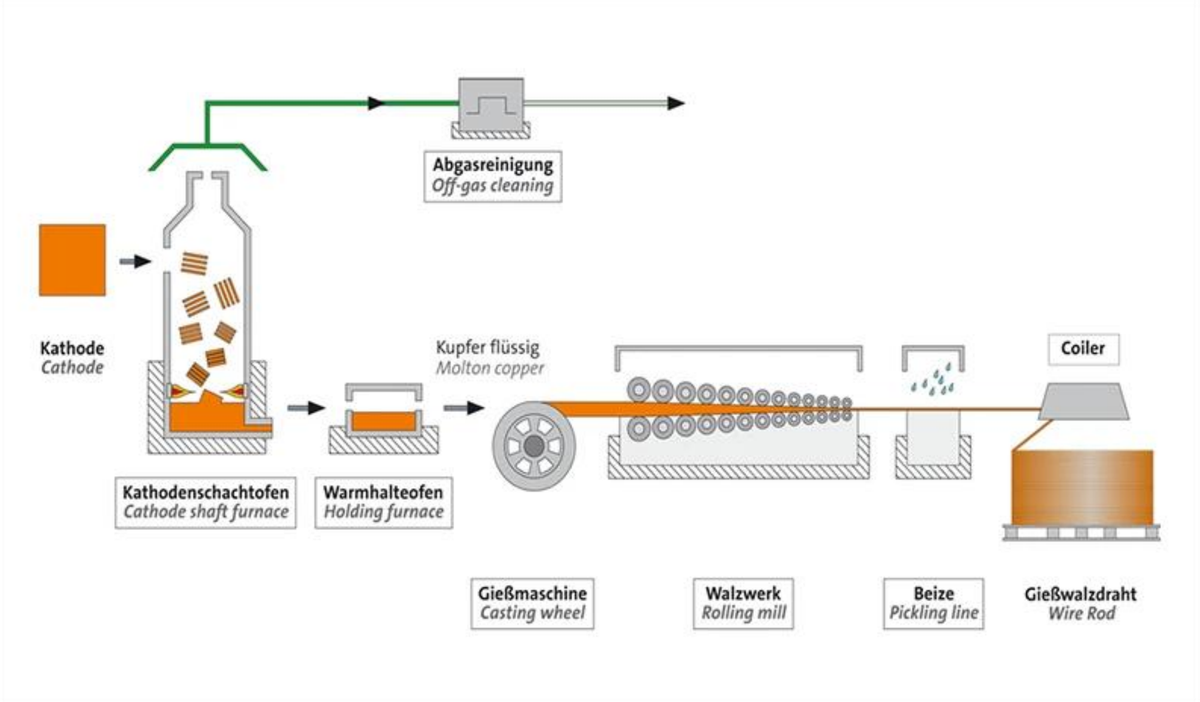


Figure 4: production process of copper rods (source: Aurubis)

The coils are transported by truck to cable manufacturers, which process the raw wires/cables into the end product ‘wire’. This is reasonably standardized process for all manufacturers. The manufacturing process of low and/or medium voltage cable is divided into seven stages: incoming feed, polymer feed, triple extrusion, thickness control, cross-linking, cooling and collection.

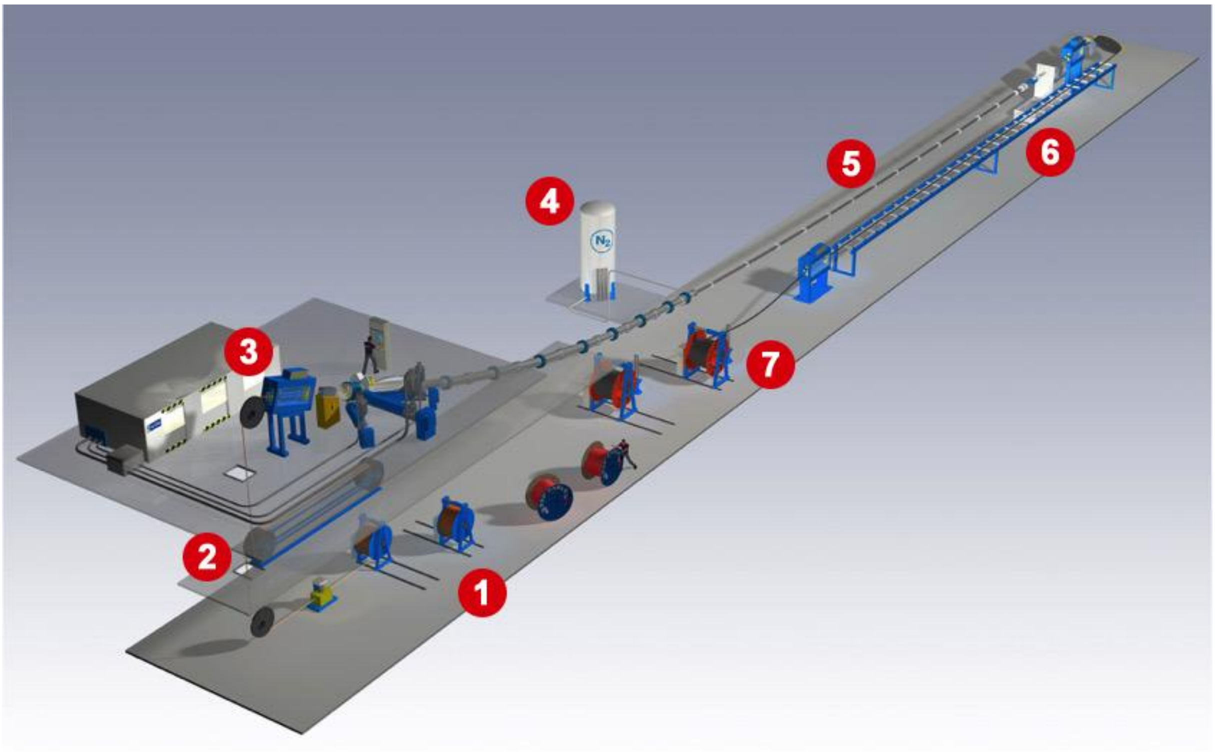


Figure 5: Production process of medium voltage cable (source: Top Cable)

The process requires industrial amounts of energy. Most of the suppliers are working on reducing their scope 1 and 2 emissions. One of the main suppliers already has 15% green energy, 5% energy from their own PV installation and the remaining part is still grey energy.

4.1.2 Plastics

Plastic can either be "synthetic" or "biobased". Synthetic plastics are derived from crude oil, natural gas or coal. Whilst biobased plastics come from renewable products such as carbohydrates, starch, vegetable fats and oils, bacteria and other biological substances.

Today, cables are usually made using synthetic plastics. However, research on the usage of biobased materials is going on.

The compound suppliers of most production entities in Europe are mainly located in Europe. The raw materials come from the chemical industry. In this step a complex mixture of thousands of compounds is processed, a lot of them originate from crude oil. In the refining process crude oil is heated in a furnace, which is then sent to the distillation unit, where heavy crude oil separates into lighter components called fractions. One of these, called naphtha, is the crucial compound to make a large amount of plastic. Polymerization is a process in the petroleum industry where light olefin gases (gasoline) such as ethylene, propylene, butylene (i.e., monomers) are converted into higher molecular weight hydrocarbons (polymers). This happens when monomers are chemically bonded into chains.

In compounding, various blends of materials are melt blended (mixed by melting) to make formulations for plastics. Generally, an extruder of some type is used for this purpose which is followed by pelletizing the mixture. Extrusion or a different molding process then transforms these pellets into a finished or semi-finished product. Compounding often occurs on a twin screw extruder where the pellets are then processed into plastic objects of unique design, various size, shape, color with accurate properties according to the predetermined conditions set in the processing machine.

4.2 Study

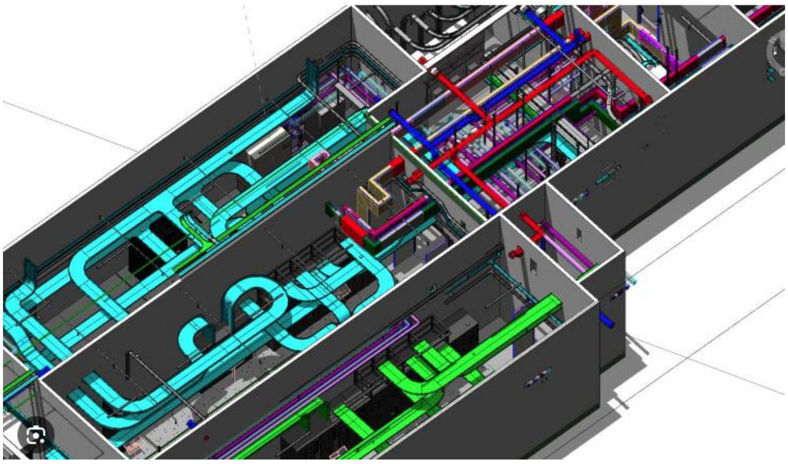
In the majority of projects (independent of the contract type, Design & Build, Engineering & Build, Build only), EQUANS is responsible for carrying out the electrical study, particularly the dimensioning of the electrical cables (section/number of conductors/length/…). EQUANS has several simulation/modelling software (Caneco, BIM, etc.) for this purpose.

Proper sizing of cables begins with a good analysis of needs, including:

- The type of loads connected and the necessary power.
- The operating conditions to determine the type of cable (copper or aluminum, type of insulation, mechanical reinforcement, fire resistance, etc.).
- The required lengths between the power source and the load to be supplied.
- Applicable standards (RGIE, etc.).

EQUANS increasingly uses BIM (Building Information Modelling) from the design and/or engineering phase of its projects. The goal of BIM is to optimize collaboration among the various stakeholders in a construction project (owners, designers, contractors). This modelling aims to produce a common digital model of the building to be constructed.

The use of BIM and its 3D virtual model allows for the virtual execution of tests and simulations of the construction. The different stakeholders can thus identify potential technical risks at an early stage of the project.



The use of a BIM model plays a crucial role to minimize the lengths of electrical cables:

- **3D Modeling:** Provides a three-dimensional visualization of spaces, facilitating the understanding of spatial relationships between elements (cables, equipment, walls, etc.).
- **Avoiding Conflicts:** By visualizing the model, teams can identify potential conflicts between cables and other systems such as plumbing and ventilation, helping to avoid unnecessary paths and excessive lengths.
- **Optimized Routing:** BIM allows for planning and determining the most direct paths for cable installation while minimizing unnecessary detours.
- **Simulation**: BIM tools enable the simulation of cable routing within the building, helping to find the most effective solutions.

The sections of cables are then sized to meet various objectives:

- Limiting the overheating of the cables.
- Ensure that the voltage drop at the end of the line remains within the acceptable tolerances for the load to be supplied.
- Ensure that in case of a short circuit at the end of the line (worst case), the current intensity remains above the rating of the circuit breaker at the beginning of the line.

4.3 Cable installation

There are different approaches for projects. The two most common approaches are underground and aboveground installation.

4.3.1 Underground installation

Underground installation is either done with excavation work to create a trench in which pipes and cables can be placed, or by pulling cables in existing ducts (typically red pipes with a diameter of 90/110 cm).

The excavation requires a prior specific study to:

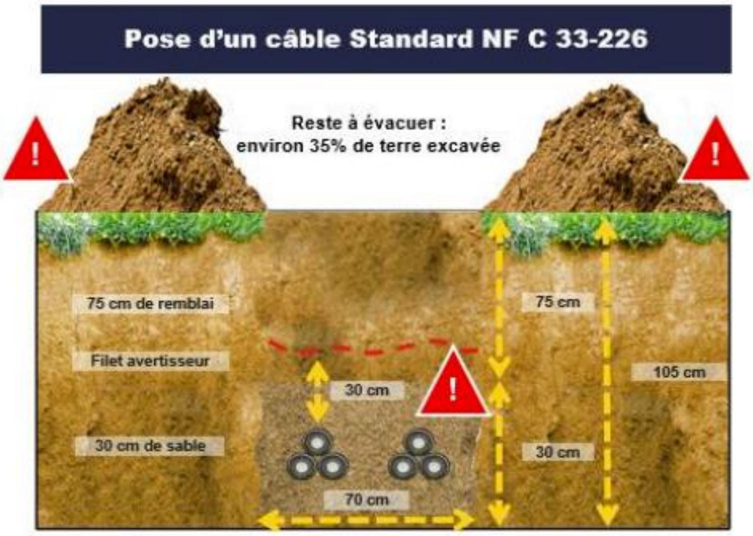
- analyze the terrain and identify existing underground infrastructures (cables, water pipes, gas lines, etc.).
- obtain the necessary permits.

Regional authorities have IT platforms (Powalco in Wallonia, Osiris in Brussels, …) intended to manage work authorizations requiring excavations. When a road opening request is made, the associated services try as best as possible to group the work by zone in order to take advantage of the same trench to work on the gas, the telephone cable or the energy cable.

Depending on the type of cable, the environment and regulatory requirements. Here are the main methods for burying a cable:

4.3.1.1 Laying cable in a traditional trench

Illustrative image of a traditional trench (source Nexans)



a. Excavating the trench (at least 60 cm deep) in accordance with local regulations and wide enough to accommodate the cable and facilitate its installation.

b. Add an initial layer of sand to the bottom of the trench to ensure that the bottom of the trench is clean and level to avoid pressure points on the cable.

c. Laying the cable in the trench.

d. Add a second layer of sand to the cable to protect it.

e. Add warning ribbon to make it easier to identify cables during future work.

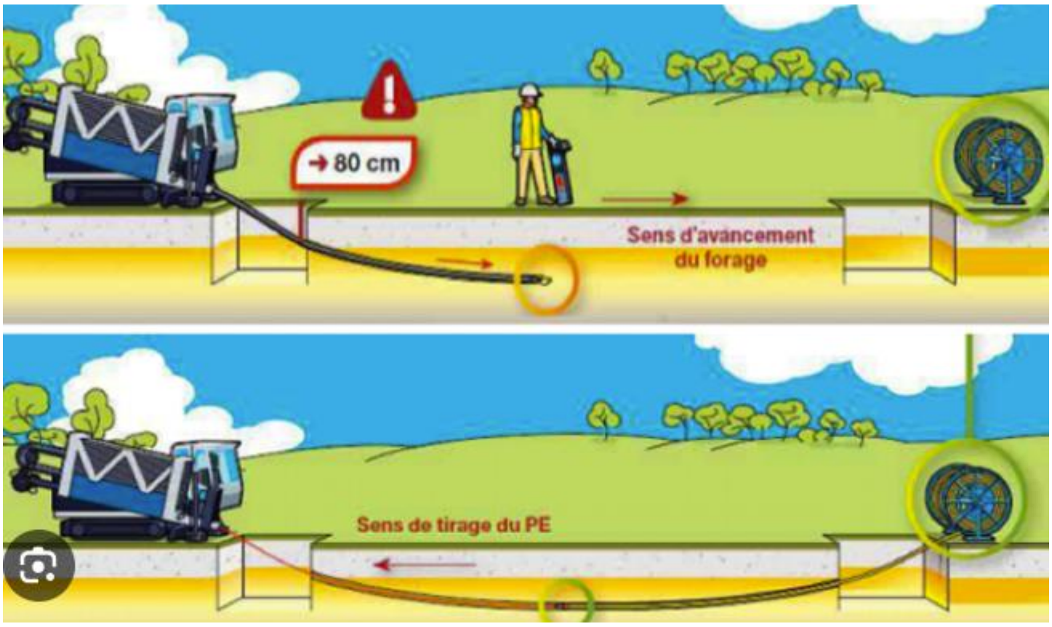
f. Backfill the trench with the excavated soil, compacting lightly to avoid air pockets or settling.

Assumption: cable designed to be buried directly in the sand without additional protection. If the cable is not designed to be buried directly, install a PVC conduit into which the cable will then be pulled (see point 4.2.1.3).

Equipment:

- Use an excavator or vacuum truck to carry out the trench.
- For large cable sections, an unwinder and/or a motorized winch can be used.
- Use an excavator to place the sand and backfill the soil.
- In addition, there is a container truck for transporting the sand and removing the excess soil.

4.3.1.2 Laying cable by directional drilling



a. Create an excavation at the entrance and exit of the drill hole.

b. Drilling the borehole:

   i. Place the drill at the initial drilling location, checking alignment to achieve the target depth and angle.

   ii. Start drilling at the desired angle. Use the drill controls to progress through the ground.

   iii. Continuously monitor direction and depth. Use the guidance system to maintain a straight path at the correct angle.

   iv. Change/adapt the drill head according to the hardness of the soil.

c. Laying the cable:

   v. Once drilling is complete, insert the cable at the borehole exit point and use a pulling system to insert the cable into the protection tube or directly into the borehole as required.

d. Fill the excavations with excavated soil or other suitable materials if required and level the surface.

Equipment:

- Use an excavator or a vacuum truck to create a pit on either side of the borehole.
- Use of a directional drill for carrying out the borehole and for pulling the cable.
- Use an excavator to fill in the holes on either side of the borehole.

4.3.1.3 Laying cable in an existing duct

Where new cables replace existing cables or where we are carrying out work interfacing with civil engineering works, the cable is pulled into an existing conduit outside the scope of our work.

Equipment:

- For large cable sections, an unwinder and/or a motorized winch can be used.

4.3.2 Aboveground installation

Aboveground installation is applied mainly in tunnels and buildings. In this case cables are placed in metal cable trays and on cable ladders. Cables can also be placed in PVC casings or conduits or even be laid in the open air with point fixings. When the cable is laid on a structure (cable tray, pole, …), the installation of the structure is outside the scope of this analysis (others product).

Equipment:

- Depending on the installation height, lifting means can be used (elevator, etc.) For large cable sections, an unwinder and/or a motorized winch can be used.

4.3.3 Transport

Cables are delivered by the suppliers either to one of the Equans depots or directly to the project location. For large quantities, delivery directly to the site is the most common usage.

From the Equans depot cable is transported by Equans or GLS to the projects. Deliverance is then always chosen from the depot closest to the project site. Depending on the quantity, the transport is done by truck or van. In some cases the subcontractors collect the cable at a depot.

The transport of large quantities is done by truck with a crane. The wire is delivered on a spool (on reel). The spools are returned to the manufacturer.

The Equans Logistics Department is continuously optimizing logistics to reduce transport (rides), which is called Internal groupage (grouping of orders). This is the case for transport with own vehicles, but also for transport done by GLS. There are about 12.000 internal transports per year from the depots to the project site. There are also about 9.000 direct transports per year from around 10 suppliers. These numbers are Equans wide and not specific for low and/or medium voltage cables.

4.3.4 Execution

Equans works with a network of small local contractors for the excavation and cable pulling, Equans operates mainly as a coordinating engineering party and provides personnel to perform higher value-added tasks, such as connections with equipment and commissioning.

The subcontractors work with their own equipment.

4.3.5 Waste and processing:

During the projects certain waste is generated. There are two types of cable waste:

- excess length of new cables
- old cables that are removed or being replaced.

There is no insight in the ratio of these two types of waste, but based on estimate it is assumed that the majority of waste comes from removed old cables. The CO_2-emissions from this waste belongs in the 'end-of-life' stage of the old cables and is therefore not included in this chain analysis.

In the majority of the projects Equans coordinates waste management. Usually, AG Metals places containers to collect cable waste. This waste is of value due to the demand for copper.

AG Metals has recommended an alternative waste management operator: "Krommehoek" to optimize the waste management process.

Spools and/or wooden pallets are returned to the suppliers (either collected from the project or from the depot). Plastic or carboard packaging is minimal and collected separately.

In total there are about 1.800 waste containers ordered per year. The larger part of this is for cable waste, including high, medium and low voltage cable. Concerning the recycling of waste collected by AG Metals for Equans, the following information is available for the treatment of the various types of waste after sorting/separating.

- Plastic: is sent to diverse recycling channels
- Aluminum: delivery to crusher in Belgium and then to aluminum foundry to manufacture ingots for recycling
- Copper: is sent to copper foundry
- Scrap metal is sorted at Ag Metals and then moved to foundries or steelworks in Belgium or France or exported to Turkey or Spain.

4.4 Use stage (out of scope)

The term "scope 4" was introduced in 2013 by the World Resources Institute (WRI). Scope 4 emissions – often referred to as avoided emissions – focus on greenhouse gas emissions outside the product life cycle and value chain. There are currently no recognized guidelines or standards for scope 4 accounting, and it will likely be several years before the WRI publishes guidance. Despite this, scope 4 is becoming increasingly relevant in carbon accounting.

The environmental footprint of a cable can also be measured beyond its production and installation.

Joule losses, also known as resistive losses, occur when an electric current passes through a conductor. These losses are caused by the resistance of the cable, leading to energy dissipation in the form of heat. The diameter of the cable is of big influence.

This is a very rough estimate, since there are many unknown variables, such as the ratio of green and grey electricity in the future, the load of the cables, the amount of time a cable is 'overloaded', the quality of the connections and switchboards, etc.

4.5 End of life:

A well-placed cable does not need to be replaced for 40 years (except in cases of external causes like change in legislation/cut or gnawed by rodents/instable structures wherein the cable is placed/…). Today, the main reason for replacing cables is changes in safety standards. Safety circuit (if there is a fire at the beginning of the tunnel, the rest must continue to function).

For now we assume that the lifespan of the applied cables is 40 years. After that period the cables will be replaced. For this chain analysis we make the assumption that the waste processing of the cables is done with current technology.

The End-of-life treatment of low and medium voltage cable contains four stages:

- Demolition phase (C1-C2): The cable is dug up or removed from the cable duct and then transported by road.
- Waste processing phase (C3-C4): The current industry standard is that of the mantle (XLPE/PE) about 10% is recycled, none is reused and 90% ends up in a waste processing facility. For copper around 10% ends up in landfills, 5% in waste processing facilities and 85% is recycled. Also no copper is reused directly.

4.6 Chain partners/ stakeholders.

The most important chain partners are to be found in the Excel "Actions Planning and Responsibilities"

5 | Quantifying emissions

Based on the description of the chain as shown in Chapter 3, it is determined per chain step how much CO_2 is emitted during the various phases of the chain. Each paragraph describes a part of the chain and the associated GHG emissions, calculated in CO_2-equivalents (further noted as CO_2-emissions)

Since good quality primary data of the most commonly used cables is not widely available yet, data from Milieudatabase is mainly used to calculate the base-year emissions. The quality of this data is rated as good enough for the base year calculation, since this data is representative specifically for the 'average' low and medium voltage cable.

The Milieudatabase data of the cables comes from different manufacturers. Average values of the different types of cables were taken via information sheets of those manufacturers. The LCA calculations were made with SimaPro v9.1 software. The reference databases used are:

- Process database National Environmental Database (NMD) version 3.3
- EcoInvent database version 3.6

The phases mentioned below refer to the image in chapter 4. Any possible uncertainties are mentioned in chapter 6.4.

To be able to measure progress consistently over time, it is decided to relate the emissions to one linear meter of cable.

5.1 Reference

For the low voltage cable, the calculations below are based on a low-voltage cable with a copper conductor. The cable consists of 4 cores of 6.0mm2 cores Suitable for all applications for low-voltage installations described in NEN1010. The insulation is XLPE and the sheathing is PVC. The outer diameter is approximately 25mm. (see chapter 3, product description)

For the medium voltage cable the calculations below are based on a cable with a conductor cross-section of 150 mm2. If deemed necessary, scaling is possible based on the conductor cross-section (25 to 600 mm2). Scaling is not needed, see chapter 3: product description.

5.2 Raw materials and production of cables

This considers phase A1-A3, the production of low and medium voltage cable. Based on data from different suppliers the emissions for these phases are calculated in the table below. The difference between the two is caused by the much larger amount of copper used per meter in medium voltage cable due to larger cross section sizes.

EMISSIONS GR CO_{2EQ}/M^1		
	MEDIUM VOLTAGE	**LOW VOLTAGE**
Raw materials and production	6.250,0	1.042,0
Total	**6.250,0**	**1.042,0**

Table 8: production emissions

Top suppliers have been asked to share primary data on CO_2-emissions for the production process of low and medium voltage cable. The available data is limited and mainly aimed at the more sustainable product options. Since some of the top suppliers are working on performing lifecycle analysis on their product portfolio, it is expected that this data will be coming available in the coming years. This data can be used to be able to make more sustainable choices.

5.3 Processing in projects

The table below shows an approximation of the quantity of trench carried out compared to length of cables.

Estimated percentage of trench			
	meter cable	**% buried cable**	**m1 trench**
XVB (or equivalent)	1.304.887	30%	391.466
XGB (or equivalent)	2.053.499	5%	102.675
EmXGB (or equivalent)	236.225	5%	11.811
EXAVB (or equivalent)	366.960	95%	348.612
Other	602.313	5%	30.116
Data	2.176.494	5%	108.825
Medium voltage	73.851	95%	70.158
Total	**6.814.229**		**1.063.663**
			16%

Table 9: percentage of cable in trench

Construction phase (A4-A5): This scenario assumes that the cable will be buried. This has a higher impact than laying it in a cable duct. It is estimated that putting cables in a cable duct causes about 10% of the emissions compared to putting cables in a trench. The cable duct itself is out of scope.

EMISSIONS GR CO_{2EQ}/M^1			
	MEDIUM VOLTAGE	**LOW VOLTAGE TRENCH**	**LOW VOLTAGE CABLE DUCT**
Transport	47,0	7,9	7,9
Placing cables	2.054,0	1.840,0	184,0
Total	**2.101,0**	**1.847,9**	**191,93**

Table 10: Processing on projects emissions

The explanation of the emissions are stated in the paragraphs below.

5.3.1 Transport (upstream distribution)

The transport of the cables is done by truck or van. It is however unknown what kind of truck or van is used. Also, the distances and the amounts of cable differ per project. With that, there is no administration of who transports which amounts of cable, this can be a subcontractor, a transportation company or Equans personnel. Transport is often combined with other transportation or movement to project sites.

The logistics department has been asked to share information about the transport movements for low and medium voltage cables. It turns out that it is not possible yet to solely select information that is applicable for low and medium voltage cable. The main subcontractor for transport is GLS. GLS calculates the CO_2-emissions for the transport they do for Equans. All transport is done under the 'label light' program. The total emissions for all transport by GLS done for Equans is 65 tons of CO_2 in 2023. At this point it is not possible to calculate the emissions for the transport of low and medium voltage cables.

Since exact information about the transport of cables is not insightful, allocation of data is not possible yet. Therefore, the data from Milieudatabase is used for a start. This is an insignificant portion of the total CO_2-emissions.

5.3.2 Subcontractors

Equans works with many different small companies as subcontractors if the work is not carried out by Equans itself. Until today none of the subcontractors have been asked to provide data on CO_2-emissions on projects. Therefore, there is no actual project data concerning CO_2-emissions available yet. Until actual data comes available, data from Milieudatabase is applied.

The subcontractors work is mainly the excavation work with an excavator that runs on diesel. Combined with handheld tools that run on petrol, the occasional generator and the usage of trucks and other equipment to lay the cables, and specialized equipment for horizontal drilling.

5.3.3 Waste and processing

Waste is responsible for far less than 1% of the emissions. Therefore, the emissions from waste are negligible. Waste of removed cables is not calculated, since it concerns end-of-life emissions in the life cycle of the removed cables. The total amount of waste from Equans processed in 2023 by AG Metals is 572 tons:

WASTE MATERIAL	WEIGHT IN KG	PERCENTAGE
Scrap metal	246.913	43%
Alu Almelec	218.020	38%
Electrical cables	**41.697**	**7%**
Sterile	41.430	7%
Lead batteries	15.540	3%
Motors	4.711	1%
Red copper	2.039	0%
Small Electronics	1.680	0%
Aluminum	20	0%

Table 11: Waste quantities

A total amount of 41.697 kgs of electrical cables is processed by AG Metals. This concerns all types of electrical cable with copper and not only medium voltage cable. Further specification is desired.

5.4 End-of-life

The top waste processor has provided only global information about waste treatment. There is no CO_2-emission data available yet. Within the four stages of the End-of-life phase, the following emissions are calculated in Milieudatabase:

EMISSIONS GR CO_{2EQ}/M^1		
	MEDIUM VOLTAGE	LOW VOLTAGE
Digging up old cables*	0,00	0,00
Transport of the waste	0,55	0,10
Waste processing	2.351,00	468,06
Waste disposal	1,40	0,19
Total	**2.352,95**	**468,35**

Table 12: end-of-life emissions

* in deviation from the data in Milieudatabase, the starting point is that deconstruction is always done in one go with the installation of new cable (replacement).

Knowledge of actual waste processing methods and quantities of cable removed will help to specify these emissions to the situation that is applicable for Equans.

5.4.1 Avoided emissions and circular economy opportunities

There are some opportunities to improve the treatment of waste in/after the end-of-life stage (stage D). The recycling of materials leads to avoiding emissions for raw materials. Also, energy that is generated from the incineration of waste leads to avoiding the burning of fossil fuels for energy.

EMISSIONS GR CO_{2EQ}/M[1]		
	MEDIUM VOLTAGE	**LOW VOLTAGE**
Potential benefits beyond system boundaries	-3.206,0	-489,4
Total	**-3.206,0**	**-489,4**

As stated in chapter 2.2.1. this is , for now, out of scope. And as stated the introduction of chapter 5, this information originates from Milieudatabase. The calculations behind the numbers above are not publicly available, textual substantiation is to be found in the 'Report category 3 data National Milieudatabase, chapter 26 'Cableworks', page 29/30.

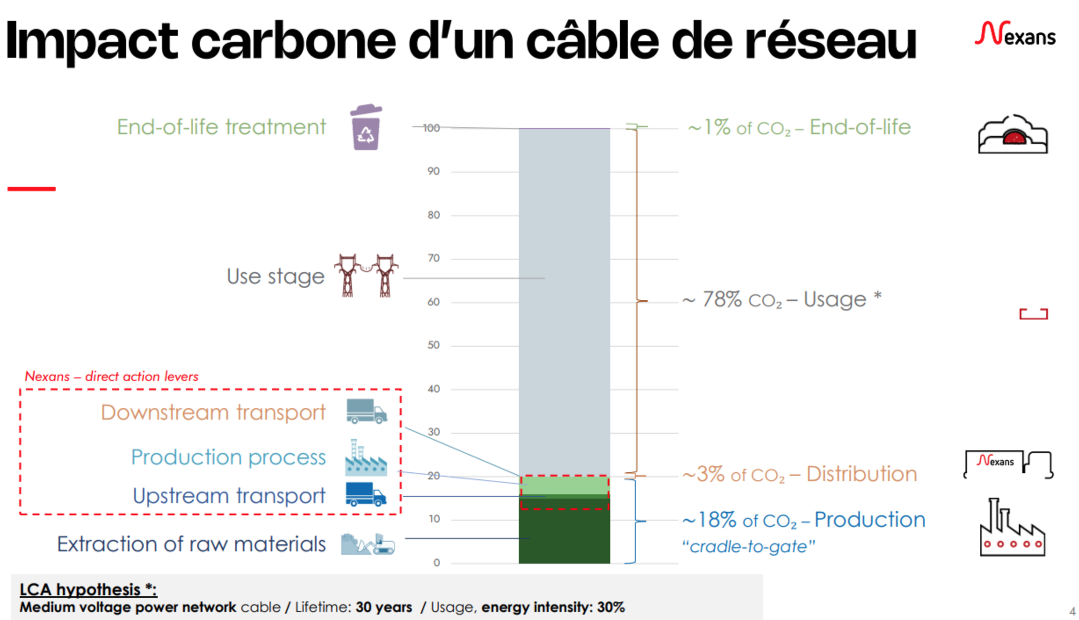
With today's knowledge and methods, this leads to the number of avoided emissions elsewhere as displayed in the table above.

The higher the rate of circularity (The R-ladder), the more positive impact this stage will have.

5.5 Use stage (out of scope)

Low and medium voltage cables do not emit any greenhouse gasses during the use phase, but cable losses can result in a significant amount of CO_2 emissions during the life span of the cables.

For medium voltage cable, approximately 80% (see study by Nexans below for example) of the total emissions from network cables are generated by energy loss.



Source : https://www.auvergne-rhone-alpes.developpement-durable.gouv.fr/IMG/pdf/202312-4-nexans-confregenr-reseau.pdf

For low voltage cable, up to 99% (see study by LAPP below for example) of the total emissions from network cables are generated by energy loss. In this study, the lifespan of a low voltage cable is estimated to be 10 years. Considering that the Milieudatabase estimation of the lifespan is 30 years, this would result in triple the amount of emissions that are calculated in the study by LAPP.

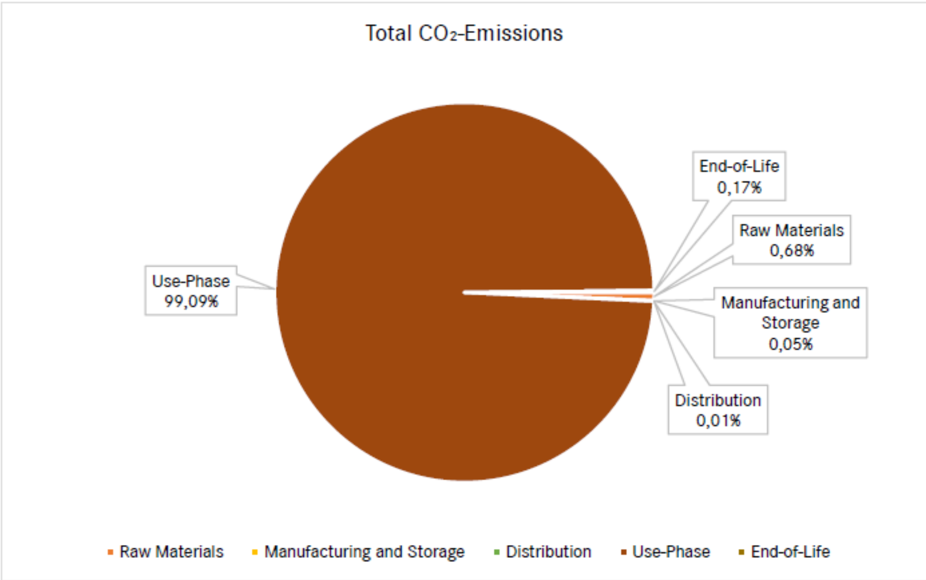


Figure 4: Total Carbon Emissions of ÖLFLEX® FD 855 P 3G1.5

This results in the following estimates. It should be emphasized again that what the actual emissions from cable losses will be in reality depends on many variables beyond the control of Equans.

ESTIMATED POTENTIAL EMISSION AVOIDANCE (GR CO_2/M^1)	
EMISSIONS GR CO_2/M^1	
MEDIUM VOLTAGE	**LOW VOLTAGE**
7.248,5	**9.200 – 27.600**

Correct design and engineering can have a significant effect on energy losses in the cables. Any cuts in energy losses can be counted as ‘avoided emissions from third parties’. How much can be avoided by better engineering is impossible to state at this moment.

5.6 Overview of CO_2-emissions in the chain and reduction potential

In the table below the total CO_2-emissions for low- and medium voltage cable are calculated, based on the information in the previous paragraphs.

EMISSIONS OVERVIEW			
	EMISSIONS GR CO_2/M^1		
PHASE	**MEDIUM VOLTAGE**	**LOW VOLTAGE IN TRENCH**	**LOW VOLTAGE IN DUCT**
Raw materials and production	6.250,0	1.042,0	1.042,0
Processing on projects	2.101,0	1.848,0	191,9
End-of-Life (beyond system boundaries)	2.353,0	468,4	468,4
Total (gram CO_2/m^1)	**10.704,0**	**3.358,3**	**1.702,3**

Table 13: CO_2-emissions per chain step

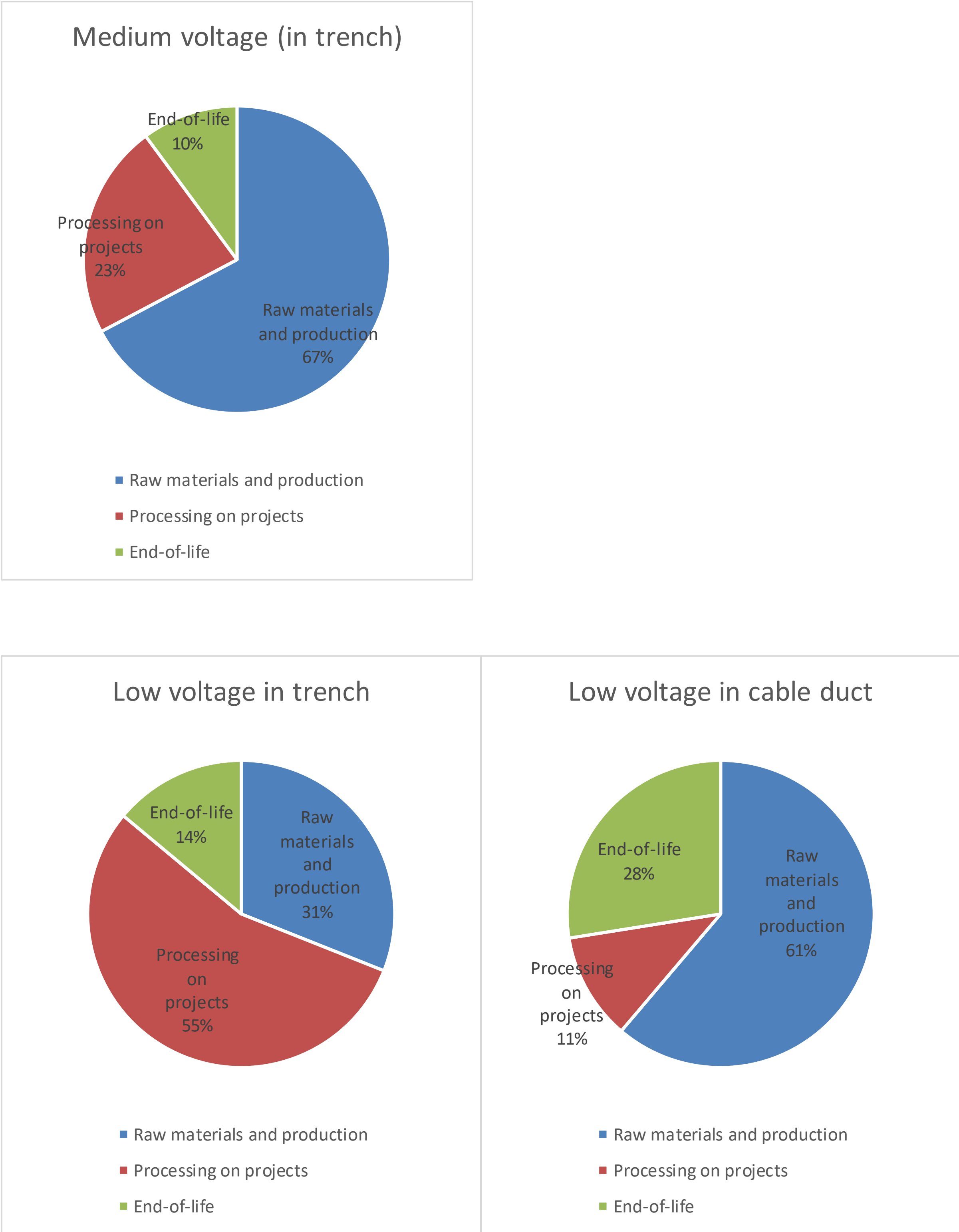


Figure 6: Ratio CO_2- emissions per chain step.

5.6.1 Extra potential

Looking past the actual chain steps of the cable life cycles, there are some more reduction possibilities. For example, aiming for a more circular treatment of the cables after the end of the lifespan can lead to lower emissions in the next lifecycle. There are also possibilities to reduce cable losses. With the current knowledge, the emissions are calculated to be as follows:

REDUCTION POTENTIAL BEYOND SYSTEM BOUNDARIES		
	EMISSIONS GR CO_2/M^1	
PHASE	**MEDIUM VOLTAGE**	**LOW VOLTAGE**
Potential benefits after end of life	-3.206,0	-489,4
Potential emission avoidance use stage (*per year*)	-1.270,0	-4.340,0

Table 14: reduction potential beyond system boundary

The potential benefits after end-of-life are sourced from Milieudatabase. The potential emissions avoidance in the use stage is based on estimations in the life-cycle assessments from different cable suppliers.

As stated in chapter 2.2.1, this is out of scope. The potential of avoided emissions is therefore not taken into account in the calculation of the total emissions in chapter 5.6. This information is merely to inform about the possibility of avoiding emissions beyond the life cycle of cable.

6 | Improvement possibilities

The goal of this analysis is to identify opportunities to improve the environmental performance of medium voltage cable over the full lifecycle. Common results include:

Product redesign: define where product design changes can be made.

Process improvement: identify opportunities for process improvements. For example, a manufacturing process may be modified to reduce energy consumption or waste generation.

Supply chain management: identify areas where improvements can be made in the supply chain, like selecting suppliers that use sustainable practices or choosing materials with a lower environmental impact.

Communication and marketing: communicate the environmental performance of a product to clients and other stakeholders. This can help clients to make more sustainable choices.

Policy development: initiate the development of policies and regulations aimed at reducing CO_2-emissions for chain partners.

6.1 Ideas for improvement

The figure below shows how EQUANS aims to contribute to the reduction of CO_2 emissions at each link in the chain. The following sections of this chapter provide more detailed explanations of each recommendation.

Raw materials and production of cables	Processing in projects	Use stage	End-of-life processing
• **1) Supply chain management** • improve the collect of data • prioritize the purchase of low carbon cables • encourage/support local suppliers	• **2) Integrating the use of Life Cycle Assessment tools in the BIM modeling** • **3) Electrification of vehicles/tools and use of low-carbon fuel for trucks and heavy equipment (HVO)** • **4) Prefer directly burying cables for trench installation** • **5) Prioritize subcontractors engaged in the reduction of CO_2 emissions for excavation works or cable pulling.**	• **6) Optimizing Section of Cable to Minimize Losses During Use**	

6.1.1 Supply chain management

Our analysis shows that among various cable suppliers, not all are at the same level of environmental commitment. Some manufacturers, such as Nexans, are fully committed to reducing the carbon footprint of their cables, with strong ambitions for the coming years.

Nexans
ELECTRIFY THE FUTURE

> Pleinement conscients de notre responsabilité en matière d'électrification durable, Nexans s'engage, dans le cadre de l'initiative Science Based Targets (SBTi), à atteindre le « Net-Zéro » émission d'ici à 2050 et à réduire nos émissions de gaz à effet de serre absolues de Scopes 1 & 2 de 46% d'ici 2030, et ses émissions de GES de Scope 3 de 30% d'ici 2030 (par rapport à 2019, année de référence).

This commitment from suppliers implies that they are already taking a series of measures at different levels of the chain to minimize the carbon footprint, such as:

- Choosing sustainable materials:
  - Using recycled copper/aluminum and plastic in the production of cables.
  - Utilizing materials with a low carbon footprint.
- Energy efficiency in production:
  - Optimizing manufacturing processes.
  - Using renewable energy in the manufacturing process.
- Optimizing upstream and downstream transport of products.
- Publishing Product Environmental Profiles (PEP) for different types of cables.
- ...

On the contrary, other significant suppliers like Eupen are much less advanced in their ecological thinking and currently provide no data regarding the ecological footprint of their cables.

As 50% of cable purchases are made through distributors, it is not always possible to identify the manufacturer of the product. Additionally, it's worth noting that some suppliers, like NEXANS, do not sell directly but only through distributors.

The quest for sustainability begins with the choice of materials. Manufacturers are now prioritizing recyclable metals, glass, and plastics, reducing the environmental footprint of each street light produced.

"Our first recommendation is to actively engage with suppliers by establishing a quantitative mapping of CO_2 emissions from a larger proportion of suppliers each year. The measures are as follows:

- Include sustainability and CO_2 emissions per euro in the procurement policy and in the selection of suppliers,
- Actively approach the largest suppliers to determine the CO_2 emissions of the products/services provided,
- Critically assess its own purchases and determine where high-emission products can be spared or where a circular alternative can be chosen."
- Engage with suppliers who have EPD's-LCA's available
- Engage with suppliers and encourage them to use ECO design approach ads from the start (can be re-use old armature, can be design based on 50+% of recycled aluminum/steel/plastic
- Get full insight in their raw material upstream value chain to get insight in their 'Eco approach'.
- Incentivize the 'most sustainable producer by giving them a (%) priority in tender phase or penalize (%) those companies who don't (BONUS-MALUS approach)

The example below shows that the choice of a Nexans XVB 4G6 cable reduces the CO_2 impact from "Raw materials and production" by approximately 24% compared to the average data from the "Milieudatabase" (876 kg CO_2/km < 1,042 kg CO_2/km). This is still to be validated, but it forecasts good progress possibilities.

XVB Cca 0,6/1kV

XVB Cca 4G6 mm² R100 P1.5km

CARACTÉRISTIQUES

Caractéristiques de construction	
Nature de l'âme	Cuivre
Flexibilité de l'âme	Massif classe 1
Forme de l'âme	Rond, massif (RE)
Isolation	XLPE
Repérage des conducteurs	Brun, Noir, Gris + Vert/Jaune
Avec conducteur Vert/Jaune	Oui
Matière du bourrage / gaine interne	Bourrage ou ceinture rubanée
Gaine extérieure	PVC
Couleur de la gaine	Gris
Avec conducteur neutre plus petit	Non
Sans halogène	Non
Caractéristiques dimensionnelles	
Nombre de conducteurs	4
Section du conducteur	6 mm²
Section du conducteur de terre	- mm²
Section du conducteur neutre (quand plus petit)	- mm²
Epaisseur moyenne de l'isolant (mm)	0,7 mm
Epaisseur isolation du conducteur réduit	- mm
Epaisseur minimale de la gaine externe	1,09 mm
Diamètre extérieur nominal (mm)	13,3 mm
Masse approximative	378 kg/km

V. PRODUITS COUVERTS PAR LE PEP

Les produits couverts par le PEP donné sont représentés dans le tableau ci-dessous par un: ●
Le tableau ci-dessous fournit également la résistance linéaire maximale (ohm/km) à 20°C en DC pour les
60228

Section (mm^2)	Résistivité (ohm/km)	N° de CONDUCTEURS																		
		1	2	3	4	5	6	7	8	9	10	12	14	19	21	24	27	30	37	40
0,5	36																			
0,75	24,5																			
1	18,1																			
1,5	12,1		●	●	●	●		●												
2,5	7,41		●	●	●	●		●												
4	4,61		●	●	●	●														
6	3,08		●	●	●	●														
10	1,83		●	●	●	●														
16	1,15																			
25	0,727																			

Règles d'extrapolation pour chaque étape du cycle de vie

Etape du cycle de vie	Principe d'extrapolation applicâble	Formule pour calculer chaque indicateur environnemental	Exemple: Si la masse du produit est 185 kg/km, chaque indicateur est calculé avec:	L'écart moyen de la règle d'éxtrapolation
Fabrication	Variation linéaire en fonction de la masse	Indicateur = a x Masse du câble + b. N.B.: les coefficients (a & b) sont différents suivant si la masse du câble à l'étude est plus importante ou plus faible que 343,5 kg/km	Indicateur = (185 x a) + b.	1,73%

Tableau à prendre en compte pour les calculs d'extrapolation des différentes étapes du cycle de vie:

	Fabrication				Distribution		Installation		Fin de vie	
	Masse<343,5 kg/km		Masse>343,5 kg/km							
	a	b	a	b	a	b	MIV		a	b
Réchauffement climatique	2,72E+00	4,44E+01	2,20E+00	-3,82E+01	5,72E-02	5,62E-01	1,42E+00	-	9,40E-02	7,24E+00
Appauvrissement de la couche d'ozone	6,09E-07	2,28E-05	4,86E-07	-2,35E-05	1,16E-10	1,14E-09	9,06E-09	-	1,63E-08	3,08E-07

6.1.2 Integrate LCA tools in BIM modelling

Building Information Modelling (BIM) is often classified into several levels, each representing an increasing sophistication in collaboration, data, and modelling techniques. Here are the commonly recognized levels:

- Level 0: 2D Drawings
  - Use of 2D drawings without the integration of additional data. Information is limited to graphical representation.
- Level 1: 3D Modelling
  - Introduction of basic 3D models that allow for volumetric representation. Associated data is limited.
- Level 2: Collaborative BIM
  - 3D modelling with integrated data. Teams use a common model, allowing for effective collaboration.
  - Enables coordination among different disciplines (architecture, civil engineering, electromechanics, etc.) and facilitates data exchanges.
- Level 3: Integrated BIM
  - Fully integrated BIM models that include proactive data management. This includes the use of facility management systems.
  - Allows for effective management throughout the building's lifecycle, including operation and maintenance.
- Level 4: Real-Time BIM
  - Integration of IoT (Internet of Things) data and real-time visualization using augmented or virtual reality technologies.
  - Advanced applications for smart building management and real-time decision-making.

Level 3 of BIM integrates Life Cycle Assessment (LCA) tools that evaluate the environmental impacts of materials and construction methods, thus helping to select cables and materials with a low carbon footprint. By analyzing available materials in its database, BIM can encourage the use of cables made from renewable or recycled resources, thereby reducing carbon footprint.

Although EQUANS is progressing year by year in BIM modelling and is currently situated between levels 3 and 4, Life Cycle Assessment tools are not yet fully utilized.

- We recommend integrating the use of Life Cycle Assessment tools into the BIM modelling of our projects to encourage the use of materials with a lower carbon footprint.

6.1.3 Reducing emissions from heavy vehicles

Emissions of heavy vehicles can be reduced if alternatives for diesel are used. Electrification of vehicles and use of low-carbon fuel for trucks and heavy equipment (HVO) can be an option. The vans and trucks are owned by Equans and therefore treated in scope 1, the emissions are still part of the chain of activities.

Equans also rents equipment for excavation works. This equipment can also be rented in a more sustainable way, eg. from suppliers who also have CO_2 performance ladder certificate. More and more EV driven equipment becomes available on the rentalmarket.

6.1.4 Use innovative cable technology

Some manufacturers (such as NEXANS) are developing cables with reinforced sheathing that allow the cable to be buried directly in the ground. With this technology, the excavated soil is used directly as backfill, eliminating the need for a sand bed.

The figure below shows that the use of such a cable can save up to 33 tons of CO_2 for a 12 km project.

- Our recommendation is therefore to promote directly buryable cables to our clients so that they adapt the standard specifications for a trench (if necessary). When the specifications allow it, prioritize directly buryable cables to minimize transportation (no transport of sand or removal of excess soil).

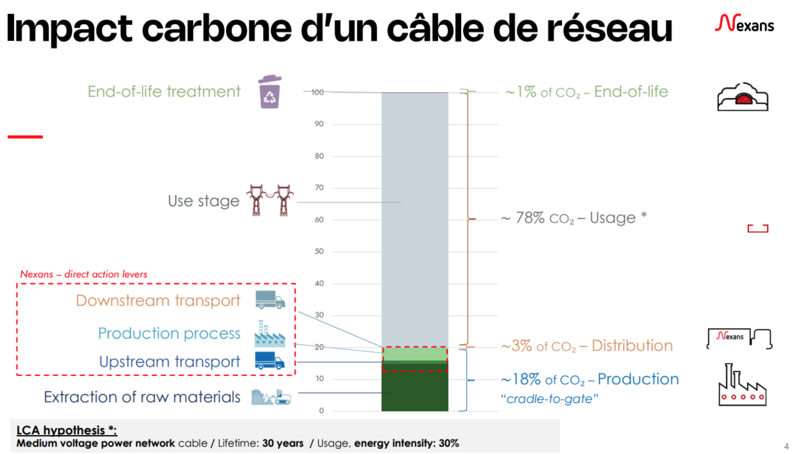
6.1.5 Demand or reward subcontractor engagement.

To reduce emissions during the project phase, it is necessary to also motivate the subcontractors to get engaged in the reduction of CO_2 emissions for excavation works or cable pulling, or to reward subcontractors that are already engaged. Since Equans is working with many different small companies for subcontracting, it is to be determined what can be asked and expected from these parties concerning investments in CO_2-reduction.

- Our recommendation aims to impose sustainability requirements on our subcontractors (zero emissions, HVO, emissions management for projects, etc.).

6.1.6 Optimizing cable sizing

The environmental footprint of a cable is also measured beyond its production and installation. Approximately 80% (see study below) of the total emissions from network cables are generated after commissioning, considering energy loss known as "Joule effect."



Joule losses, also known as resistive losses, occur when an electric current passes through a conductor. These losses are caused by the resistance of the cable, leading to energy dissipation in the form of heat. They are highlighted by Ohm's law and can be calculated using the following formula:

$P_{JOULE} = R \times I^2$

- (P_{JOULE}) is the power lost (in watts),
- (I) is the current (in amperes),
- (R) is the resistance of the cable (in ohms).

Since Joule losses in a conductor are proportional to the square of the current passing through it, it is recommended, for a given power, to increase the voltage in order to decrease the current. This technique is used in distribution networks that operate at higher voltage levels as the load increases. However, in most cases, since the voltage level is predetermined, it is challenging to modify this parameter, and only a reduction in the cable resistance (R) is possible to minimize Joule losses.

The resistance of a cable depends heavily on the material used (usually copper or aluminum), its length, and its cross-section. It can be calculated using the following formula:

$R = \rho \times L / S$

- ρ is the resistivity of the metal used (in ohm-meters, Ω·m),
- L is the length of the cable (in meters, m),
- S is the cross-sectional area of the cable (in square meters, m²).

To minimize the resistance of the cable and thus the Joule losses, several strategies are possible:

1. Choosing appropriate conductive materials:

- Using materials with better conductivity, such as copper or aluminum, can reduce resistance. However, we have limited flexibility on this matter.

2. Optimizing cable length:

    - Since losses due to the Joule effect are directly proportional to the length of the cable, minimizing the length of the cable reduces Joule losses. Since a reduction in length means a de facto reduction in the associated costs (supply and works), this optimization is already systematically applied in our electrical studies.

3. Increasing cable cross-section:

    - Since Joule losses are inversely proportional to the cross-section of the cable, increasing the cross-section helps reduce Joule losses. However, increasing the cross-section leads de facto to increased associated costs (supply and works), so this optimization is generally not made to keep construction costs down.

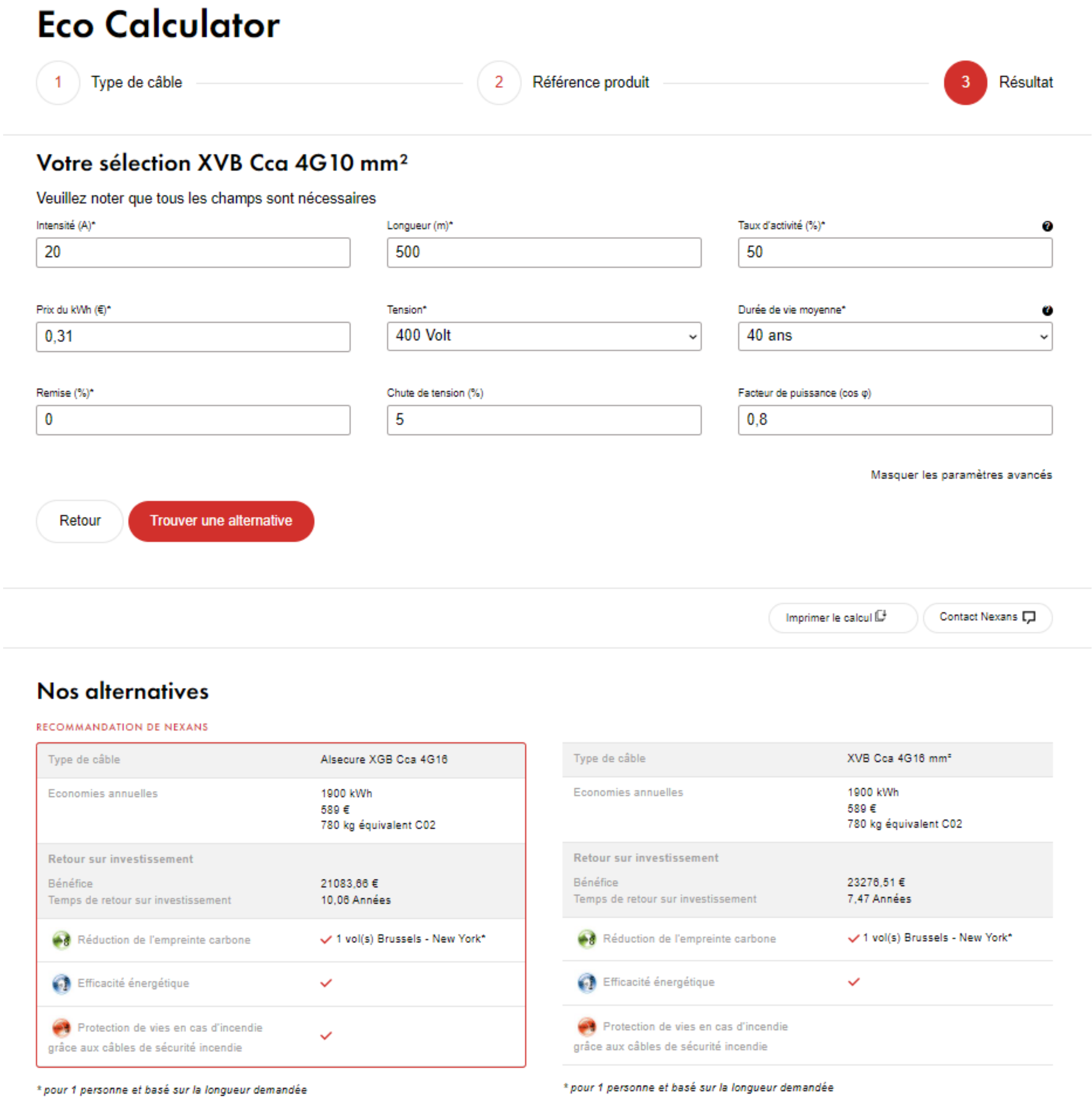
Joule losses are unavoidable in any electrical system, but their impact can be significantly reduced by applying good design practices and choosing the right materials.

To ensure that a cable heats up less quickly, the simplest approach is to choose a cross-section larger than what the required power would necessitate.

We are faced here with an ambiguity, as our direct interest is to minimize the cable cross-section in order to reduce the quantities of copper for a given project (which is the main source of CO_2 emissions in the manufacturing process of an electrical cable). Meanwhile, an increase in the cross-section (compared to the minimum technically required) helps to decrease Joule losses over the lifespan, thus reducing indirect emissions (beyond our scope).

- The main recommendation in this topic is to raise our clients awareness of the added value and benefits of larger cable cross-sections for the total cost of an installation over its lifespan, as too few clients are aware and focus solely on the purchase price.

For example, Nexans has developed an online tool (see figure below - EcoCalculator) that indicates the amount of energy (expressed in kWh and euros) saved each year with a larger cross-section. Furthermore, the software also calculates the payback time for choosing this cable alternative and the final gain realized over the entire lifespan of the installation.



6.1.7 Other possibilities

There are many different ways to reduce the CO_2-emissions in the chain next to the most important ones mentioned in the paragraphs above. The measures with less estimated impact, less possibilities for influence and/or less possibilities to be cost effective are mentioned below and not further elaborated yet.

- Reducing cable theft. Estimate of cable thefts: €500.000 per year. There is no administration of kg's and/or meters of cables that have to be replaced because of theft yet. Theft of copper cables during the installation phase is a significant problem. It leads to higher costs and of course to higher emissions due to extra materials and transportation. More/better security can be an option, but also calculating 'Total cost of ownership' for copper vs aluminum can be interesting if damage by theft is incorporated. This counts for Equans but might even be useful as a USP for clients.
- Create a 'closed loop' of cables together with clients, suppliers and waste processors to improve circularity.
- As market leader, start an innovation center for cables and bring chain partners together to cooperate on reducing emissions and improving circularity in the chain of cables (in line with this analysis), encourage all participants to be creative, dare to take chances and keep the collective climate targets for 2050 in mind.

- Optimalization of transport movements (full loads, joint transport with stakeholders, etc.)
- Choose suppliers with sustainable packaging solutions (for example: https://www.nexans.be/en/company/Nexans-in-Belgium/Eco.html)
- Further development of the Equans Reuse Corner https://equans.reuse.corner.mytroc.pro/
- Aim for more DBFM(O) projects [Design - Build - Finance - Maintain – Operate]. If clients choose a DBFM(O) formula, it gives Equans more freedom in choices of materials. Due to the long-term character of these kinds of projects, it is in Equans' interest to choose more sustainable materials.
- Use aluminum as an alternative to copper, since aluminum has less CO_2-emissions per ton.
- Aim to always remove old cables to be able to reuse the materials.

6.2 Objective

To actually convert the reduction opportunities from the previous chapter into concrete CO_2 reductions, an action plan has been drawn up with measures and an objective. Equans would like to stimulate CO_2 reduction by sustainable procurement of cable and subcontractors in combination with reducing scope 1 and 2 emissions.

The objective is:

Equans wants 52% less CO_2-emissions per meter of buried cable in 2030, compared to reference year 2023.

Life Cycle Assessment (LCA) Integration by 2030: EQUANS aims to systematically incorporate Life Cycle Assessment (LCA) tools into BIM modeling for multi-technical and long-term projects (10 to 30 years) as from 2030. This will enable the quantification, optimization, and monitoring of the overall carbon footprint throughout the project lifecycle. Pilot projects will be undertaken between 2025 and 2030 to test and refine this approach.

Sustainability in Procurement by 2030: EQUANS plans to develop processes and tools to assist operational teams in selecting suppliers based on environmental performance through its procurement systems by 2030. This initiative will help reduce the carbon footprint of projects while promoting a culture of sustainability among operational teams.

6.3 Plan of approach

To achieve the above objective, various measures are required. These measures are listed in the Excel "Actions Planning and Responsibilities". As the name suggests, there is information about the planning and responsibilities etcetera to be found in this Excel. The status of the actions will be recorded at least on a half-year basis.

6.4 Data Quality

The following data quality issues have been defined:

- The qualitative scope 3 analysis is largely based on spend data. An estimation is made for the separation of supporting services (like subcontractors) between the activities of 'lighting' and 'cables'. Better structural substantiation is desirable.
- Data for the 'average' type of medium voltage and low voltage cable is applied but there are many varieties.
- LCA calculations are not yet fully available from the top suppliers and/or for all cable types. Therefore, the information (specific for low and medium voltage cable) from Milieudatabase is used. Insight into actual emissions data from all suppliers is necessary to be able to steer towards a more sustainable purchase policy.

- It is necessary to create better insight into the exact amounts of CO_2 emitted in the entire process of the projects, ideally per m1 cable placed. This can be primary data supplied by subcontractors, but also from Equans.
- Also, better insight into the ratio of the diversity in project execution is desirable.
- Transport allocation per m1 cable is needed for a proper estimation.
- Milieudatabase data is based on the Netherlands, data may vary at some points for Belgium.
- There is no insight yet into the amount of cables that has to be replaced during project phase because of theft.
- Exact information about the transport of cables is not available.
- For cables in cable ducts emissions from the construction phase have been estimated to be 10% compared to cables in trenches.
- CO_2-emissions due to cable losses are an estimation. This is of significant importance since it refers to about 80% of the total emissions.

Data improvement measures are listed in the Excel "Actions Planning and Responsibilities".

7 | Progress reports

7.1 Progress 2025-1 :

Introduction
This progress report provides a deeper and more quantitative overview of the steps Equans has taken in 2024 towards the goal of achieving 52% less CO_2 emissions per meter of buried cable by 2030 compared to 2023. While the existing progress chapter mainly describes KPIs used to assess CO2 reduction as well as qualitative developments for years 2024.

In chapter 5.6, we defined the Carbon Emissions in kilogram of CO_2 per meter of cable, whereas several suppliers use Carbon Intensity expressed in kg CO_2 per €.

The aim of this chapter is therefore to establish an objective correspondence between the two measurement scales.

Quantitative Progress
According to the analysis, CO_2 emissions per meter of cable in 2023 for low voltage (in trench) amounted to 3,358 grams CO_2 per meter (see chapter 5.6). The total volume of low voltage cables that year was over 6.7 million meters, resulting in total emissions of approximately 22,637 tons CO_2.

The 2023 data has been completed with the amounts of purchases made for each supplier, which has enabled us to determine a Carbon Intensity of 1.07 for the reference year (2023), subdivided into three categories: 0,33 for Raw material and Production, 0,59 for Processing on Projects and 0,15 for End Of Life.

	2023								
	A	B	C	D	E	F = A x C	G = A x D	H = A x E	I = F + G + H
Suppliers	Quantity	Purchases	Raw material and production	Processing on projects	End-Of-Life	Raw material and production	Processing on projects	End-Of-Life	Total Emissions
	meter	€	kg CO2 / meter	kg CO2 / meter	kg CO2 / meter	kg CO2	kg CO2	kg CO2	kg CO2
CEBEO	3.778.516	12.147.278	1,042	1,848	0,4684	3.937.214	6.982.698	1.769.857	12.689.768
EUPEN	621.728	4.661.000	1,042	1,848	0,4684	647.841	1.148.953	291.217	2.088.011
REXEL	1.364.839	3.474.014	1,042	1,848	0,4684	1.422.162	2.522.222	639.291	4.583.675
KANNEGIETER	-		1,042	1,848	0,4684	-	-	-	-
B CABLES	-		1,042	1,848	0,4684	-	-	-	-
Others	975.295	775.822	1,042	1,848	0,4684	1.016.257	1.802.345	456.828	3.275.431
Total	**6.740.378**	**21.058.114**				**7.023.474**	**12.456.219**	**3.157.193**	**22.636.885**
Carbon per meter (kg CO2 / meter)						1,042	1,848	0,468	3,358
Carbon Intensity (kg CO2 / €)						0,33	0,59	0,15	1,07

In addition to the quantitative results, several qualitative steps were taken in 2024. Pilot projects were launched for the integration of LCA tools in BIM, 44 climate meetings were held with suppliers regarding EPDs, proposals were made for circular projects and recycling, and there was active collaboration with procurement to also monitor direct purchases and purchases via other suppliers (such as REXEL).

Conclusion and outlook
Thanks to the above analysis, we were able to convert our baseline 2023 defined in kilograms of CO_2 per meter of cable into the carbon intensity more commonly used by cable suppliers, expressed in kilograms of CO_2 per € of cable purchased.

The table below shows the results of the analysis presented in 5.6, extended to the results of the present analysis.

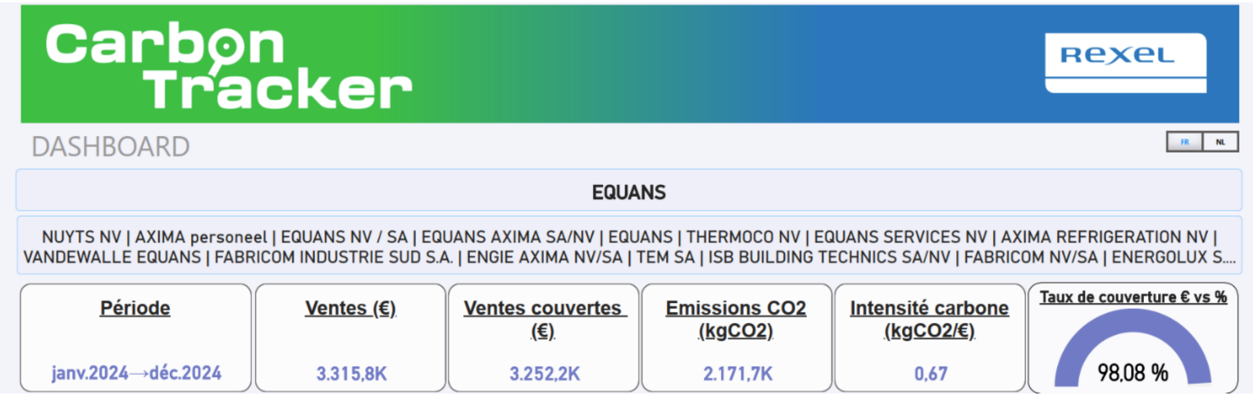
Emissions overview (baseline 2023)		
	LOW VOLTAGE in trench	
	Carbon per meter	Carbon Intensity
	kg CO2/m1	kg CO2/€
Raw materials and production	1,042	0,33
Processing on projects	1,848	0,59
End-of-Life (beyond system boundaries)	0,468	0,15
Total (gram CO_2/m^1)	**3,358**	**1,07**

7.2 Progress 2025-2 :

Introduction
This progress report provides a deeper and more quantitative overview of the steps Equans has taken in 2024 towards the goal of achieving 52% less CO_2 emissions per meter of buried cable by 2030 compared to 2023.

Thanks to our discussions with REXEL, we have been able to use their new tool (Carbon Tracker) to provide a clear overview of our purchases and the associated CO_2 emissions based on EPDs or equivalent environmental certificate.
We will therefore attempt to compare the carbon footprint of cables purchased from REXEL, based on certified cable, compared to our 2023 baseline.
Given that our baseline can be calculated using two different metrics (see Progress 2025-1), we will attempt to assess progress using both metrics.

Quantitative Progress
In 2024, cables purchased via REXEL accounted for a total CO_2 emission of 2.171 tons CO_2. Notably, 98.09% of these cables are provided with an EPD or equivalent environmental certificate. Based on the emissions kgCO2 per euro the progress is analyzed.



The table below (detailed data from REXEL 2024) shows that the carbon intensity of 0.67 announced by REXEL can be subdivided into four categories: 0,33 for raw materials and production, 0,01 for processing on project, 0,01 for transport, and 0,28 for losses. The detailed data also indicates the quantity of cables purchased, which allows us to calculate CO_2 emissions per meter of cable.

CABLE REXEL 2024								
	A	B	C	D	E	F	G	H
Suppliers	Purchases	Quantity	Raw material and production	Processing on projects	Transport	End Of Life	Losses	Total CO2 Emission
	€	meter	kg CO2	kg CO2	kg CO2	kg CO2	kg CO2	kg CO2
B-CABLES N.V.	351.971	271.433	147.877	341	7.911	14.447	103.883	274.459
BRUNO BALDASSARI F.LLI SPA	47.377	12.883	16.866	520	630	891	4.881	23.788
EUPEN KABELFABRIEK N.V.	275.794	40.223	68.350	1.492	2.616	3.650	28.047	104.155
EUROCAVI-EUROPA BVBA	127.860	141.400	39.950	209	2.023	3.605	59.836	105.624
FABER KABEL	680	190	116	2	5	7	36	165
GENERAL CAVI SPA	767.952	306.783	252.188	8.987	9.355	13.249	277.189	560.968
LA TRIVENETA CAVI SPA	490.847	450.649	162.694	3.156	6.200	8.717	254.868	435.635
LAPP KABEL B.V.	13.455	10.104	2.622	98	114	190	10.836	13.860
LEGRAND SA	530	1	0	0	0	0	1	1
MIGUELEZ CABLES	133.003	60.574	35.828	6.658	986	1.514	6.225	51.212
NEXANS BENELUX N V	1.022.885	238.298	348.596	14.815	12.772	18.131	162.574	556.887
OMERIN DIVISION SILISOL	56.514	15.685	11.103	192	443	654	3.804	16.197
PHOENIX CONTACT N.V.	332	1	1	0	0	0	0	1
SUDCAVI SRL	22.118	32.100	16.949	0	936	1.758	8.373	28.016
TOP CABLE S.A.	561	40	133	3	5	7	6	154
TWENTSCHE KABELFABRIEK	2.486	1.200	357	0	20	37	177	591
Total	**3.314.365**	**1.581.564**	**1.103.632**	**36.472**	**44.017**	**66.857**	**920.736**	**2.171.714**
Carbon per meter (kg CO2 / meter)			0,698	0,023	0,028	0,042	0,582	1,373
Carbon Intensity (kg CO2 / €)			0,33	0,01	0,01	0,02	0,28	0,66

The carbon intensity provided by REXEL is not directly representative of and comparable to the 2023 baseline with regard to cable losses and processing on project.

- While cable losses are excluded from our 2023 baseline, they are taken into account in the carbon intensity defined by REXEL.
- With regard to processing on project, we expect a significant difference between the CO_2 balance determined by EQAUNS, which takes into account buried cables, and the REXEL balance, which appears to represent standard installation.

By breaking down emissions by category and based on the 1,581 km of cable purchased in 2024, the cables purchased from REXEL can be compared to the 2023 baseline in terms of emissions per meter or carbon intensity, as well as for the "Raw materials and production" category as for the "End of Life" category. "Losses" and "processing on the project" are excluded from this comparison'. The "processing on project" category (EQUANS core business) will be analyzed separately, as EQUANS has a direct impact on this area.

The table below shows that the carbon emissions per meter of cables purchased from REXEL, based on certified cable, is 49% lower than the 2023 baseline. The same comparison based on carbon intensity shows a 26% reduction.

Emissions overview (baseline 2023)			REXEL 2024	
phase	LOW VOLTAGE in trench		LOW VOLTAGE in trench	
	Carbon per meter	Carbon Intensity	Carbon per meter	Carbon Intensity
	kg CO2/m1	kg CO2/€	kg CO2/m1	kg CO2/€
Raw materials and production	1,042	0,33	0,726	0,33
Processing on projects				
End-of-Life (beyond system boundaries)	0,468	0,15	0,042	0,02
Total (gram CO_2/m^1)	1,510	0,48	0,768	0,35
			-49%	-26%

Conclusion and outlook :

Progress in 2024 shows that Equans is on track to achieve the CO_2 reduction target. The share of certified REXEL cables is very high, emissions are transparent, and there is a clear trend towards further reduction. To monitor and report progress even more accurately, it is important to determine the total volume of cables purchased in 2024 and to integrate data from other suppliers. This will allow emissions per meter of cable or carbon intensity to be directly compared with the reference year, making progress towards 2030 increasingly concrete and substantiated.

7.3 Progress 2026-1

Introduction
This progress report provides a deeper and more quantitative overview of the steps Equans has taken in 2025 towards the goal of achieving 52% less CO_2 emissions per meter of buried cable by 2030 compared to 2023.

With regard to trench work, EQUANS has begun its transition to biofuels for the supply of construction machinery. The first pilot projects were carried out using biofuel (HVO type), reducing CO_2 emissions by 50% to 90% compared to conventional fuels. One of the aims of this analysis is therefore to examine the impact of biofuel on the "processing on project" category.

To monitor and report progress more accurately, and the aim is therefore to determine the total volume of cables purchased in 2024/2025 and to integrate data from other suppliers.

Based on the certified cable impact for sourcing in the 'Raw materials and production' and 'End of Life' categories defined in the 2025-2 Progress Report, and on the impact of biofuels to be defined in this analysis, we will attempt to assess progress in 2024/2025 compared to the 2023 baseline.

Quantitative and Qualitative Progress
To remain conservative, we will consider at this stage that 5% of trench work realized in 2025 is carried out by machines powered by biofuel, and we will consider that the associated reductions are limited to 70%. Our 2023 assumptions remain unchanged for 2024.

Emissions overview (baseline 2023)			2024 assumptions				2025 assumptions			
phase	LOW VOLTAGE in trench		% trench with biofuels	% benefits of biofuels	LOW VOLTAGE in trench		% trench with biofuels	% benefits of biofuels	LOW VOLTAGE in trench	
	Carbon per meter	Carbon Intensity			Carbon per meter	Carbon Intensity			Carbon per meter	Carbon Intensity
	kg CO2/m1	kg CO2/€			kg CO2/m1	kg CO2/€			kg CO2/m1	kg CO2/€
Raw materials and production										
Processing on projects	1,848	0,59	0%	0%	1,848	0,590	5%	70%	1,783	0,569
End-of-Life (beyond system boundaries)										
Total (gram CO_2/m^1)	1,848	0,59			1,848	0,59			1,783	0,57
					0%	0%			-4%	-3%

By combining the impact of sourcing certified cables and the impact of processing on project, the table below shows that for REXEL 2024 cables, emissions per meter of cable are reduced by 22% compared to 2023 and by 0% for other distributors/suppliers. Our assumptions for 2023 remain unchanged for non-certified cables (column OTHERS).
In 2025, the reduction will be 24% for REXEL cables and 2% for other cables compared with 2023. A similar analysis of carbon intensity shows a 12% reduction for REXEL cables and 0% for others cables in 2024. And respectively 14% et 2% in 2025.

Emissions overview (baseline 2023)			REXEL 2024		OTHERS 2024		REXEL 2025		OTHERS 2025	
phase	LOW VOLTAGE in trench		LOW VOLTAGE in trench		LOW VOLTAGE in trench		LOW VOLTAGE in trench		LOW VOLTAGE in trench	
	Carbon per meter	Carbon Intensity	Carbon per meter	Carbon Intensity	Carbon per meter	Carbon Intensity	Carbon per meter	Carbon Intensity	Carbon per meter	Carbon Intensity
	kg CO2/m1	kg CO2/€	kg CO2/m1	kg CO2/€	kg CO2/m1	kg CO2/€	kg CO2/m1	kg CO2/€	kg CO2/m1	kg CO2/€
Raw materials and production	1,042	0,330	0,726	0,333	1,042	0,330	0,726	0,333	1,042	0,330
Processing on projects	1,848	0,590	1,848	0,590	1,848	0,590	1,783	0,569	1,783	0,569
End-of-Life (beyond system boundaries)	0,468	0,150	0,042	0,020	0,468	0,150	0,042	0,020	0,468	0,150
Total (gram CO_2/m^1)	3,358	1,07	2,616	0,94	3,358	1,07	2,551	0,92	3,294	1,05
			-22%	-12%	0%	0%	-24%	-14%	-2%	-2%

As data from other suppliers/distributors is currently only available in euros, only the carbon intensity will be analyzed at this stage. The table will be updated with an analysis of carbon emissions per meter of cable as soon as the data becomes available.
EQUANS purchased respectively 30,1 M€ of cables from various distributors/suppliers in 2024 and 25,8 M€ in 2025. The top 5 distributors/suppliers account for 80% of cables purchased per year, with the remaining 20% coming from a multitude of suppliers, each representing less than 3% of the volume of cables purchased.
The table below shows that REXEL purchases represent respectively 11% of cable purchases in 2024 and 12% in 2025.
Thanks to Carbon intensity defined in the table above, we are able to fix a carbon intensity for each suppliers (REXEL and Others) for years 2024 and 2025.
For year 2024, applying a carbon intensity of 0.94 to REXEL cable purchases and a value of 1.07 for others, the table below shows that carbon intensity decreased with 2% in 2024 compared to the reference year. For year 2025, applying a carbon intensity of 0.92 to REXEL cable purchases and a value of 1.05 for others, the table below shows that carbon intensity decreased with 4% in 2025 compared to the reference year.

	2023	2024				2025			
	J = I / B								
Suppliers	Total Intensity	Purchases		Intensity	CO2 Emission	Purchases		Intensity	CO2 Emission
	kg CO2 / €	€		kg CO2 / €	kg CO2	€		kg CO2 / €	kg CO2
CEBEO		9.325.510	31%	1,07	9.978.296	8.390.031	33%	1,05	8.804.079
EUPEN		8.483.369	28%	1,07	9.077.205	6.204.168	24%	1,05	6.510.344
REXEL		3.319.146	11%	0,94	3.130.474	3.001.784	12%	0,92	2.769.165
KANNEGIETER		1.524.000	5%	1,07	1.630.680	2.477.480	10%	1,05	2.599.744
B CABLES		1.444.914	5%	1,07	1.546.058	826.467	3%	1,05	867.253
Others		5.957.543	20%	1,07	6.374.571	4.881.485	19%	1,05	5.122.386
Total	**1,075**	**30.054.482**	**100%**	**1,056**	**31.737.283**	**25.781.415**	**100%**	**1,03**	**26.672.971**
				-2%				-4%	

In addition to the quantitative results, several qualitative steps were taken in 2025 :

For both chain analyses, the use of Life Cycle Assessments (LCAs) has been increasingly implemented. The BIM team has conducted tests to explore the effectiveness of these tools, with the goal of integrating LCA methodology as a standard practice within the BIM teams. The testing of LCA-tools included, among others, Nooco and One Click LCA.

General Actions are taken or followed at Equans BeLux level by procurement. In 2025, Equans BeLux achieved the EcoVadis Gold and our decarbonisation plan has been accepted by the Science Based Targets initiative (SBTi) and the Belgian Alliance for Climate Action (BACA). Procurement department has deployed three programs with following actions and Targets for 2026. In line with these targets, we have also listed the results of 2025.

a) Procure with trust
Actions include integrating the supplier assessment program into Equans digital tools (COUPA, Synapse); deploying a mitigation action plan to tackle CSR major risks; and deploying the human rights policy at the Bouygues SA level.
Targets :
- Rate 50% of suppliers under framework agreements on EcoVadis
- Conduct 3 social audits – A social Audit was conducted in 2025 (Chinese Site of Sylvania)

b) Procure in partnership
Actions include supporting the deployment of each principle of the CSR Procurement Charter for buyers; creating training on carbon basics for buyers; and improving Equans practices to comply with CSR standards such as taxonomy reporting and CSRD reports.

Targets :

- Ensure 100% of new framework agreements and purchase orders have the CSR Charter for suppliers and sub-contractors attached
- Organize 1 Sustainable Procurement Training for buyers

c) Procure for climate

Actions include launching a supplier engagement program (via Integrity Next and integrating results into Equans carbon trajectory); setting up a global platform to share low carbon alternative products; and including CSR criteria in tenders and CSR charters.

Targets :

- Evaluate our top 200 suppliers via Integrity Next – 96 suppliers were contacted in 2025 to register with 64 responses registered.
- Engage 15% of our top 100 suppliers to reduce their emissions with SBTi or during the validation process.
- Organize 30 climate meetings – 25 climates meetings were organised.
- Include CSR criteria in 50% of our tenders

In order to elaborate on the actions taken in 2025 and that will be continued in 2026, here below a few relevant examples of application of the CSR approach for our top 3 cable distributors/suppliers :

- Cebeo (cables)
    - We follow Cebeo's emissions via Integrity Next platform.
    - EcoVadis level went from 76/100 (Gold medal) to 81 in 2026 (Gold medal).
    - Cebeo is certified ISO 14001.
    - Their Dashboard enables the comparison between products among the same category and throughout their entire stage of life.
- Rexel (cables)
    - We follow Rexel's emissions via Integrity Next platform.
    - Rexel has an EcoVadis level of 78/100.
    - Rexel does have the SBTi certificate.
    - Rexel have put in place an environmental dashboard collecting environmental information of their product and proposing some change to improve the environmental footprint before paying.

During our climate meetings, we formally requested supplier Eupen to develop a CO_2-reduction roadmap outlining their planned measures and expected timelines. Eupen has since provided the requested documentation and confirmed several sustainability commitments, including responsible sourcing practices related to copper origins. These steps demonstrate their willingness to align with our climate objectives and contribute transparently to emission-reduction efforts within the supply chain.

Conclusion and outlook :

Although the reductions in carbon intensity are limited compared with the 2023 baseline (2% in 2024 and 4% in 2025 respectively), this analysis shows that is on track to achieve the CO_2 reduction target. This low score can be explained by the fact that only 11% to 12% of cables are certified by EDP or an equivalent environmental certification, and that the use of biofuels remains limited in 2025.

A quick analysis shows that, all other things being equal, the use of certified cable alone can reduce carbon intensity by 14%, without taking future progress into account. The carbon intensity of REXEL 2025 cables is used to extrapolate the result to other suppliers/distributors.

	2023	2024				2025			
	J = I / B								
Suppliers	Total Intensity	Purchases		Intensity	CO2 Emission	Purchases		Intensity	CO2 Emission
	kg CO2 / €	€		kg CO2 / €	kg CO2	€		kg CO2 / €	kg CO2
CEBEO		9.325.510	31%	0,94	8.795.414	8.390.031	33%	0,92	7.739.857
EUPEN		8.483.369	28%	0,94	8.001.144	6.204.168	24%	0,92	5.723.385
REXEL		3.319.146	11%	0,94	3.130.474	3.001.784	12%	0,92	2.769.165
KANNEGIETER		1.524.000	5%	0,94	1.437.370	2.477.480	10%	0,92	2.285.491
B CABLES		1.444.914	5%	0,94	1.362.780	826.467	3%	0,92	762.421
Others		5.957.543	20%	0,94	5.618.895	4.881.485	19%	0,92	4.503.201
Total	**1,075**	**30.054.482**	**100%**	**0,943**	**28.346.077**	**25.781.415**	**100%**	**0,92**	**23.783.520**
				-12%				-14%	

Given that, in 2023, 55% of the carbon intensity of an buried cable is related to the "processing on project" category (0.59 out of 1.07), it is clear that the use of biofuel offers significant potential for CO2 reduction.

A quick analysis shows that, all other things being equal, the use of HVO on 90% (with 70% CO2 reduction) of our sites offers a potential reduction of 36% on carbon intensity.

	2023	2024				2025			
	J = I / B								
Suppliers	Total Intensity	Purchases		Intensity	CO2 Emission	Purchases		Intensity	CO2 Emission
	kg CO2 / €	€		kg CO2 / €	kg CO2	€		kg CO2 / €	kg CO2
CEBEO		9.325.510	31%	1,07	9.978.296	8.390.031	33%	0,70	5.858.759
EUPEN		8.483.369	28%	1,07	9.077.205	6.204.168	24%	0,70	4.332.371
REXEL		3.319.146	11%	0,94	3.130.474	3.001.784	12%	0,57	1.715.389
KANNEGIETER		1.524.000	5%	1,07	1.630.680	2.477.480	10%	0,70	1.730.024
B CABLES		1.444.914	5%	1,07	1.546.058	826.467	3%	0,70	577.122
Others		5.957.543	20%	1,07	6.374.571	4.881.485	19%	0,70	3.408.741
Total	**1,075**	**30.054.482**	**100%**	**1,056**	**31.737.283**	**25.781.415**	**100%**	**0,68**	**17.622.405**
				-2%				-36%	

This demonstrates that by pushing suppliers to provide EPDs and by making the use of biofuels for trench excavation standard practice, EQUANS is well on track to achieve its target of a 52% reduction in emissions from buried cables by 2030.

As cable quantities are not yet available for suppliers other than REXEL, the analysis for 2024 and 2025 could only be carried out on the basis of carbon intensity. As soon as the data becomes available, the comparison will also be made in terms of CO_2 emissions per meter of cable.

8 Citation

SOURCE / DOCUMENT	FEATURE
Handbook CO_2-performanceladder 3.1, 22 -06-2020	The Foundation for Climate Friendly Procurement and Business (SKAO).
Corporate Accounting & Reporting standard	GHG-protocol, 2004
Corporate Value Chain (Scope 3) Accounting and Reporting Standard	GHG-protocol, 2010a
Product Accounting & Reporting Standard	GHG-protocol, 2010b
Dutch normative Environmental management – Life Cycle assessment – Requirements and guidelines	NEN-EN-ISO 14044
www.milieudatabase.nl	Nationale Milieudatabase
	https://milieudatabase.nl/nl/viewer/milieuverklaring/nmd_83288/ (medium voltage cable) https://milieudatabase.nl/nl/viewer/milieuverklaring/nmd_84146/ (low voltage cable) h26-kabelwerk-v10
Topcable.com	How an electric cable is made
Aurubis.com	Production process wire-rod
202312-4-nexans-confregenr-reseau	
20240807_Life Cycle Assessment_LAPP	

Table 15: Reference list

The structure of this document is based on the Corporate Value Chain (Scope 3) Standard. In addition, the methodology of the Product Accounting & Reporting Standard has been used where necessary (see the table below).

CORPORATE VALUE CHAIN (SCOPE 3) STANDARD	PRODUCT ACCOUNTING & REPORTING STANDARD	CHAIN ANALYSIS
H3. Business goals & Inventory design	H3. Business Goals	Chapter 1
H4. Overview of Scope 3 emissions	-	Chapter 2
H5. Setting the Boundary	H7. Boundary Setting	Chapter 4
H6. Collecting Data	H9. Collecting Data & Assessing Data Quality	Chapter 5
H7. Allocating Emissions	H8. Allocation	Chapter 2
H8. Accounting for Supplier Emissions	-	Part of CO_2-Performanceladder level 5
H9. Setting a reduction target	-	Chapter 6

Table 16: Theoretical standard and substantiation of chain analysis Cables

9 Disclaimer & Colophon

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