RSV
Rohrleitungssanierungs-
verband e.V.

Information Sheet

Sustainability in Sewer Rehabilitation

(November 2024, updated March 2025)

This Information Sheet is a translation of the German version "Informationsblatt: Nachhaltigkeit in der Kanalsanierung" (July 2024).

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Table of Content

Errata

A minor revision was made in March 2025 on page 10, first paragraph, last sentence.


Source: Adobe Stock

1 Sustainability – a clear thing!

Global challenges such as climate change, environmental pollution and resource scarcity show us that sustainable action is required at all levels. Heavy rainfall events and periods of drought in particular are making us increasingly aware of this. We realise this especially when supply lines and sewers break down: Securing the pipeline infrastructure in the areas of water and wastewater is **not negotiable, but elementary.**

When we talk about sustainability efforts, the environmental technology sector in which we work is a particular focus. Whenever **trenchless procedures** can be used, they make a significant contribution to reducing CO_2-emissions (see chapter 5).

As far as laws on **sustainable public procurement** are concerned, we are currently (June 2024) still in the discovery phase. There are initial tendencies to include sustainability aspects in the evaluation of tenders alongside the economic efficiency factor. In this publication, we present the principles and possibilities for this to **decision-makers and those responsible in civil engineering offices** (see chapter 7). You can also find the latest news and statements on this subject on the RSV website **(www.rsv-ev.de/nachhaltigkeit).**

The RSV and its companies are committed to:

- aligning their business activities with the United Nations' Sustainable Development Goals (SDGs) through development, research and testing of processes
- pooling expertise and resources effectively,
- helping to find practicable tendering regulations - with comparable parameters for sustainability assessment.

2 This is a contribution we can make

The many facets of sustainability are represented today by the United Nations' 17 Sustainable Development Goals. In 2016, the United Nations defined these Sustainable Development Goals (SDGs), which represent the global benchmark for a future worth living.

Figure 1: 17 Sustainable Development Goals are political objectives of the United Nations – Sustainable Development Goals (SDG) (Source: United Nations)

Through the work **we do as a trenchless sewer rehabilitation company** along the entire value chain, we have an impact on various social factors and environmental aspects that are listed in the individual SDGs.

Safe drinking water supply (SDG 6)

In many cases, we obtain our drinking water from the groundwater. Consistent trenchless maintenance prevents the escape of wastewater from leaking pipes (exfiltration) and the mass entry of clean extraneous water into the sewer system (infiltration). In this way, valuable stratum water and leachate are no longer available to the groundwater. With groundwater levels falling anyway, this is an important aspect that affects health and quality of life!

Health and well-being (SDG 3)

According to the **Water Resources Act** (§§ 60, 61 Wasserhaushaltsgesetz (WHG)), drains must be continuously maintained and leaking sewers must be repaired. This is an **obligation** in Germany and is implemented by network operators and local authorities as part of public services.

A functioning sewer system plays a decisive role for hygiene and health as well as for the prosperity of societies. A historical look, particularly at cholera epidemics in Germany in the 19th century, illustrates this impressively. Diseases such as typhoid, dysentery and hepatitis A, which are all spread by contaminated water, are contained with the help of a functioning sewerage system.

Actions for climate protection (SDG 13)

Trenchless processes for sewer rehabilitation have one main advantage: they are climate-friendly. Greenhouse gas emissions can be reduced by up to 90 % compared to open trench installation methods - depending on the procedure and site. We have compiled detailed information on this in chapter 5 "Trenchless sewer renovation vs. open trench installation".

Active water protection (SDG 14)

Network operators and local authorities also ensure that discharges from sewage treatment plants into the body of water are as clean as possible through their consistent maintenance of pipes. In addition, **exfiltration** (leakage of wastewater into the soil) and **infiltration** (penetration of extraneous water into the sewer system) are prevented, which protects the groundwater and prevents sewage treatment plants from being overloaded.

Affordable sewage disposal (SDG 9)

In many cities and municipalities, citizens have to pay increasingly higher fees for sewage disposal. The treatment of wastewater in sewage treatment plants is complex and expensive. If, in addition to normal wastewater, an increased proportion of extraneous water from defective pipes and pipe connections is added, this can lead to considerable cost increases. According to a study by the Federal Environment Agency, the costs for energy and the addition of bacteria rise sharply from an extraneous water content of 50 % [1]. With trenchless procedures, we therefore ensure that sewage disposal remains affordable for everyone.

Good work and economic growth (SDG 8)

Demographic change is presenting us with ever greater challenges. The shortage of skilled labour in particular is already clearly noticeable and will have an even greater impact on us in the future.

- **Healthy and satisfied employees:** By developing and using new technologies, such as AI-supported evaluation processes, we can make tasks more efficient and constantly optimise the quality of our work.
- **Training and further education:** In addition to fair salaries, the training and qualification of trainees, employees and specialists is essential. An important step in arousing the interest of trainees is the further development of the "Specialist in Pipe, Sewer and Industrial Services" training programme to become an "environmental technologist for pipeline networks and industrial plants". There is also an extensive range of further training opportunities for companies.
- **Security of employment:** Many of the company locations are characterised by medium-sized companies and are located in rural regions. We see a great responsibility here to create and maintain jobs. Jobs in the sewer rehabilitation industry are crisis-proof, as the maintenance of wastewater infrastructure is systemically relevant and will always be needed in the future.
- **Collective labour agreement coverage:** Sewer renovation work is an activity that falls under the collective agreement for the construction industry. This guarantees employees in the industry collective bargaining protection and corresponding

social security. The RSV is also committed to this as a representative organisation of companies. This is because the industry's own minimum standards for working conditions and quality ensure fair procurement procedures.

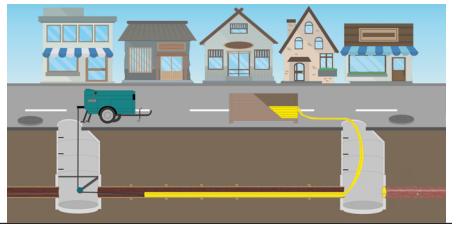
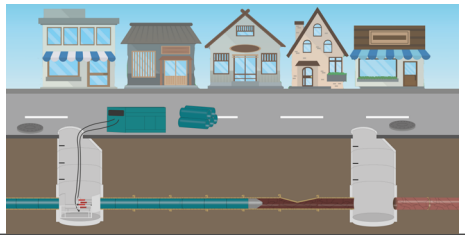
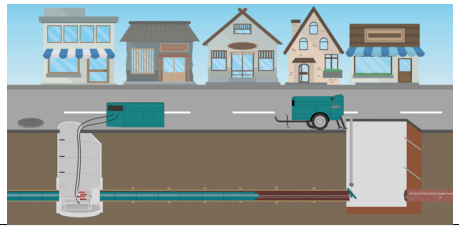
3 Trenchless procedures

Sewer rehabilitation in Germany - the key facts:

In Germany, around **6000 kilometres of public drains** are renovated every year – this corresponds to around one percent of the entire network infrastructure.
50 % of all remedial actions are short-term or selective repair procedures – mostly with the help of robots. A further 25 % are made functional again in the long term using minimally invasive pipe-in-pipe procedures ("renovation procedures").
This means that **75 % of all repair measures are carried out trenchless** – in other words, they already do not involve tearing up roads or removing trees, hedges and plants, including their roots. [2]

A number of trenchless processes for sewer rehabilitation have become established in Germany. An overview of the most common procedures is set out in DIN EN 15885. We have compiled the procedures commonly used in Germany for non-pressure drainages in the following overview. Some of these procedures can also be used for pressurised wastewater pipes. However, pressure pipes are not included in this information sheet.

Overview of common rehabilitation procedures

Procedure	Short description
Cured-in-place pipe lining (existing pipeline continues to operate as a casing pipe) 	In pipe lining, a flexible hose made of carrier and/or reinforcement material is impregnated with a reactive resin system, retracted or inverted into the defective pipeline and set up there using air pressure or high water pressure. Curing of the resin turns the cured-in-place pipe into a new, stable pipe within the existing pipeline. The internal diameter is reduced by the cured-in-place pipe.
Lining with discrete pipes/continuous pipes without annulus (existing pipeline continues to operate as a casing pipe) 	Factory-produced new pipes are inserted or retracted into existing pipelines. In the close fit procedure, the external diameter is reduced before installation and reshaped to the original size in the existing pipeline. In the tight-in pipe procedure, pipes or continuous pipe are inserted in a tightly conforming manner using machine technology. The internal diameter is reduced by the new pipe.
Lining with discrete pipes/continuous pipes with annulus (existing pipeline continues to operate as a casing pipe) 	Factory-produced new pipes with a significantly smaller external diameter than the internal diameter of the existing pipelines are retracted or pushed into them. Usually, the resulting annulus must be filled.
Press-pull procedure, pipe-eating procedure (existing pipeline will be removed) 	In the press-pull procedure, the existing pipeline is removed segment by segment by pushing or pulling it forward. In pipe-eating procedure, the existing pipeline is destroyed and the pipe fragments are removed. At the same time, new factory-produced pipes are retracted, pushed or pressed into the cavity. The new pipe has the same or a larger diameter than the existing pipeline.
Pipe bursting procedure (existing pipeline is destroyed and remains in the ground) 	The existing pipe is destroyed and displaced into the surrounding soil. At the same time, factory-made new pipes with a smaller, same or larger diameter are inserted trenchlessly using machine technology. (Source: RSV e.V.)

4 Life Cycle Assessments and Environmental Product Declarations

Sustainability is measurable, especially with regard to the environmental impact of products. From the production of raw materials to use as a pipe underground and recycling – Life Cycle Assessments (LCA) calculate the consequences for air and water as well as disposal at the end of the useful life. LCAs are also referred to as ecological assessments.

The international standards ISO 14040 and ISO 14044 govern the data collection and methodology of the assessment. Based on this, the European standard DIN EN 15804 was developed for **construction products**. The aim of this standard is to ensure that life cycle assessment results are produced in a standardised manner at the European level. It not only covers production in the factory, but also the environmental impacts associated with the structure for which a product is intended.

The Environmental Product Declaration (EPD) is based on the principle of a complete Life Cycle Assessment. Databases containing values are available to calculate the environmental impact of a product, e.g. ÖKOBAUDAT from *Bundesministerium für Wohnen, Stadtentwicklung und Bauwesen* or ProBas from *Umweltbundesamt und Öko-Insititut*.

Definitions

Cradle to Gate (= from the cradle to the factory gate: consideration of a product's life cycle from the extraction of raw materials to delivery.

Cradle to Grave (= from cradle to bracing): consideration of the life cycle of a product from the production of raw materials to the disposal/recycling of the product.

CO_2-equivalent (CO_2e): Designation of a unit of measurement used to compare the climate impact of different greenhouse gases with that of carbon dioxide – for example methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs).

Ecobalance: Life Cycle Assessment (LCA) is used as a synonym for an ecological balance sheet. This is a systematic analysis of the possible environmental impacts and energy balance of products throughout their entire life cycle. It shows energy consumption, raw materials, waste streams and emissions and expresses them, for example, in the form of CO_2 values or water consumption.

Environmental Product Declarations (EPD): EPDs are standardised documents that describe the environmental impact of a product. An EPD contains data on resource consumption, emissions and environmental pollution. They are valid for a period of five years.

In the case of Environmental Product Declarations in accordance with DIN EN 15804, the life cycle phase of the construction product to be declared is specified at the beginning of the document. For example, environmental impacts can be stated up to the factory gate (cradle to gate) or up to a defined end of life (cradle to grave). There are many gradations between the minimum statement of environmental impacts up to the factory gate and the statement of the entire life cycle. This must be taken into account when comparing the stated environmental impacts (Figure 2).

The first EPDs and LCAs are already available for plastic pipes and renovation systems. The biggest challenge here is to ensure comparability between the results from different EPDs and LCAs. The boundary conditions selected in the calculations are relevant for comparative assessments.

When evaluating Environmental Product Declarations as a criteria in a competition, it is important to remember that only if the Life Cycle Assessments have been created using the same principles and standards they can be seriously compared with one another.

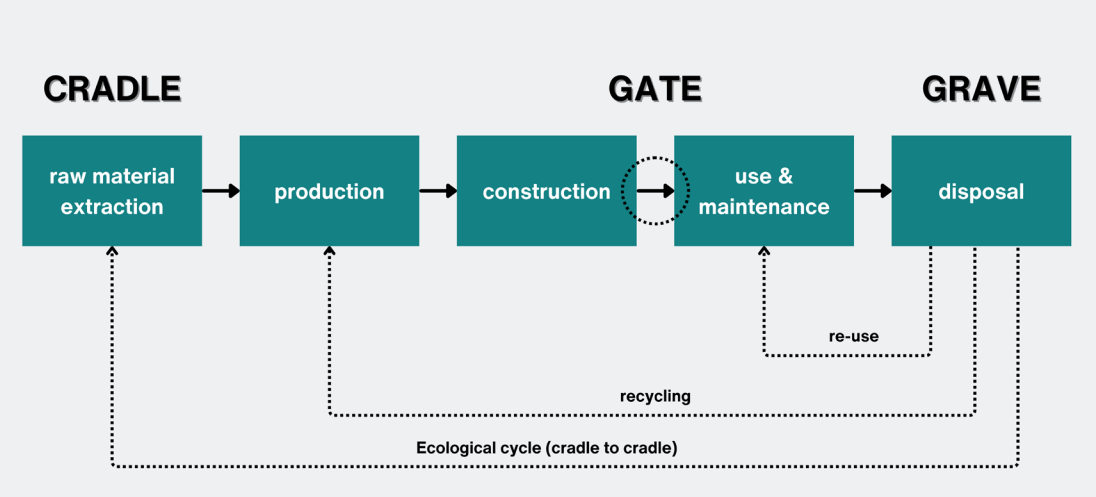


Figure 2: Consideration of the life cycles of a product (Source: RSV e.V.)

The Greenhouse Gas Protocol (GHG Protocol) provides the international framework for greenhouse gas accounting. It is the most widely used accounting tool for governments and companies to quantify and manage greenhouse gas emissions. Scopes 1 to 3 for categorising greenhouse gas emissions according to their source (1 = own sources, 2 = indirect emissions from energy procurement, 3 = indirect emissions along the entire supply chain) are taken from the GHG Protocol.

Almost all greenhouse gas standards and programmes worldwide – from the International Organisation for Standardisation (ISO) to the climate register – are based on the GHG Protocol, as are numerous greenhouse gas balances drawn up by individual companies. It is also the basis for DIN EN ISO 14064, which deals with the quantitative determination and reporting of greenhouse gas emissions.

When preparing a greenhouse gas balance, we recommend that all our participating companies follow the GHG Protocol in order to comply with the most important guiding

principles and ensure comparability. When public grid operators issue tenders, the GHG Protocol can provide a common basis for taking transport routes into account, for example. As an additional criterion, verified GHG determination and offsetting can be requested as standard.

5 Trenchless sewer renovation vs. open construction

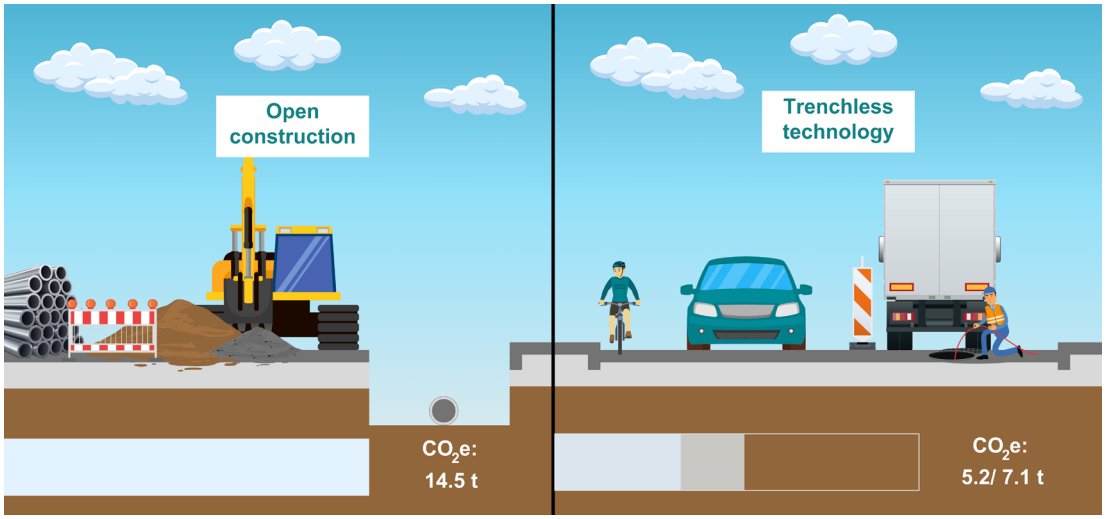


Figure 3: Comparison of CO_2e emissions for open construction vs trenchless pipe replacement (calculated according to DIN EN 15804) at a typical site in Berlin, DN 200, 100 m, vitrified clay pipe (Source: RSV e.V.)

Trenchless technologies produce significantly fewer emissions than open construction. Energy consumption is reduced, sometimes considerably, depending on the depth of construction, due to shorter construction times, the elimination of road reinstatement work, the avoidance of soil excavation, minimal installation technology and the low use of lifting vehicles and machinery to create the excavations. According to a recent study by GSTT, 90% of all emissions attributed to the consumption of fossil fuel on a construction site can be reduced [3].

How can the work steps involved in pipeline construction be taken into account in accordance with the standards and a **standardised statement of greenhouse gas emissions be determined?** This question is answered in a study conducted by the Potsdam University of Applied Sciences in cooperation with Berliner Wasserbetriebe [3]. Based on model construction sites (e.g. Figure 3), the carbon dioxide emissions were compared in accordance with DIN 15804, taking into account the emissions of all steps, such as breaking up road surfaces, removing pipes and backfilling.

Result: The CO_2 savings for pipe lining were 5.2 tonnes of CO_2e, around 64 % compared to the open construction method. The savings from renewing the pipe using the pipe-eating-procedure were around 50 % (Figure 4).

The fact that the reduction in emissions is lower than with other calculation formulas is due to the fact that the indirect consequences of traffic diversion, road closures and traffic lights are not included in DIN EN 15804. We believe that this important distinction should be taken into account in future product category rules.

An open-access calculation tool that includes all the parameters of a remedial action and an internationally standardised calculation method for all rehabilitation procedures is to be welcomed. It should be adapted, if necessary – for example, by an independent body – to take into account further future developments and requirements.

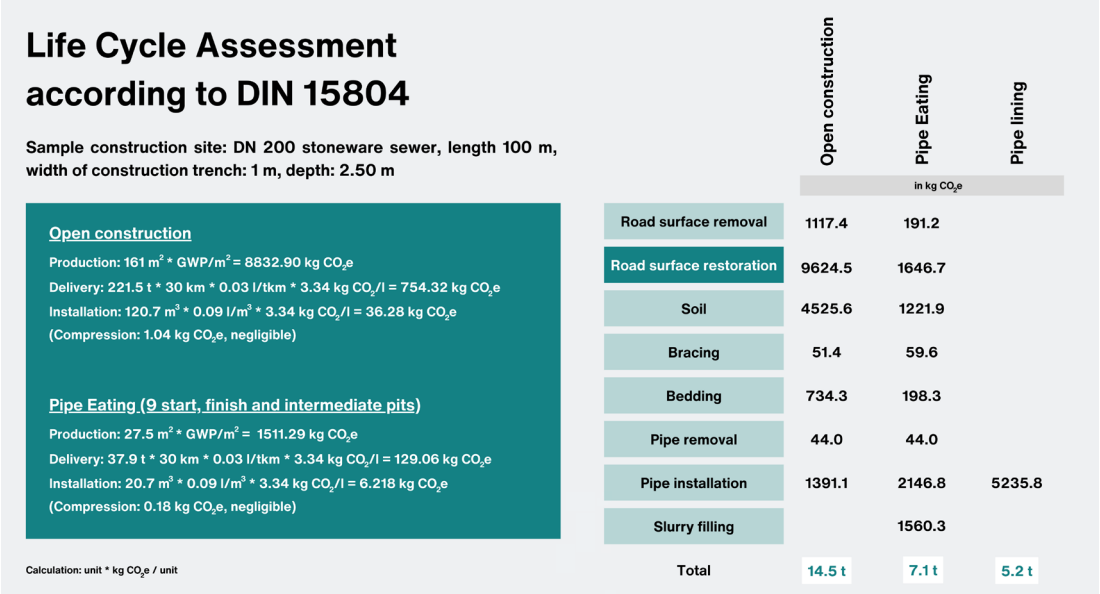


Figure 4: Exemplary calculation of greenhouse gas emissions from the renewal/renovation of a DN 200 Stz sewer using the open construction method, pipe eating and pipe lining (100 m sewer, without manholes, without service life consideration) (Source: Lena Fuchs [4], translated by RSV)

6 Sustainability assessment using the example of pipe lining

In this information sheet, we follow the system of Life Cycle Assessments and use the example of pipe lining as a renovation method that is very common in Germany, from production to disposal or recycling.

Why are we doing this? For prefabricated plastic pipes, such as those used in pipe bursting procedures, TIP procedures or lining with close-fit pipes, there is already experience with LCA analyses and Environmental Product Declarations (EPD). System manufacturers of cured-in-place pipes are offering the first EPDs [5].

Unlike products for open-trench installation, on-site installation is particularly important for systems that cure on site. The parameters to be observed are considered below.

Raw material production

Figure 5: Production of a cured-in-place pipe preproduct in the factory (Source: SAERTEX multiCom GmbH)

Cured-in-place pipes for sewer pipes and manholes are made of the basic materials glass and/or synthetic fibres. In addition, various types of foils are required, which are indispensable for production, storage and installation.

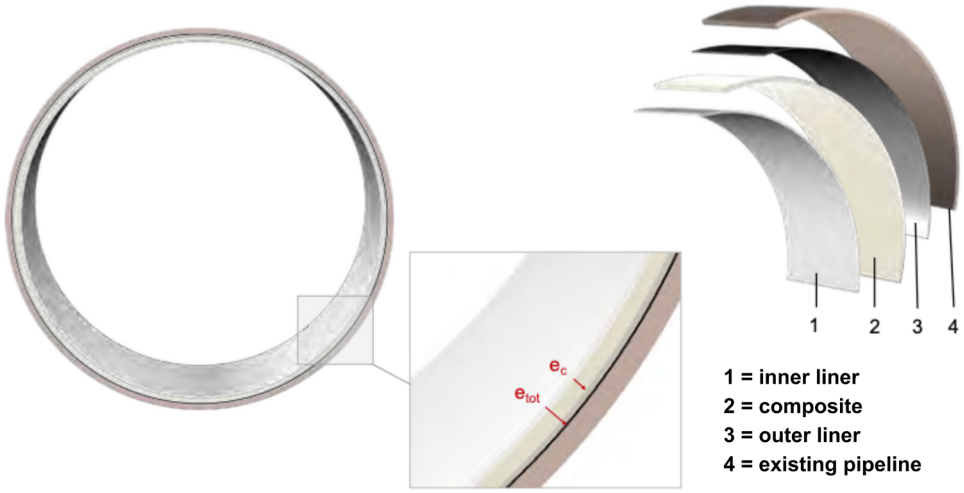


Figure 6: Schematic representation of cured-in-place pipes (Source: RSV e.V.)

High temperatures are needed for the production of polyester resins as well as for the production of poly(ethylene terephthalate) fibres and ECR glass fibres. The melting processes involved in fibre production are highly energy-intensive.

What is the relationship between the individual components of a liner in terms of CO_2 emissions? The example of a UP glass fibre liner shows that polyester resins account for the largest share of the 'cradle to gate' CO_2 footprint (CO_2 emissions from raw material extraction to product manufacturing), with up to 60% per kilogramme of CO_2e per kilogramme of liner. The reason for this is the energy-intensive production process – starting with crude oil and ending with the refined raw materials used to manufacture synthetic resins.

Manufacturing of the preproduct

A textile fabric is produced from **glass and/or synthetic fibres**, and a hose is then made from this. During the production process, this hose is impregnated with reactive resins as a substrate, resulting in a processable fibre-resin combination. In addition, the cured-in-place pipes are equipped with foils for installation and transport.

Regardless of the material used, the environmental impact of the **impregnation and manufacturing process** is low compared to that of the production of the raw materials used. This is partly due to the fact that no energy-intensive equipment or thermal processes need to be operated. In the future, it will therefore be possible **to cover the modest energy demand simply with renewable energies.**

Looking ahead, it will become increasingly important to reduce the use of particularly energy-intensive materials. At the same time, the longest possible useful life should be kept in mind. In addition, attention can be paid to the efficient use of raw materials and energy-efficient production processes during manufacturing. **Responsibility along the supply chain** and fair competition are further key issues for us.

Extraction and transport of raw materials

According to the German Federal Environment Agency, the construction industry processes a large proportion of the non-renewable raw materials mined in Germany [6]. The increasing demand **for the construction and maintenance of buildings and infrastructure** is an important factor in terms of the impact on the environment. The transport of materials also has an impact on the environment and poses challenges from a sustainability perspective. It is estimated that plastic wastewater systems weigh 80 to 90% less during transport and installation [7].

Trenchless rehabilitation procedures require the **transport of the rehabilitation systems** and the equipment and machinery necessary for installation.

Not only for reasons of sustainability and environmental protection, but also from a purely economic point of view, it makes sense for the companies carrying out the work to minimise travel to the sites, to use **existing machinery regionally if possible** and to keep the travel distances for employees as short as possible. Digital planning tools are already helping with this. In the future, **alternative drive concepts** will also be increasingly used to power the plants and accompanying vehicles.

Installation

During the installation of the renovation systems, the equipment used and their energy requirements represent the greatest challenges, but at the same time they also offer the greatest potential. As RSV, we motivate our member companies to take advantage of these opportunities. After all, as with transport, the focus for the future should be on alternative, low-emission drive options and machine technology. For example, companies can use energy management and monitoring to ensure that the installation process takes into account the use of particularly efficient and energy-saving devices.

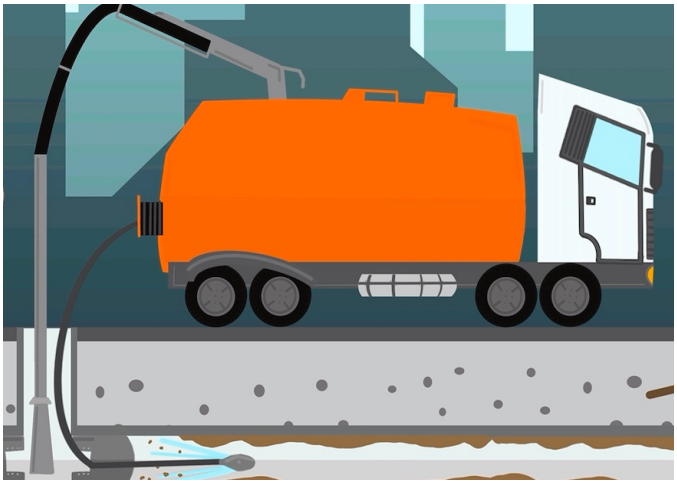
The installation of the liner on site is of particular importance. This is because on-site curing using light or heat is an energy-intensive process. Steam systems or chains of lights ensure that the curing takes place on the construction site and that the pipe is completed on site.

After the successful installation of a cured-in-place pipe, the reaction resin moulding materials are fully cured in the technical sense and no longer interact with their environment. A new, socketless pipe has been created in the old pipe section, which, due to its flexible properties, is able to withstand the effects of, for example, soil settlement, angular deflections and faults that may have been caused by the old structure.

Cleaning

Regular cleaning is necessary to maintain the functionality of the sewer network. The sections of the sewer system that have been rehabilitated with cured-in-place pipes typically have very few deposits, as they are hydraulically smooth and have no joints. This extends the flushing intervals while simultaneously reducing the flushing effort required.

With our Factsheet 12.1 "Cleaning of renovated Sewers", we have made an important contribution of energy-saving and gentle cleaning methods for sewers (Figure 7). These are, incidentally, part of the German federal government's technical guidelines for sewage.



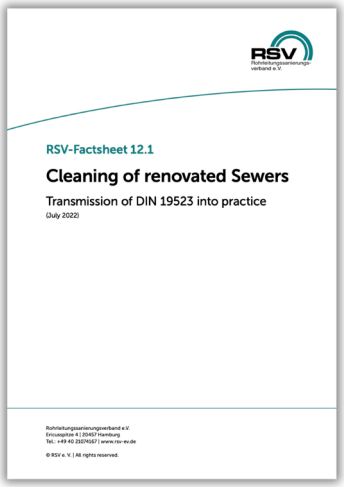


Figure 7: Sustainability goals for cleaning can be achieved through the economical use of energy and the reduction of water quantities. Information on this can be found in the RSV Factsheet "Cleaning of renovated Sewers" available at **www.rsv-ev.de**

Useful life

One thing is clear: the longer pipes can be used, the fewer resources and energy are consumed for their renewal. This also applies to rehabilitated pipes. The useful life of the installed cured-in-place pipes is therefore an essential factor for the efficiency and sustainability of trenchless sewer renovation. This has been largely ignored in the calculation models of Life Cycle Assessments so far. In view of the growing experience, this point is receiving increased attention.

The depreciation periods for cured-in-place pipes are currently conservatively assumed to be around 50 years. Every cured-in-place pipe with national technical approval has undergone tests according to DIN EN ISO 11296-4. The material tests on cured pipes included in this are designed to ensure a useful life of 50 years. The data from the determined characteristic values are extrapolated accordingly, i.e. projected on the basis of the known characteristic values.

Since the statically assumed load case typically does not occur due to the planned safety measures, the RSV working group 1.1 believes that the technical useful life of the systems should be set significantly higher. Cured-in-place pipes that have been in operation for around 40 years indicate this. The quality of the planning and installation is crucial for the high durability of the systems. Further information can be found in RSV Factsheet 1.1 (Figure 8).

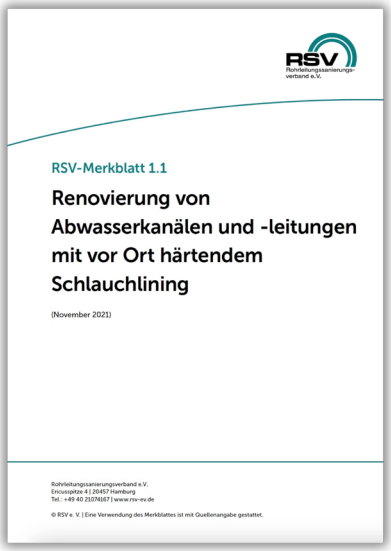


Figure 8: RSV Factsheet 1.1. (information on useful life), German version is available at **www.rsv-ev.de**

Pollutants

In 2015, the German Environment Agency (Umweltbundesamt) evaluated the environmental compatibility of sewer rehabilitation agents, particularly with regard to styrene as a reactive solvent, toluene diisocyanate as a starting material for polyurethane and bisphenol A in epoxy resin systems [1]. The result: since styrene and toluene diisocyanate are only present in low concentrations and/or are degradable after professional sewer rehabilitation, the environmental impact is considered to be low. A release of bisphenol A from professionally manufactured rehabilitation materials has not yet been scientifically proven.

Generally speaking, sewer renovation work should be carried out properly and professionally in order to minimise the environmental impact. When the installation (curing) is carried out well, the initial components are bound and are not released into the environment. This also applies to the smell-intensive reactive agent styrene, which is a recurring cause for concern in connection with pipe liner measures.

Microplastic abrasion

Plastic pipes are mainly used for sewer rehabilitation. A 2021 study by the Fraunhofer Institute for Environmental, Safety and Energy Technology UMSICHT, commissioned by the German Federal Association for Concrete Sewer Systems (Bundesfachverband Betonkanalsysteme), concludes that the amounts of plastic abrasion from plastic pipes in the sewer system are **"rather low"** compared to the total amount of microplastic emissions. They conform approximately to the level of brush cutters and lawn trimmers. By way of comparison, the total microplastic from car tyres is 1228 grams per person per year, while the calculated possible abrasion from pipes is 12 grams [8].

The study relates to plastic pipes in general. With regard to pipe lining, it should be noted that rehabilitation systems must provide proof of abrasion resistance as part of their general national technical approval.

Recycling and waste disposal

If rehabilitated sewers develop new damaged areas, it is necessary to check whether further repairs are possible. Only when this is no longer the case has the cured-in-place pipes reached the end of their useful life. The old pipeline may still be suitable as a casing pipe.

If the repair potential is exhausted, the defective cured-in-place pipe can be removed trenchless, e.g. by:

- High/maximum pressure jetting
- Cutting robot
- Mechanical cutting/grinding
- Scraping

The removed material should be recycled to the greatest extent possible and can be used as recycled building material after crushing and grinding (Figure 9). This is used, for example, as a filler for mortar or in asphalt production for road construction.

Only when **the recycling potential** has been exhausted materials should be sent for energy recovery. Completely hardened and inert remediation materials are disposed of in residual waste and thus thermally recycled in waste incinerators or waste-to-energy plants. Materials that are not completely hardened are marked accordingly and disposed of separately if post-hardening is not possible.

The biggest challenge for the future is to constantly extend the useful life of rehabilitated pipes through maintenance concepts and to remove materials only when the potential for repair and renovation has been exhausted.

Our goal must also be to recycle an increasing proportion of refurbishment products. The generation of waste should be reduced as much as possible. In the coming years, the refurbishment industry can contribute to optimising the repair and recyclability of refurbishment systems through further development.

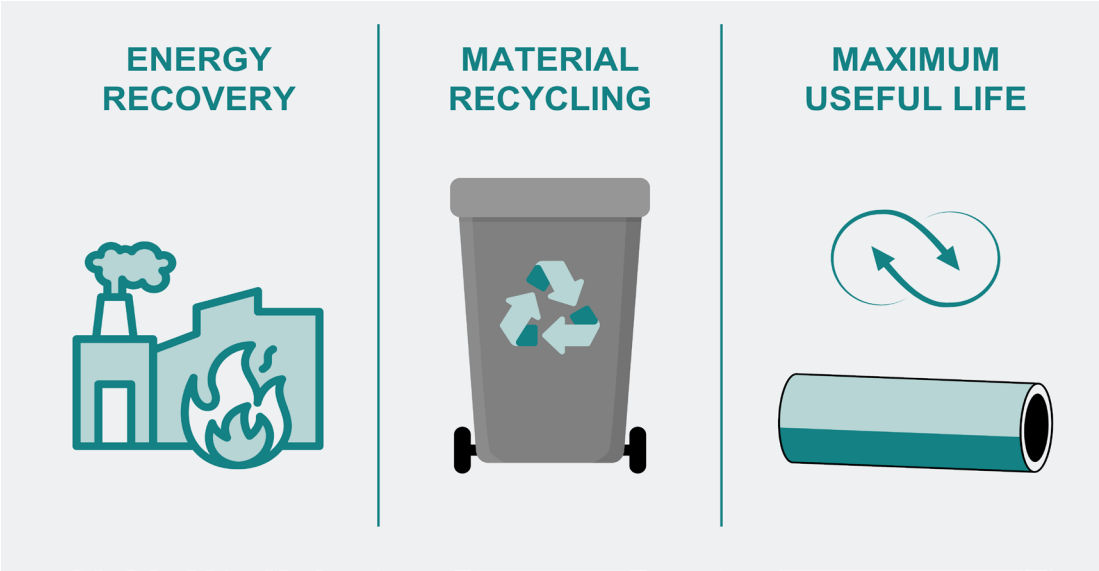


Figure 9: Energy recovery, material recycling and maximum useful life (Source: RSV e.V.)

7 Current situation, potential and prospect

Expressions of intent and good resolutions are of no use if they are not put into practice. The Rohrleitungssanierungsverband e.V. has planned the following measures by the end of 2025:

- Regular exchange of information on gentle and energy-saving maintenance procedures
- Identification of good examples from Germany and other countries
- Collection of information and knowledge
- Contribution to improving sustainable procurement conditions
- Support through monitoring of energy consumption in selected projects

Options for procurement

Increased focus on quality and technical useful life

The cheapest offer wins the contract – this has been a widespread practice in sewer rehabilitation for decades. However, this is a model that is being phased out: the legal framework has long since ensured that a **rehabilitated sewer is considered part of the municipal assets** and can be depreciated accordingly. Instead of focusing on the cheapest installation, the focus is increasingly on the reliable technical useful life. The fact that there is a direct correlation with the quality of the product and its installation has been proven, particularly in the case of systems that cure on site.

Tendering institutions can exert considerable influence through **tendering, construction supervision and quality assurance**. This realisation is becoming increasingly accepted, but has not yet reached all municipalities.

Sustainability criteria in procurement

Furthermore, the current public procurement law already allows sustainability criteria to be included in the tender. Public clients can already contribute to sustainable tendering under the current laws. The German Environment Agency (Umweltbundesamt) points out:

- **Environmental requirements** can be included in the performance description as **technical specifications**.
- In the suitability test, the company may be required to meet certain **standards for environmental management** – insofar as these are relevant for the execution of the order.
- **Environmental criteria can be included as award criteria** in the evaluation of offers or in the additional conditions for installation.

Tendering institutions can find legal opinions and training materials on the **website of the Federal Environment Agency (Umweltbundesamt).**

The German government is currently working on implementing the public procurement reform set out in the coalition agreement (Figure 10). The goal of making public procurement 'economic, social, ecological and innovative' sounds like the famous 'squaring of the circle'. It is to be hoped that neither an increase in bureaucratic hurdles nor a proliferation of eco-labels will be the result of this process.

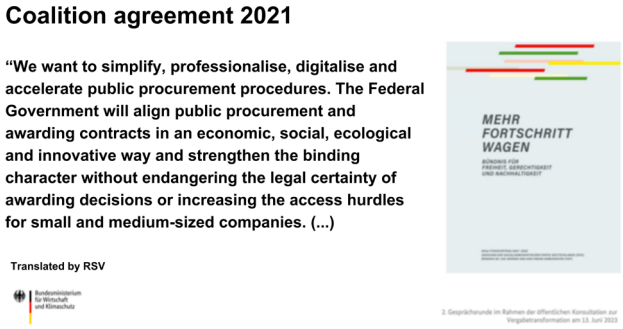


Figure 10: Excerpt from the coalition agreement of the federal government 2021 (Source: BMWK; translated by RSV)

Consideration of a CO_2 shadow price

The CO_2 shadow price in public tenders financially assesses the CO_2 emissions of projects. A monetary value is set for each tonne of CO_2 emissions and included in the cost-benefit analysis. In the case of construction projects, for example, this can mean that a provider with high initial costs and low travel distances appears more attractive economically due to the shorter transport distances. The principle is already enshrined in laws governing procurement and investments at the federal level. In some federal

Greenwashing or authentic sustainability efforts?
The pursuit of sustainability currently carries the risk of setting unattainable and barely comprehensible targets in tenders.

Example 1:
When **award**ing the contract, a questionnaire is sent out that includes questions about environmentally friendly behaviour. If a question is answered with 'No', the contract is not awarded. However, there is no review.

Example 2:
A manufacturer of cured-in-place pipes has a life cycle analysis (LCA) carried out by two different certified institutes. Although the manufacturer provides the same data to both institutes, the EPDs produce different CO_2e quantities. This is because the certification institutions use different databases for the CO_2e assessment of products. This allows product providers a certain amount of scope when declaring their products.

In a functioning market economy, competition for the highest quality, most efficient, and most cost-effective products or services is a model for success. Sustainability also benefits from competition for the lowest possible emissions, although it is likely to become increasingly challenging for tendering institutions to differentiate actual CO2 advantages from "greenwashing".

Potential for cured-in-place pipe lining

The technology of cured-in-place pipe lining (sometimes also referred to as "inliner") has been established over the past few decades through research and development work and high standards of quality assurance. We have a globally recognised level of quality of materials and process engineering that is on a par with the quality assurance of factory pipe production techniques. By the way: although the first cured-in-place pipes were developed in the UK, Germany is now the world leader in this technology (Figure 11). All those involved are tirelessly committed to research and development activities to find and implement potential improvements – especially in terms of sustainability.

Figure 11: Locations and export countries of German pipe lining system manufacturers (Source: RSV e.V.)

Examples of sustainable improvements that are already being made to cured-in-place pipe lining:

- Ensuring the complete curing of cured-in-place pipes using monitoring and control techniques
- Saving resources when using materials and technology: high-performance materials, optimised wall thicknesses, coordinated curing techniques
- Continuously improved quality assurance mechanisms and good planning help to ensure the longevity of the liner during installation.
- The individual fabrication of liners increases quality and ensures high process reliability and durability.
- Developing alternatives to fossil raw materials in production and improving recyclability contributes to environmental protection and the responsible use of resources.

Recommendations of the RSV Sustainability Working Group

In summary, we would like to make a few specific recommendations at this point that should be considered in procurement procedures for sewer rehabilitation.

As long as there are no standardised rules for product declarations or comparable certificates on the sewer rehabilitation market, it is recommended to **use the current possibilities of public procurement law (Vergaberecht für öffentliche Aufträge)** to reward comprehensible, comparable and unambiguous sustainable behaviour.

This means in practice that quality, useful life and the transparent ecological efforts of the bidding companies, as well as short transport distances, are taken into account in the evaluation. The price as the most important award criterion thus moves into the background.

In all ecological considerations, attention should always be paid to the quality of work. Our medium-sized companies offer a high level of training, further education and social security. These investments in high-quality human resources ensure continuity and quality.

To summarise: the highest-quality offering ensures the long-term value of the channel as a fixed asset – a win-win situation, for the climate too.

8 Standards

DIN EN 15804	Nachhaltigkeit von Bauwerken - Umweltproduktdeklarationen - Grundregeln für die Produktkategorie Bauprodukte English title: Sustainability of construction works - Environmental Product Declarations - Core rules for the product category of construction products
DIN EN ISO 11296-4	Kunststoff-Rohrleitungssysteme für die Renovierung von erdverlegten drucklosen Entwässerungsnetzen (Freispiegelleitungen) - Teil 4: Vor Ort härtendes Schlauch-Lining English title: Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks - Part 4: Lining with cured-in-place pipes
DIN EN ISO 14064	Treibhausgase - Teil 1 bis 3 English title: Greenhouse gases (Part 1 to 3)
ISO 14040	Environmental management — Life cycle assessment — Principles and framework
ISO 14044	Environmental management — Life cycle assessment — Requirements and guidelines

9 References

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