



HDD80-E as a sustainable Solution in Pipeline Technology

IPLOCA Environmental Award 2022



The STREICHER Group is characterised by technologies and services in five **business sectors**:

- **Pipelines & Plants**
- **Mechanical Engineering**
- **Electrical Engineering**
- **Civil & Structural Engineering**
- **Raw & Construction Material**

The individual corporate divisions are specialised in their business fields. 4,000 employees work with expertise and distinctive customer orientation. The divisions work hand in hand and guarantee a smooth execution of the projects. Cost-effectiveness is achieved by a tight organizational structure and high reliability in project management.

The success of the STREICHER Group is based on a foundation from many years of experience, a consequent quality management and solid capital resources as well as motivated employees. The companies of the STREICHER Group work on a high technological level. The basis for this is regular investments in machinery as well as the qualification of their employees.



**Unsustainable consumption and production** practices not only deplete natural resources through the use of material inputs, but also cause **environmental impacts** as a result of the extraction, processing, manufacturing, consumption and waste disposal at every stage of a product or service lifecycle.

These environmental impacts of unsustainable consumption and production are driving the three planetary crises we are currently facing:

- **climate change,**
- **biodiversity loss**
- **and air, soil, groundwater and sound pollution.**

**Very high noise emissions** from a conventionally operated HDD rig with hydraulic, diesel-powered drive make working in the vicinity of residential areas more difficult, lead to the imposition of severe stress on the local wildlife and cause damage to the health and the working environment of the drilling crew.

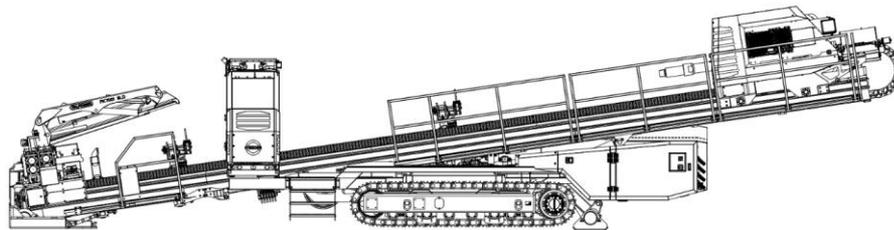
A further environmental aspect is the CO<sub>2</sub> Emissions while operating a diesel-driven HDD rig.

## The **STREICHER HDD80-E fully electrical horizontal drilling rig**

The fully electric drive system will bring along essential advantages **in regard to noise emissions** and the general observance of **environment protection standards**.

**2019-2020:** Conception of a **fully electric horizontal drilling rig** that combines all advantages:

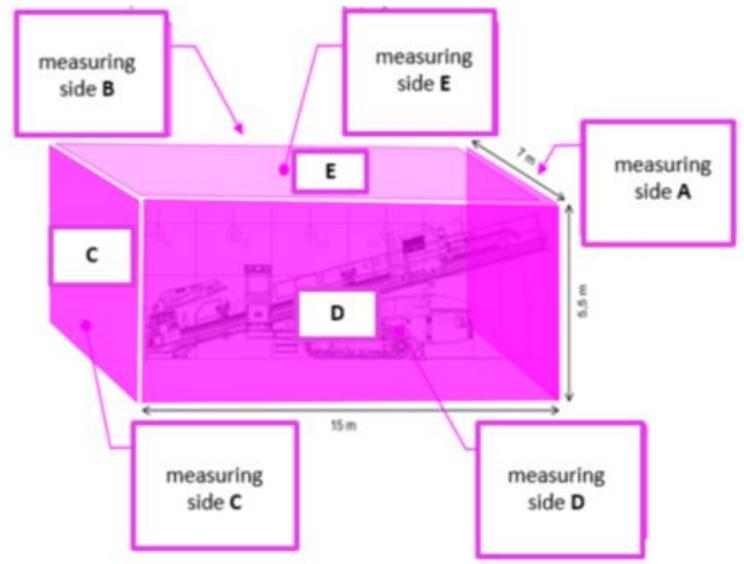
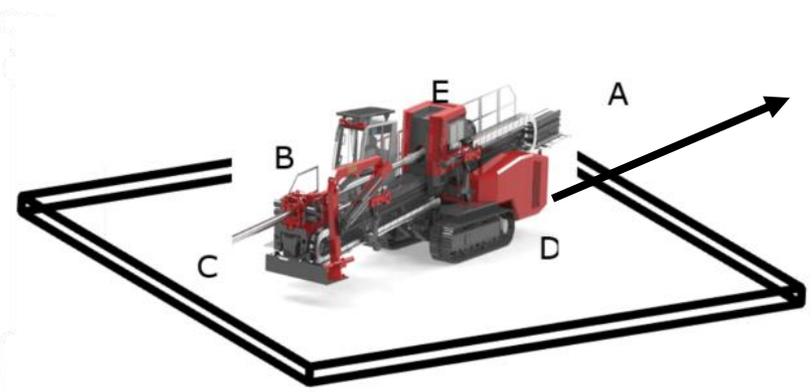
- In an internal joint project with participation and comittment of STREICHER's top management, operational and engineering staff, we have completely redesigned the previously diesel-hydraulic rigs. The result is a system that builds on previous practical experience with an HDD rig which meets all the requirements and at the same time is future-oriented in terms of electric drive, design structure, quality, long-term environmental protection and sustainability!
- System as the basis for future technologies (new drive technology and energy supply)
- Use of flexible, environmental friendly energy sources of the future (including hydrogen)
- Can be expanded for further digitization.



A noise measurement has taken place on the open area by the STREICHER Engineering crew according to the relevant standards for horizontal drilling rigs

**DIN EN ISO 3744/3746**

**And the results were promising !**



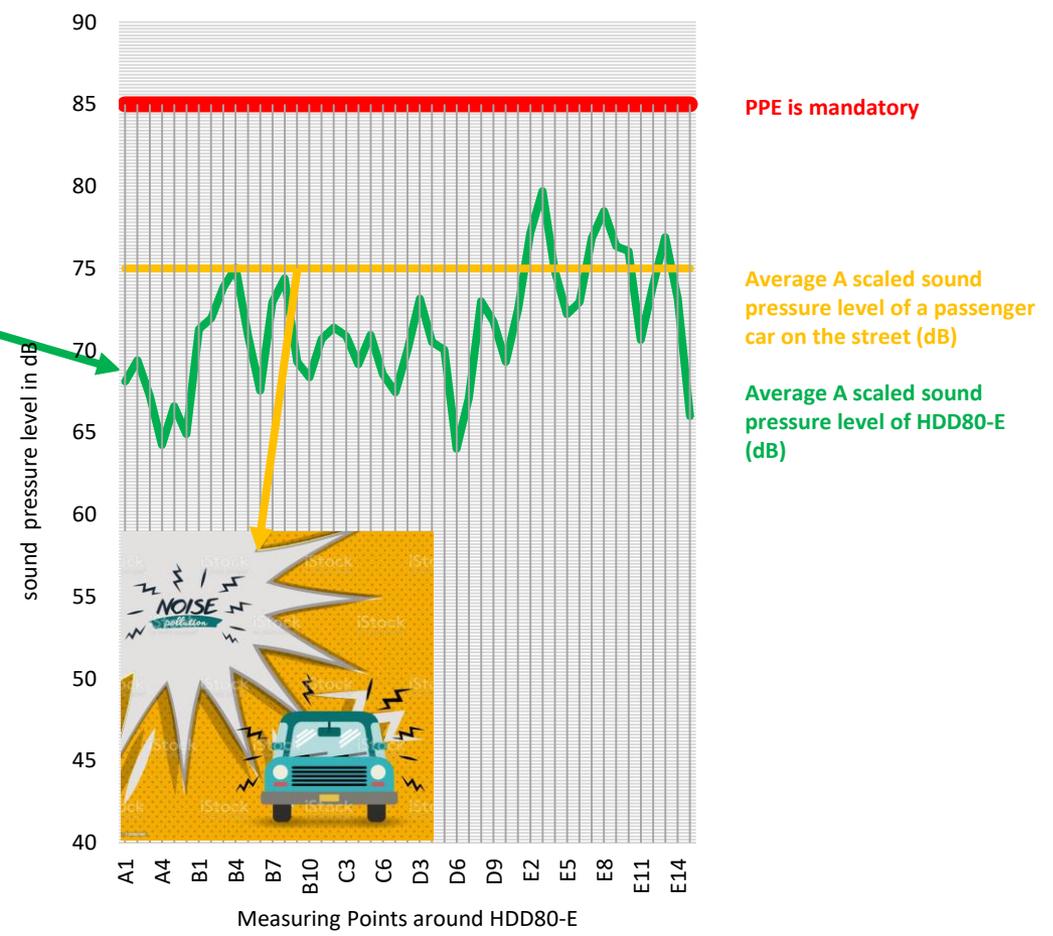
Measured sides (A - E)  
HDD80-E is considered as a noise emitter

# DEVELOPMENT PHASE 2020

## NOISE MEASUREMENT AND TESTING BY STREICHER

The average sound pressure level describes how high the noise exposure is from a certain distance from the device.

measured point	average A-scaled sound pressure level dB over 15 s	average A-scaled sound pressure level passenger car on the street dB	PPE is mandatory dB
A1	68.1	75	85
A2	69.4	75	85
A3	67.2	75	85
A4	64.2	75	85
A5	66.6	75	85
A6	64.9	75	85
B1	71.3	75	85
B2	71.9	75	85
B3	73.8	75	85
B4	75.0	75	85
B5	70.9	75	85
B6	67.5	75	85
B7	72.9	75	85
B8	74.4	75	85
B9	69.3	75	85
B10	68.3	75	85
C1	70.7	75	85
C2	71.4	75	85
C3	70.9	75	85
C4	69.1	75	85
C5	70.9	75	85
C6	68.5	75	85
D1	67.4	75	85
D2	70.0	75	85
D3	73.1	75	85
D4	70.9	75	85
D5	70.0	75	85
D6	64	75	85
D7	67.1	75	85
D8	73	75	85
D9	71.7	75	85
D10	69.3	75	85
E1	72.5	75	85
E2	77.1	75	85
E3	79	75	85
E4	74.8	75	85
E5	72.2	75	85
E6	72.9	75	85
E7	76.8	75	85
E8	78.1	75	85
E9	76.3	75	85
E10	76.0	75	85
E11	70.6	75	85
E12	73.9	75	85
E13	76.6	75	85
E14	73.1	75	85
E15	64	75	85



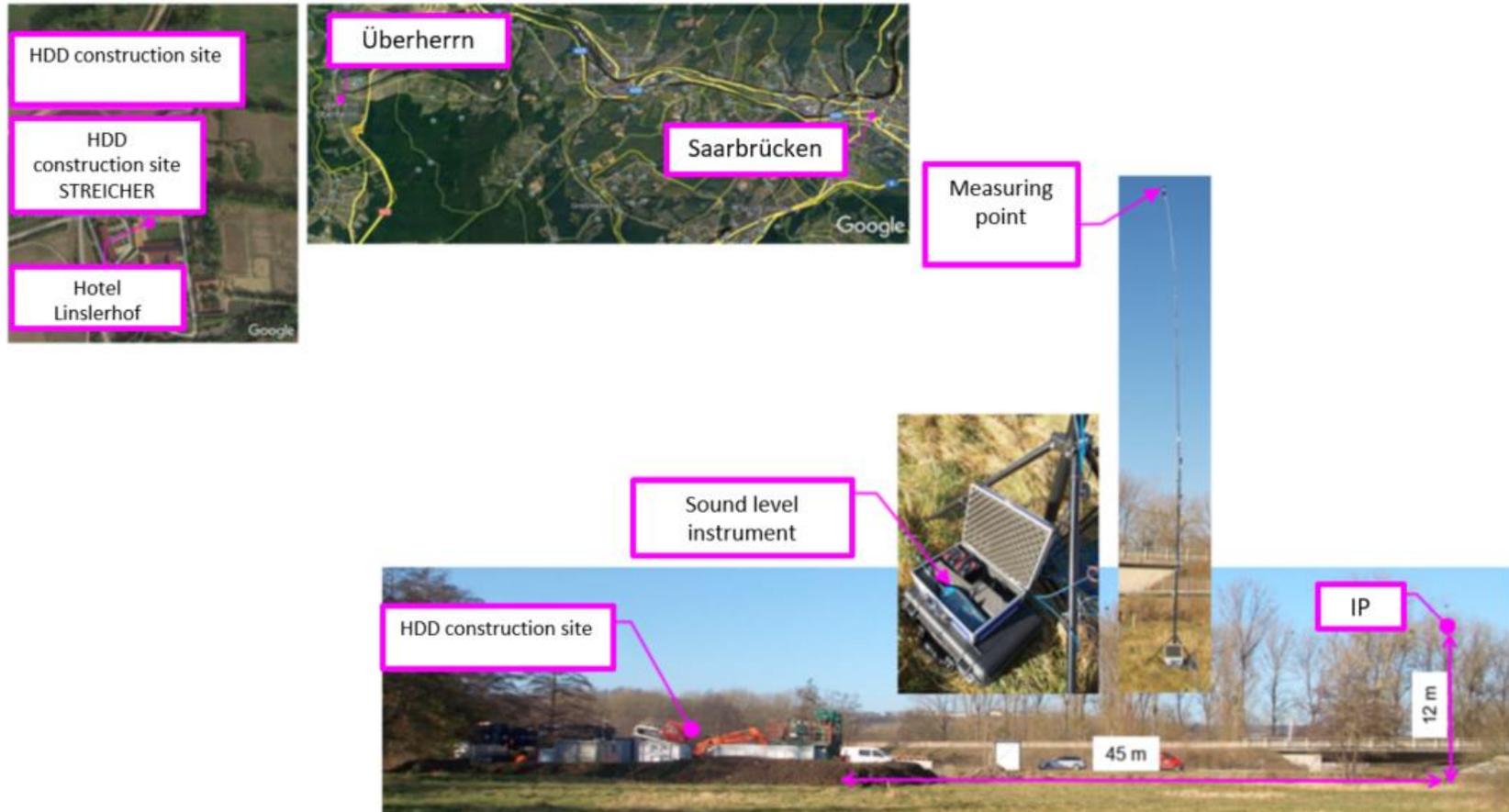
# DEVELOPMENT PHASE 2022

## NOISE MEASUREMENT ON SITE

### Construction site Saarland

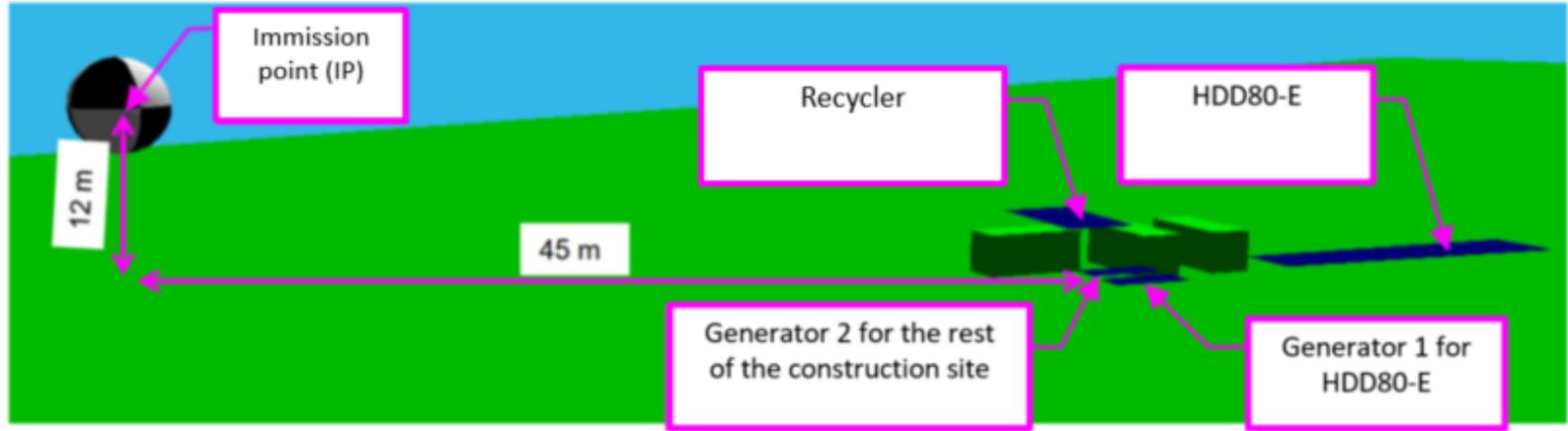
HDD80-E is considered as a noise emitter

- Location: Überherrn Saarbrücken



# DEVELOPMENT PHASE 2022

## NOISE MEASUREMENT ON SITE



According to DGUV (German accident prevention law), which uses all suitable means to support company management in protecting their employees from work incident and accidents and work-related health risks:

The employer must provide hearing protection above a daily noise exposure level of 80 dB(A).  
 If the daily **noise exposure level reaches or exceeds 85 dB(A), hearing protection must be used.**

How is it monitored?

WORST CASE SCENARIO

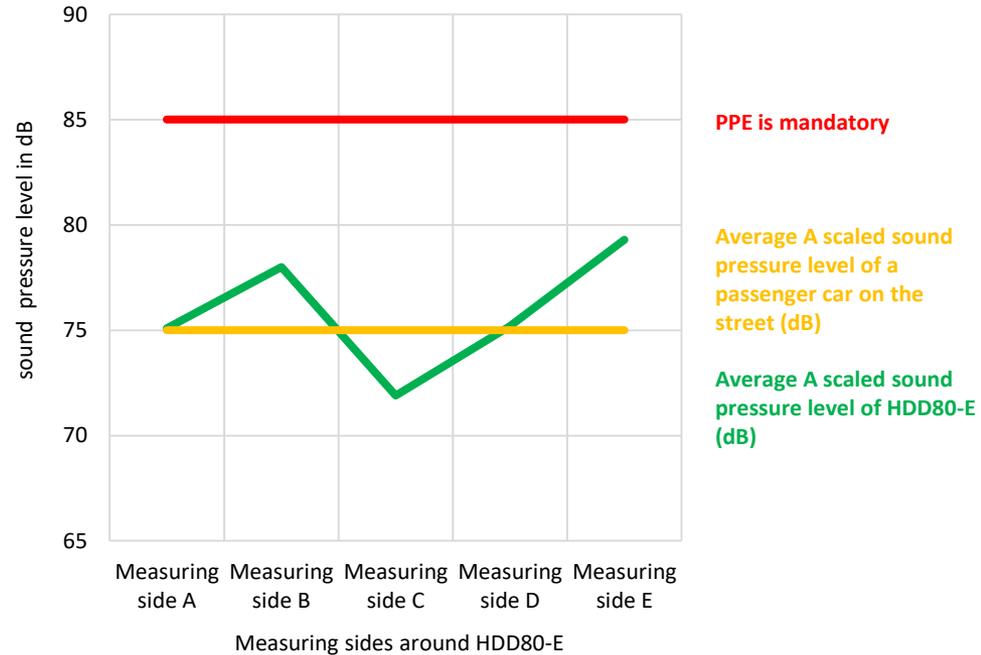
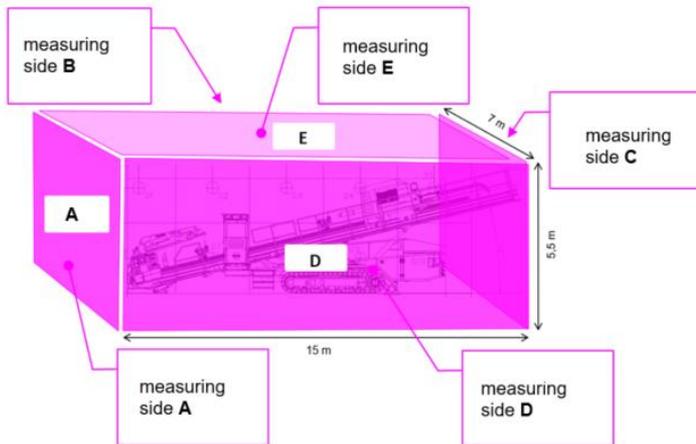
**Equivalent sound pressure level  $LA_{eq}$**

or energy-equivalent continuous sound level is measured and documented for **describing the noise exposure in a given period of time.**

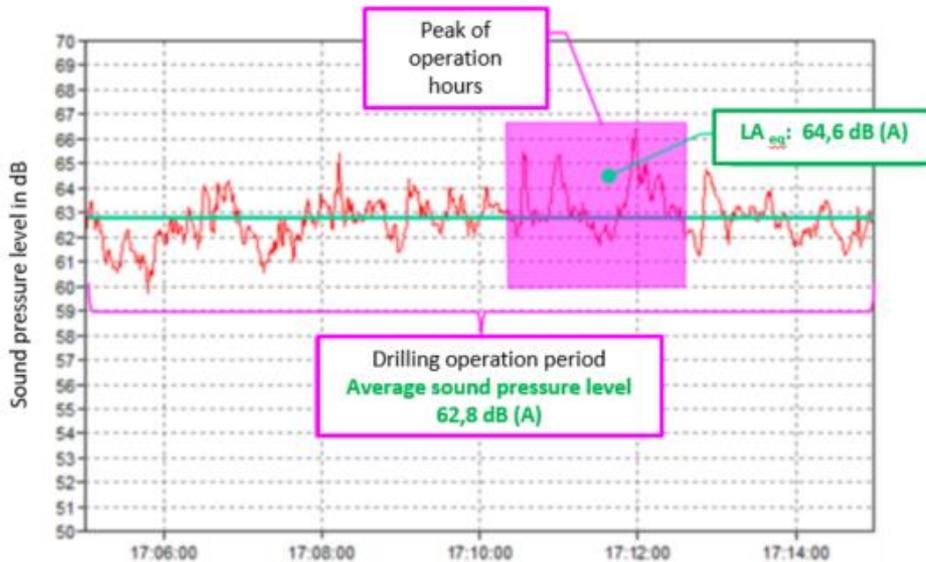
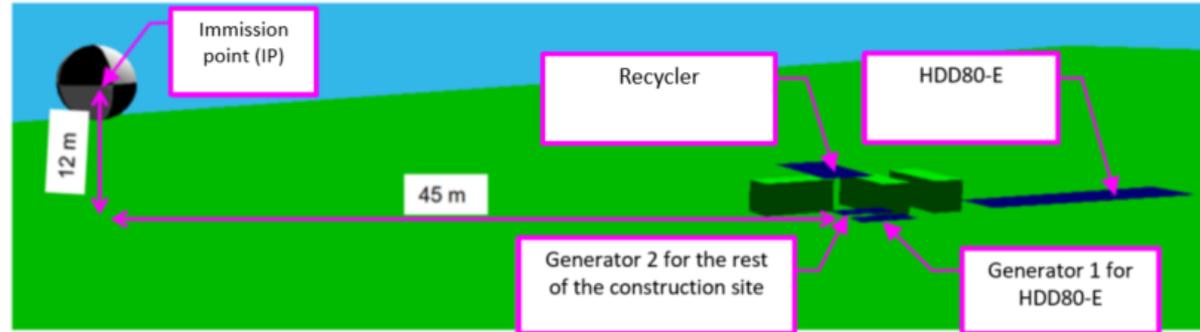
**This period** should be chosen so **that the loudest sound events within a work shift are recorded.**

Sound pressure results taken from the measurement on 24.-25.01.2022

Measurement on 24 - 25.01.2022		
	average sound pressure level; which describes how high the noise exposure is from a certain distance from the device.[dB]	average power level; without any dependence on the distance between source and listener or the acoustic conditions of the room[dB]
Measuring side A	75,1	75
Measuring side B	78	75
Measuring side C	71,9	75
Measuring side D	75,2	75
Measuring side E	79,3	75



Equivalent sound pressure level  $LA_{eq}$



Drilling operation period on 24.01.2022

Conclusion:

The HDD80-E Rig as a noise source **satisfies the working comfort of the drilling crew due to its fully-electrical motor.**



# DEVELOPMENT PHASE 2021-2022 PRODUCED CARBON DIOXIDE ON SITE

**KPI: Key Performance Indicators (according to DIN EN ISO 50001.chap.6.4.)**

This enables a better overview to compare the efficiency of the consumption

Energy consumption and **KPI in [Tons produced Carbon dioxide per total working hours]**

month	Description	estimated operating hours	Total Consumption on-site							KPIs	
			E-Consumption	Aggregate Consumption	Aggregate Consumption	Total consumption	Total consumptionratio	consumptioncosts	Total CO <sub>2</sub> -emission produced on site	KPI <sub>1</sub>	KPI <sub>2</sub>
			[kWh]	[l]	[kWh]	[kWh]	[%]	[€]	[tCO <sub>2</sub> ]	[kWh/Bh]	[tCO <sub>2</sub> /Bh]
January	HDDE80 in testing										
February											
March	Plattling, bayern	460	35.112,00	-	-	35.112,00	9%	6.952,18 €	9,83	76,33	0,02
April	26.03.2021 - 31.05.2021										
May											
June											
July	Bogen-Straubing, Bayern	850	140.559,30	11.382,00	113.820,00	254.379,30	68%	52.450,30 €	75,44	299,27	0,09
August	01.06.21 – 30.09.21										
September											
October	Aeiterhofen, Bayern	370	51.380,00	3.075,00	30.750,00	82.130,00	22%	12.233,49 €	24,13	221,97	0,07
November	01.09.21 – 22.11.21										
December											
<b>Total</b>		<b>2.549,00</b>	<b>227.051,30</b>	<b>14.457,00</b>	<b>144.570,00</b>	<b>371.621,30</b>	<b>100%</b>	<b>71.635,97 €</b>	<b>109,40</b>	<b>199,57</b>	<b>0,06</b>

2021	Plattling	Bogen	Aeiterhofen
Energy source	Electricity	aggregate (Diesel) and electricity	
estimated construction period [based on total working hours]	26.03. – 31.05. 46 x 10=460 h	06.06-30.09 85 x 10= 850 h	01.10 – 22.11 37 x 10 =370 h
CO <sub>2</sub> emission produced [Tons]	9,83	75,44	24,13
<b>KPIs [Tons/Working hours]</b>	<b>0,021</b>	<b>0,089</b>	<b>0,065</b>
<b>average KPI 2021</b>	<b>0,03</b>	<b>0,077</b>	

Electricity as an energy supply resource allows around 60% Reduction in produced carbon dioxide

Development of a **fully electrical driven** horizontal drilling rig as a **sustainable solution** in Pipeline Technology



## Energy Storage and Recuperation!

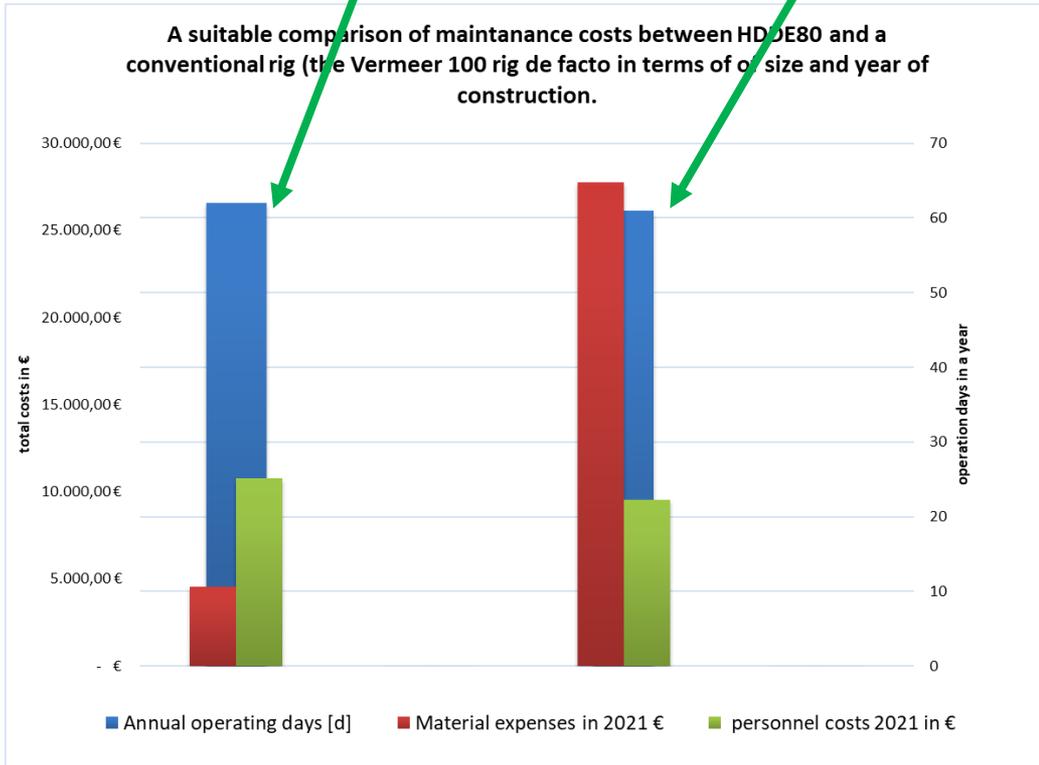
The fully electric driven system can **store or recuperate excess energy**, which can be flexibly utilized when needed. This allows for an efficient management of energy consumption.

- ⊕ Stored energy is utilized for powering of circuit when rig is moved.  
→ **no supplementary energy source necessary!**
- ⊕ **Regeneration of braking energy in integrated energy storage or in the supplying power grid**  
→ Optimization of energy usage  
→ Sustainable handling of excess energy (return to the energy cycle)
- ⊕ Through the **use of regenerative energy** and the use of environmentally friendly lubricants,  
→ the burden on the work environment is minimized.



# SOLUTION: STREICHER HDD80-E

	HDD80-E	comparable conventional rig system
Annual operating days [d]	62	61
Material expenses in 2021 [€]	4.564,40 €	27.780,12 €
personal costs 2021 [€]	10.780,37 €	9.523,25 €



comparable conventional rig system		STREICHER HDD80E	
<b>DATEN</b>			
Inventar-Nr.	46.386	Inventar-Nr.	46.409
Vorschub-/Rückzugskraft [to]	45	Vorschub-/Rückzugskraft [to]	80
Baujahr	2019	Baujahr	2021
Betriebsstunden	2960	Betriebsstunden	748
Vergleichsjahr	2021	Vergleichsjahr	2021
Einsatztage	61	Einsatztage	62
<b>MATERIALKOSTEN</b>			
Datum	(Mehrere Elemente) .T	Art	Material .T
Art	Gesamtwert	Art	Gesamtwert
Kundendienst	440 €	Magazinentnahmen (Zuordn.: Kostenstelle)	4.182 €
Reparatur/Verschleiß	27.340 €	Wartung und Jahresinspektion	382 €
<b>Gesamtergebnis</b>	<b>27.780 €</b>	<b>Gesamtergebnis</b>	<b>4.564 €</b>
<b>LÖHNE</b>			
Datum	(Mehrere Elemente) .T	Art	(Mehrere Elemente) .T
Art	Gesamtwert	Art	Gesamtwert
Kundendienst	351 €	Wartung und Jahresinspektion	10.780 €
Reparatur/Verschleiß	9.172 €	<b>Gesamtergebnis</b>	<b>10.780 €</b>
<b>Gesamtergebnis</b>	<b>9.523 €</b>		
Wartungskosten im Vergleichsjahr, gesamt	<b>37.303 €</b>	Wartungskosten im Vergleichsjahr, gesamt	<b>15.344,77 €</b>

➕ **Huge reduction in maintenance costs** in comparison between a hydraulic drilling rig and STREICHER HDD80-E  
 → **Satisfying economical future in pipeline technology**

## sustainable solution = Huge reduction of environmental aspects

- + Power supply via the public power grid or alternative energy sources**  
Operation of the system is possible with “green” electricity.
- + Reduction of CO<sub>2</sub> Emissions**  
Minimization of CO<sub>2</sub> Emissions in comparison to the conventional combustion rig systems.
- + Noise emission reduced to a minimum**  
→ high acceptance in residential and high environmental protection areas, which ensures optimal communication within the drilling crew and protecting the health of employees.
- + Risk of ground contamination is significantly reduced**  
strongly reduced need for oil – usage of biodegradable oil  
+ no need to refuel with diesel fuel  
→ Result: can also be used in high environmental protection areas!
- + Reduction of oil requirement/need for fuel**  
Water cooling of the motors instead of environmentally harmful thermal oil cooling
- + Minimal geotechnical soil compaction**  
HDD80-E counts as a minimal disturbing factor to the ground, since it hardly causes ground pressure.

Development of a **fully-electrical** horizontal drilling rig as a **sustainable solution** in Drilling Technology

**Operation with electric motor enables:**

- ⊕ **Reducing the ecological footprint**
- ⊕ **Developing green technologies** for a **sustainable future**
- ⊕ **Reduction of operating costs** → **Higher efficiency** due to optimal energy management and lifespan
- ⊕ **Minimization of service and maintenance costs** (compared to conventional diesel-powered systems)

We look forward to designing even **more sustainable products**.





# STREICHER HDD80-E – Fully Electrical Horizontal Drilling Rig

## 1. Why does it add value?

As we are facing **a global climate change**, sustainability plays an increasingly important role. By using electric engines on pipeline construction sites, **noise Emission, CO<sub>2</sub> Emissions and other green house pollutants can be minimized. An improving sustainable factor on the construction sites** will also have a positive effect on the population, through which an ever increasing rejection of pipeline construction can be seen. **Comforting working environment not only for the workers, but on the restricted areas is a remarkable value of this technology.**

## 2. Why does it show Management commitment?

The management of the STREICHER Group **focuses on sustainable growth** and was actively involved in the financial support, development and in the process of defining the specific requirements for the new machine while consistently **taking the highest environmental and climate protection standards into account.** Significant environmental aspects have been recorded for several years in order to be able to manage them in a targeted manner. This is probably the right time to take action and apply these concepts into one of the most critical fields of engineering, the pipeline technology.

## 3. Why does it constitute a step forward in Environment achievement for the Industry?

**The convenient combination of sustainability, environmental Friendliness, efficiency, safety and innovative technology are definitely a step forward in the world of industrial technology.** HDD80-E and its performance on the construction sites have proved it not only in theory, but on the field. Environmental impacts of laying conduits may influence species, populations, assemblages and ecosystems by modifying a variety of ecological and environmental parameters (e.g., biodiversity, biomass, productivity, pollution, etc.). Being able to indicate and reduce the most concerned environmental impacts; such as noise and carbon dioxide are definitely a reason why this sustainable solution is to be recognized in the future of pipeline technology.





## 4. How efficient is it?

By using HDD80-E, we are facing **a huge reduction in terms of energy consumption/costs** (electricity, aggregate or diesel) **and carbon dioxide production. Transitioning to renewable energies** as an energy source on the field would **allow us up to 60% reduction in carbon dioxide emission. Furthermore the comfort in terms of noise emission enables the working sites to be placed in residential or restricted areas, where there is no need for sound barrier walls on the construction sites.**

## 5. Does it have additional benefits?

In addition to the positive effects on the environment, the HDD80-E can be supplied with **“green electricity”** from the public power grid. **Saving operating and maintenance costs** allows to consider such a technology as a long-term financial and beneficial investment.

The **safety and health** is increased by controlling the machine during rig-move using a **remote control**. The machine operator can be given a much **larger field of vision than it was possible in the driver's cab.**

With the Rig-Move, the machine can be operated with the **built-in battery** (recuperation) **without an additional energy source.**