



SOLUTIONS

REFERENCES

**PYREG**

NET ZERO TECHNOLOGY

**PROVEN**



> 50 Systems  
Worldwide

**SUSTAINABLE**



- + Biochar Production
- + Renewable Energy
- + Carbon Credits

**SCALABLE**



- + Modular
- + Decentralized

# BIOCHAR CARBON REMOVAL

**INDUSTRY  
LEADING  
TECHNOLOGY**





**PYREG'S CARBON DIOXIDE REMOVAL TECHNOLOGY**  
NECESSARY TO ACHIEVE OUR CLIMATE GOALS

**50+**  
systems worldwide



**130,000 t**  
**CARBON DIOXIDE**  
**REMOVAL**

5 million trees

By the end of 2023

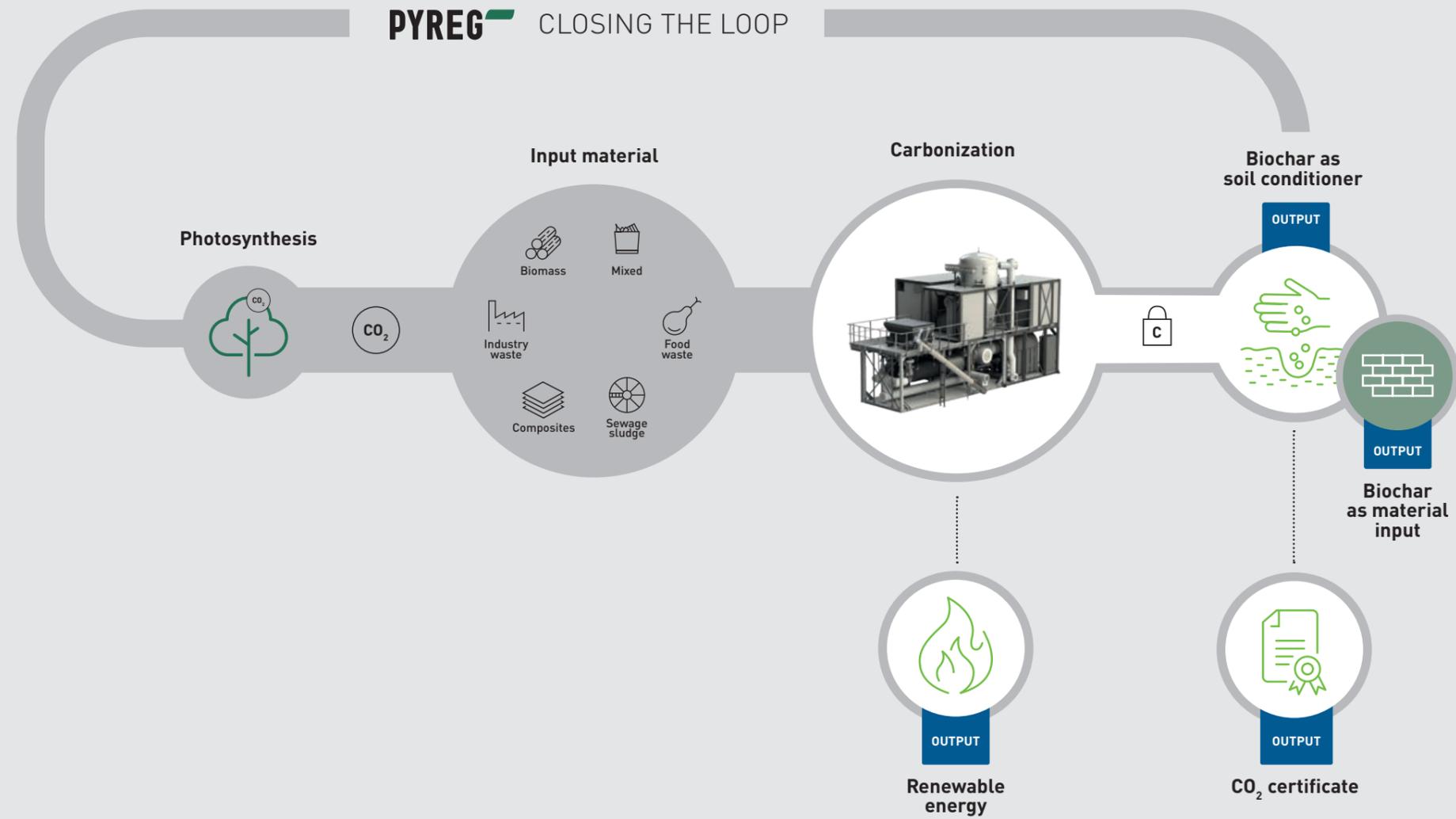


**75 GWh**  
**RENEWABLE**  
**ENERGY**

8,000 households

per year

**PYREG SOLUTIONS**  
CARBONIZATION



**PYREG SOLUTIONS**  
MULTI-MATERIAL CAPABILITY



**PYREG SOLUTIONS**  
WORLDWIDE

MARKET LEADER



**PYREG SOLUTIONS**  
WORLDWIDE

IN DETAIL

<p><b>SEWAGE SLUDGE RECYCLING</b></p> 	<p><b>BEDDING FOR URBAN TREES</b></p> 	<p><b>BIOCHAR, RENEWABLE ENERGY &amp; CARBONCREDIT PRODUCTION</b></p> 	<p><b>CARBON REMOVAL &amp; DISTRICT HEATING</b></p> 	<p><b>DISPOSAL OF DIVERSE BIOGENIC RESIDUES</b></p> 	<p><b>PRODUCTION OF SOIL</b></p> 	<p><b>DISPOSAL OF INDUSTRIAL SLUDGE</b></p> 
<p>During the carbonization process, the contained nutrients of the dried sewage sludge are conserved. The sewage sludge is sanitized on site and is completely recycled into a marketable phosphate fertilizer.</p>	<p>Biochar obtained by carbonization, becomes an important component of planting substrate, in which water and nutrients are stored, specially adapted to the needs of urban trees. As a consequence, the life expectancy of the trees is extended and the risk to lose new plantings is reduced.</p>	<p>The PYREG system enables upcycling of different residuals (e.g. agricultural waste and woodchips) into valuable biochar, which can be used as soil conditioner in arable soils. In addition to improving the quality and quantity of the crop, the green energy generated can be used locally. This closed-loop material cycle contributes to CO<sub>2</sub> emissions reduction.</p>	<p>With innovative PYREG technology, plant residues are processed into high-quality biochar (1,700 t per year). In the process, the carbon contained in the biomass is captured and permanently stored in the biochar (3,200 t of captured CO<sub>2</sub> per year). The generated green exhaust heat is fed into the district heating network.</p>	<p>This site utilizes a multi-material biochar technology already in use worldwide for processing a variety of waste streams. The sewage sludge system is used as a center of excellence for the production of biochar from various feedstocks such as agricultural and woody residues as well as sludges to expand biochar production and carbon removal in Asia.</p>	<p>The biomass-obtained biochar, together with compost, is processed to a high-quality plant soil, which improves the growth of plants in a sustainable and 100% natural way.</p>	<p>Industrial sludge can be carbonized without prior sorting. The resulting homogeneous biochar can, e.g. be used as a filler in further integrated processes.</p>



# REFERENCES & PARTNERS

## REFERENCES SOIL PRODUCTION



Our customers actively contribute to climate protection, as carbon remains contained in the soil for thousands of years (carbon sink). Over the course of time we have put three PYREG plants into operation – what better proof can there be that we stand by our ecologically and economically sensible decision? ”



CHRISTOPH ZIMMERMANN  
MANAGING DIRECTOR

Moola is the name of the biochar, produced by Fetzer Rohstoffe & Recycling GmbH, which is made from regional biomass (wood chips, grain husks). During production, up to 150 KW of heat are generated per plant. Fetzer uses this heat to heat the water system of a PET recycling plant. The remaining energy is used to heat the administration rooms.

[www.du-gut-pflanzenkohle.de](http://www.du-gut-pflanzenkohle.de)



Gentle carbonization of the residual materials is the basis of our valuable potting soil. We have chosen PYREG because their many years of scientific support and practical experience give us great security regarding our sustainable product quality. And with the additional commercialization of CarbonCredits at Carbonfuture, we have been able to expand our business model since 2022. ”



AARON SASSMANNSHAUSEN  
MANAGING DIRECTOR

In close cooperation with the University of Halle-Wittenberg, Bionero GmbH has developed a Terra Preta made of unused biological materials. This plant soil, produced from vegetable charcoal and compost, improves the growth of plants in a sustainable and 100 % natural way.

[www.bionero.de](http://www.bionero.de)





## REFERENCE

### CARBON DIOXIDE REMOVAL & RENEWABLE ENERGY



As the leading marketer of EBC certified biochar, we are opening *The Carbon Removal Park Baltic Sea* in Grevesmühlen (Germany) in 2023 - the largest site of Novocarbo. To be able to handle such a project and guarantee our quality promise on a long-term basis, we need a reliable technology. Therefore we have been successfully cooperating with PYREG from the very beginning. This new site is only a next step on the way.



CASPAR VON ZIEGNER  
MANAGING DIRECTOR

"The Carbon Removal Park Baltic Sea" in Grevesmühlen (Germany) is the largest site of the German cleantech startup Novocarbo. On this site we produce high-quality biochar (1,700 t per year). In this process, the carbon contained in the biomass is captured and permanently stored in the biochar (3,200 t of captured CO<sub>2</sub> annually). The generated green exhaust heat is fed into the district heating network of Grevesmühlen, increasing the share of renewable energies from 60% to 75%.

[www.novocarbo.com](http://www.novocarbo.com)

## REFERENCES

### BIOCHAR PRODUCTION & CARBON DIOXIDE REMOVAL



Maine is the place to deploy, state of the art carbonization technology and the time is now! Our vision is to co-locate biochar production at large sources of biomass feedstock (using byproducts from Maine's vast working forests), thereby driving a true circular economy, through the application of innovative NetZero technology. Using a proven process, we will use these forestry byproducts to produce an end product that nourishes soils, cleans water and re-

moves carbon dioxide from the atmosphere, while simultaneously generating renewable energy. To make this vision a reality, we have chosen PYREG as our strategic partner. We are thrilled to be walking this path together and doing good – not only for the region, but also for the world.



FRED HORTON  
CEO STANDARD BIOCARBON

Standard Biocarbon has a mission to lead the creation of a modern North American biochar industry as part of a global climate solution. The company will manufacture high quality European standard biochar with Pyreg machines from forest waste which have traditionally been used for paper or power generation, both in decline. Our goal is to create a new growth industry, leveraging the infrastructure of the forest products industry in our region to serve growing demand for better soil, cleaner water and less CO<sub>2</sub> in the air.

[www.standardbiocarbon.com](http://www.standardbiocarbon.com)





## REFERENCES

### SEWAGE SLUDGE RECYCLING



Water supply and disposal plays a key role in securing peace, growth and prosperity worldwide. HST actively shapes environmental protection with solution-oriented engineering developments. PYREG plays a decisive role in this. Our project in Trutnov is an example of the successful implementation of a future-proof green technology.



**PETR HELLMICH**  
DIRECTOR

The activities of the HST Group include the manufacture of products, the supply of turnkey system solutions and engineering services for water management plants in the municipal and industrial sectors. By combining several specialized companies under one roof, HST is able to offer comprehensive solutions for almost all water management problems.

[www.hydrosystemy.cz](http://www.hydrosystemy.cz)

## REFERENCES

### DISPOSAL OF INDUSTRIAL SLUDGE, RESIDUALS



Our goal is to provide our customers with a complete, efficient and cost-effective solution which continually creates an added value. By integrating PYREG technology at the respective sites and making additional use of the bioenergy generated, we have achieved this in a sustainable manner.



**PENG JIANG**  
MANAGING DIRECTOR

Henotec GmbH, founded in 2012 in Munich, helps European environmental technology companies enter the Chinese market. Henotec Qingdao specializes in solutions for the recycling of bio-waste, henotec Shanghai in solutions for the recycling of hazardous waste.

[www.henotech.com](http://www.henotech.com)





## REFERENCE

### SOIL AND SEED PRODUCTION



In this day and age, it is especially important to break new ground. That is why we have already decided to rely on PYREG technology since 2019. The use of biochar in our business field not only helps the environment, but also the end customer. The production technology must be both economical and ecological, which is why Skånefrö was the first company to receive a plant of the latest PX generation. PYREG and Skånefrö – a partnership that works well.



**Skånefrö AB**

SVEN-OLOF BERNHOFF  
VD-CEO

Skånefrö is one of Sweden's leading seed companies with one of the most modern seed factories in Europe. With PYREG technology high-quality biochar is produced for soil application from various biomass residues, that are produced during seed production. The complete excess thermal energy from carbonization process is fed into a district heating network, which supplies parts of Hammenhög and Tommarp with regenerative energy.

[www.skanefro.se](http://www.skanefro.se)

## REFERENCE

### ACADEMICS



"This exciting and highly topical subject focuses, among other things, on the fact that the biochar introduced into the soil not only serves as a long-term CO<sub>2</sub> sink, but also makes the soil more fertile and less susceptible to the negative consequences of intensive use and climate change," says Bruno Glaser.  
"I have been working successfully with PYREG for more than 10 years, as their technology enables the use of this natural problem solver."



  
MARTIN-LUTHER  
UNIVERSITÄT  
HALLE-WITTENBERG

PROF. DR. HABIL. RER. NAT. BRUNO GLASER  
SOIL BIOGEOCHEMISTS AND UNIVERSITY LECTURER AT THE UNIVERSITY OF HALLE (SAALE)

Our cooperation partner Professor Dr. Bruno Glaser, a German soil biogeochemist and lecturer at the University of Halle (Saale), with a research focus on Terra Preta and biochar, is considered a luminary in the field of biochar.

[www.landw.uni-halle.de/prof/bodenbiogeochemie](http://www.landw.uni-halle.de/prof/bodenbiogeochemie)



**PARTNERSHIPS**  
COOPERATIONS

**puro·earth**

 **Carbonfuture**

 **EBI** | European Biochar Industry

**DÜRR**

 **ANZ BIOCHAR**  
INDUSTRY GROUP

**USBI**  
Building the future from the ground up.™

 **European Sustainable Phosphorus Platform**

 **International Biochar Initiative**

**Skånefrö AB**

 **HST**  
HYDROSYSTEMY

**char net**  
Schweizer Fachverband für Pflanzenkohle

 **Novocarbo**

 **Carbon Business Council**

 **EBC**  
EUROPEAN BIOCHAR CERTIFICATE (EBC)

**henotec**

**Kita**

 **Standard Biocarbon**

 **NORTH TEC**

 **ZAHNEN**  
TECHNIK

 **GERMAN BIOCHAR**

 **ElectraTherm**

 **DEUTSCHE PHOSPHOR PLATTFORM**

**ELIQUO**

 **BIOFORCETECH**  
Corporation

# WE ARE

Technology Partner

**puro·earth + PYREG**

**Empowering biochar suppliers to monetize their carbon removal activities**

PYREG is thrilled to be recognized as the first technology partner of puro-earth, the world's leading crediting platform for engineered carbon removal. PYREG's patented high-tech carbonization systems have gained industry recognition for their ability to produce high-quality biochar that meets the stringent eligibility requirements set by the Puro Standard for CO<sub>2</sub> Removal Certificates (CORCs). Therefore PYREG's customers have the opportunity to monetize their carbon removal operations by leveraging the credibility and integrity of the Puro Standard. Through their Puro Accelerate program, puro-earth further enables biochar producers to secure funding for their projects in development. Together, we aim to foster the expansion of carbon removal initiatives.

**PYREG**

Technology Partner

The first recognized partner providing high-tech carbonization machines that meet the Puro Standard requirements for CORCs.

**puro·earth**

## REFERENCES BIOMASS

P1500, P500

		SITE	SYSTEM	COMMISSIONING	
<b>1</b>	Verora GmbH	Edlibach <b>SUI</b>	<b>P500</b>	2012	Woodchips Green waste
<b>2</b>	Fetzer Rohstoffe und Recycling GmbH	Eislingen <b>GER</b>	<b>P500</b> <b>2 x P500</b>	2013 2018	Woodchips Forestry and agricultural residues
<b>3</b>	NovoCarbo GmbH	Dörth <b>GER</b>	<b>P500</b> <b>2 x P500</b>	2014 2018	Woodchips Screenings
<b>4</b>	Finzelberg GmbH & Co.KG	Andernach <b>GER</b>	<b>P500</b>	2015	Production residues
<b>5</b>	Abfallwirtschaftsgesellschaft des Neckar-Odenwald-Kreises (AWN) mbH	Buchen <b>GER</b>	<b>P500</b>	2016	Woodchips Various biomass
<b>6</b>	Greenpoch s.a.	Wagnelée <b>BEL</b>	<b>P500</b>	2016	Woodchips Green waste
<b>7</b>	Stockholm Vatten	Stockholm <b>SWE</b>	<b>P500</b>	2016	Woodchips Green waste
<b>8</b>	Skanefro AB	Hammenhög <b>SWE</b>	<b>P1500</b>	2018	Agricultural residues (pallets) Various biomass
<b>9</b>	Bionereo GmbH	Thurnau <b>GER</b>	<b>P500</b>	2018	Woodchips Green waste Various biomass



<b>10</b>	AS Rohstoffe GmbH	Lohsa <b>GER</b>	<b>P500</b>	2020	Woodchips Forestry and agricultural residues
<b>11</b>	Jordpro AS	Trondheim <b>NOR</b>	<b>P500</b>	2020	Woodchips Green waste
<b>12</b>	thyssenkrupp rothe erde Germany GmbH	Lippstadt <b>GER</b>	<b>PX1500</b>	2022	Woodchips screenings
<b>13</b>	NovoCarbo GmbH	Grevesmühlen <b>GER</b>	<b>2 x PX1500</b>	2022	Woodchips Green waste
<b>14</b>	Blackbull Biochar	Manchester <b>UK</b>	<b>P500</b>	2023	Woodchips Wastewood
<b>15</b>	Standard Biocarbon	Maine <b>USA</b>	<b>2 x PX1500</b>	2023	Woodchips waste wood
<b>16</b>	PREOL. a.s.	Lovosice <b>Czech Republic</b>	<b>PX1500</b>	2024	Agricultural residues
<b>17</b>	TCHAR CO. LTD	Taichung City <b>TAIWAN</b>	<b>PX1500</b>	2024	Agricultural Residues Green Waste



## REFERENCES SEWAGE SLUDGE

P500

		SITE	SYSTEM	COMMISSIONING	
<b>18</b>	Zweckverband Abwasserbeseitigung Linz-Unkel (KdöR)	Unkel <b>GER</b>	<b>P500</b>	2015	Dried sewage sludge
<b>19</b>	Entsorgungsverband Saar (EVS) (KdöR)	Homburg <b>GER</b>	<b>P500</b>	2016	Dried sewage sludge
<b>20</b>	Silicon Valley Clean Water	Redwood, California <b>USA</b>	<b>P500</b>	2017	Dried sewage sludge
<b>21</b>	Skanfro AB	Hammenhög <b>SWE</b>	<b>P500</b>	2019	Dried sewage sludge
<b>22</b>	HST Hydrosystémy s.r.o.	Trutnov <b>CZE</b>	<b>P500</b>	2020	Dried sewage sludge
<b>23</b>	Abwasserverband Main-Taunus (KdöR)	Lorsbach <b>GER</b>	<b>PX750</b>	2021	Dried sewage sludge
<b>24</b>	Umweltbetriebe der Stadt Kleve AöR	Kleve <b>Germany</b>	<b>PX750</b>	2022	Dried sewage sludge
<b>25</b>	Bioforcetech Corp.	Ephrata, Pennsylvania <b>USA</b>	<b>PX500</b>	2023	Dried sewage sludge
<b>26</b>	Bioforcetech Corp.	Redding, California <b>USA</b>	<b>PX500</b>	2023	Dried sewage sludge



## REFERENCES INDUSTRIAL RESIDUALS / DISPOSAL

P1500, P500

		SITE	SYSTEM	COMMISSIONING	
<b>27</b>	Shanghai Meiho International Logistics Co., Ltd.	Shanghai <b>CHN</b>	<b>P500</b>	2020	Paint waste
<b>28</b>	DESMI A/S	Hyderabad <b>IND</b>	<b>P500</b>	2020	Mixed municipal waste



## REFERENCES PYREKA

LABORATORY SCALE UNIT OF PYREG SYSTEM

		SITE	SYSTEM	COMMISSIONING
<b>29</b>	Agroscope, Bundesamt für Landwirtschaft (BLW)	Zürich <b>SUI</b>	<b>PYREKA</b>	2014
<b>30</b>	Austrian Institute of Technology (AIT)	Tulln <b>AUT</b>	<b>PYREKA</b>	2016
<b>31</b>	Zürcher Hochschule für Angewandte Wissenschaften (ZHAW)	Zürich <b>SUI</b>	<b>PYREKA</b>	2017
<b>32</b>	Fachhochschule Burgenland	Pinkafeld <b>AUT</b>	<b>PYREKA</b>	2020
<b>33</b>	Universität Kassel	Kassel <b>GER</b>	<b>PYREKA</b>	2020
<b>34</b>	Hochschule Nordhausen	Nordhausen <b>GER</b>	<b>PYREKA</b>	2021

PYREG GmbH  
Trinkbornstr. 15-17  
56281 Dörth  
**Germany**

Phone +49 6747 953880  
info@pyreg.com

PYREG Inc.  
Marine Trade Center  
2 Portland Fish Pier, Suite 213  
Portland, ME 04101  
**USA**

Phone +1 207 317 6907

**pyreg.com**

Scan & Surf 

