Intro presentation

April 2022

Turning a big problem into an even bigger opportunity

WET WASTE

Negative value

- A health risk
- A huge source of methane and other greenhouse gases
- Expensive and difficult to dispose of
- Causes pollution

HYDROCHAR

Positive value

- ✓ Fossil fuel substitute
- ✓ Biofuel substitute
- ✓ Industrial feedstock
- ✓ Soil improvement
- ✓ Carbon sink

Source: Company information.

With OxyPower HTC

Wet organic waste

From 5 kg of this…

OXYPOWER™ HTC

Dry hydrochar

…to 1 kg of this.

BIOFUEL

SOIL IMPROVEMENT

BIO CCS

Source: Company information.

Our solution

OXYPOWER™
HTC

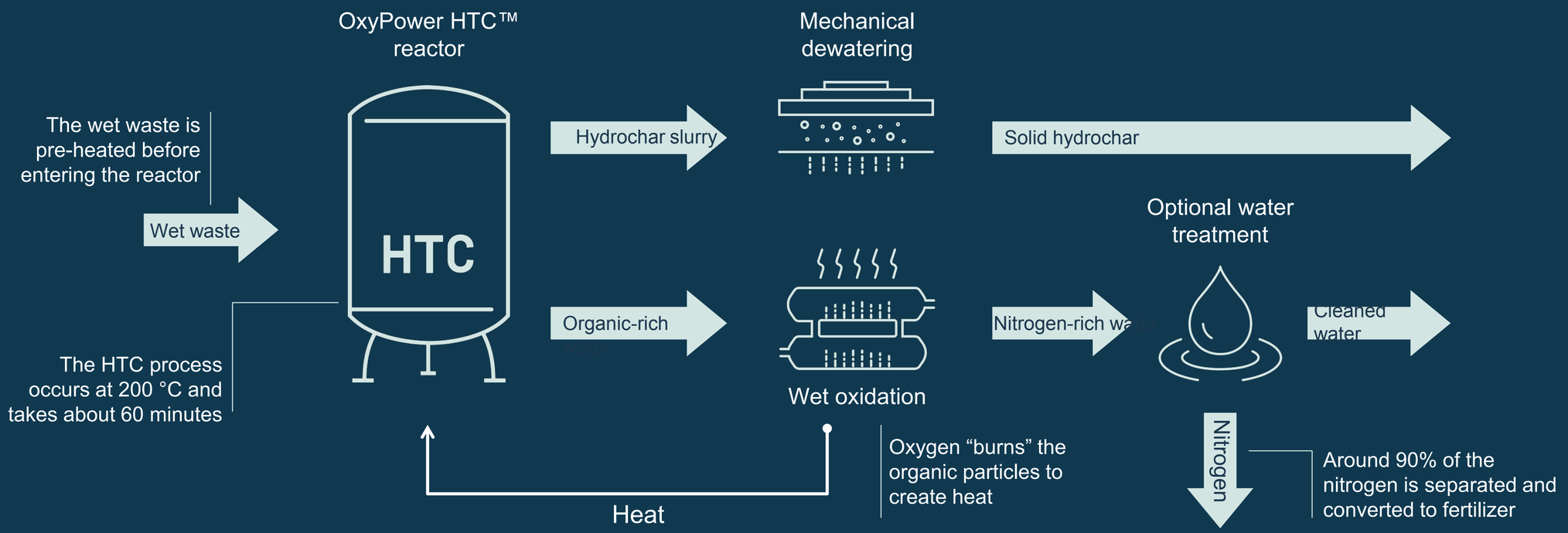
Movie from biorefinery at Heinola, Finland

OxyPower HTC™ wet waste refinery

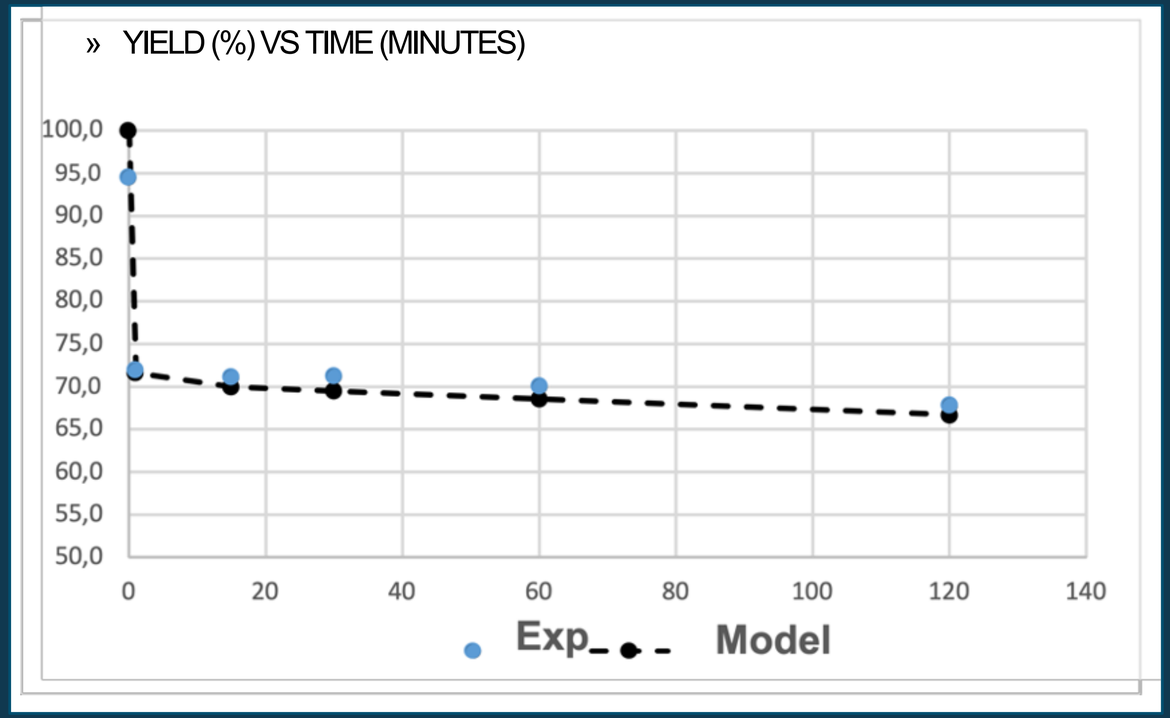
- Capacity of 25,000 ton sludge/year
- No need for external heat
- Pre-manufactured in container-sized modules
- Small footprint
- Easy to deploy, operate, and maintain

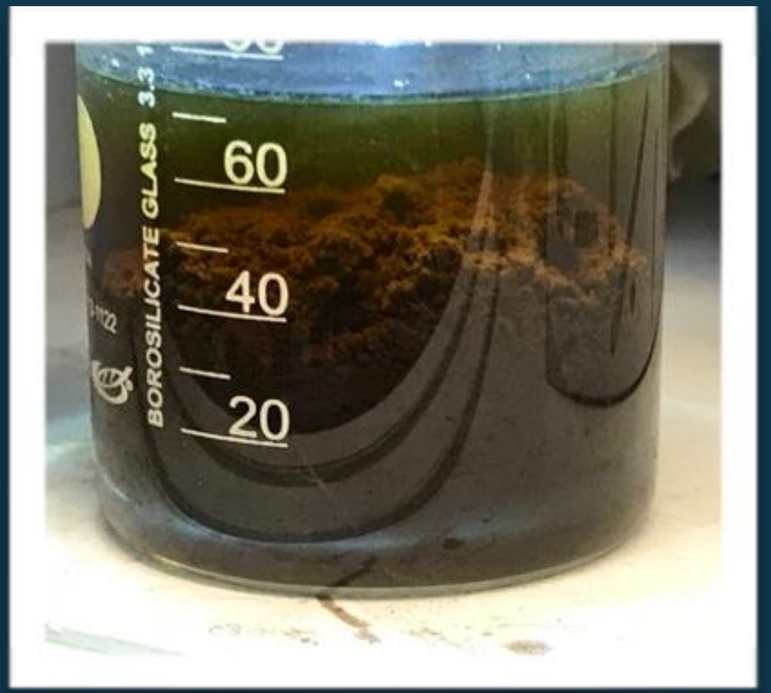
The OxyPower HTC™ process

A proven and industrialized hydrothermal carbonization (HTC) process for wet organic waste management and nitrogen recovery.



HTC kinetics at 200 °C

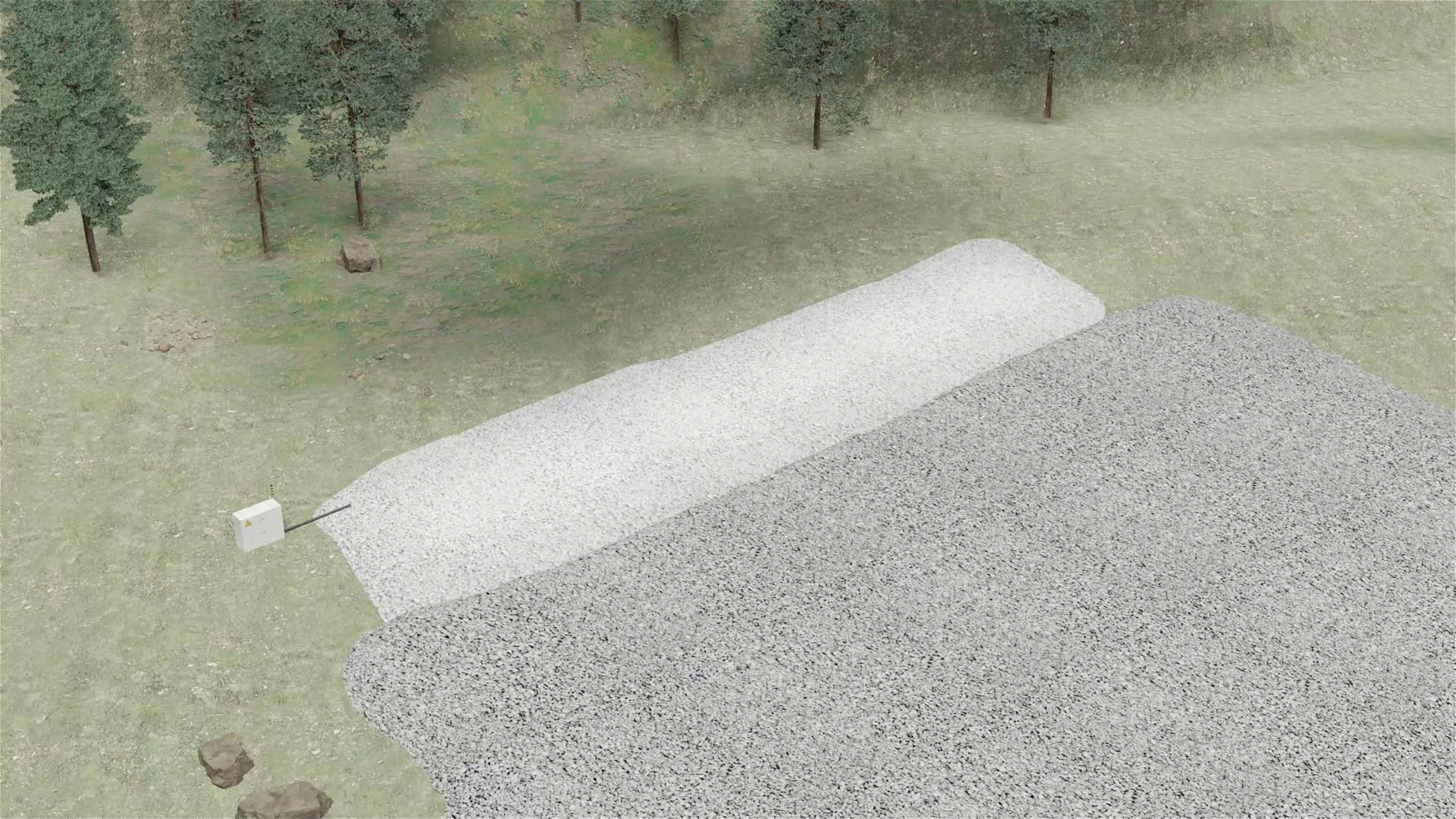




Benefits of wet oxidation

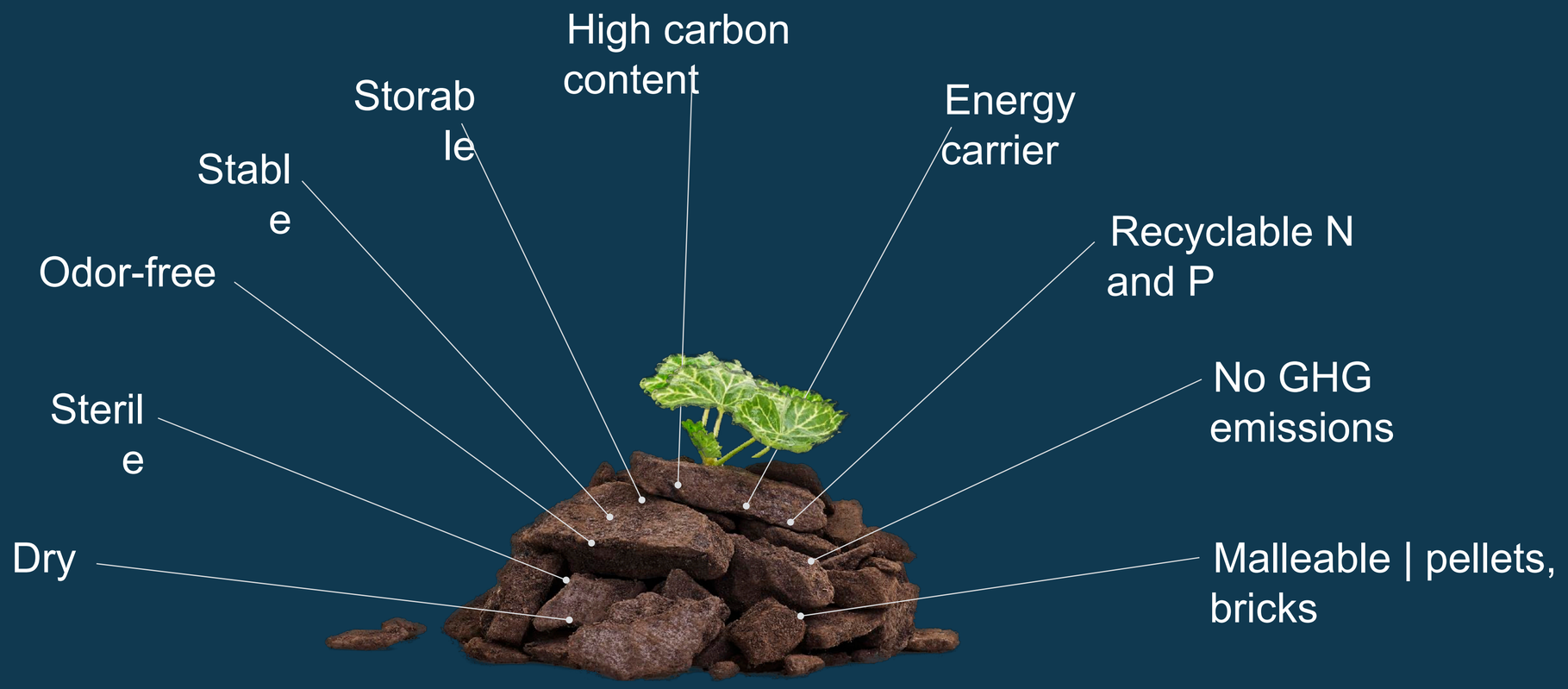
- Temperature increase from ~200°C to ~230°C
- COD reduced up to 99%
- Dramatic reduction of color and odor

- Organic N
- Standard OxyPower HTC – conversion to NH4
- Extended OxyPower HTC - conversion to N2



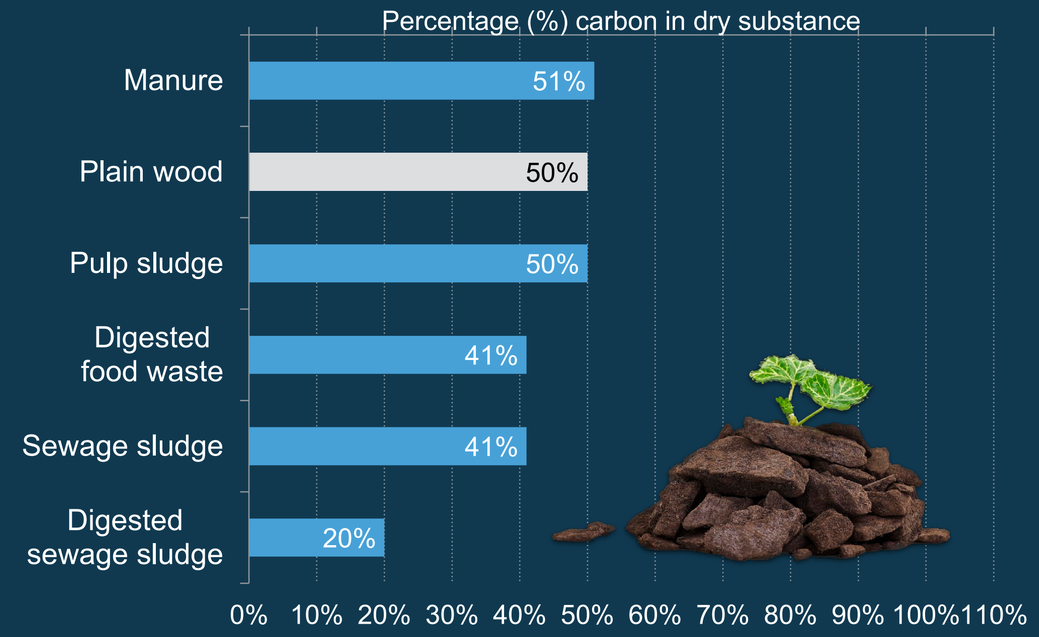
What is hydrochar?

Hydrochar is a useful product with many interesting characteristics and applications.



Carbon content in hydrochar

The amount of carbon varies between different types of wet waste.



Source: RISE analysis of OxyPower HTC™ hydrochar
SkogsSverige

Hydrochar

– a new sustainable commodity

- A fossil fuel replacement
- A biofuel replacement
- An industrial feedstock
- For arable land development
- CO_2 A carbon sink

COMPOSITION OF DIGESTED SEWAGE SLUDGES

		Min	Average	Max
Moisture	%	69	79.5	74.8
C	kg/t TS	238	321	372
P	kg/t TS	22.6	27.3	32.7
N-tot	kg/t TS	40	46.5	55.2
Ash	kg/t TS	350	400	550

High recovery of C, P, Al, Ca, Fe, Si, ash and heavy metals in hydrochar

		Min	Average	Max
Al	kg/t TS	5.3	20.1	49.3
Ca	kg/t TS	19.4	27.7	37.1
Fe	kg/t TS	46.1	60.0	84.5
Si	kg/t TS	17.6	50.2	110
Ag	g/t TS	1.2	2.3	3.8
As	g/t TS	3.1	3.9	4.7
Ba	g/t TS	164	348	516
Cd	g/t TS	0.4	0.8	1.3
Co	g/t TS	3.0	6.2	8.3
Cr	g/t TS	26	101	204
Cu	g/t TS	199	275	338
Hg	g/t TS	0.38	0.7	1.3
Mn	g/t TS	204	376	657
Ni	g/t TS	17.3	36	85
Pb	g/t TS	9.9	24	30
Zn	g/t TS	387	553	811

Projects and pipeline

On-going projects:

Stora Enso

Pulp & Paper
Heinola, Finland

1 biorefinery

Status: Operational in production

ramp-up

Roslagsvatten

Sewage treatment
Margretelund, Sweden

1 biorefinery
(planned production start 2024)

Status: Pre-project ongoing[3]

Ragn-Sells

Waste recycling services
Sweden

1 biorefinery
(planned production start 2023)

Status: Delivery project ongoing[1]

REYM Rotterdam

Waste recycling service
Netherlands

1 biorefinery (requires 20)

Status: Pre-project ongoing[3]

Pipeline

10 potential biorefineries in the short-term

Sewage plant

Europe

MoU for 8-13 biorefineries
(requires +50)

Recycling service

Nordic region

1 biorefinery
(requires 4)

Sewage plant

Europe

1 biorefinery
(requires 10)

Sewage plant

Europe

1 biorefinery
(requires 10)

Sewage plant

Europe

2 biorefineries
(requires 10)

C-Green and Next Rung Technology

Next Rung Technology provides engineering, execution, operations & consulting services to organizations developing and delivering sustainable technologies.

Services Include:

- Strategic planning, road-mapping with an execution bias
- Technology development, scale-up and commercialization
- Project development, execution and management
- Organizational and operational leadership
- Manufacturing Sourcing and Scale-up

Located at:

Greentown Labs

CONTACTS:

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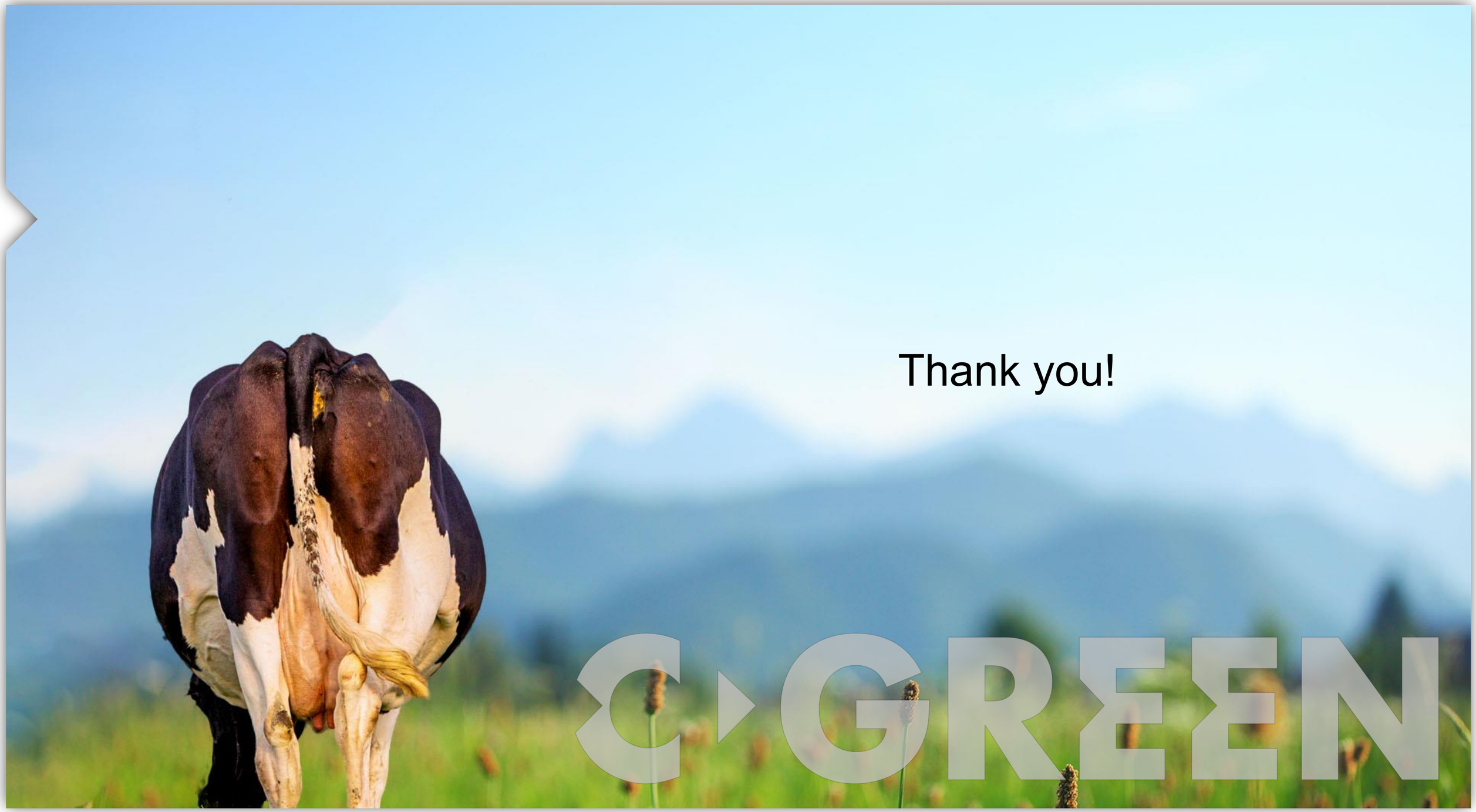
Susanne Feagin – Commercialization Program Manage
sfeagin@nextrungtechnology.com

Next Rung Activities in US for C-Green

Current Efforts in the US:

- Support team for commercializing C-Green technology in the US.
- Currently working to establish C-Green lab in US.
- Actively involved in MABA and other biosolids organizations. Also presenting next week a NEWEA and planning to be at WEF.


Thank you!
CGREEN

A.
Appendices

Innovative technology with unique advantages

UNIQUE HTC REACTOR

Wet organic waste is heated under high pressure to form hydrochar (carbonization) in our **patented** and compact hydrothermal carbonization (HTC) reactor design

HEAT PRODUCTION

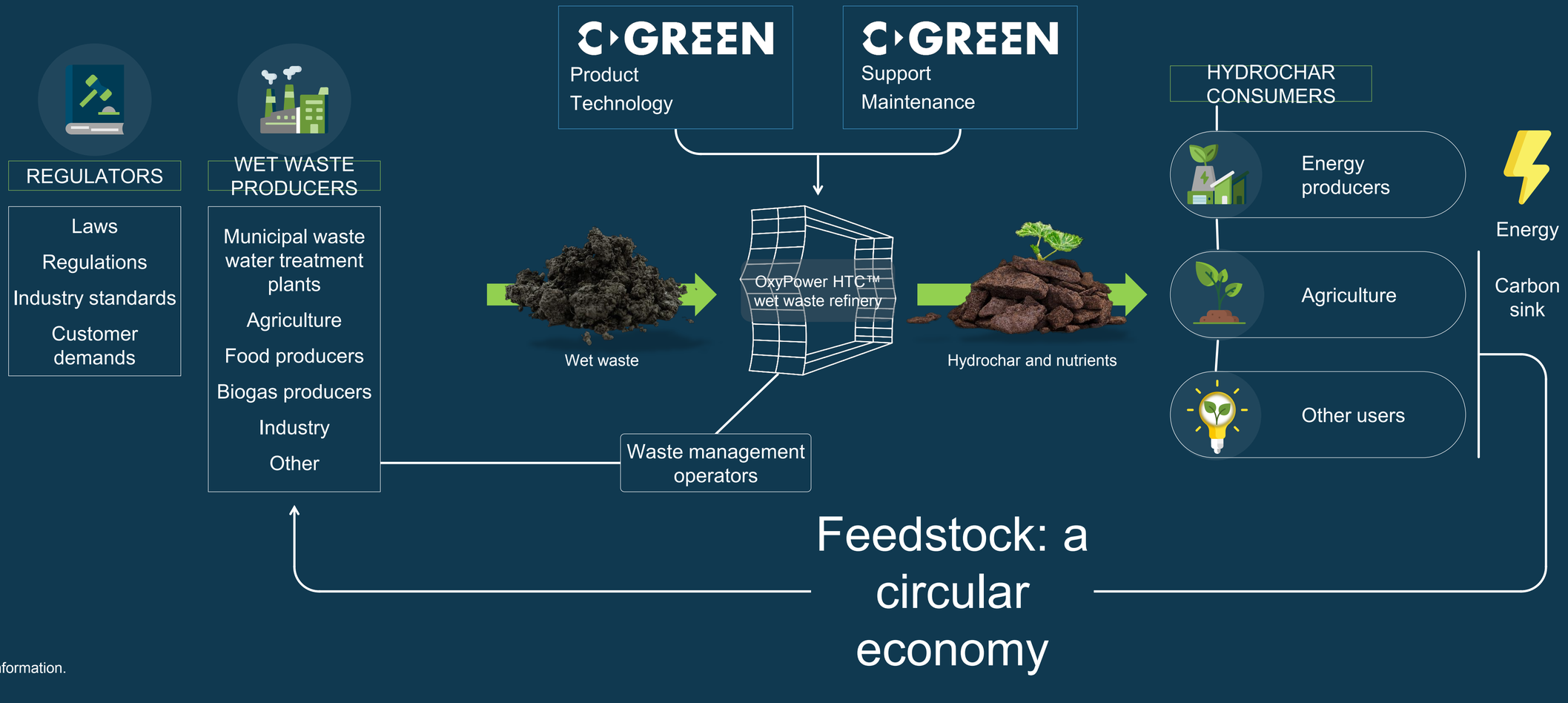
Our patented wet oxidation process is used to generate heat, providing excess energy to customers and making the process heat **self-sufficient** without reducing the production capacity

STANDARDIZED

The OxyPower HTC™ plant design is manufactured in **functional modules** for efficient production, easy shipping and fast assembly on customer site

Source: Company information.

C-Green’s value chain



Source: Company information.

Operator business case

Sample business case for a wet waste recycling service operator based on a OxyPower HTC™ 2.1 refinery. [EUR]

Investment

OxyPower HTC™ wet waste refinery	10,000,000
Site preparations, engineering, all other costs	2,000,000
Investment grant	Opportunity

Annual OPEX

Operational costs, parts, service	600,000

Annual revenue

Recycling of 25 000 ton wet waste at EUR 100/ton	2,500,000
	2,500,000

Additional annual revenue

Sales of 5 000 ton hydrochar	Opportunity
	Not included

Return on investment

Cost of capital	2%
10 year IRR	11%

10-year IRR sensitivity

Annual OPEX (EUR)	Price wet waste recycling service (EUR / ton)				
	80	100	120	140	160
600000	4%	11%	16%	22%	27%
800000	1%	8%	14%	20%	25%
1 000 000	-2%	6%	12%	18%	23%
1 200 000	-6%	3%	9%	15%	21%

Slide supporting text

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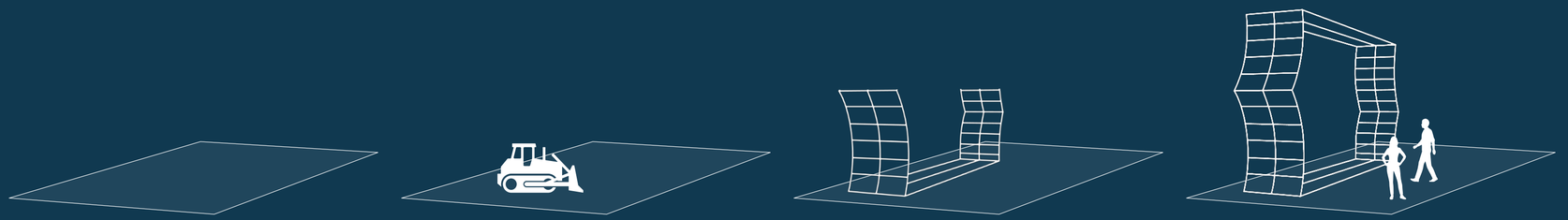
Quick deployment of fully operational OxyPower HTC™ biorefinery



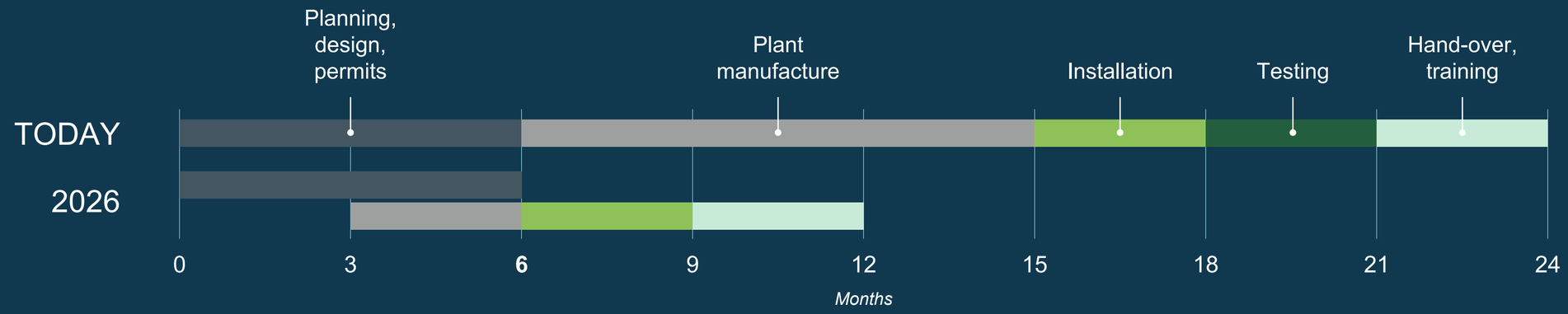
1 PLANNING

2 SITE DEVELOPMENT

3 OXYPOWER HTC™ PLANT ASSEMBLY

4 OPERATIONS

- Compact, space-efficient with self-generating heat
- Designed for serial production
- Easily transportable, pre-fabricated modules
- Each module is the size of a 20 or 40 foot ISO container
- **An easy-to-assemble modular plant designed for industrial-scale deployment**



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COMPOSITION OF PROCESS WATER

Average of 7 tested sludges, mg/L

	OxyPower HTC before wetox	OxyPower HTC Standard	OxyPower HTC Extended
P	0.17	0.03	<0.01
N_{tot}	7.2	0.94	<0.5
COD	80	24	<5
BOD	32	16	-

COMPOSITION OF PROCESS WATER

Average of 7 tested sludges, mg/L

	OxyPower HTC before wetox	OxyPower HTC Standard	OxyPower HTC Extended
Al	9.5	**0,5**	0.48
Ca	208	**74**	10.4
Fe	350	7.1	17.5
Mg	78	43	3.9
S	1000	1066	50
Si	172	109	8.6
Ag	<0,009	<0,009	0.0093
As	0.3	0.2	0.010
Cd	<0.001	<0.004	<0.014
Cr	0.2	0.1	0.000
Cu	0.3	0.3	<0.013
Hg	0.1	0.2	0.008
Mg	0.0004	0.0004	<0.0004
Ni	0.3	0.6	0.028
Pb	0.01	<0.01	<0.010
Zn	0.4	0.3	0.015

EFFECT OF FEEDSTOCK COMPOSITION ON HYDROCHAR