

## Annex 3

### CHP small-scale CHP Unit examples build for charcoal production

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The following examples are especially designed and build CHP plants for the by product charcoal. Syncraft and Xylowatt are so far the only known companies which are promoting this type of by product concept.

### Implemented CHP units in operation

#### Syncraft Austria

<http://www.syncraft.at/index.php/en/>



Hauptkategorie: [Referenzen](#) | in [Referenzen Holzgaskraftwerk](#)

#### SYNCRAFT®Werk CW1200-400 / Stadl / AT

Erfolgreiche Inbetriebnahme des SYNCRAFT®Werk 1200-400 in Stadl Anfang November 2016.

[Read More](#)



Hauptkategorie: [Referenzen](#) | in [Referenzen Holzgaskraftwerk](#)

#### SYNCRAFT®Werk CW1000-300 / Innsbruck / AT

Das turboaufgeladene BHKW mit 8 Zylindern und 16,7 Liter Hubraum hat bereits in der ersten Woche nach Inbetriebnahme im November 2016 eine elektrische Leistung von 300kW erreicht.

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Hauptkategorie: [Referenzen](#) | in [Referenzen Holzgaskraftwerk](#)

#### SYNCRAFT®Werk / Dornbirn / AT

SYNCRAFT®Werk in Dornbirn wurde 2014 mit einer Bauzeit von nur 3 Monaten errichtet und ging Ende 2014 erfolgreich ans Netz.

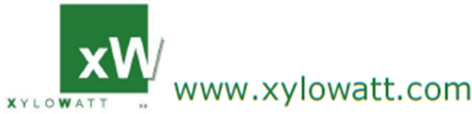
[Read More](#)

<http://www.syncraft.at/index.php/de/referenzen-menu/referenzen-holzgaskraftwerk-menu>

By product is charcoal for soil improvement grill char and animal food etc.  
see also Annex 2 for specification of charcoal.

**Xylo watt**

<http://www.xylo watt.com>



# Biochar valorization

Production of high quality char in Xylo watt's NOTAR® technology



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### Introduction

The NOTAR® Gasifier is an industrial multi-stage downdraft Gasifier that produces a **Tar Free syngas**. The technology developed by Xylo watt since 2007 has as a consequence that the char produced is a very **high quality product** as it's also tar free.

As long as the carbon conversion is not complete, every gasifier will produce char. This by-product, mainly composed of carbon can have various uses in several context. To promote this potential market, Xylo watt led a test campaign in order to highlight the process parameters impacting the char's quality and amount and to define optimized set-up regarding to several char's characteristics.

### Experimental Setup

Tests were performed on a proto-scaled 1MW<sub>e</sub> gasifier referred as *Industrial Test Platform*. The selected process parameters for variation were the **pyrolysis temperature** and the **residence time** of solid material in the gasifier.

Each recorded set point consists in a full mass and energy balance and sampling of every by-products. Each parameter changes were followed by 12 to 24 hours of stabilization to ensure the recording of **steady states**.

Samples were analyzed by external and independent laboratories about the following parameters (standard methods): **LHV/HHV** (NEN-EN-ISO 18125), **ultimate analysis** (NEN-EN-ISO 16948 and 16994), **iodine number** (ASTM D4607), **BET specific surface** (ISO 9277), **PAH content**.

Char extracted from the gasifier and fly ashes were analyzed separately to highlight potential variations that could impact the most exacting uses.



Figure 1: NOTAR® Gasifier on P11

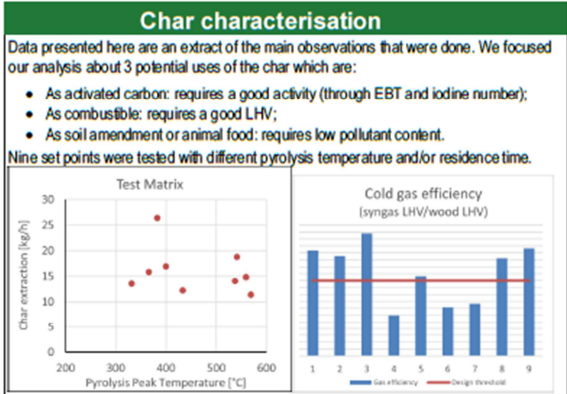


Figure 2: Test matrix (left) and gasification efficiency (right)

The following table shows the results for the main characteristics of char.

Table 1: Main result of char analysis.

Set point	Unit	1	2	3	4	5	6	7	8	9
LHV	MJ/kg	25,8	24,7	24,3	27,4	28,2	27,9	28,1	29,7	29,8
Iodine number	mg/kg	711	813	775	940	953	1003	775	1133	1140
PAH content	mg/kg	0,6	1,1	0,6	0,5	0,3	0,3	1,4	n.a.	n.a.
BET surface	m <sup>2</sup> /g	n.a.	n.a.	326	n.a.	546	n.a.	n.a.	n.a.	n.a.

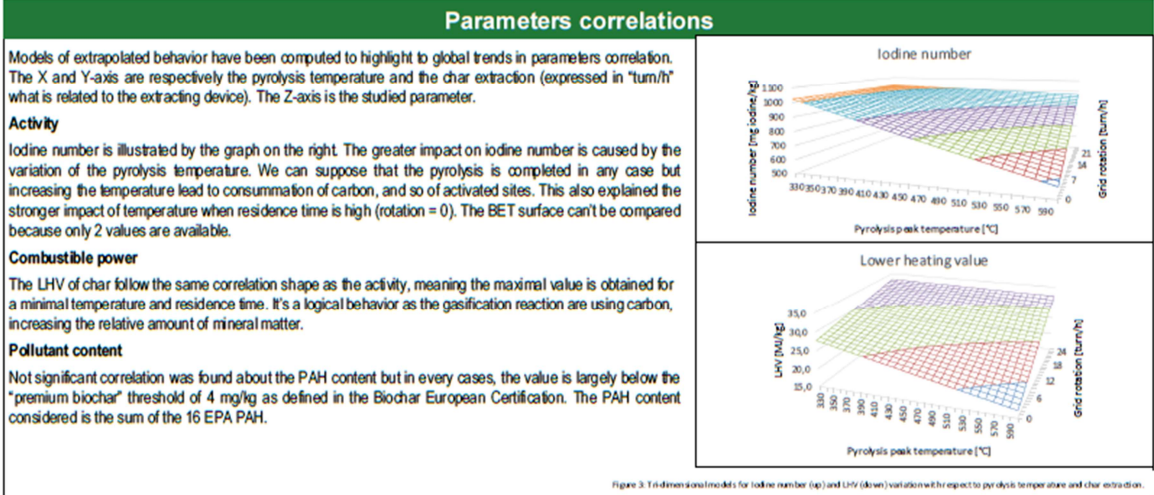


Figure 3: 3D dimensional models for Iodine number (top) and LHV (bottom) variations with respect to pyrolysis temperature and char extraction.

The Walloon Region supports Xylo watt through a "technical support" convention



"Biomass gasification for CO<sub>2</sub> emissions reduction and bio-waste recovery in energy-intensive industries."

<http://www.xyLOWATT.com/references/>

## CHP operating on syngas

### BELGIUM – Gedinne

#### Demo NOTAR® plant connected on district heating

Project Key Data	
Location	Gedinne – Belgium
Owner	Gedinne City
Application	Combined Heat Power (MTU G12).
Capacity	300kWe + 600kWth
Technology	NOTAR v.1
Feedstock	Woodchips
Periode	2007-2011

