



## **Reducing CO<sub>2</sub> footprint by using non-fossil activated carbon**

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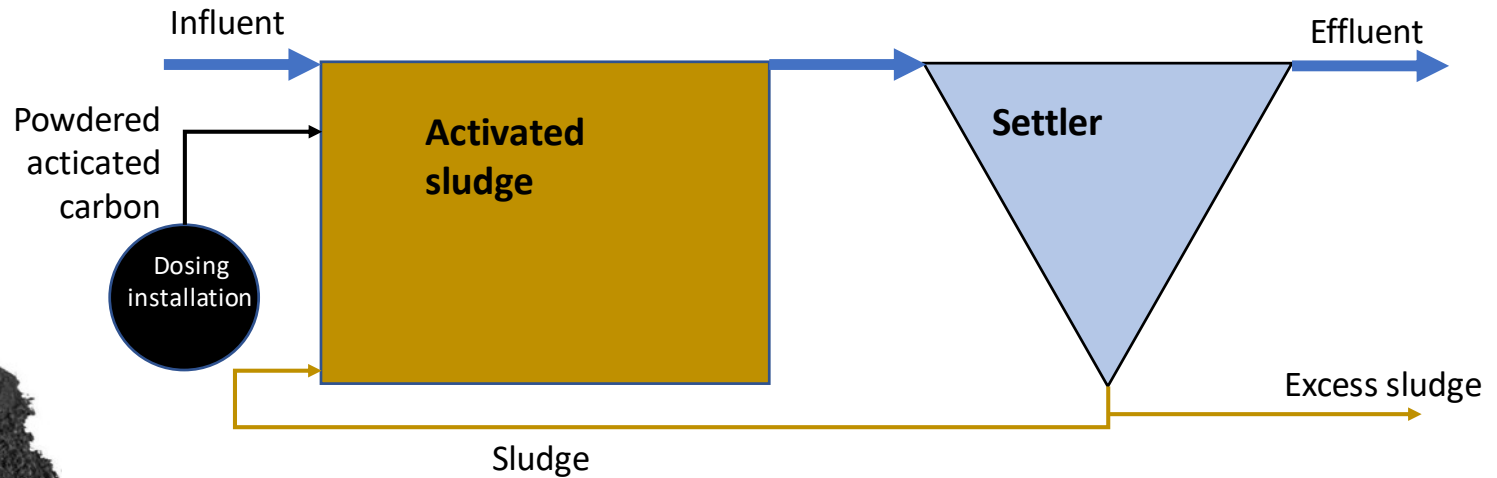
**Coen de Jong, Witteveen+Bos**



**Dutch Innovation on Micropollutants  
Removal from Municipal Wastewater  
November 7<sup>th</sup> 2019 Aquatech Amsterdam**

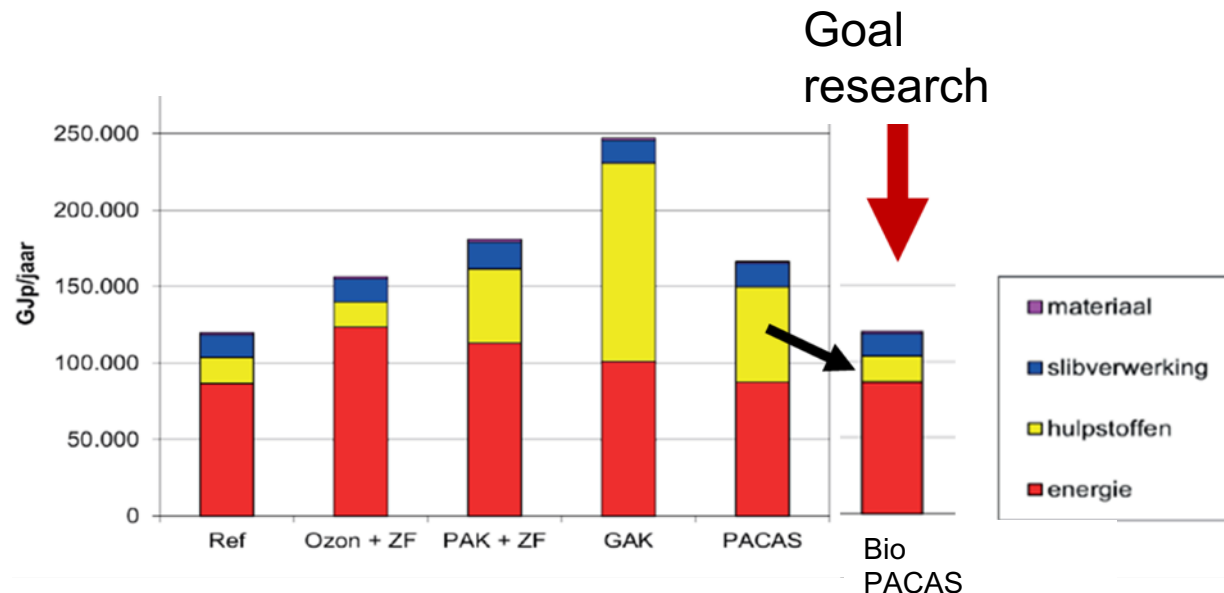
# PACAS Technology

- Powdered Activated Carbon in Activated Sludge (PACAS)
- Easy to implement and cost efficient (€ 0,05/m<sup>3</sup>) technology to remove micro pollutants from waste water on WWTP's



# Feasibility Study

- **Goal** Increasing sustainability of PACAS proces by investigating powdered activated carbon from non-fossil resources
- Interviews with producers and (inter)national experts
- Literature review



# Feasibility Study

Tabel 4.1: Longlist: commercieel beschikbare PAK's gemaakt uit hernieuwbaar materiaal en de referentiekool

Naam kool	Leverancier	Indicatieve kosten euro/ton	Grondstof kool	Verwijderingsrendementen micro-verontreinigingen getest?	Activatie methode
Referentie: Pulsorb WP 235	Chemviron	1.950*	Steenkool blend		stoom
Act & sorb product**	Act& sorb	>2.000	MDF afvalhout	✓	stoom
PAK C 1000 C	Carbotech	1.410	kokosnoot schillen	✓	stoom
MAR-300	Carbon Activated Europe	8.000	hernieuwbaar, onbekend	✓	stoom
WOS-PL1000	Carbon Activated Europe	7.750	hout		stoom
WHP-11	Carbon Activated Europe	11.750	hout		chemisch
Acticarbone 2SW	Chemviron	5.100	marine dennen hout		stoom
Acticarbone ENO H	Chemviron	7.250	marine dennen hout		chemisch
C-PURE®	Desotec	4.250	hout		chemisch
C-pure 200-7	Desotec		hout		chemisch
Organosorb 200-1 WB	Desotec	1.940	hout		stoom
Aquasorb G9	Jacobi carbon	2.500	hout	✓	?
AquaSorb TM XP-W	Jacobi carbon	Niet bekend	gereactiveerde steenkool (deels)		?
Oxpure 325W-10	Oxbow	vertrouwelijk	hout		stoom
Oxpure 325W-12	Oxbow	vertrouwelijk	hout		stoom
Oxpure 325W-9	Oxbow	vertrouwelijk	hout		stoom
Pyreg kool	Pyreg	Niet bekend			stoom

Reference



Possible sustainable alternatives

# Results

Criterium	Score in respect to PAC in activated sludge
Removal of micropollutants	?
CO2 footprint	++
Costs	?
Ecotoxicity	0
Resource recovery	++
Antibiotic resistance	0

# Further research

- Start november 2019
- Adsorption tests with 9 sustainable PAC's on effluent wwtp
  - Define removal efficiencies on micro pollutants
  - Compare costs and sustainability with reference PAC





**Thank you for your attention!**

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