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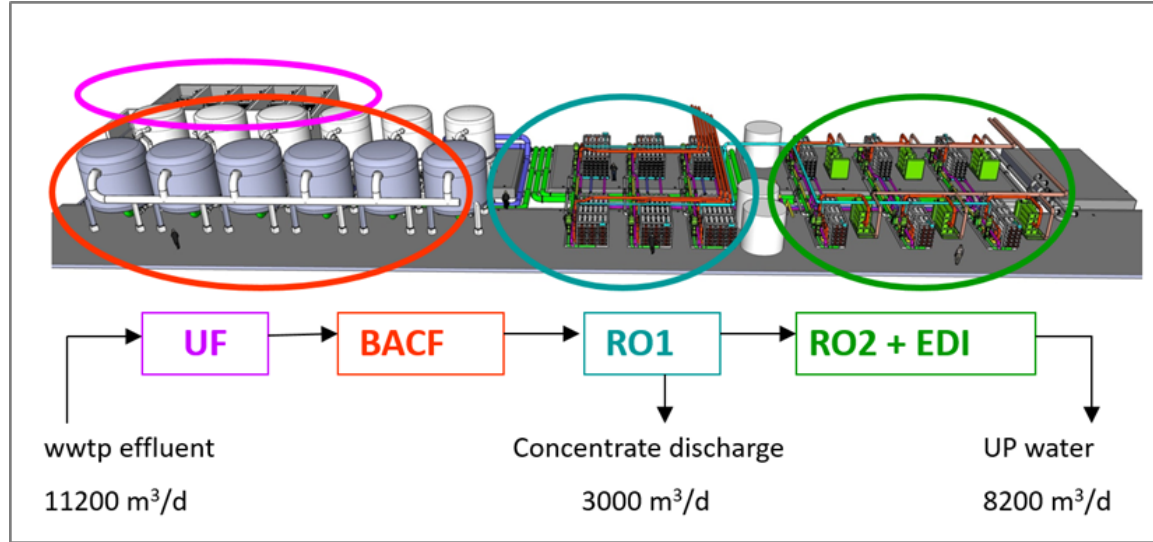
Biologically Active Carbon Flirtation



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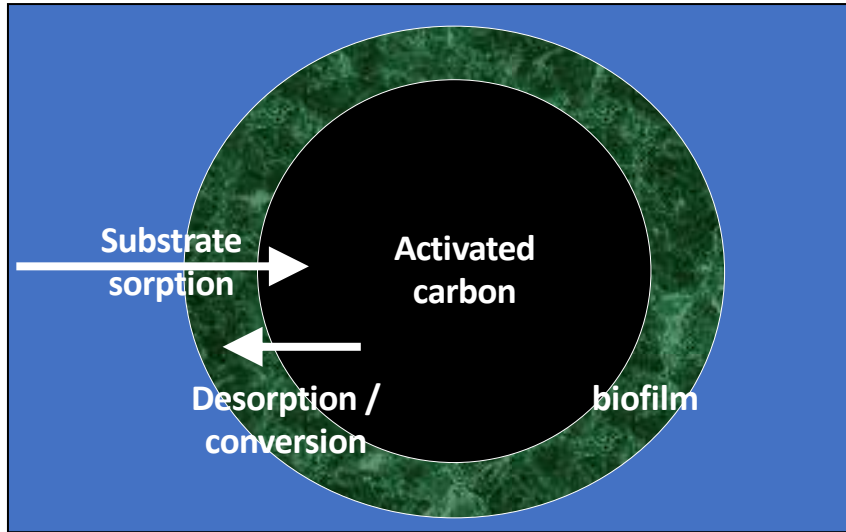
Ultrapure Water from WWTP effluent



Conductivity < 0.2 $\mu\text{S}/\text{cm}$

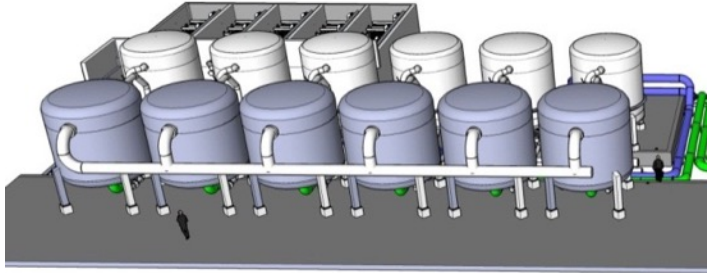
Ca, Mg, Si, Cu, Fe, Mn < detection limits

What is Biological Active Carbon Filtration ?



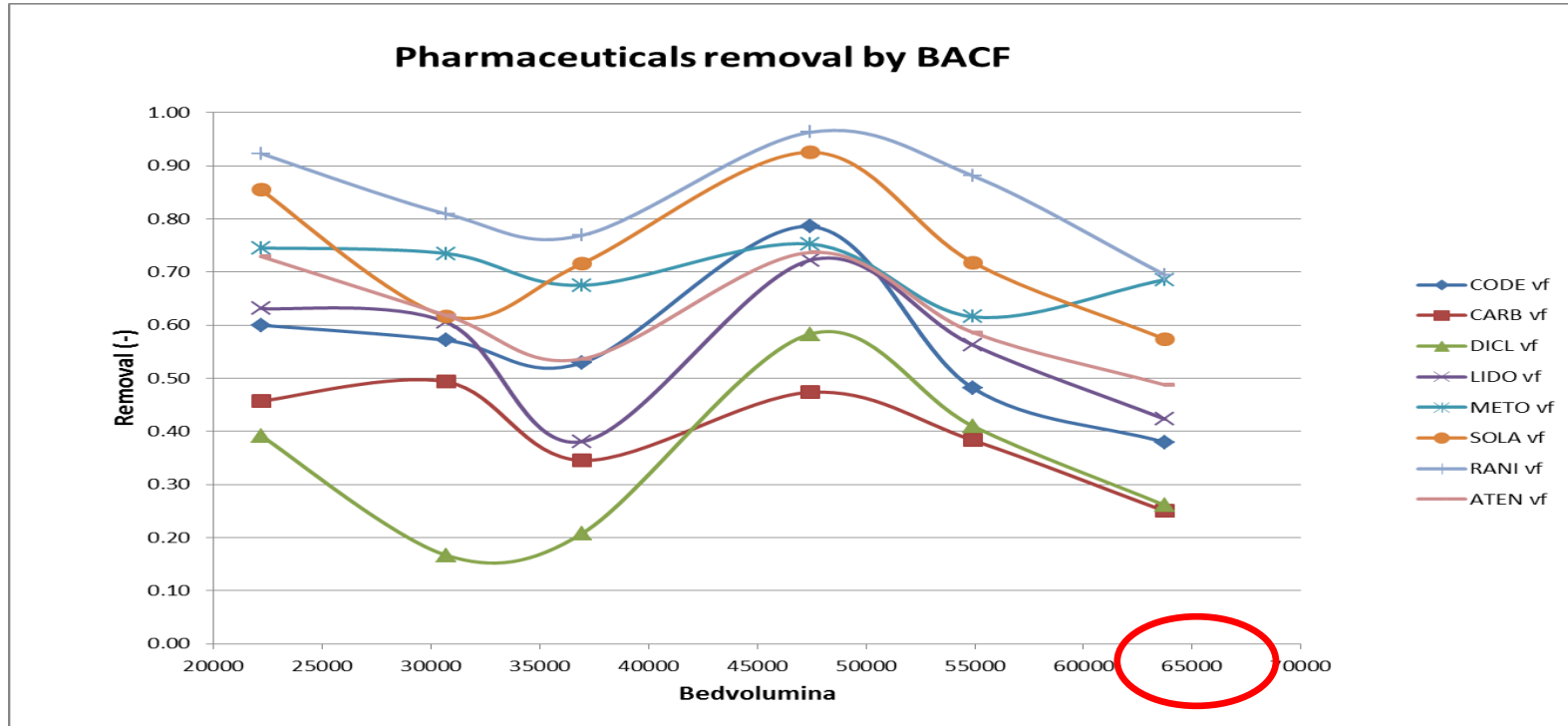
**Substrate limitation → Biologically stable water =
Biofouling control**

Biological Active Carbon Filtration

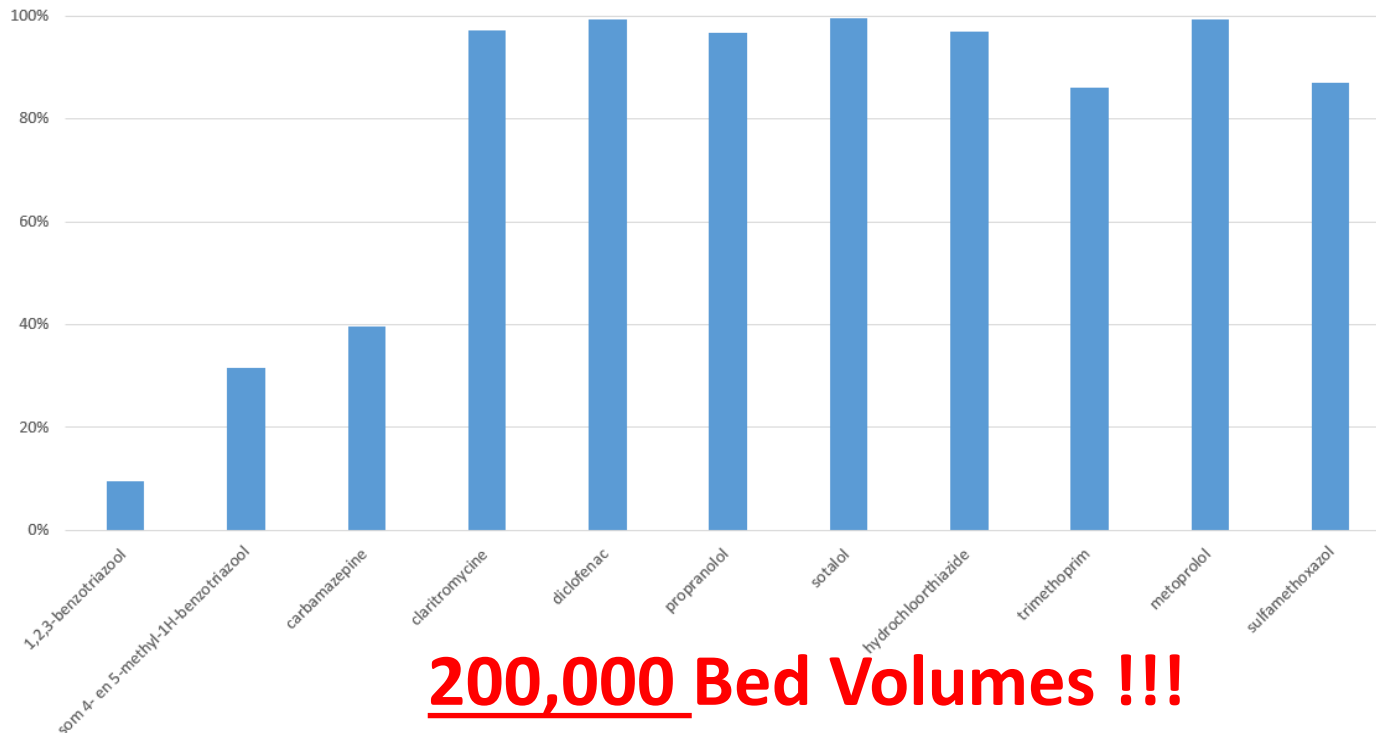


- 10 years Successfully
- Bed Volumes **200,000** !!!!
- No regeneration/ reactivation or addition of fresh Carbon

Pharmaceutical removal BACF 2010 - 2012

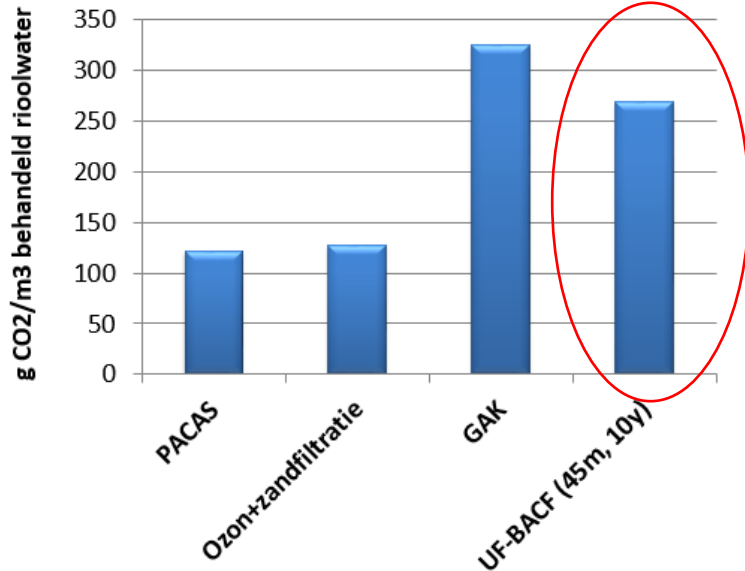


Pharmaceutical removal BACF 2019

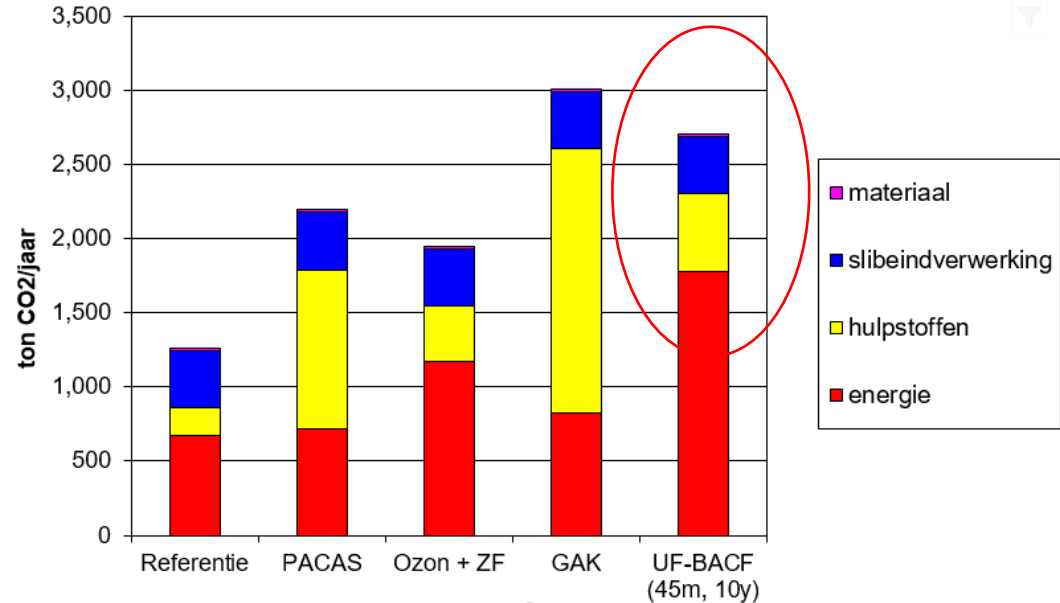


Carbon Footprint UF – BACF (100,000 PE)

CO2 footprint verwijdering micro's

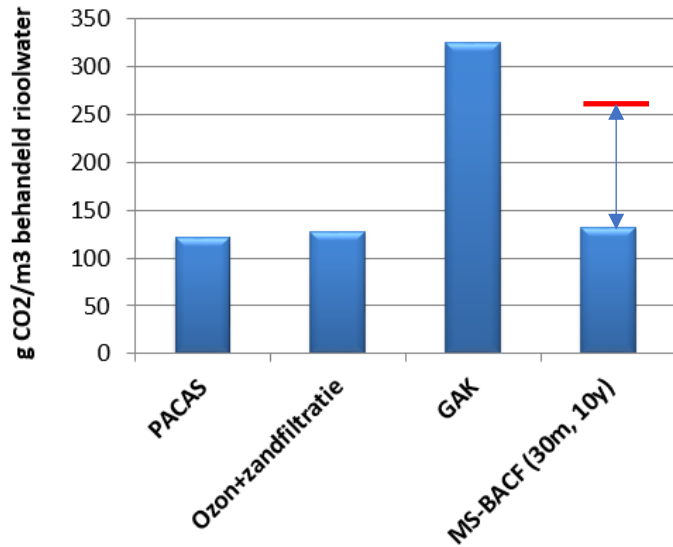


CO2 footprint totale rwzi inclusief verwijdering micro's

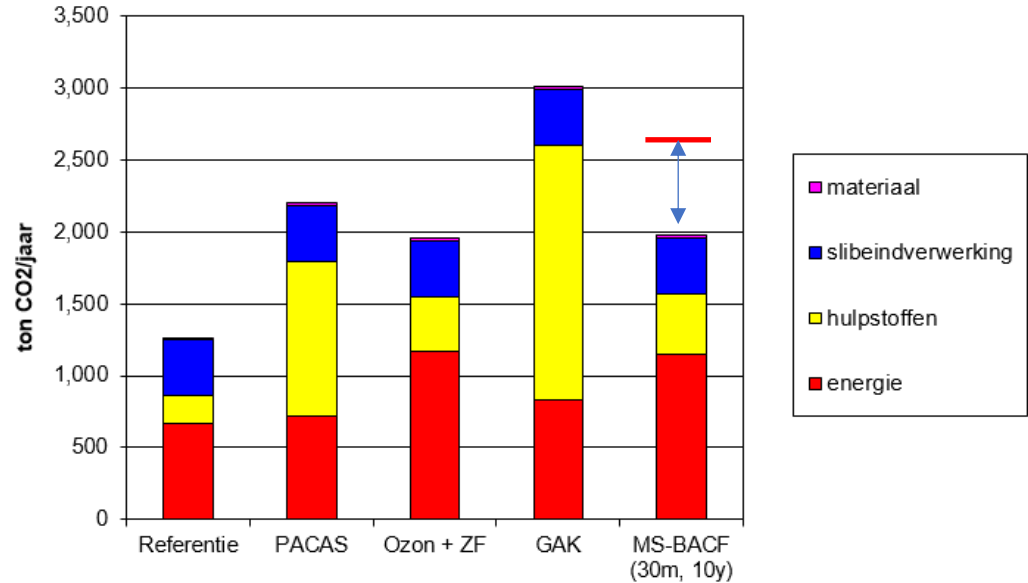


Carbon Footprint MS – BACF (100,000 PE)

CO2 footprint verwijdering micro's

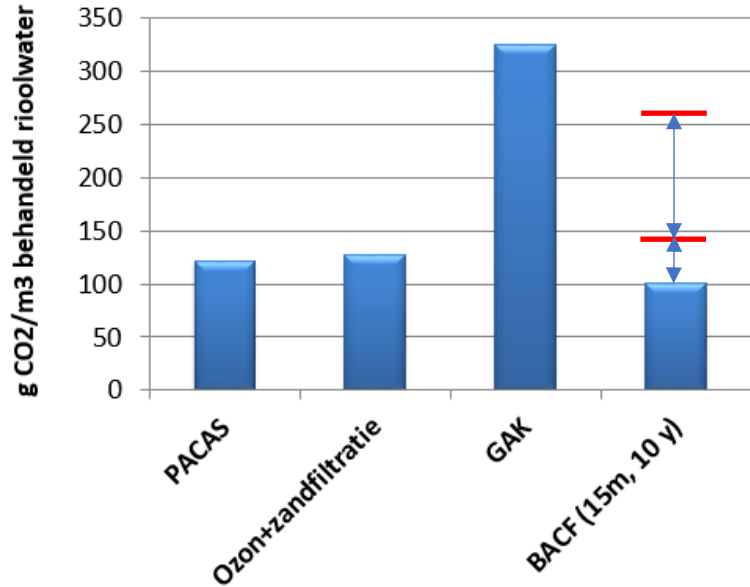


CO2 footprint totale rwzi inclusief verwijdering micro's

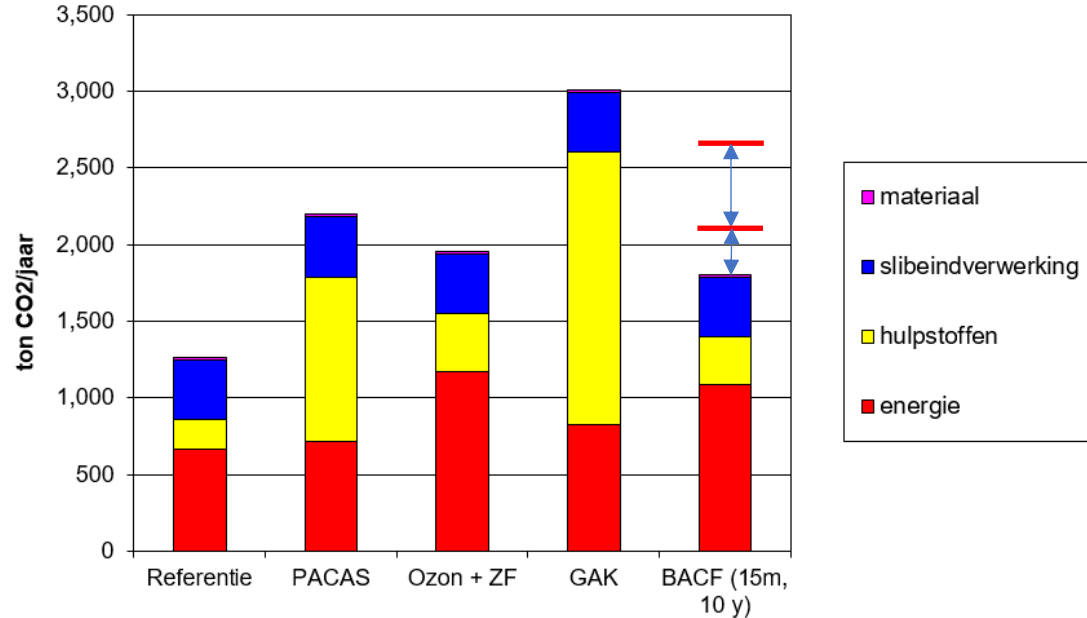


Carbon Footprint optimized BACF (100,000 PE)

CO2 footprint verwijdering micro's



CO2 footprint totale rwzi inclusief verwijdering micro's



Costs indication BACF (100,000 PE)

Ultrafiltration + BACF : 0,25 -0,27 €/m³ (Current , 200.000 BV)

Micro Sieve + BACF : 0,15 – 0,17 €/m³

Optimized BACF : 0,13 – 0,14 €/m³

Reference GAC : 0,26 €/m³



Overview

	Units	PACAS*	Ozone +SF*	GAC*	UF- BAKF (10 years AC)	MS –BACF (10 years AC)	BACF (10 years AC)
CO2 footprint	ton /year	2198	1953	3009	2707	1974	1805
Costs	€/m ³	0,05	0,17	0,26	0,25-0,27	0,15-0,17	0,13-0,14
Removal eff	%	70-75	80-85	80-85	90-95	90-95	90-95

1. **UF-BACF** : High removal not optimized for pharmaceutical removal from WWTP effluent
2. **MS-BACF** : Robust optimized concept
3. **BACF** : Further optimized concept

* Source: STOWA guidelines



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