



# SMART-Plant

*Scale-up of low-carbon footprint  
material recovery techniques in existing  
wastewater treatment plants*



## SCEPPHAR

*sidestream*

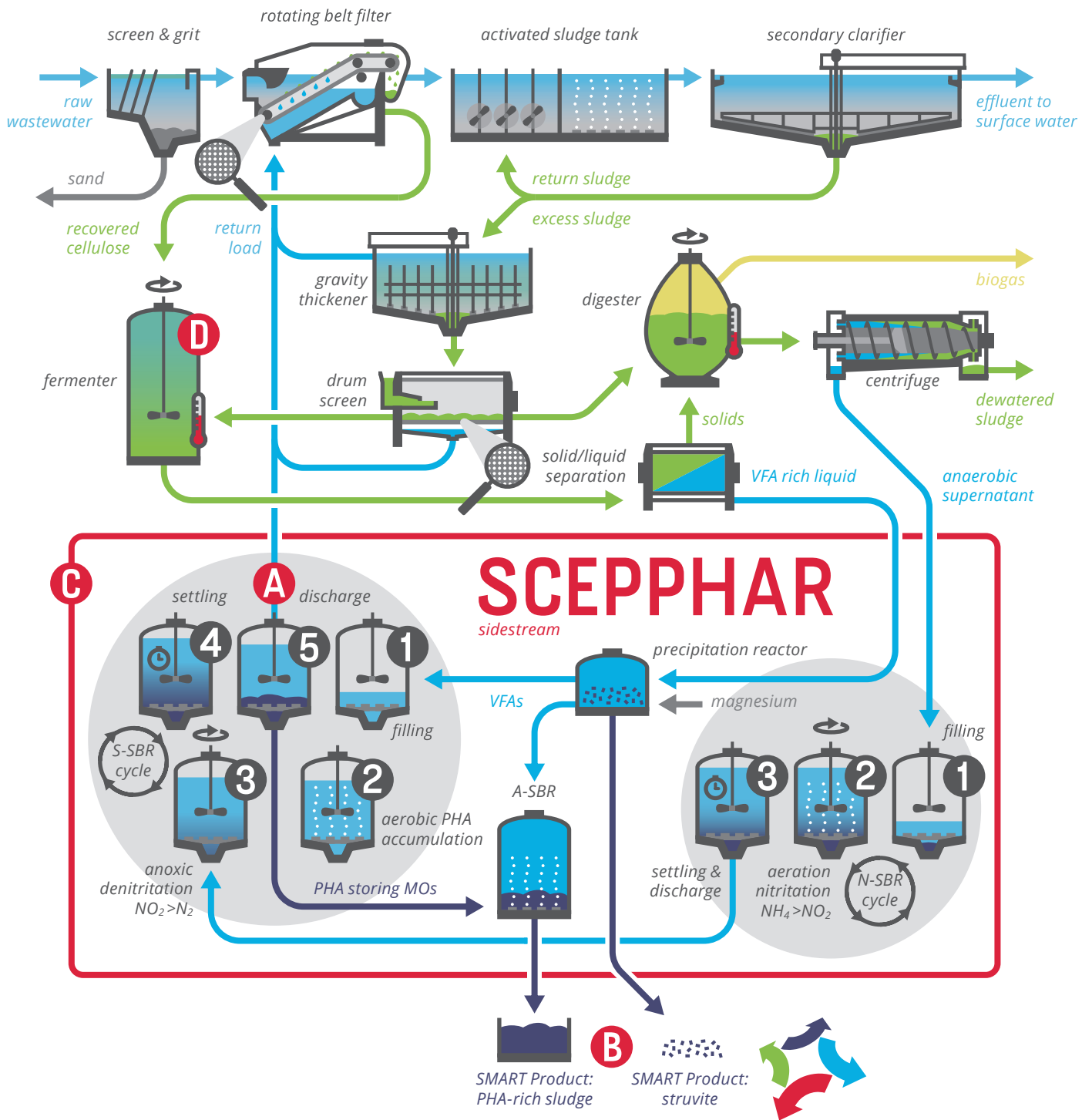
*Removal and recovery of nutrients and  
biopolymer production in sidestream*

The sidestream SCEPPHAR (short-cut enhanced phosphorus and PHA recovery) process was developed by the University of Verona to treat sludge liquor, which is highly loaded with nutrients nitrogen (N) and phosphorus (P). The process achieves up to 85% N removal, enables the recovery of phosphorus as struvite and produces a sludge enriched with biopolymer (PHA). In addition, it decreases the energy costs for sidestream treatment by up to 20%.

The system is tested in pilot scale at the wastewater treatment plant of Carbonera (Italy), treating 4-5 m<sup>3</sup> of sludge liquor per day. The carbon source for optimised biopolymer production is produced on-site by fermentation of cellulosic sludge, which is recovered from raw wastewater

using a rotating dynamic filter. The recovered struvite can be used as P-based fertilizer while the PHA content in the biomass achieves up to 50% on dry weight basis.





### Unique Selling Points

- A** High effluent quality due to effective N removal from sludge liquor
- B** Recovery of valuable products (PHA, struvite)
- C** Reduction of energy and operational costs
- D** Carbon source (VFA) for PHA production is gained in the process

	conventional treatment	SCEPPHAR
P Removal	Chemical	Chemical
N Removal	Nitrification + Denitrification with external C Source	Nitritation + Denitrification
Products	None	Struvite + PHA-rich Sludge