

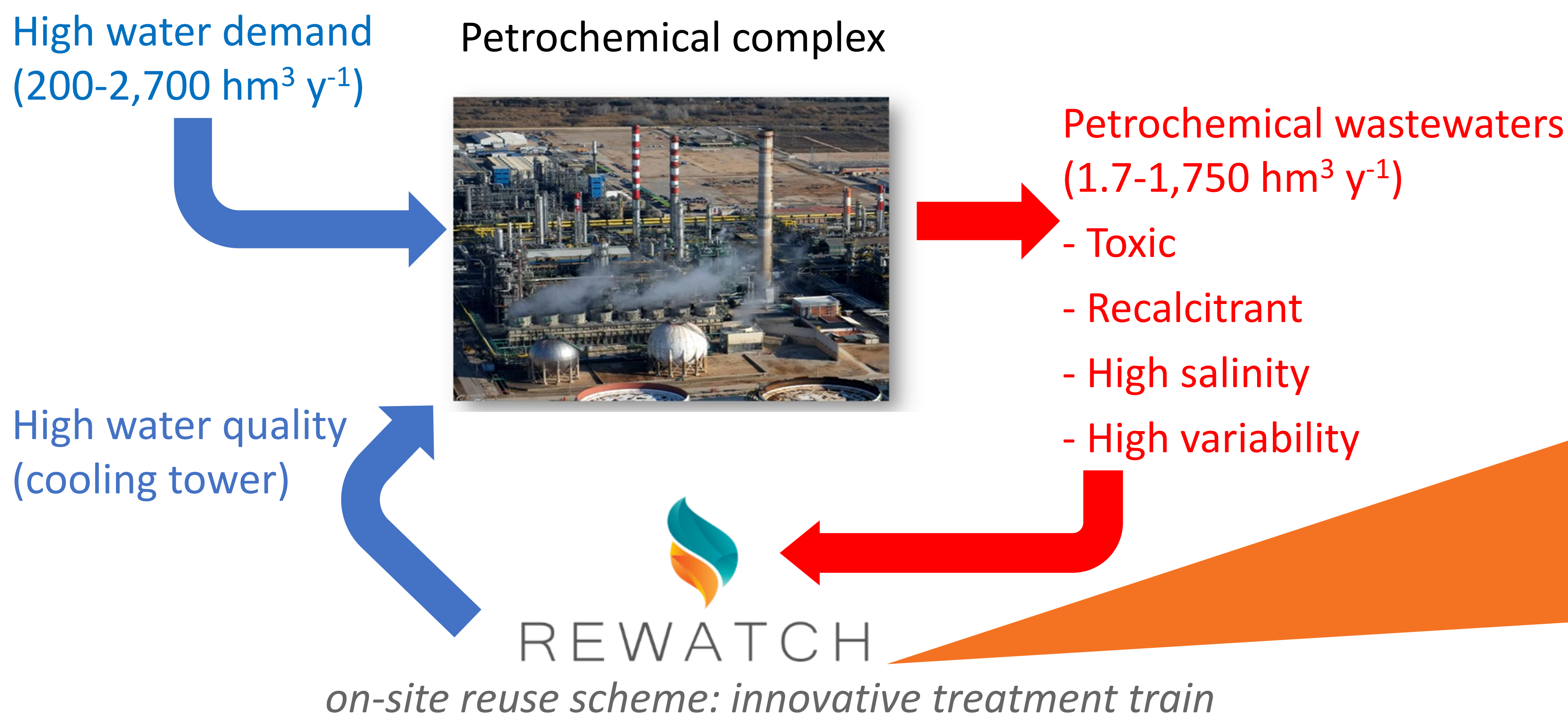
Towards an innovative process for wastewater treatment and reuse in the petrochemical industry

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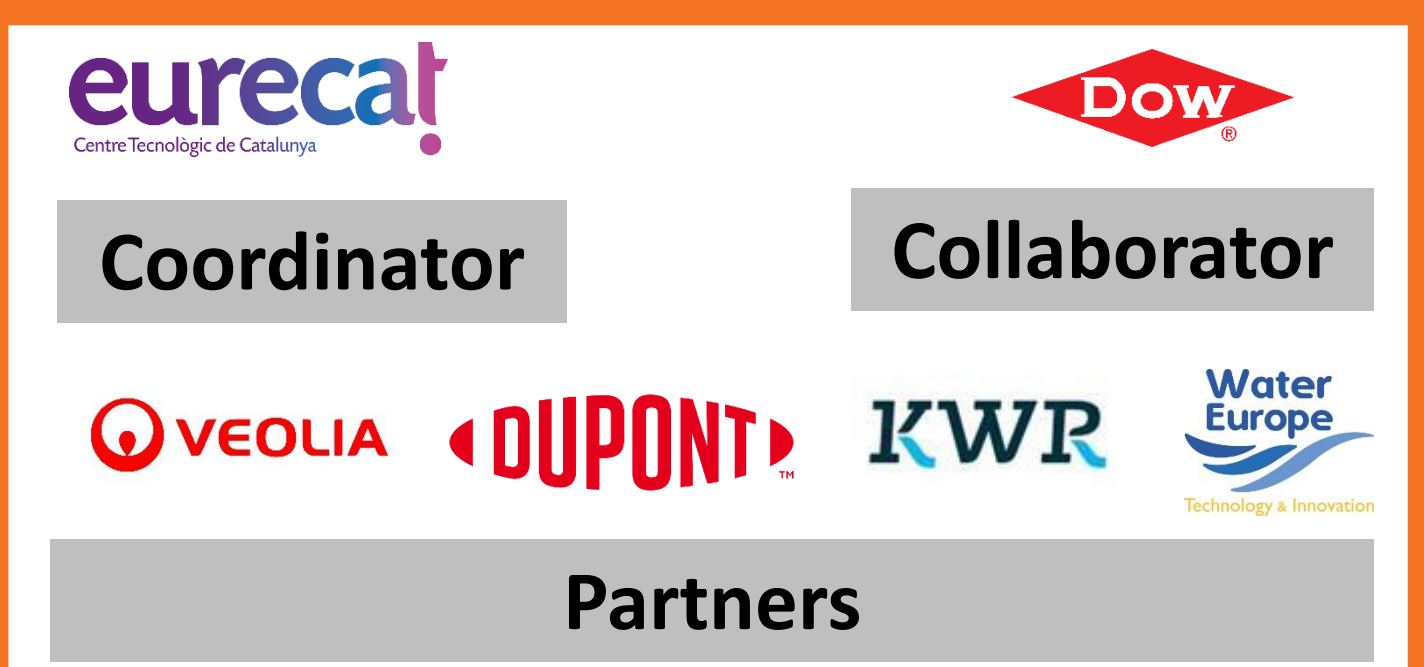
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1. Introduction



Project title:

REWATCH - Demonstration of an innovative recycling scheme to increase the water efficiency in the petrochemical industry



Funding program/identifier: LIFE15 ENV/ES/000480

Budget of the Project: 2,645,765 €

Objective of this study: to demonstrate and validate, at pilot scale and with real wastewater, the technical, economical and environmental feasibility for implementation of an innovative treatment system in the petrochemical sector for on-site water reclamation.

2. Materials and methods

- Demo site: Dow Chemical Ibérica's (DCI) petrochemical complex in Tarragona (Spain)
- 5 stages for on-site water recycling: (i) coagulation-ballasted flocculation, (ii) MBBR, (iii) UF, (iv) FM and (v) RO

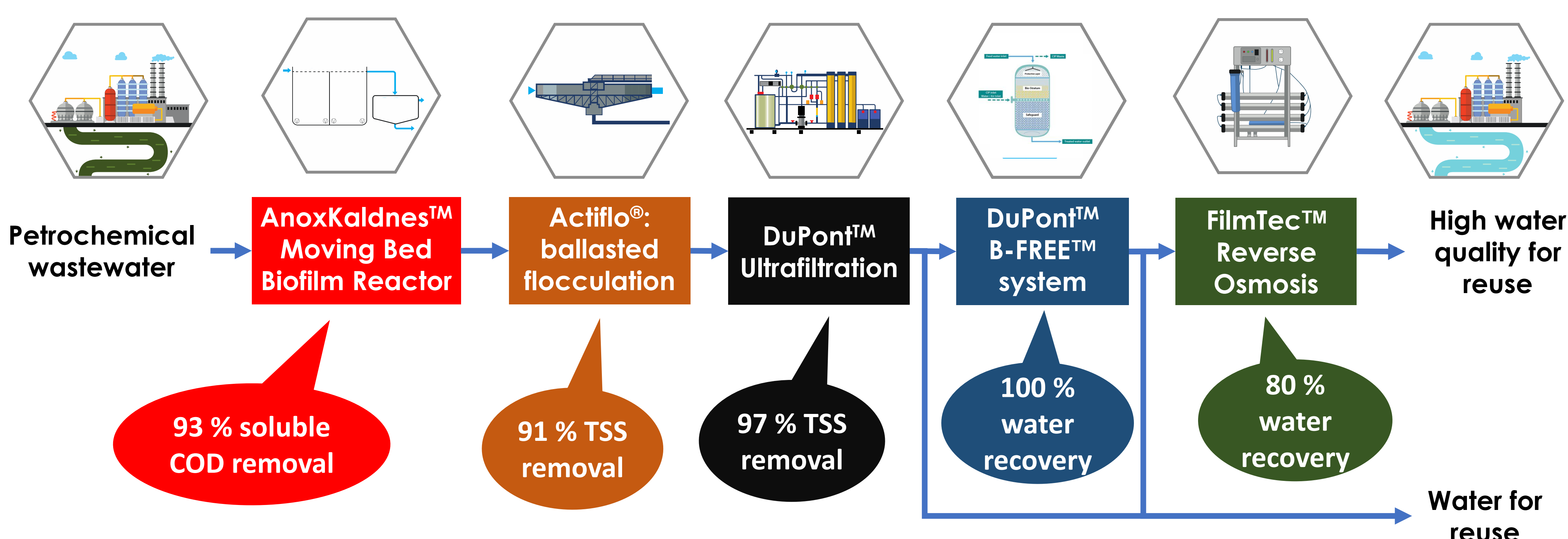


Treated wastewater: from olefins steam cracker and octene plant

Total COD (mg O ₂ L ⁻¹)	Soluble COD (mg O ₂ L ⁻¹)	BOD ₅ (mg O ₂ L ⁻¹)	pH	EC (mS cm ⁻¹)	TSS (mg L ⁻¹)	PO ₄ ³⁻ (mg L ⁻¹)	Total N (mg L ⁻¹)	NH ₄ ⁺ (mg L ⁻¹)	NO ₂ ⁻ (mg L ⁻¹)	NO ₃ ⁻ (mg L ⁻¹)	Turbidity (NTU)	T (°C)	Ca (mg L ⁻¹)	Alkalinity (mg CaCO ₃ L ⁻¹)	SO ₄ ²⁻ (mg L ⁻¹)
958.6	824.9	655.6	7.3	2.8	69	3	10	0.4	0.6	1.2	67.6	30.1	296.4	147.7	1097.5

3. Results and discussion

315 days of operation and average values obtained at steady state conditions.



Parameter	Cooling Water	RO Permeate (Average)
TSS	< 5 ppm	< 0.5 ppm
Conductivity	< 2000 μS/cm	91.2 μS/cm
Sulphates	< 300 ppm	1.20 ppm
Calcium	< 350 ppm	0.50 ppm
TOC	< 15 ppm	6.04 ppm
COD	< 20 ppm	15.09 ppm

Water recovery: 60 %

4. Conclusions

- Robustness of the combination of the technologies against the complexity and variability of the wastewater was proved.
- With the proposed technology is possible to treat, recycle and reuse the wastewater from the petrochemical industries into the same facility, achieving water for cooling towers.
- Full-scale implementation of this process would represent around 25 % reduction of their annual freshwater consumption.
- All the applied technologies are available for implementation, indicating that the process can be easily implemented in other petrochemical industries.