



demEAUmed technological solutions

Smart Air MBR



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Outline



1. The technology
2. Objectives
3. The pilot plant
4. Resume of results
5. Application into the tourism and water market

Go and check the poster for more details!



1. The technology

MBR: Combination of a conventional activated sludge bioreactor and a membrane filtration system (MF/UF)

- Very high effluent quality
- Compact
- Automated



WATER REUSE DECENTRALIZED SYSTEMS



- High energy consumption

1. The technology

MBR: Combination of a conventional activated sludge bioreactor and a membrane filtration system (MF/UF)

Innovation: air-scour control system based on permeability trend. Previous results demonstrate energy savings (up to 22%) in **municipal wastewater treatment**, minimizing fouling and keeping or improving nutrient removal efficiencies



Smart Air MBR
Air-scour Control System

Ferrero *et al.*
ES2333837 Spanish Patent, 2010

2. Objectives

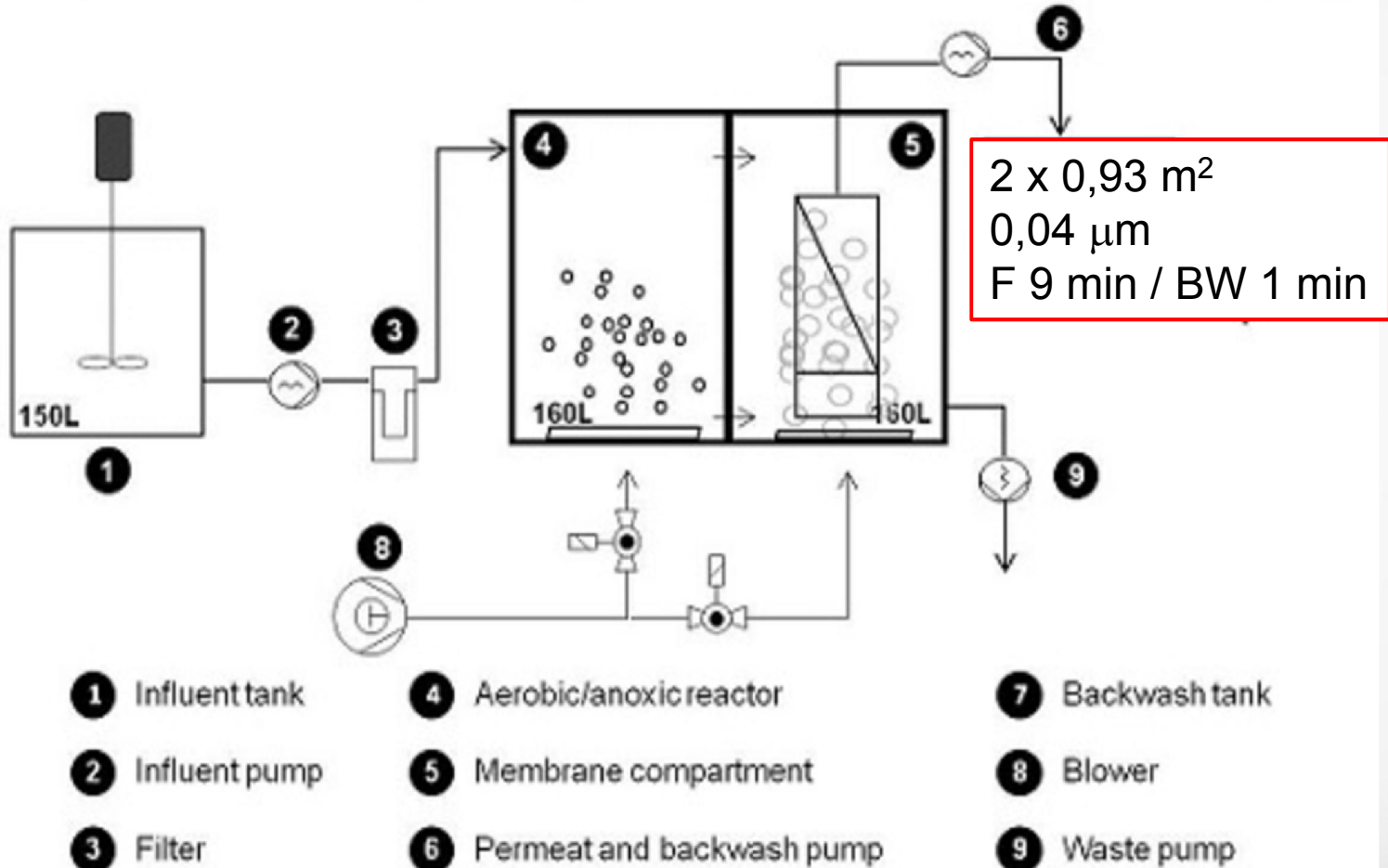
- Validate/demonstrate smartAir MBR at the hotel
- Removal efficiencies (fouling, cost)
 - organic matter
 - nutrients
 - microbial indicators
 - micropollutants (14 PhACs & 13 EDCs)
- Grey water? Black water? Water from other uses?
- Single/integrated system



3. The pilot plant

SCADA (Supervisory Control And Data Acquisition)

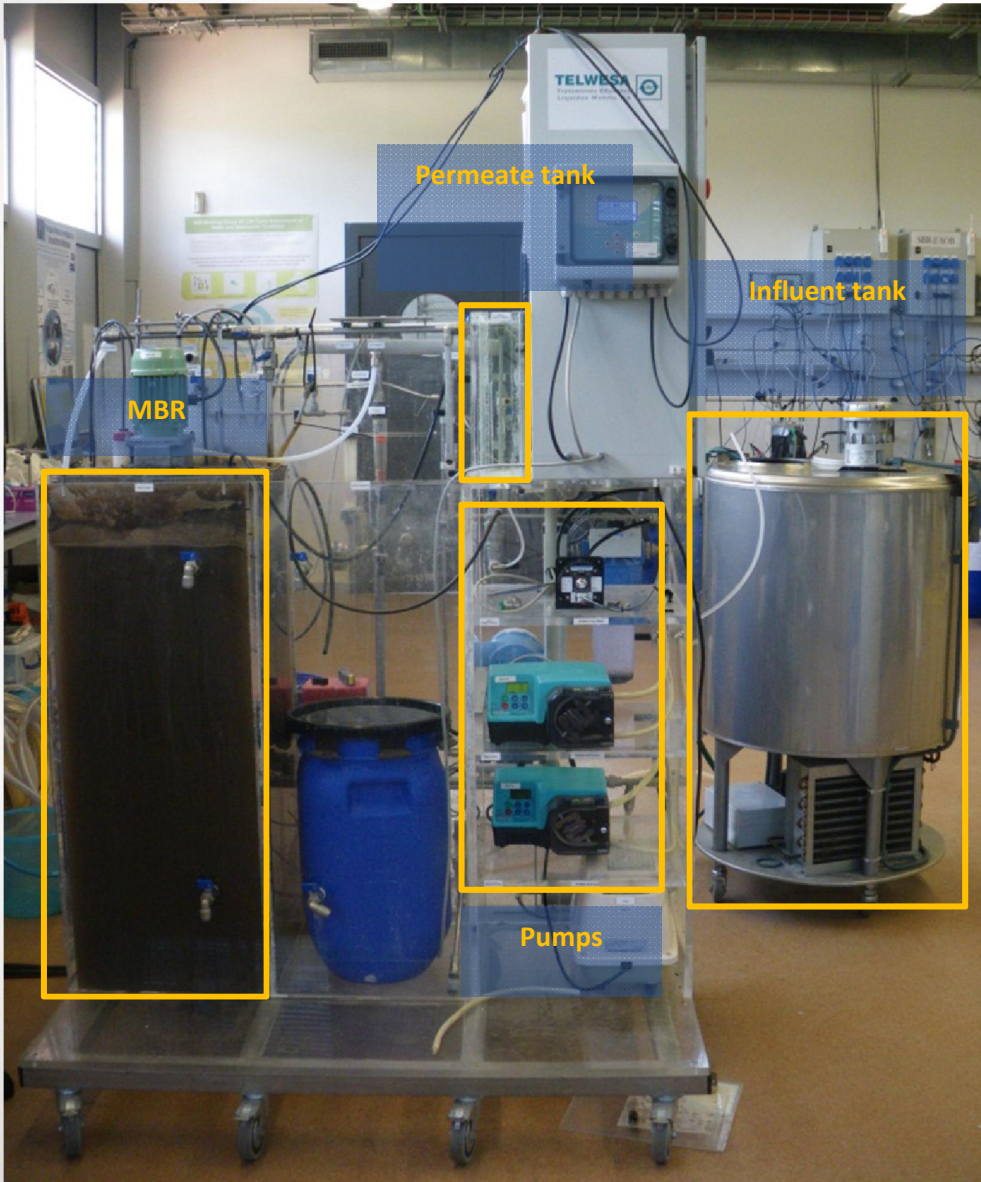
TMP, pH, temperature, dissolved oxygen, flows, pumps...
SmartAir MBR



3. The pilot plant

In the lab (ICRA)

Synthetic water
 Shower and laundry
 14 months



- 20-30- 40 L/h
- 10-15-20 LMH
- HRT 4-8 h
- SRT 20-22 d
- Air scour 3,5 m³/h

3. The pilot plant

In the demo site (Samba)

Real water from the hotel:
Grey water (shower, 8 months)
Wastewater (2 months)

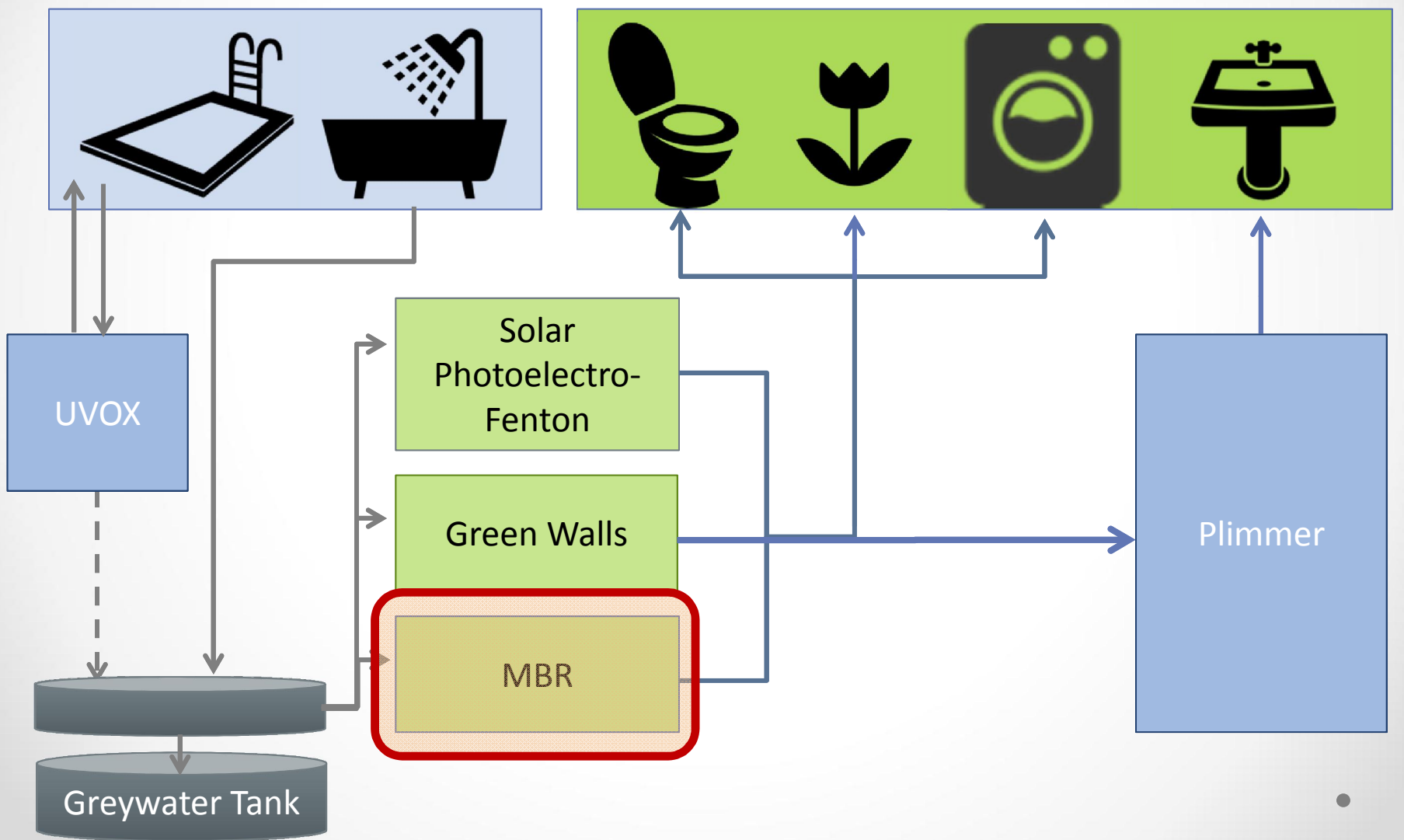
- 20-30- 40 L/h
- 10-15-20 LMH
- HRT 4-8 h
- SRT 20-22 d
- Air scour 2 - 3,5 m³/h



Greywater – ROADMAP

SOURCE

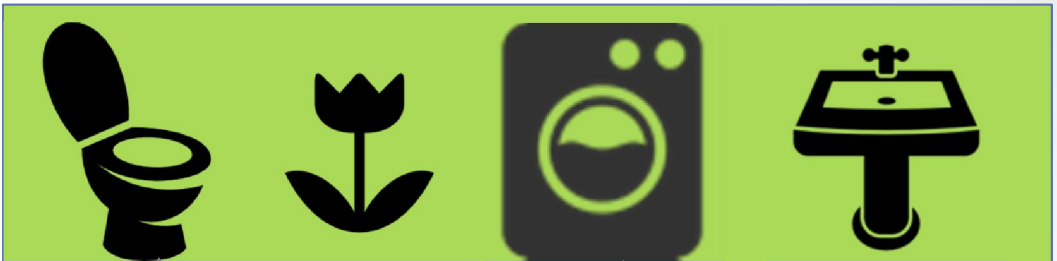
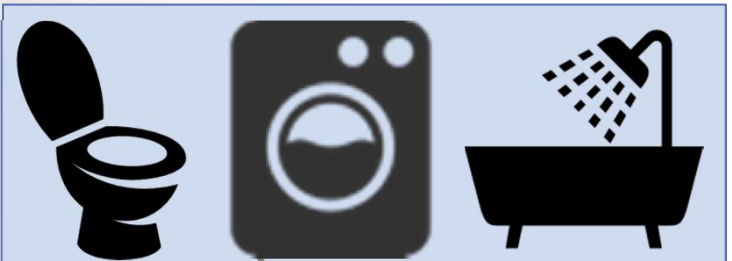
REUSE



Wastewater – ROADMAP

SOURCE

REUSE



Pump + TANK

Electrocoagulation
flotation

MBR

UV-172 nm

Electrochemical
ozonation

Plimmer

4. Resume of results

GREY WATER (Samba Hotel)

~ 90% removal of COD

~ 95% removal of BOD5



~ 89% removal of TKN and NH_4^+ (nitrification)

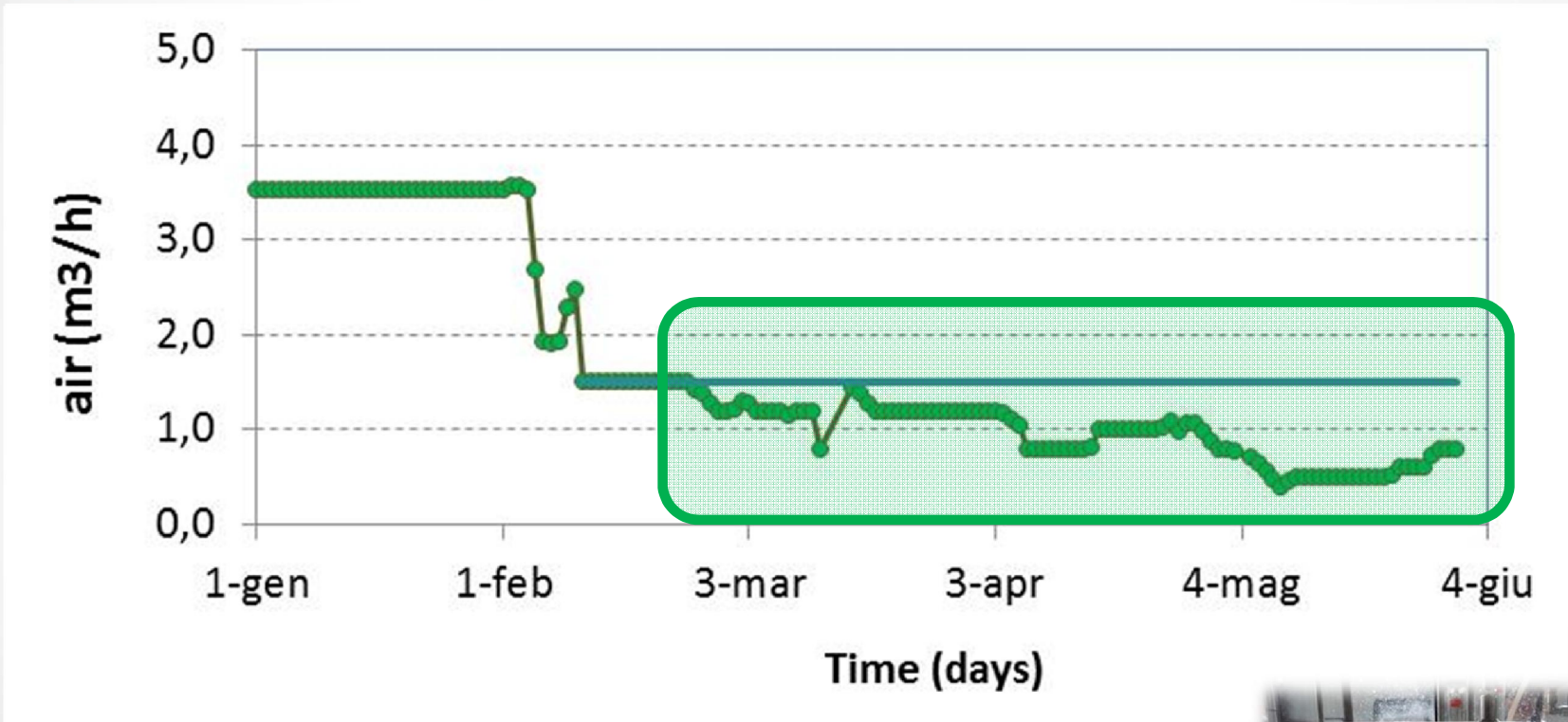
$\leq 5 \text{ mg/L NO}_3^-$

No removal of P

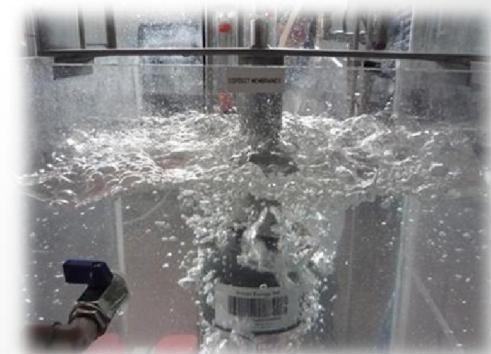
Pathogen removal between 3 and 5 logs

High (but variable) removal of micropollutants

4. Resume of results



- ~ 35,2% or air saving
- ~ SAD reduced from 0,75 to 0,27-0,45
- same fouling
- same removal efficiency



5. Application into the (tourism) market

Where can it be applied?

- **greywater effluents (shower and laundry)**
- **wastewater (or black) effluents (domestic and industrial)**

Who may be interested?

- **water scarcity (Mediterranean area)**
- **high water quality required**
- **high water cost**
- **irrigation of recreational areas**
- **toilet flushing**
- **Decentralized areas**

New €Directive



Thank you for your attention



For further information:

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