

Sustainable Projects Engineering

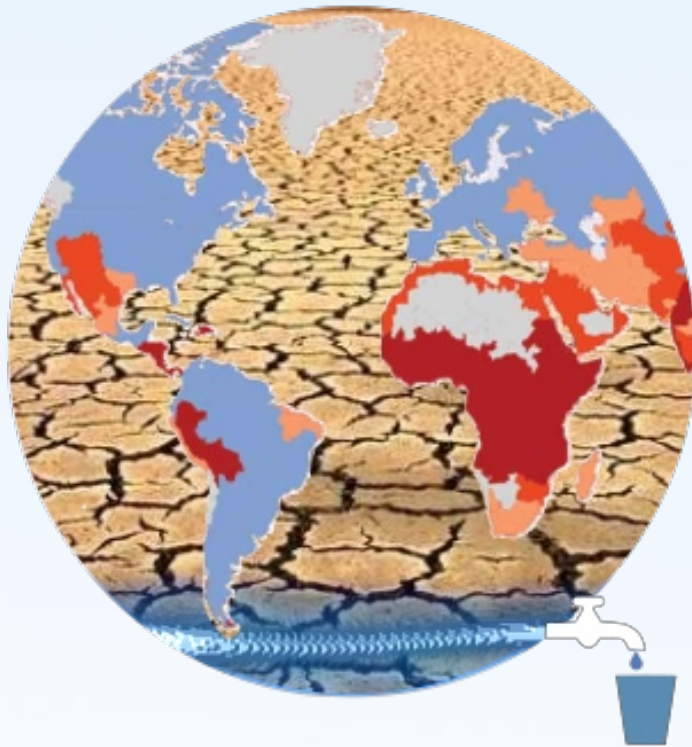
Zero Emission Technologies



WASTEWATER PURIFICATION

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1. Paradigm Change



**HUMAN GENERATION OF
WASTEWATER HAS EXCEEDED
EARTH'S NATURAL CAPACITY**

**IS OUR HUMAN
RESPONSABILITY
TO RESTORE ITS
NATURAL CAPACITY**



2. WWTP Risks

It generates Pestilent Odors (VOC) reaching 10 km around and being infection focus

Treated Byproducts disposal area after 3 years operation at 40% capacity.

Bio Digesters burn methane, also CO₂ producers

Denitrificadores generadores de Oxidos Nitrosos



Actually PTAR just operates at 40% of its full capacity (2018)

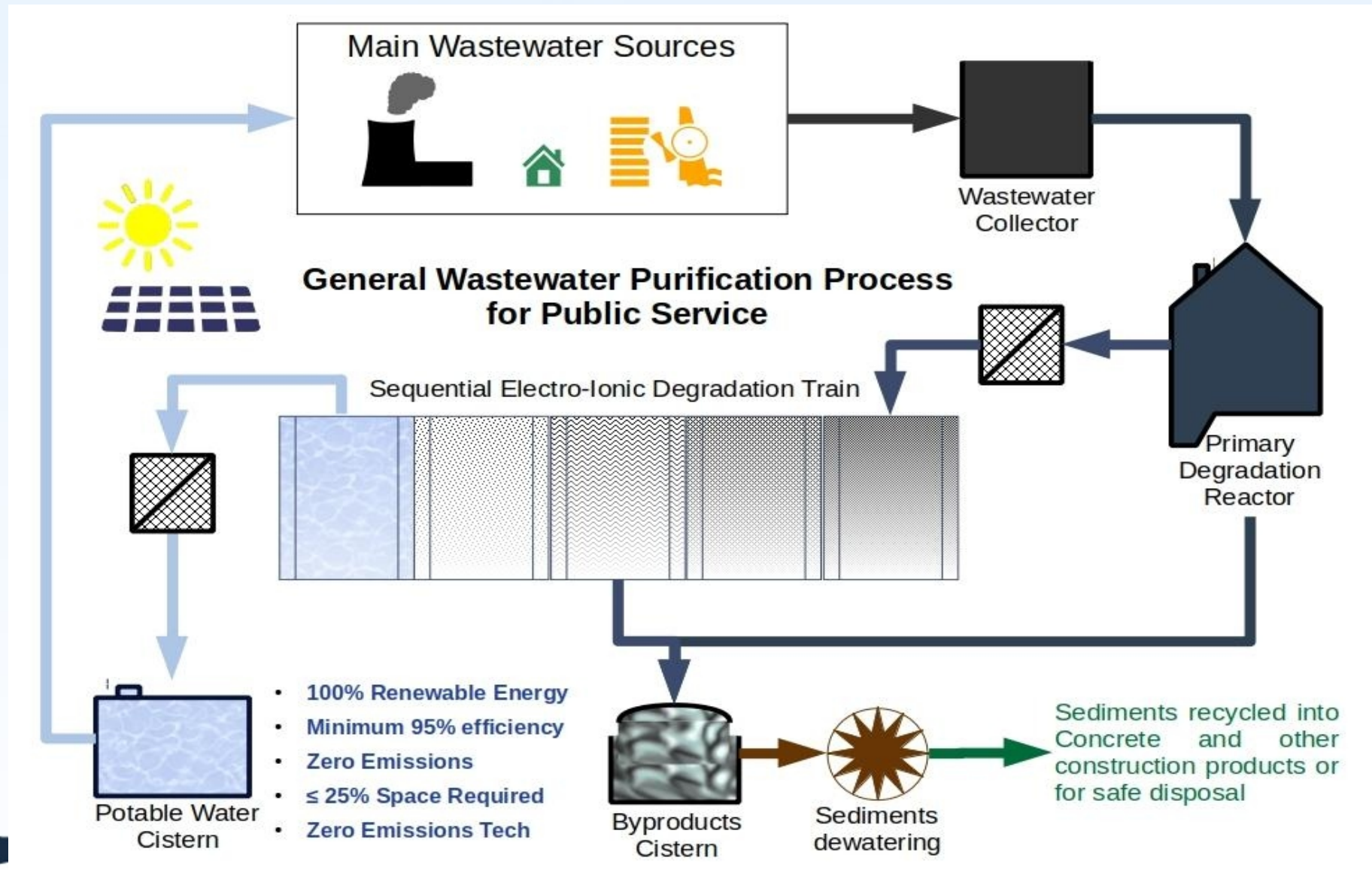
Coagulators generate methane, and Sand Removers are CO₂ emissions

Atotonilco's 23 m³/sec WWTP 2014

3. Re-Purification of Wastewater

- ✓ Reliable Operation, Profitable y 95% efficient
- ✓ Zero Emissions for Air, Soil, Noise neither Odors
- ✓ Low Operating Costs less than 70%
- ✓ 100% commitment of international Water Drinking Standards
- ✓ Built-in solution for Sustainable Development Goals Water agenda (SDG#6)

4. Re-Purification Cycle



5. Purification and Treatment Plants



Chiapas State 1,100 m³/día



Mexico State 100 m³/día



Mexico City 100 m³/día



O&G Refinery WWTP



Fabric Plant 5,400 m³/día

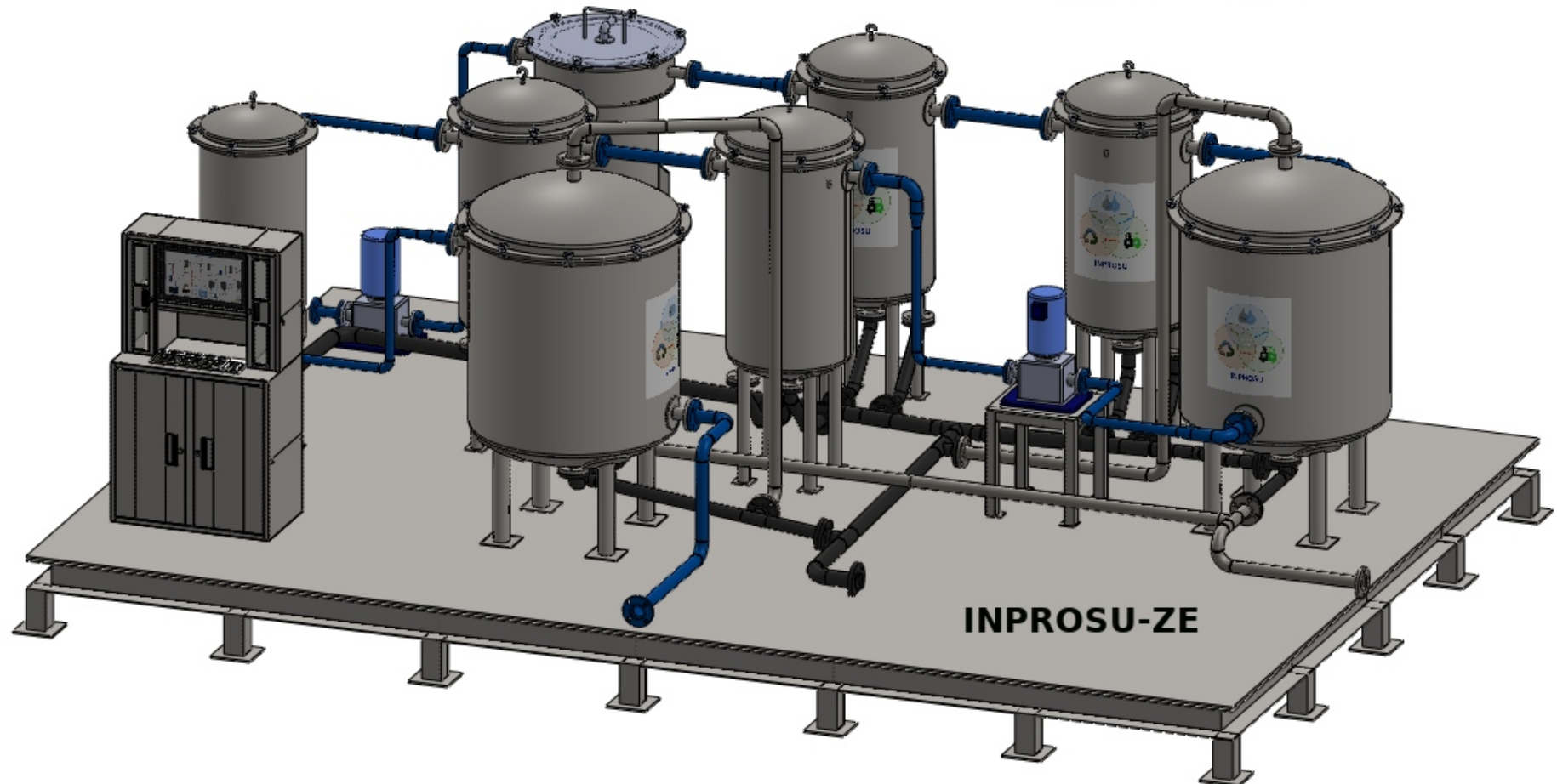


Offices 75 m³/día

Note: Partner Plants FI-EGC

6. Standard WWPS Industrial Model

Industrial Wastewater Purification Plant
1 Ips Standard Model



7. Performance Comparison

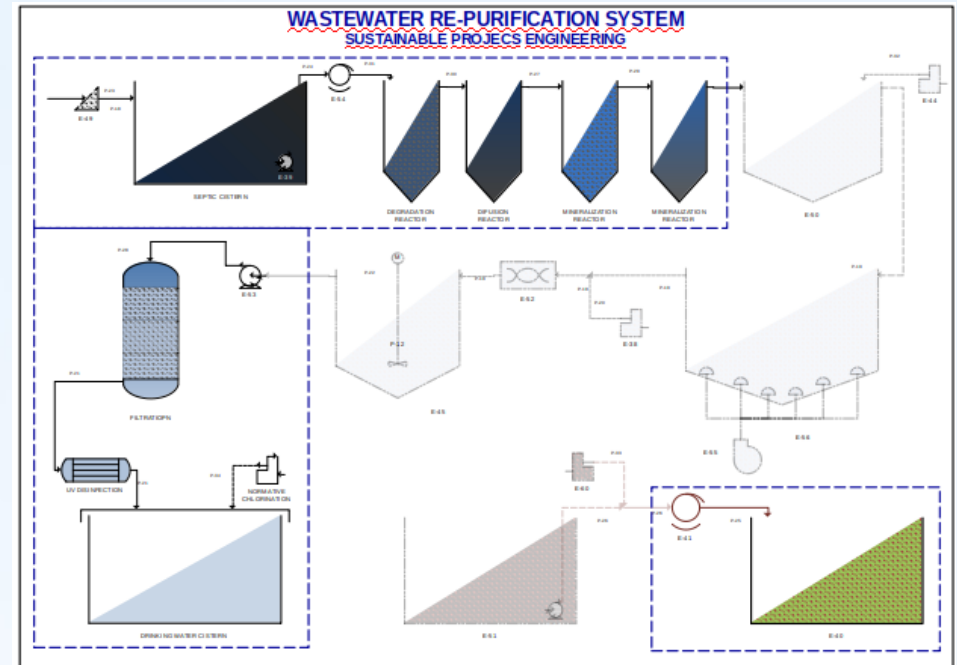
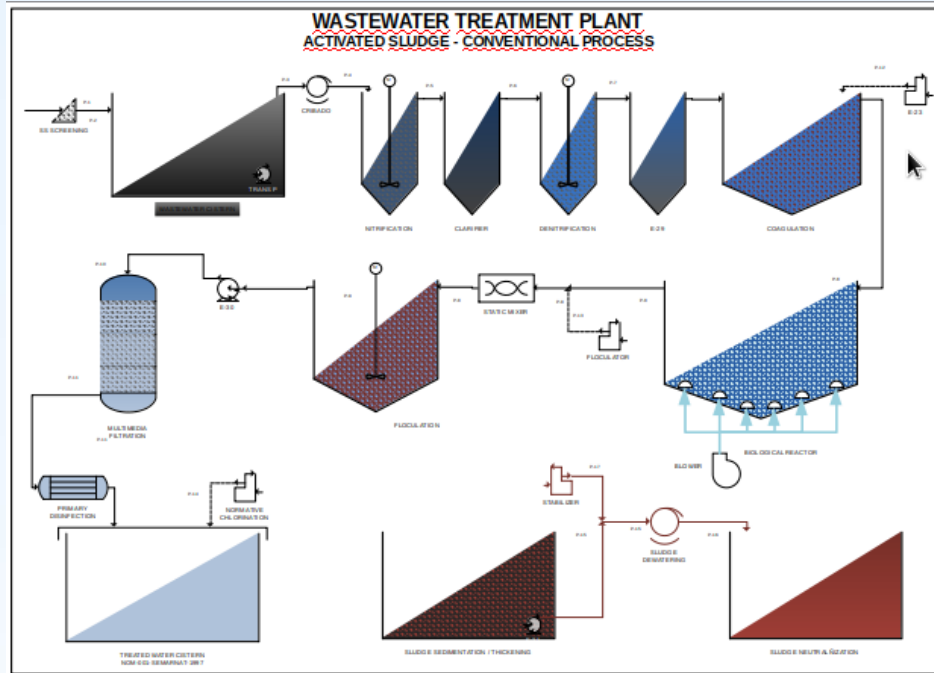
| PARAMETER | CONVENTIONAL WASTEWATER TREATMENT PLANT | ADVANCED OXIDATION TREATMENT |
|---|---|---|
| INFLUENT WASTEWATER QUALITY | CONSTRAINED TO HIGH CONTAMINATED < 800 DBO | ANY CONTAMINATION DEGREE EVEN O&G, PATHOGENIC OR RADIOACTIVE |
| EFFLUENT QUALITY | JUST TREATED FOR IRRIGATION | POTABLE WATER |
| POWER CONSUMPTION | 12.0 kW/m ³ | 1.4 kW/m ³ - RENEWABLE ENERGY |
| REACTIVE DOSING | CHEMICAL AND BIOLOGICAL | NOT REQUIRED |
| OPERATING & MAINTENANCE COSTS | ~\$55,000 USDLS/YEARLY | < \$20,000 USDLS/YEAR |
| INVESTMENT COSTS (US\$/LPS) | \$35,000 a \$75,000 | \$150,000 a \$300,000 |
| REQUIRED AREA (m ² /LPS) | 100 - 120 m ² /LPS | 18 a 36 m ² /LPS |
| FACILITIES CONFIGURATION | HORIZONTAL | HORIZONTAL AND VERTICAL |
| AUTOMATION LEVEL | AUTOMATED | FULLY AUTOMATED |
| BY-PRODUCTS QUALITY | HAZARDOUS SLUDGE | RECYCLABLE INERT SEDIMENTS |
| BY-PRODUCTS TREATMENT COSTS | TOO HIGH | NOT REQUIRED |
| PLANT AVERAGE LIFE TIME | 25 YEARS | 50 YEARS |
| HEALTHY | PESTILENT AND NOISY | NOT ODORS AND NEGLECTED NOISE |
| GREEN HOUSE GASES (TON CO ₂ e/LPS) | 0.72 TON CO ₂ e/LPS aprox. | ZERO EMISSIONS |

8. Another Advantages



- **Global Warming Reduction**
- Committed Wastewater Purification EPA Standards
- WWP Plant scalable, re-configurable
- More Employments Generation: > 1 job/lps
- Easy Maintenance and Very Low Service Cost
- Inert By-products, recyclable or safe disposable
- Candidate for NAMA Clean Development Mechanism

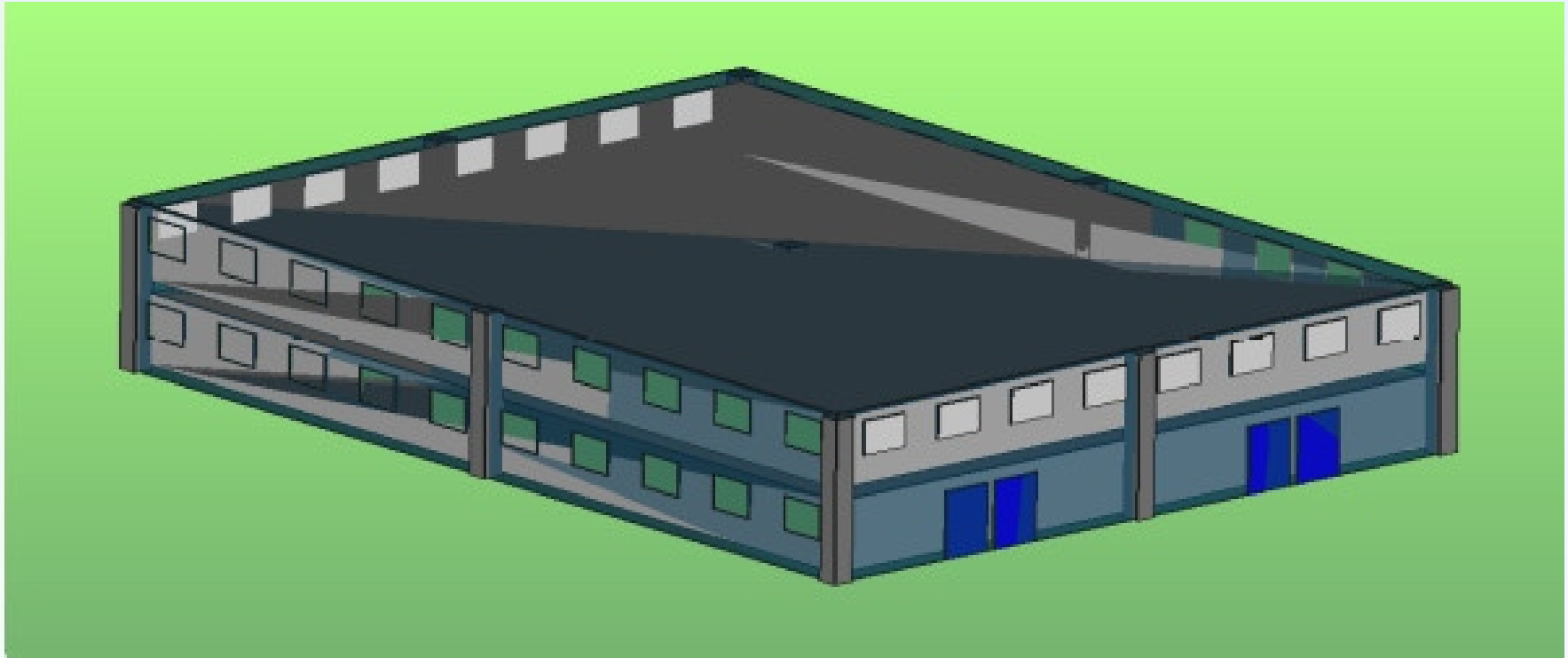
9. Comparison between WWTP vs WWPP



WWPS DIFFERENCES:

- Non Rotating Equipment
- Not Blowing System – none Bio-solids
- Non Bio-solids – Less CO₂e
- 1/3 to 1/5 of required space

10. Conceptual WWPS Plant



Conceptual Wastewater Purification Plant for 1 m³/s; 25,000 m².

Ingeniería en Proyectos Sustentables

Zero Emission Technologies

Wastewater Purification System

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