



Reducing Biological Landfill Leachate Footprint via Rapid Electrochemical-UV Treatment

Identifying the Current Treatment **Problems**

Problem 1

Source: Landfills

Leachate treatments demand **large** footprints and **long** retention times



Problem 2

Treated Effluent

The **toxic** leachate is mixed with sewage, posing health risks



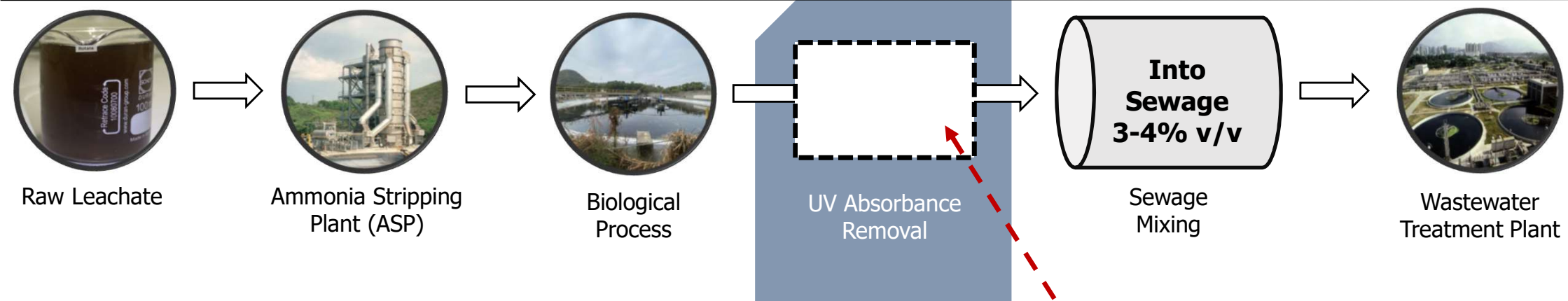
Problem 3

Downstream Treatment

Untreated refractory organics in leachate **absorb** UV, **increasing** disinfection cost and **decreasing** UV lamp life



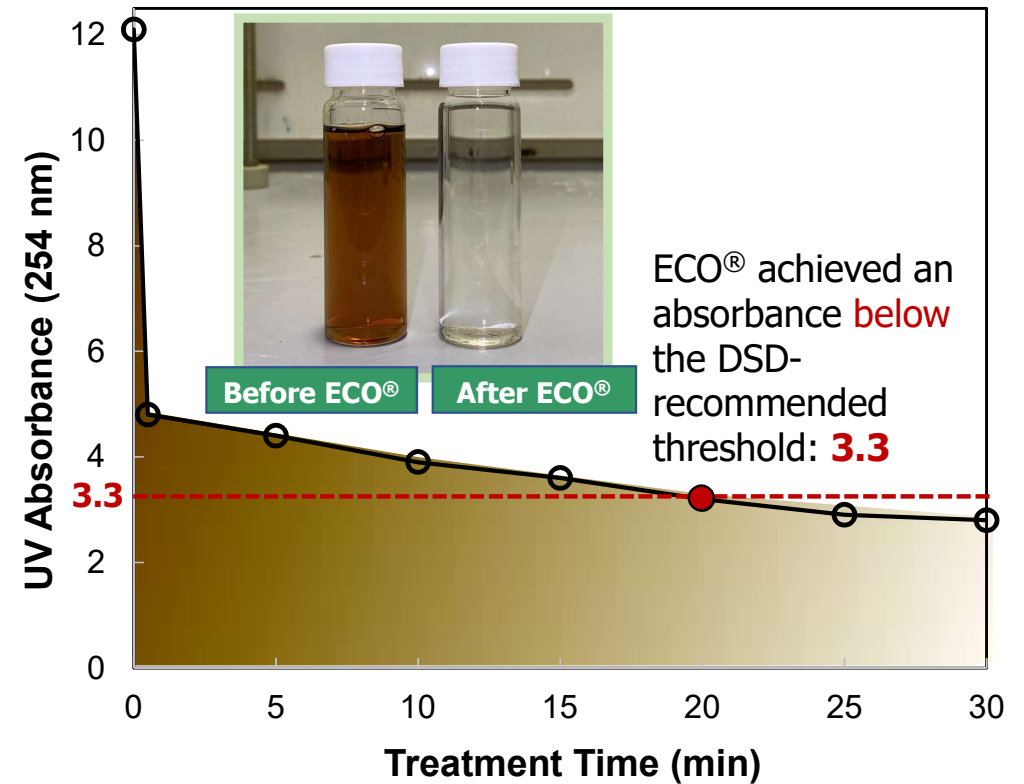
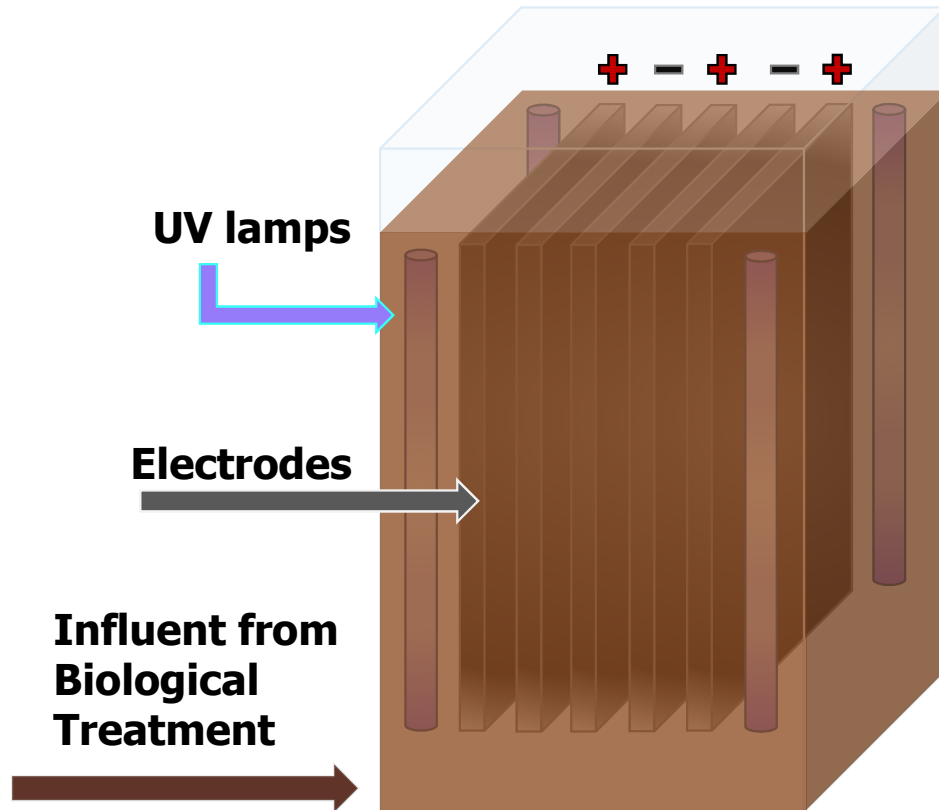
Landfill Leachate Treatment Process



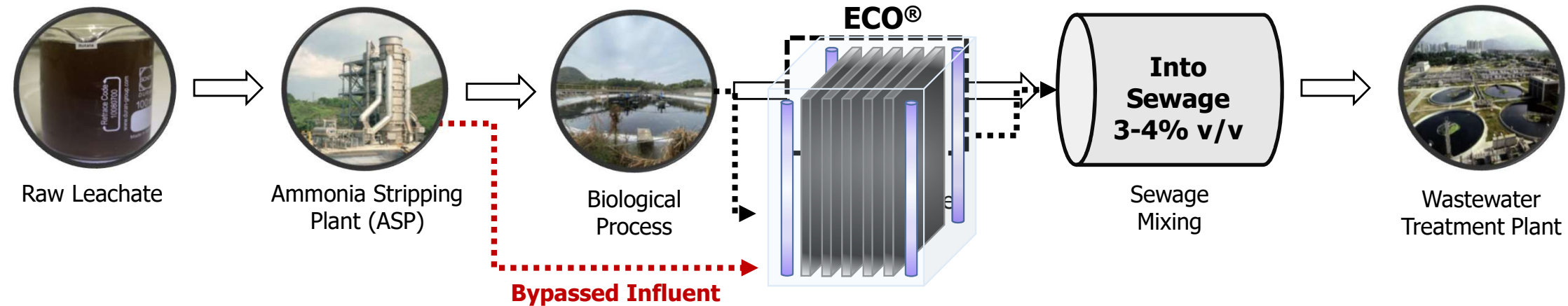
Existing Technologies:

	Biological Treatment	Chemical Treatment	Physical Treatment	Electrochemical Treatment
Positives	Inexpensive ($< 5 \text{ USD m}^{-3}$)	High UV_{254} absorbance removal	Highest UV_{254} absorbance reduction	High removal efficiency with no external dosing
Negatives	Poor efficiency for UV_{254} removal	External dose-dependent Generates additional sludge	Expensive to operate and maintain Generates additional concentrated waste	High energy consumption ($20 - 40 \text{ USD m}^{-3}$)

We Propose: ECO[®] - Electrochemical-Cycled Oxidation



ECO[®] in the Process Line



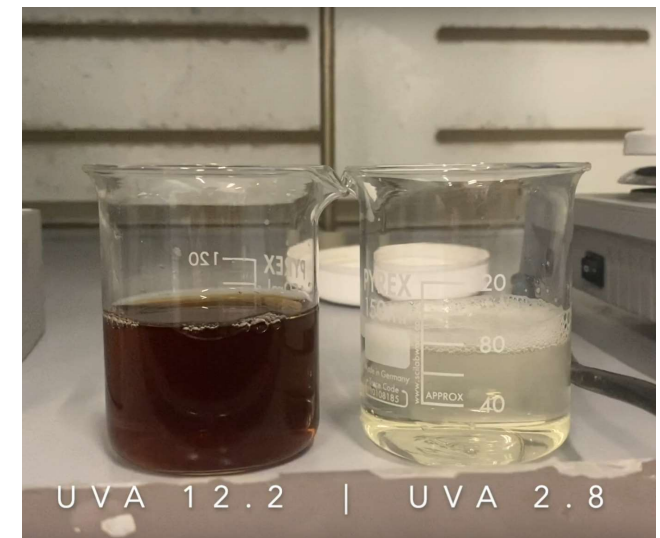
Trial Stage

- Installed after biological process
- Ameliorates toxicity: **Problem 2** ✓
- Reduces UV₂₅₄ absorbance: **Problem 3** ✓

Optimization Stage

- ECO[®] influent taken directly after ASP
- Bypasses biological process
- Reduces biological treatment costs and volume: **Problem 1** ✓

Early Prototype Trial



ECO[®] brings 4 solutions:



Biological Process

Objective: Reduce reactor volumes and footprints

Strategy: By bypassing the biological process, ECO[®] minimises **aeration energy and volume used**

Toxicity

Objective: Reduce health risks from leachate exposure

Strategy: ECO[®]'s electrochemical treatment **degrades** the toxic components

UV Absorbance

Objective: Increase operative life of UV disinfection lamps

Strategy: ECO[®] reduces the UV₂₅₄ absorbance of leachate by **>80% in under 30 minutes**

Sustainability

Objective: Reduce waste generation and additives used

Strategy: As a compact design, ECO[®] does **not require chemical dosing, nor produces sludge.**

Deliverables:

↓ Aeration Energy

↓ Space

⊘ Chemical Dosing

⊘ Sludge Production