



ORGANICA PROVIDES EFFICIENT UPGRADE FOR TIGHTER EFFLUENT STANDARDS, SAVING LAND, CAPITAL INVESTMENT, AND OPERATIONAL COSTS

CHALLENGE

As environmental regulations become increasingly stringent, wastewater utilities often require facility upgrades to meet new permit requirements. In many cases, these effluent standards include nutrient removal requirements that call for additional biological treatment.

Consider a 40 MLD treatment facility in an urban Chinese industrial town, currently utilizing a conventional activated sludge process. The river flowing through the town has environmentally degraded over decades of unplanned uses and discharge from factories, farm land, and adjacent development. This led to new environmental regulations demanding the facility comply with stricter water standards, requiring the local utility to seek an upgrade solution.

The optimal solution would meet the treatment requirements with minimal additions to the existing wastewater treatment plant's physical footprint and total operational expenditures. The utility also needs to resolve current odour and aesthetic issues, which causes a "psychological footprint" where neighbors complain about living near an unsightly and odorous facility.

OPTIONS

To meet the new effluent requirements, the utility evaluated a combination of the AAO (Anaerobic-Anoxic-Oxic) and membrane bioreactor (MBR) systems. However, this option required decreasing the treatment capacity of the existing process from 40 MLD to 20 MLD to meet the stricter treatment standards, and the construction of a new 20 MLD tank to treat the remaining loads. As a result, an additional 2,500 m² (27,000 ft²) of land would be required, drastically increasing both construction cost and timeline. Additionally, this alternative would not address the local community's concerns on odour and aesthetics.

In contrast to the AAO-MBR alternative, the Organica solution was able to upgrade the current facility with its existing concrete structures and maintain capacity without requiring additional land. This decreased total CAPEX by US\$6.6 million. More importantly, it allows the utility to upgrade without acquiring new land, which is simply not available in this part of the city. Furthermore, Organica's operating costs are approximately 21% lower due to significantly less energy requirements in comparison to AAO-MBR alternatives. Finally, Organica solutions utilize structures with the look and feel of a botanical garden, resulting in an odourless and aesthetically-pleasing facility. These advantages help create a more positive relationship between the wastewater treatment utility and the community.

	AAO + MBR	Organica
CAPEX	US\$22,200,000	US\$15,700,000
OPEX/year	US\$3,000,000	US\$2,400,000
Footprint	+2,500 m ² (+27,000 ft ²)	no addition required
NPV <small>(20 year analysis)</small>	US\$82,500,000	US\$63,300,000



ORGANICA ADVANTAGES

In contrast to the proposed combined AAO and MBR solution, the Organica solution offers numerous advantages:

-  **Small physical footprint**
-  **Lower capital expenditures**
-  **Reduced operational costs**
-  **Odourless and aesthetically-pleasing**

THE ORGANICA SOLUTION

Small Physical Footprint

Utilizing the existing reactors, the Organica upgrade eliminates the additional 2,500 m² (27,000 ft²) of land required in the AAO-MBR option. Additionally, since an Organica solution has no odour or smell, the buffer zone, which is usually added to combat this issue, is no longer needed. This allows the utility to use the buffer zone as reclaimed land.

Lower Capital Expenditures

Upgrading the facility with the Organica solution provided clear financial advantages over the AAO-MBR option. Since the existing physical footprint could be utilized to improve the effluent quality, the construction period only took 10 months with Organica, as opposed to the 14 months scheduled under the AAO-MBR option. In addition, the utility was able to maintain current operations by avoiding any disruption of service during construction.

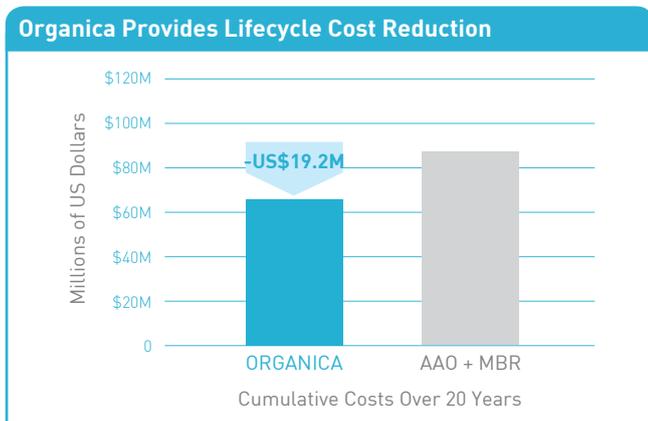
In total, the utility was able to save 29% on capital expenditures utilizing the Organica solution, a cost savings of US\$6.6 million.

Reduced Operational Costs

Compared to the AAO-MBR option, Organica consumes 50% less energy and produces 64% less sludge, translating to total operational cost savings of 21% (US\$470,000 in the first year alone). Due to these savings, utilizing the Organica solution decreased the Net Present Value (NPV) of the investment by US\$11.5 million to US\$34.2 million.

Odourless and Aesthetically-Pleasing

Organica solutions are odourless and aesthetically-pleasing botanical gardens. As a result, the upgraded site would be an opportunity to create additional "green space" in the urban environment, while eliminating the "psychological footprint" and greatly improving community relations.



	Existing	New	Improvement
COD	100	60	40%
BOD₅	30	20	33%
TSS	30	20	33%
NH₃-N	25	8	68%
TP	3	1	66%
TN	n/a	20	n/a

Assumptions: OPEX for both Organica and the alternative wastewater treatment option are assumed to increase at an annual rate of 3%. NPV is calculated over a 20-year time frame using a 10% discount rate.

Disclaimer: Financial estimates used are based on a proposal for a retrofit project in China and evaluation by an independent design institute. Images are sample displays. This case study is created for informational purposes only, and should not be considered as a quote or offer of any kind. Financial data, OPEX, CAPEX, actual footprint, components (including but not limited to water reuse functionality), etc. may vary per project depending on the actual requirements.



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