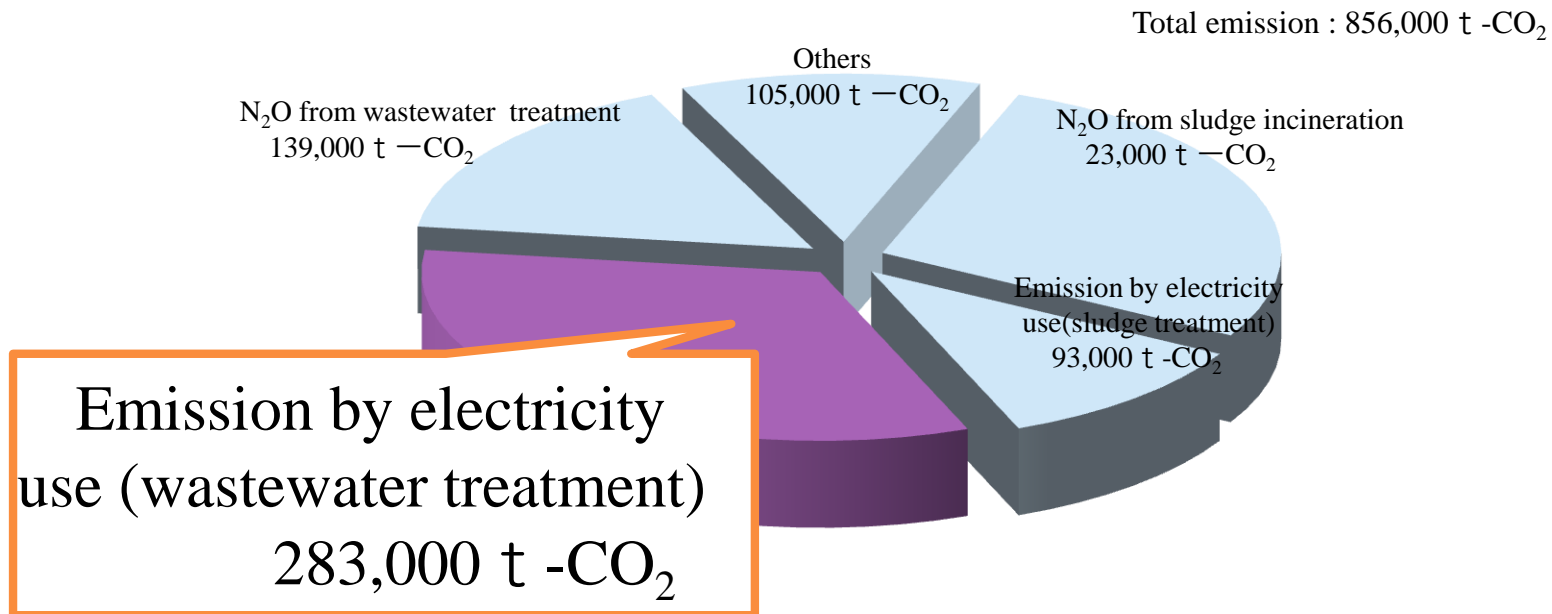


**NEW APPROACHES TO THE
COEXISTENCE OF WATER QUALITY
IMPROVEMENT AND GHG
REDUCTION IN WASTEWATER
TREATMENT**

Bureau of Sewerage,
Tokyo Metropolitan Government

BACKGROUND

- Electric energy consumed by wastewater treatment which amounts to about 33 percent of greenhouse gas (GHG) emission.



Objective

Coexistence of water quality improvement and GHG reduction in wastewater treatment.

THE INTRODUCTION OF NEW ENERGY-SAVING WATER TREATMENT METHOD

To coexist maintaining good water quality and reducing greenhouse gas emission, here we report its findings of the following two new types of water treatment method.

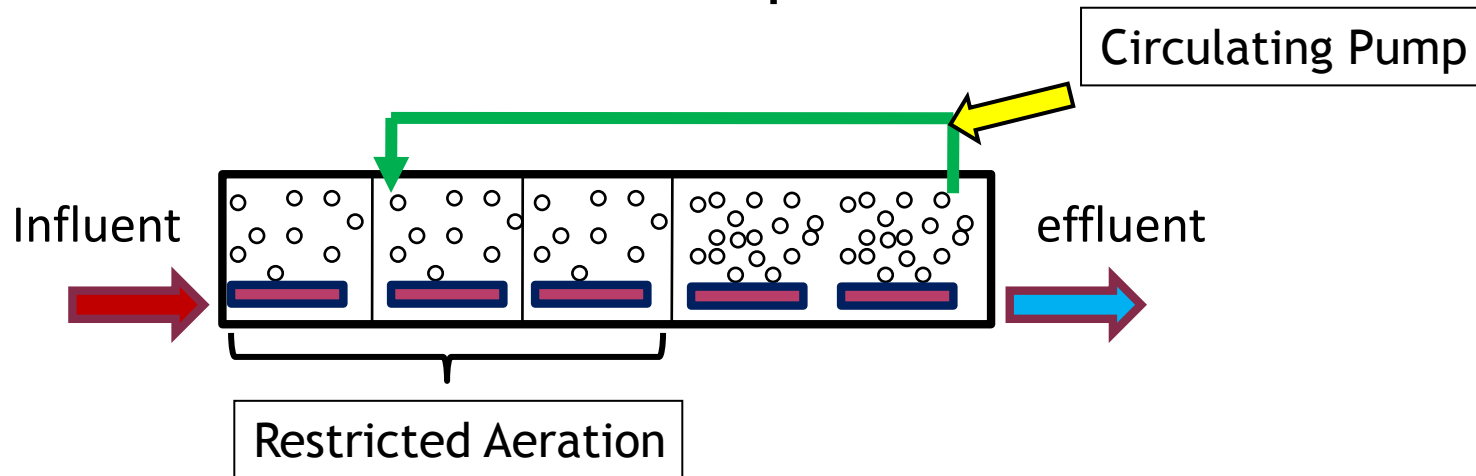
(1)Restricted-aeration A²/O process

(2)Ammonia+DO control

(1) RESTRICTED-AERATION A²/O PROCESS

FLOW OF THE PROCESS

Restricted-aeration A²/O process

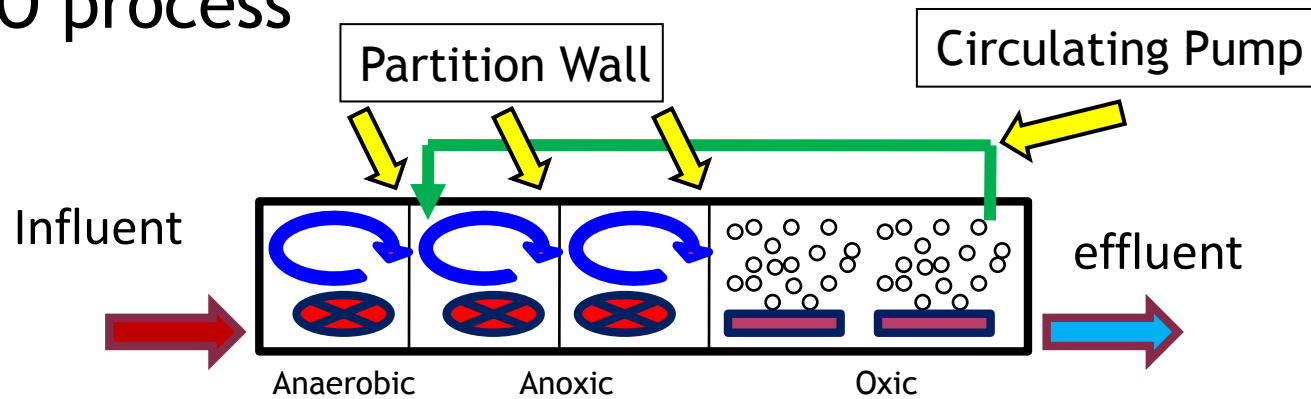


No agitators and lower electricity consumption compared to A²/O process.

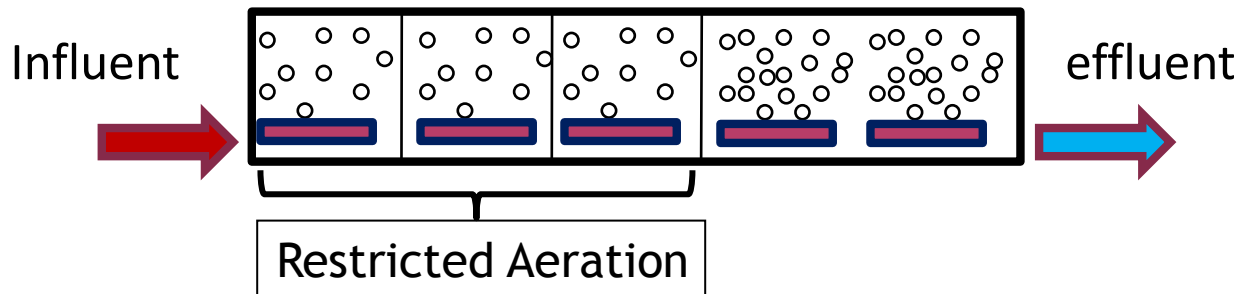
FLOW OF THE PROCESS

Conventional water treatment methods

A²/O process



Pseudo A/O process

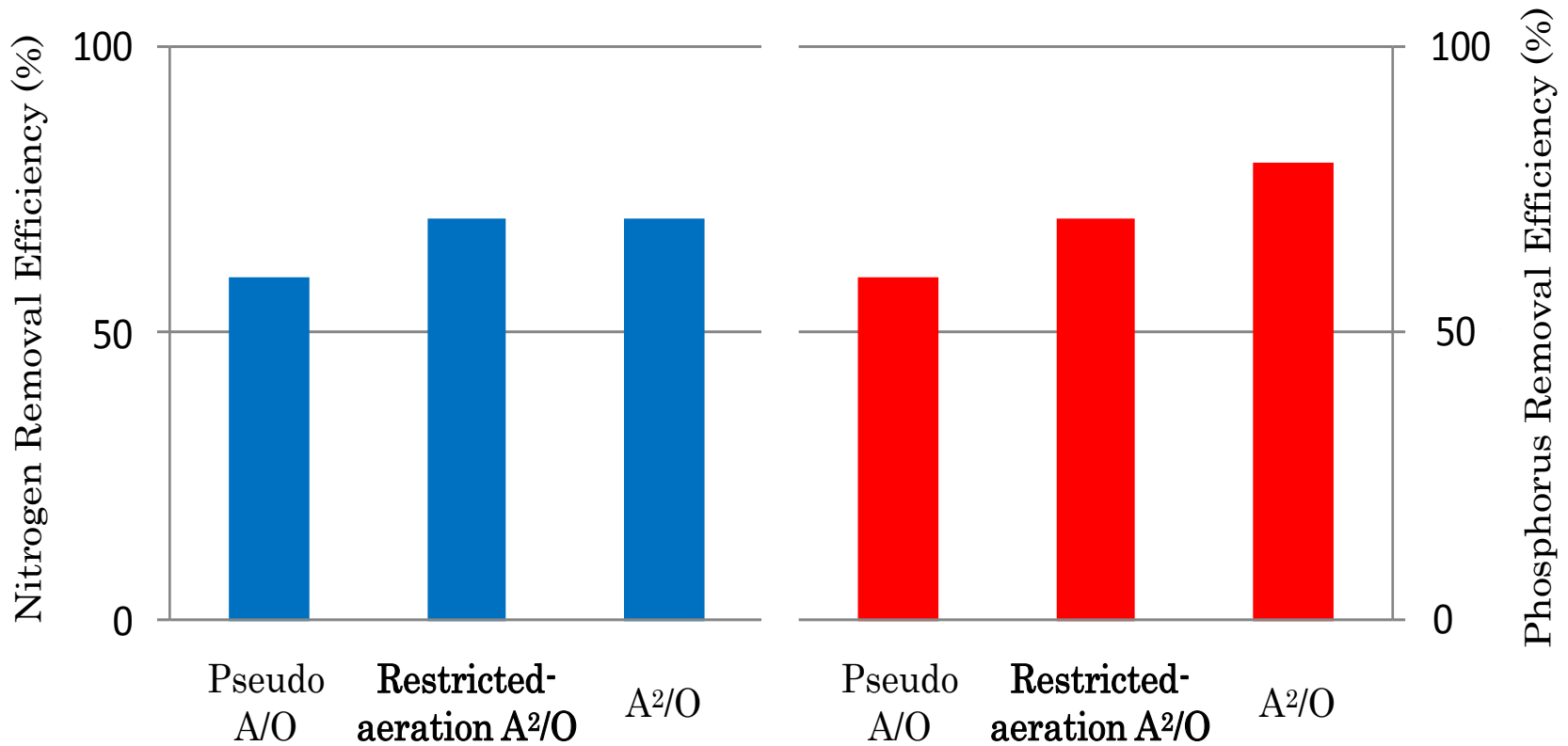


INVESTIGATION

- This research was carried out in some trains of a wastewater treatment plant capable of 77,000 m³/day from June to August, 2009.
- We compared the effluent quality, GHG emission, and cost of the three treatment processes (Pseudo A/O process, A²/O process, and Restricted-aeration A²/O process) .

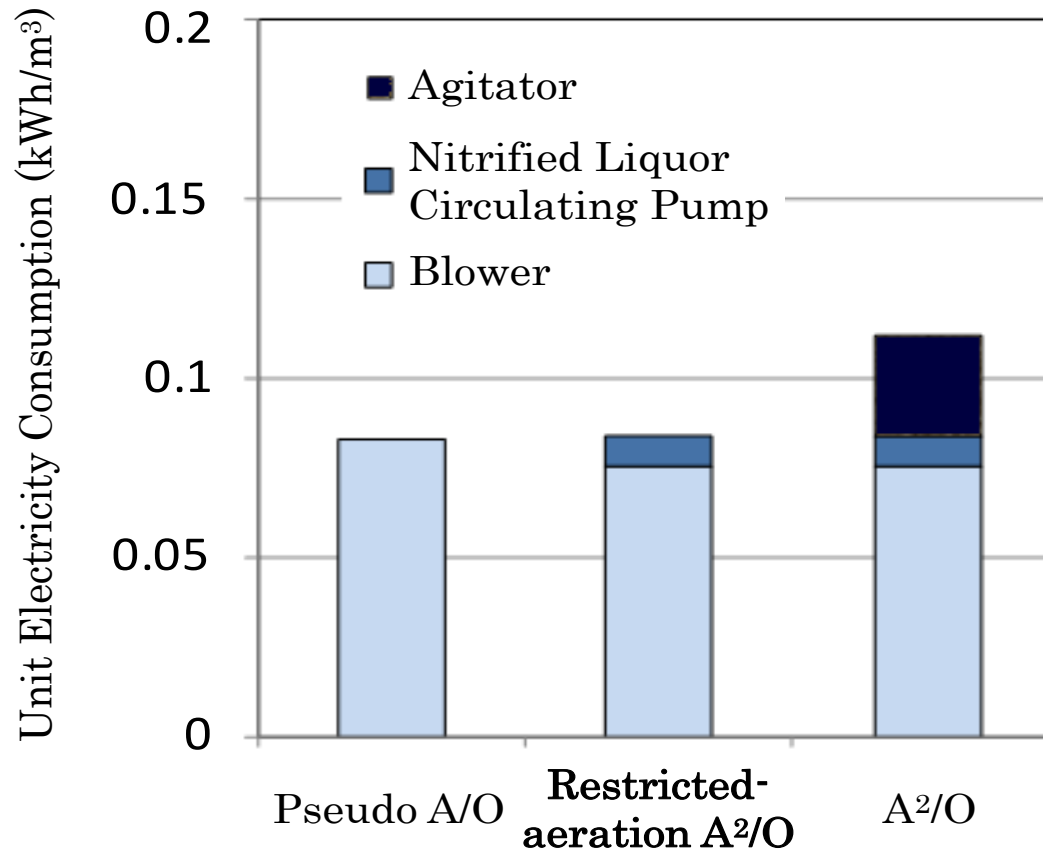
RESULTS

Comparison of Treated Water Quality



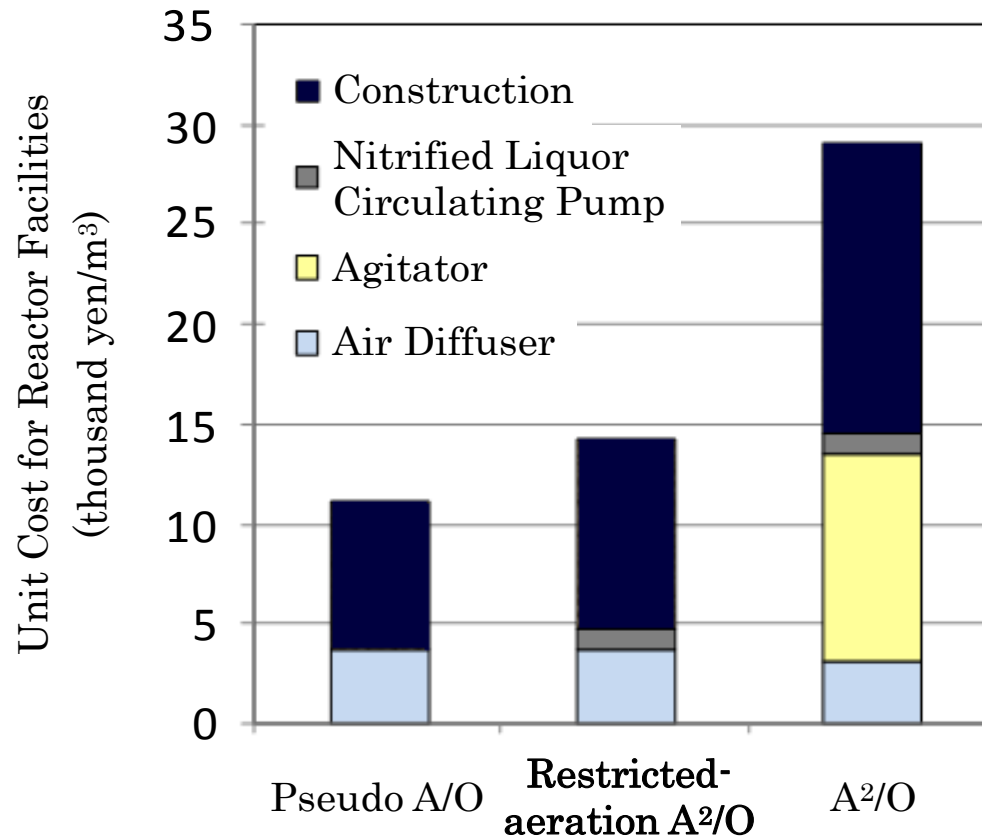
RESULTS

Comparison of GHG Emission



RESULTS

Comparison of Costs



CONCLUSION

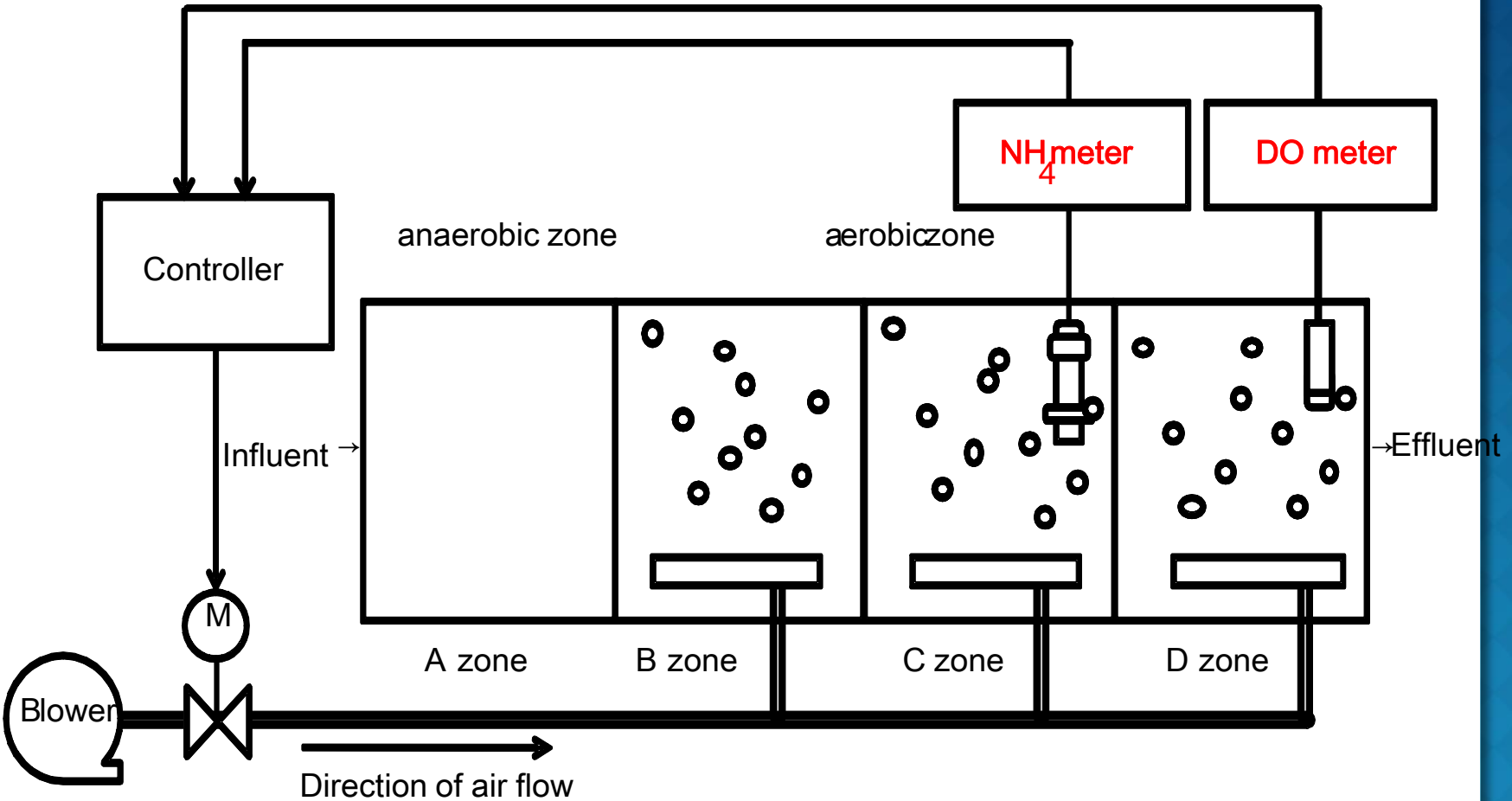
- Restricted-aeration A^2/O process is slightly inferior to A^2/O process, but superior to pseudo A/O process in treatment performance.
- GHG emission and cost of restricted-aeration A^2/O process is lower than those of A^2/O process, and equivalent to those of pseudo A/O process.

In addition, according to another study, it has been found that electricity consumption can be also reduced by intermittent operation of agitator in A^2/O process. (Data not shown)

(2)AMMONIA+DO CONTROL

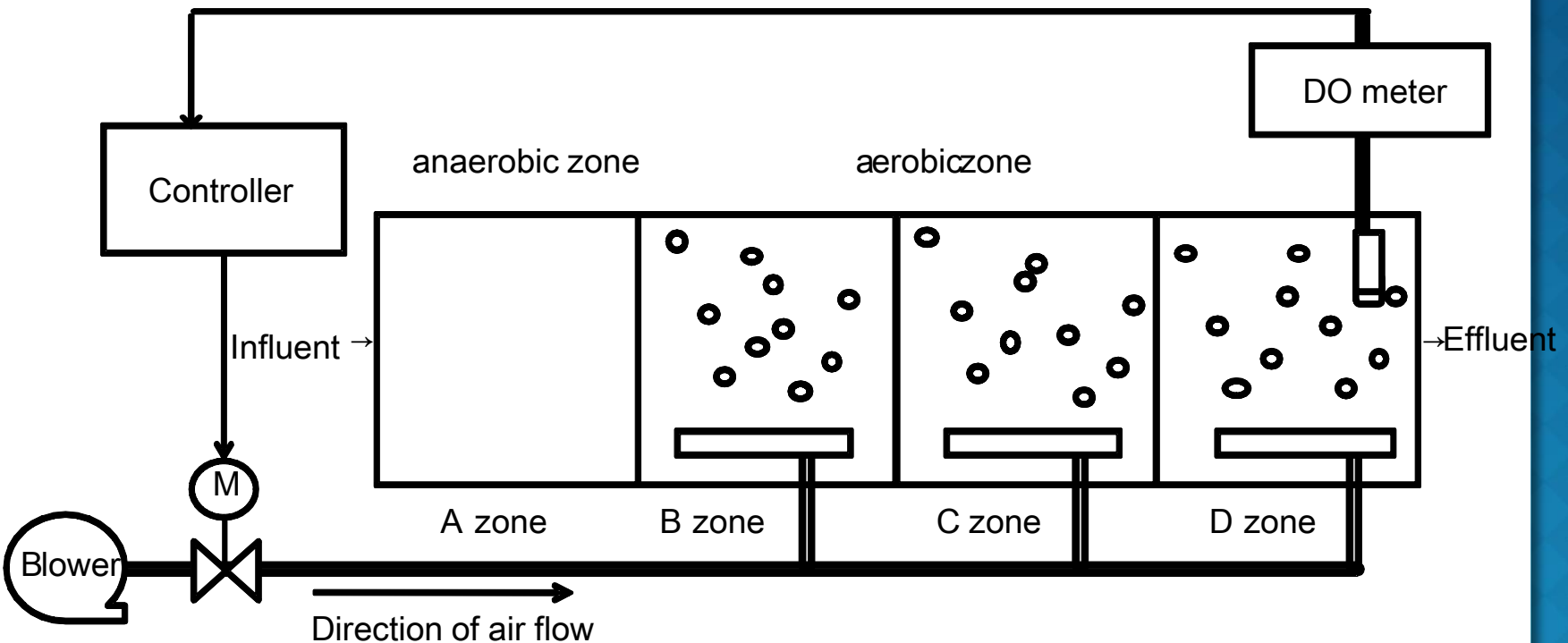
FLOW OF THE PROCESS

Ammonia+DO control



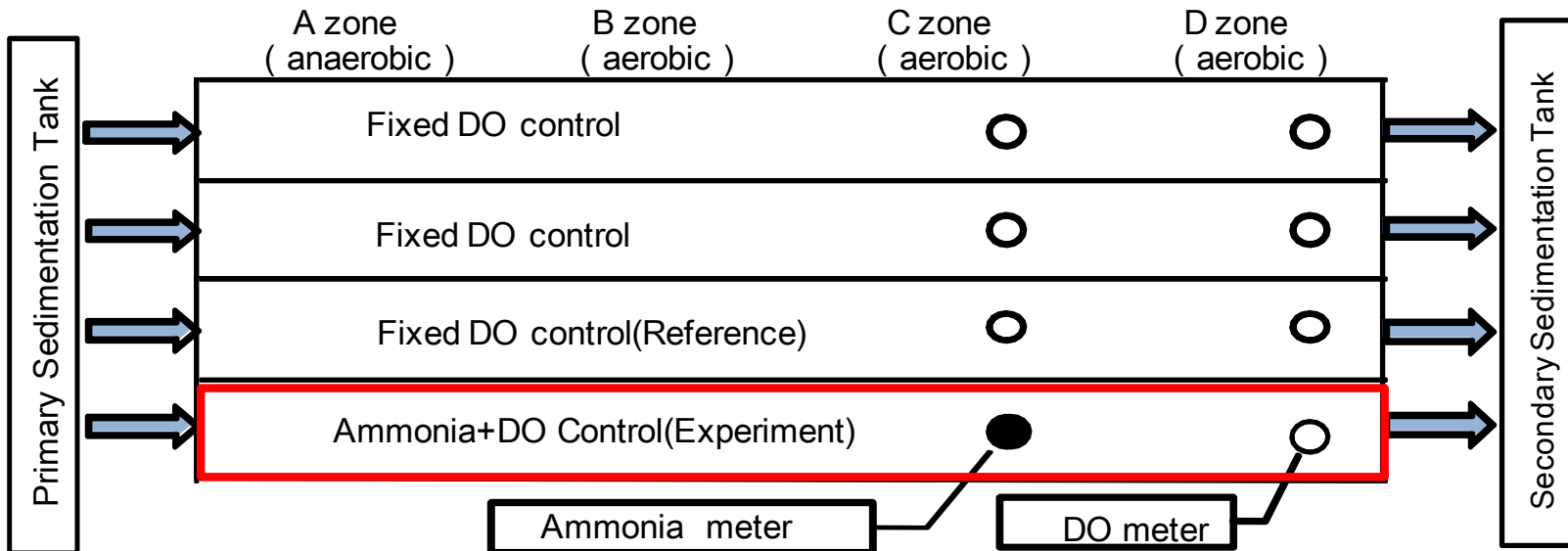
FLOW OF THE PROCESS

- Fixed DO control



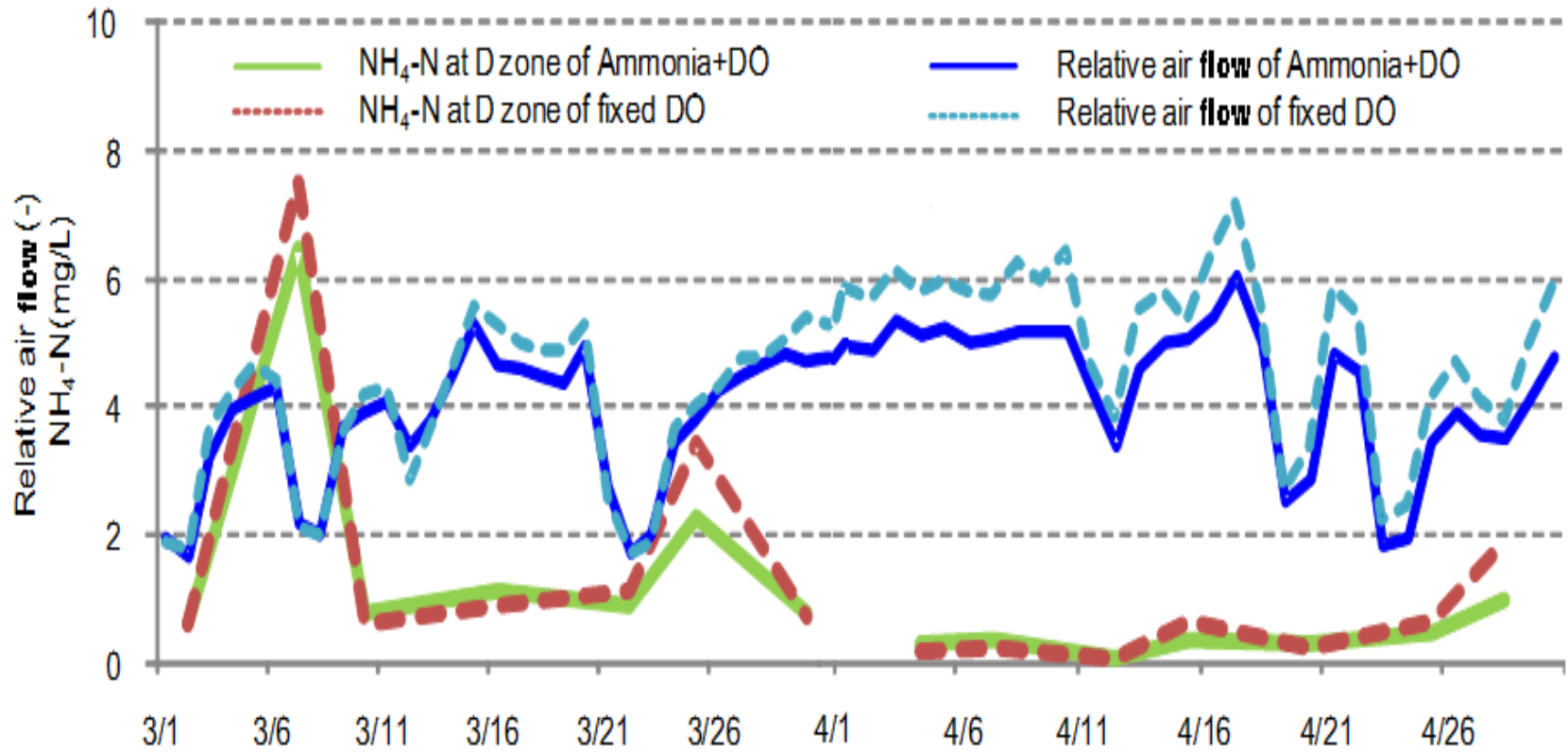
INVESTIGATION

- Ammonia+DO control system was introduced into Water Reclamation Center (25,000m³/day) in July, 2010.



→Effluent water quality and air/water ratio were compared with conventional fixed DO control system.

RESULTS



RESULTS

- Results of the study (2011)(Difference to fixed DO control of ammonia+DO control)

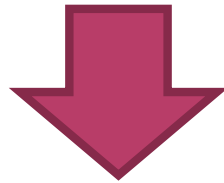
	Ammonium concentration (mg/L)	Air/water ratio (%)
March (Low water temperature period)	-0.3	-5.4
April~May (Middle water temperature period)	0.0	-16.0
June (High water temperature period)	0.0	-8.5

CONCLUSION

- This research proved ammonia+DO control to be an innovative technology that reduces supplied air flow and keeps treated water quality high steadily.
- This new system will be possible to reduce electricity consumption of blower by 10%, provided that fluctuation in water quality is small and nitrification activity is sufficient.

FUTURE PLANS

These technologies are treatment methods keeping water quality high in low carbon society.



We will select and apply appropriate treatment process to our plants depending on their characteristics.

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