

# Development & Diffusion of Enhanced Communal Waste Water Treatment System

***- Based on Practice in Indonesia -***

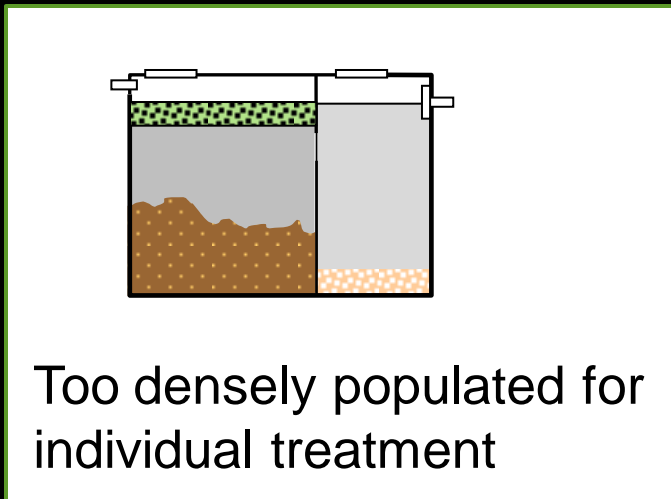


*Center for Appropriate Wastewater Treatment Technologies  
Indonesia*

19 March 2018  
Brasilia - Brazil

# Necessity of Appropriate Technology Development In the Case of Communal Waste Water Treatment

**Urbanization → bad sanitary conditions, water pollution**



**Communal Waste Water Treatment  
as practical solution**

# Conditions Required to Communal Waste Water Treatment in Indonesia

**1. Low Cost** (Initial Investment, Operation)

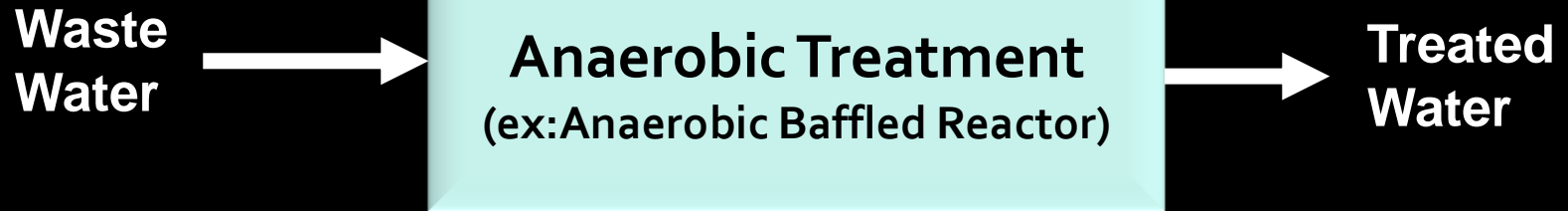
**2. Easy Operation & Maintenance**

**3. Low Energy Consumption**

**4. Space Saving**

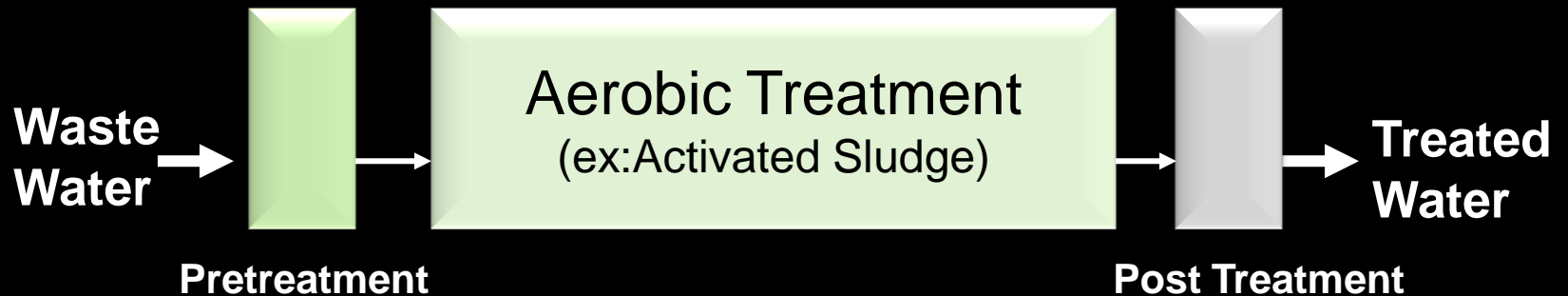
**5. High Treated Water Quality**

## Process Usually Used in Indonesia



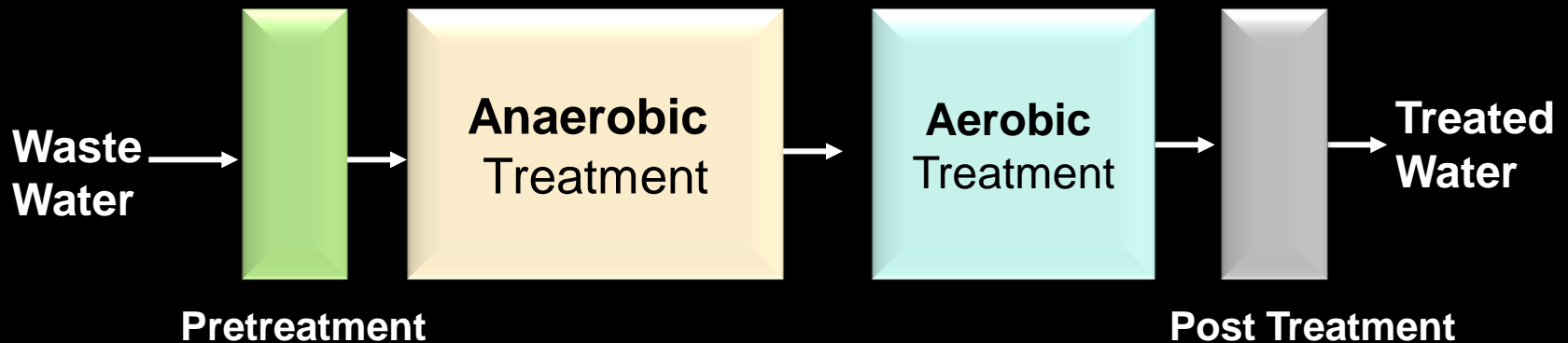
Low Electricity Consumption / Insufficient Treated Water Quality

## Process Usually Used in Japan



High Electricity Consumption / High Treated Water Quality

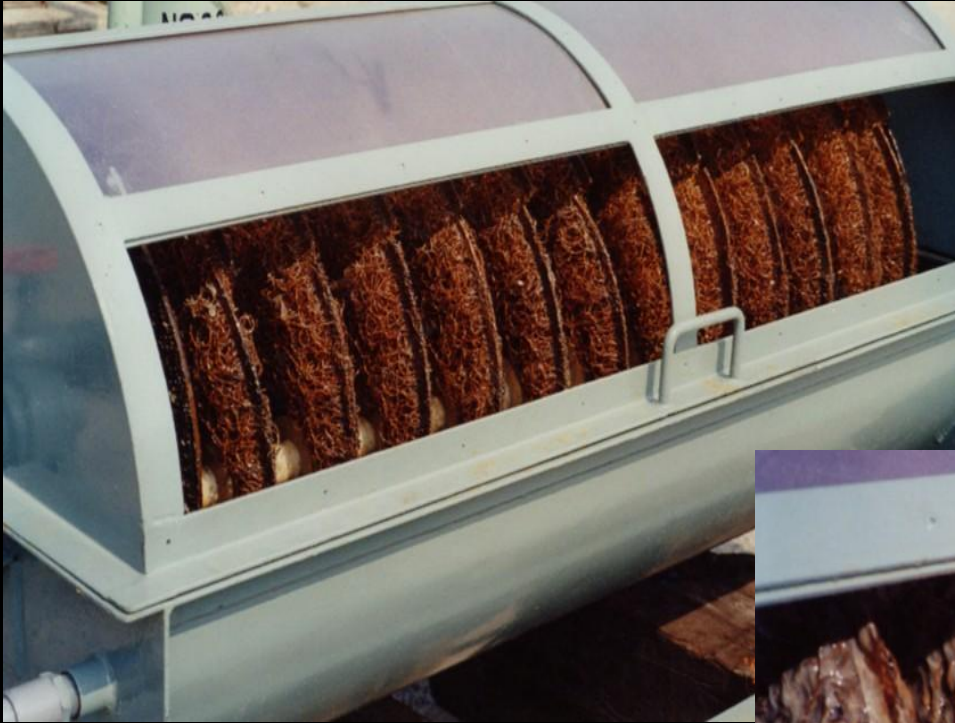
## Process Recommended by PUSTEKLIM



**Low Energy Consumption / High Treated Water Quality**

*Then, what kind of aerobic treatment process is suitable for communal waste water treatment in Indonesia ?*

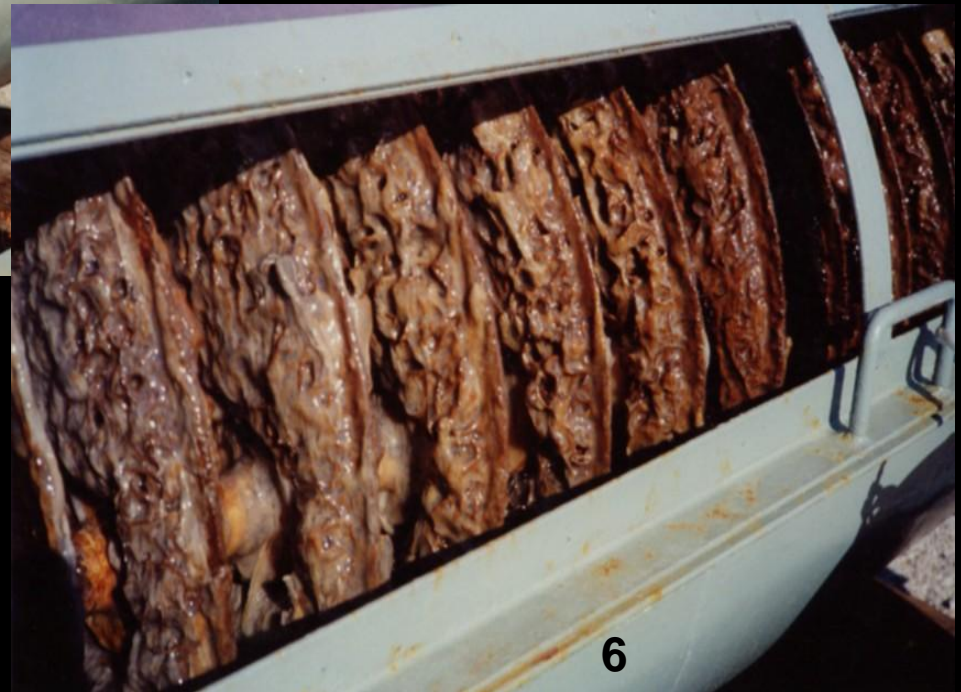
# RBC (Rotating Biological Contactors)



*Before Operation*

As aerobic process in the combination system, RBC was selected as operation/maintenance is easy and energy consumption is low

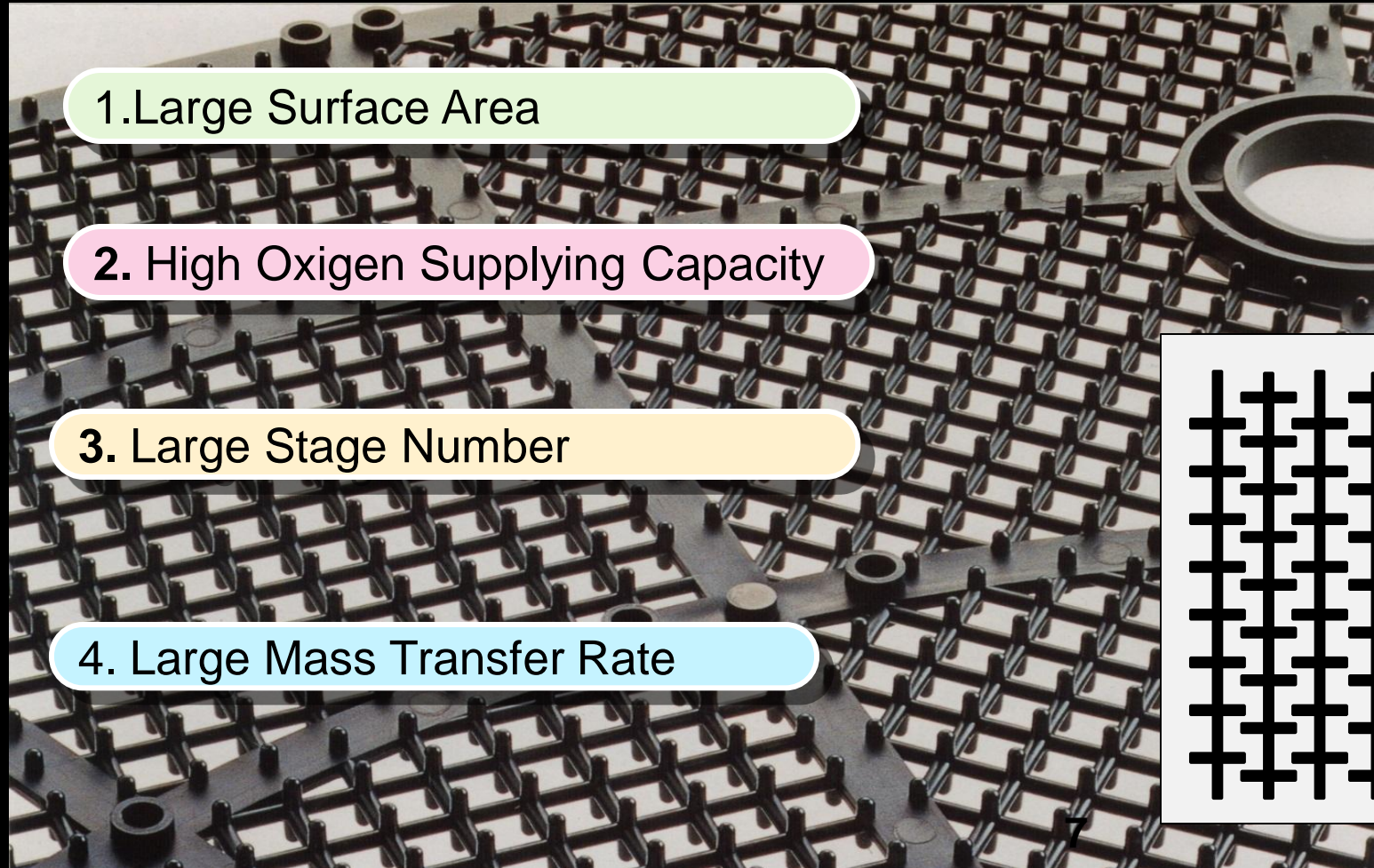
*In Operation*



Operation: Keep Rotating Only  
Maintenance: Oil & Grease

APEX had come up with a innovative concept of new contactors, which is highly efficient, durable and easy to be produced in Indonesia, that is,

## ***Three-Dimensional Lattice Contactors***

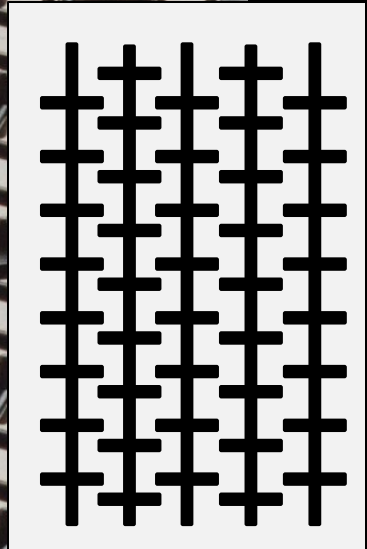


1. Large Surface Area

2. High Oxygen Supplying Capacity

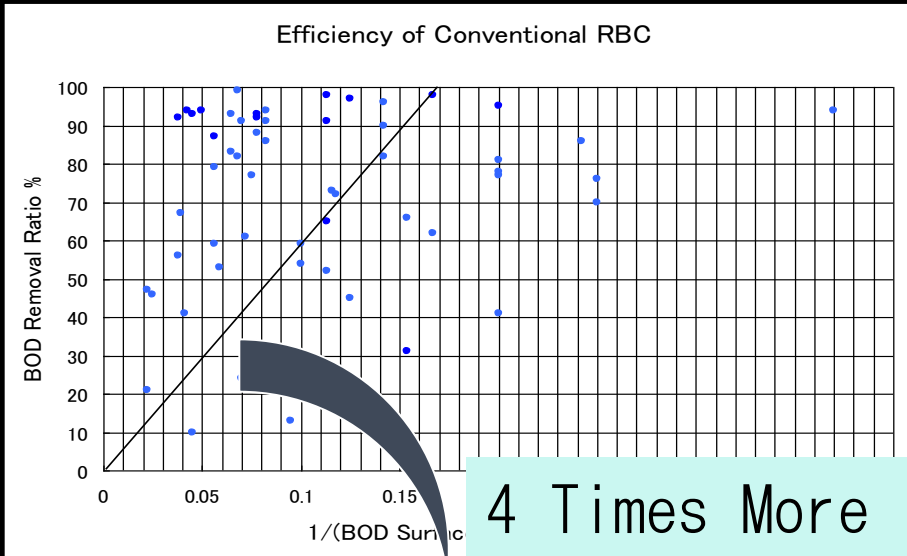
3. Large Stage Number

4. Large Mass Transfer Rate



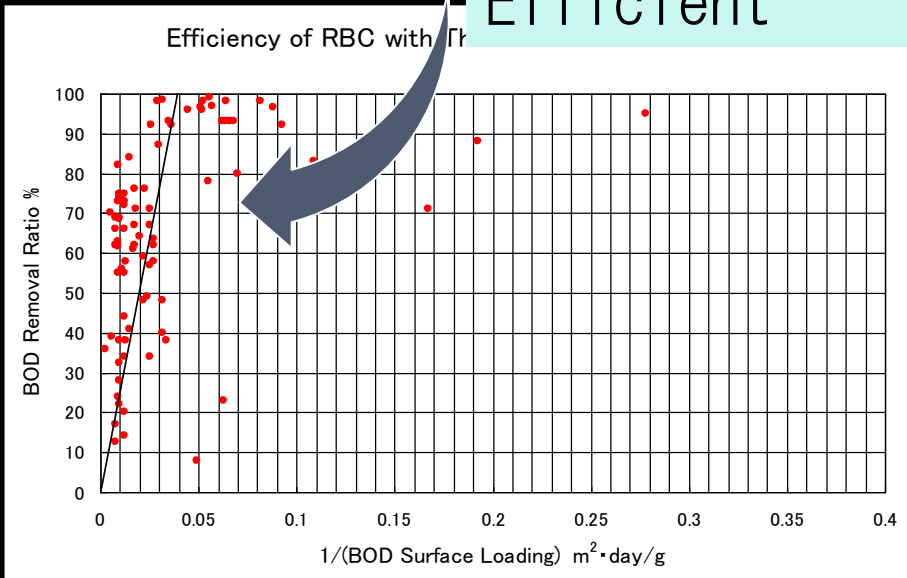
# Comparative Study as for Efficiency

## Conventional RBC



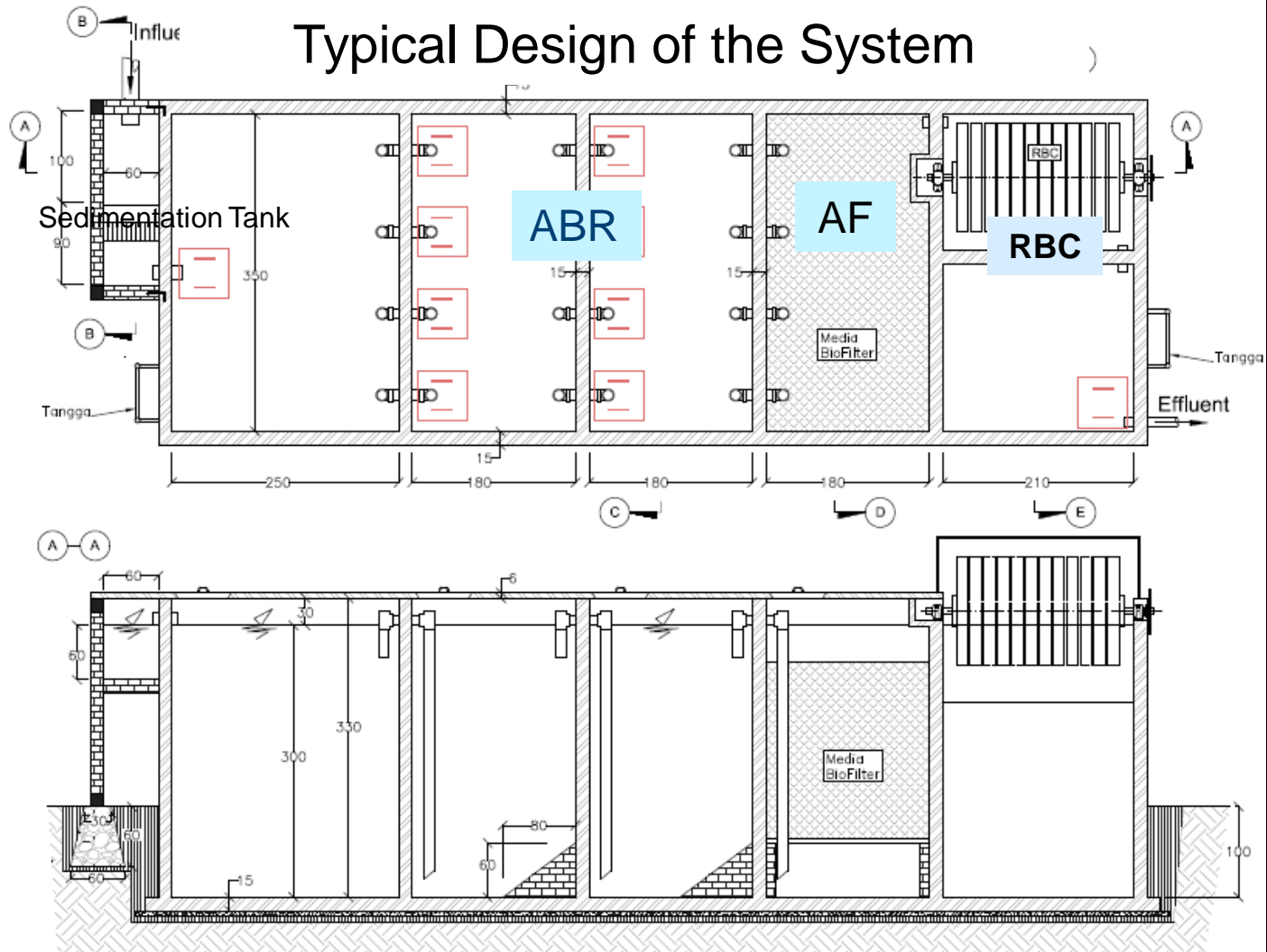
4 Times More Efficient

## Three-Dimensional Lattice RBC





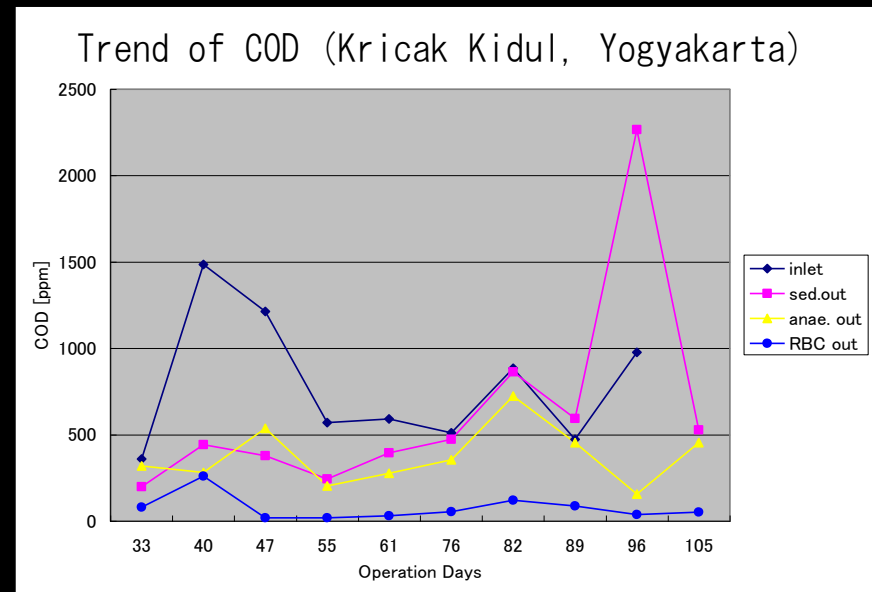
## Typical Design of the System



- Construction cost of the system with capacity of 70 – 80 households is around 26,000 – 30,000 USD including piping (2013-2014). The cost is slightly less than conventional system of anaerobic treatment.

# Results of Monitoring

- 23 model systems have been operated and maintained by community people by themselves with their own expenses. Oldest ones have been operated more than 9 years.
- Operation cost of the system is around 30 – 45 USD per month including electricity, wages for operator and oil/grease, which is covered by community people's contribution 0.45-1.32 USD per family per month.
- Drastic reduction of COD by RBC has been observed to meet domestic waste water standard.



# Summary

- In Indonesia, decentralized domestic waste water treatment system is expected to take a significant role for improving urban sanitary conditions.
- In this context, APEX (Japanese NGO) in collaboration with Dian Desa Foundation (Indonesian NGO) and Japanese private company has developed a combination system of *ANAEROBIC* and *AEROBIC* process. (*RBC L-3D contactors is used as aerobic process*)
- The developed system is characterized by its low cost, easy operation & maintenance, energy saving, space saving and high treated water quality.
- The system is totally producible in ordinary workshop in Indonesia. Operation & Maintenance can be managed by community in self-sufficient and sustainable way.