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HOUSING PROJECTS: DRINKING WATER AND WASTEWATER SOLUTIONS

GENERAL:

Many cities in ASEAN are expanding at a rapid pace due to demographic changes, attraction of workers to the cities and development of income of populations, putting a strain on public facilities such as tapwater supply and wastewater treatment that often are overloaded already.

Planning and construction of these facilities and distribution/collection networks takes up to 25 years by central or provincial governments.

Project development is heavily dependent on presence or co-development of these essential requirements, as is reliable power supply.

WHO- RECOMMENDATIONS:

Back in 2002, we participated at a world water congress in Melbourne, Australia, where Prof. Mark Sobsey, WHO Household Water Specialist, stated in his presentation that only *de-centralized systems* would be able to match the growth for need of safe drinking water and wastewater disposal for populations in emerging economies. Central production and treatment is no option anymore, plants have been surrounded by expanding neighbourhoods, now causing a nuisance to new house-owners or tenants close-by. No more land is available for expansion and digging-up roads for more and larger pipelines is costly and unproductive. 50% of capital costs of central treatment goes in long, maintenance intensive networks.

DE-CENTRALIZED SOLUTIONS

We have been active in water projects since 1977 in Europe, N-Africa and Middle East, first in cleaning-up industry such as metal-plating and other polluting processes with heavy-metals with state-of-the-art technologies, followed by municipal applications of these further developed solutions where we pioneered in Ultrafiltration (UF), a membrane technology, and Ultraviolet (UV) a non-chemical way of disinfecting water and effluents. Early this century, using our vast experience and network in academia and related suppliers, we concentrated on developing and integrating appropriate solutions for problems we encountered in developing countries / emerging markets, leading to a complete range of modern, compact, highly efficient systems that can solve the above mentioned issues that come with the typical challenges in Southeast Asia.

On the next pages we give a summary of the solutions we have supplied in ASEAN and beyond and the benefits our experience and knowledge are offering.

Eng. Dick van Dijk, Chairman
ENVIRO-PURE FOUNDATION
smartDUTCH WATER SOLUTIONS



DRINKING WATER PRODUCTION

Typically, all over the world, people have settled where water is available, it may be from a nearby river, lake or well and not salty. Most existing treatment plants in South East Asia are based on the same, 70-100 years old technology often badly maintained and hydraulically completely overloaded, producing water not fit for consumption. That is why governments call it tap water, not drinking water. Rural villages don't even have treated water but get it straight from a pond or lake.

At the time of construction rivers were relatively clean and plants were built not too far from the cities, but cities expanded, more water is needed and space has run-out. The city has surrounded them.

Modern technologies make it possible to produce clean, safe water from almost any fresh water source, and even, though more costly, from brackish water in delta's or seawater such as in the Middle East. These state-of-the-art solutions are often membrane-based, just as we started 40 years ago in industry.

Today we can offer very compact, cost effective and low maintenance plants that remove all pollutants present in surface water, or groundwater such as Arsenic and Fluoride, poisonous metalloids found in SE-Asian countries. Following the recommendation of WHO, these modern compact plants easily fit within, or close to, housing developments and save long supply pipelines that come with high installation and maintenance costs.

TECHNOLOGIES:

For projects with up to 30,000 people (6,000 houses) smartUF-membrane technology is the preferred choice:

Very compact, fully automatic, low maintenance and quick turn-around times. No bulky concrete constructions.

smartUF technology produced water may be called drinking water, because one can drink it from the taps in your house because it complies with, even surpasses all WHO and National Standards for drinking water.

No more danger of disease-causing bacteria from tanks and showers, no spots on laundry, good tasting.

Made in ASEAN, supported locally by dedicated trained professionals.

For larger projects, up to 300,000 and even 1,5 million people, our **PERFECTOR R&J** are the choice:

- 25% footprint of conventional systems
- 25% of concrete required
- 30% less energy and polyelectrolytes
- 50% cheaper treatment plant
- 50% quicker building time
- 100% made in ASEAN
- 150% capacity over conventional 70 years old designs
- Smooth design easily integrated in neighbourhoods; no noise, no smell
- Modular design can be expanded at any time in future
- No high skilled/trained operators needed
- **BETTER QUALTY DRINKING WATER**

PERFECTOR R & J (Regular and Jumbo) were developed 40 years ago by a leading Dutch water specialist par-excellence, graduate of the famous Delft University, who became our technology advisor.

Worldwide several hundreds **PERFECTORS** were installed, including 20 in ASEAN in the past 10 years.



WASTEWATER TREATMENT

Domestic wastewater is an unavoidable by-product of habitats and a topic few politicians wish to discuss; we need to take care of it however and in the least intrusive and most efficient way.

One of the reasons wastewater treatment plants were built faraway from cities is the noise and smell that comes with them, and as with drinking water plants, housing has been closing-in and it became more and more difficult with the existing technology to avoid nuisance for the inhabitants. They also require large parcels of land that has become much more valuable over the years.

The process has not changed much since the 1920-ies, special bacteria need to digest the human waste and need oxygen and time to do that. It has not and will not change soon:

Oxygen means compressors and mixers, time means large basins.

In the 1950-ies in Germany a clever technology was developed to provide the required oxygen without compressors, and create a significantly improved digestion by bacteria, meaning a shorter period to do so, resulting in much reduced volumes of the treatment process (> 4 x). Due to its smart design, smell was also largely eliminated because the rotting-smell producing (anaerobic) bacteria, are covered by a layer of so-called aerobic, or oxygen consuming, bacteria, forming a cushion.

On mainland Europe, in the UK and later USA and Canada, a number of companies started manufacturing equipment based on the Rotating Biological Contactor (RBC) principle as it was called, mostly for small to medium sized capacities. Large civil constructing companies were not interested because they could not pour a lot of concrete, their core business.

In the 1980-ies, when hundreds, if not thousands, of these reactors or contactors were installed worldwide and some technical improvements were introduced, we already were involved by disinfecting the resulting high quality effluent with Ultraviolet(UV) light so the cleaned effluent could be used safely for irrigation purposes.

Recently we have engaged with one of the few internationally active manufacturers of modern RBCs, PlanetTEK, with 17 years of experience, producing according to the original German patent but with latest technical improvements. Installed and started-up by own staff in Europe, Asia, Australia and Middle East in hotels, hospitals, university campuses, prestigious housing estates, food-industry etc. the PlanetDISK is becoming one of the world leaders and we are proud to contribute to their success.

Systems may be installed partially underground to save space and power consumption is so low, a few solarpanels will be sufficient.

PlanetDISK has the lowest OPEX and over a short period, operational savings will pay back the investment and continue to operate effortlessly afterwards for another 20-30 years. Major components are robust and virtually corrosion resistant and easy to replace should that become necessary after many years of service and no highly skilled operators are required. No chemicals are used and there is only one moving part that only needs some grease. The concept allows for large fluctuations in the consistency and volume of the effluent to be treated, always producing wastewater to higher than National Standards. On request we can add UV-disinfection so the purified water can be used for cleaning, irrigation and even cooling towers.

Capacity is almost limitless due to the modular concept, from 50 to 750,000 People Equivalents (PE)



For small to medium sized requirements, we offer an alternative to RBCs, another German invention that has found thousands of users around the world. The principle is based on converting the old septic tank as we know it in an authentic wastewater treatment unit, from single houses to house clusters, estates, condominiums, hotels, refugee-camps, campings and villages, from 3 to 10,000 PE (People Equivalents). Clever tank-inserts, complete with dedicated specially designed low-energy pumps and smart but robust electronics do exactly the same as multi-million dollar plants for large cities, including communicating through GSM or internet for monitoring, servicing, updating etc. A low cost maintenance program by trained local professionals will warrant years of trouble free functionality.

Completely installed underground even in high-table groundwater areas, except for the inlet works of the larger systems. Access for service and repairs can take place through robust manholes and the groundlevel space can be used for parking, basketball field or similar.

SUMMARY

No matter how large and / or remote the project is, we will always have a state-of-the art solution based on our 40+ years of experience solving drinking water and wastewater treatment requirements to fit the situation and available budget without compromising quality and National Standards.

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