

# **Siemens Water Technologies**

**IABC**

**SUSTAINABLE WATER SOLUTIONS**

**November 19, 2011**



# Siemens Water Technologies Vision, Mission and Values

# SIEMENS

## Our Vision:

We take care of the world's water.



## Our Mission:

We enable our customers to improve the quality and reduce the cost of their water and wastewater.

## Our Values:

We operate safely and in environmental compliance.

We take great care of our customers.

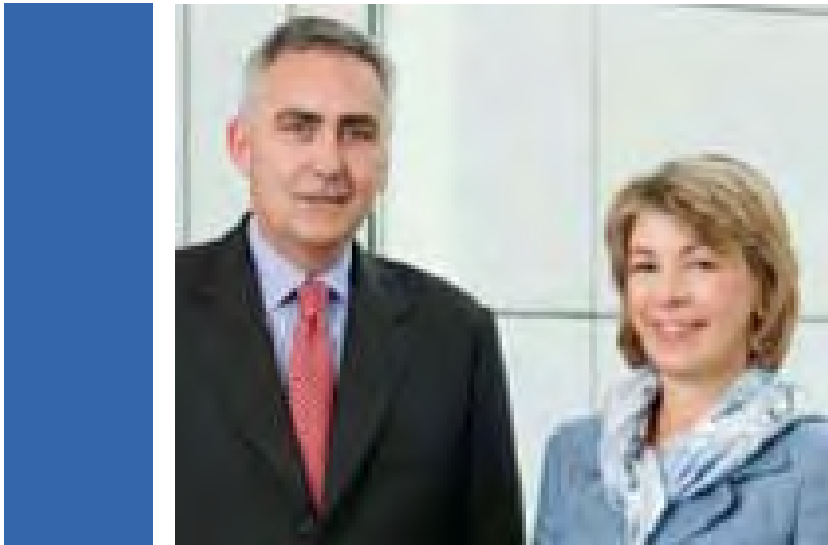
We achieve profitable, market-leading growth.

We treat our employees and business partners with respect.

**Water Technologies**

## Sustainability

"In the future, we intend to focus even more intensely on the opportunities provided by sustainable business."



# Sustainability@Siemens

## Trends are challenging our future

### Trends

#### Population Growth and Demographic Change

Rapid population growth:

- **2007:** 6.6 bn. people
- **2050:** 9.2 bn. people

Increase of live expectancy:

- **2007:** 7%
  - **2050:** 16%
- } of persons aged 65 and older

#### Urbanization

- **2008:** 3.3 bn. people (for the first time more than half of the world's population) will live in cities
- **2030:** 5 bn. people (60% of total population) will live in cities

#### Climate Change

- Growing economic activity causes depletion of natural resources & production of greenhouse gases
- Cities are responsible for about 80% of greenhouse gases
- Currently, 25% more natural resources than the earth can yield at a sustainable rate are used

### Challenges

- Water consumption grows by 2.5% per year faster than world's population
- Demand shifts to regions with already scarce resources
- Availability of water is one of the determinants of new development

- Rising need for sustainable infrastructure solutions in cities
- Industrial/Municipal wastewater subject to higher treatment standards

- Increasing water scarcity
- Growing need for environmental care
- Challenge to reduce the irresponsible consumption of natural resources
- Rising energy expenses for water treatment and transportation

# The Equation Has Changed – We need to Link Water, Energy and Climate Together

## Historic Water Paradigm

- Water is a right
- Water is cheap
- Water is available 24/7/365 everywhere

## Reality

- Water is scarce
- Water is getting more expensive
- Water has to be paid for
- Water treatment and transportation is a high consumer of energy
- Waste Water is a significant producer of CO<sub>2</sub>



## Conclusions “Charting our Water Future”

- Water is everyone’s business
- Strategy to achieve water resource security must be a joint effort of all stakeholders
- Historic rates of productivity will contribute only 20% of global supply – demand gap
- Agriculture plays a key role: crop per drop must be maximized
- Unpopular changes in policies based on regions’ social-economic priorities
- Technology plays a key role to link water, energy and environmental sustainability through radical innovation

Source: “Charting our Water Future”, the 2030 Water Resources Group 2009

## Sustainability Solutions

- Reuse of wastewater for irrigation
- Reuse of treated wastewater for industrial cooling or boiler feed water
- Recharge of groundwater, replenishment of seawater barrier, with treated wastewater
- Desalination
- Reuse of industrial process water
- Zero liquid discharge
- Waste-to-Energy



## **What do we look for?**

***The lowest Total Cost of Ownership***

***Innovative solutions***

***Substantial Energy Savings***

***Local components were used where appropriate***

***Alignment between local needs with regional priorities and within global framework / guidance of customer organization***

***Long-term partnership***

***Extended services to ensure continuous improvements***

# Siemens is providing innovative solutions to some of the most pressing global water problems

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## The Challenges for Water

- **Availability:** Water is scarce in most regions with highest population growth
- **Affordability:** Reduce the cost for water and wastewater treatment
- **Safety:** Meet WHO standards and minimize water contaminations
- **Efficiency:** Re-use water and improve energy efficiency of water treatment

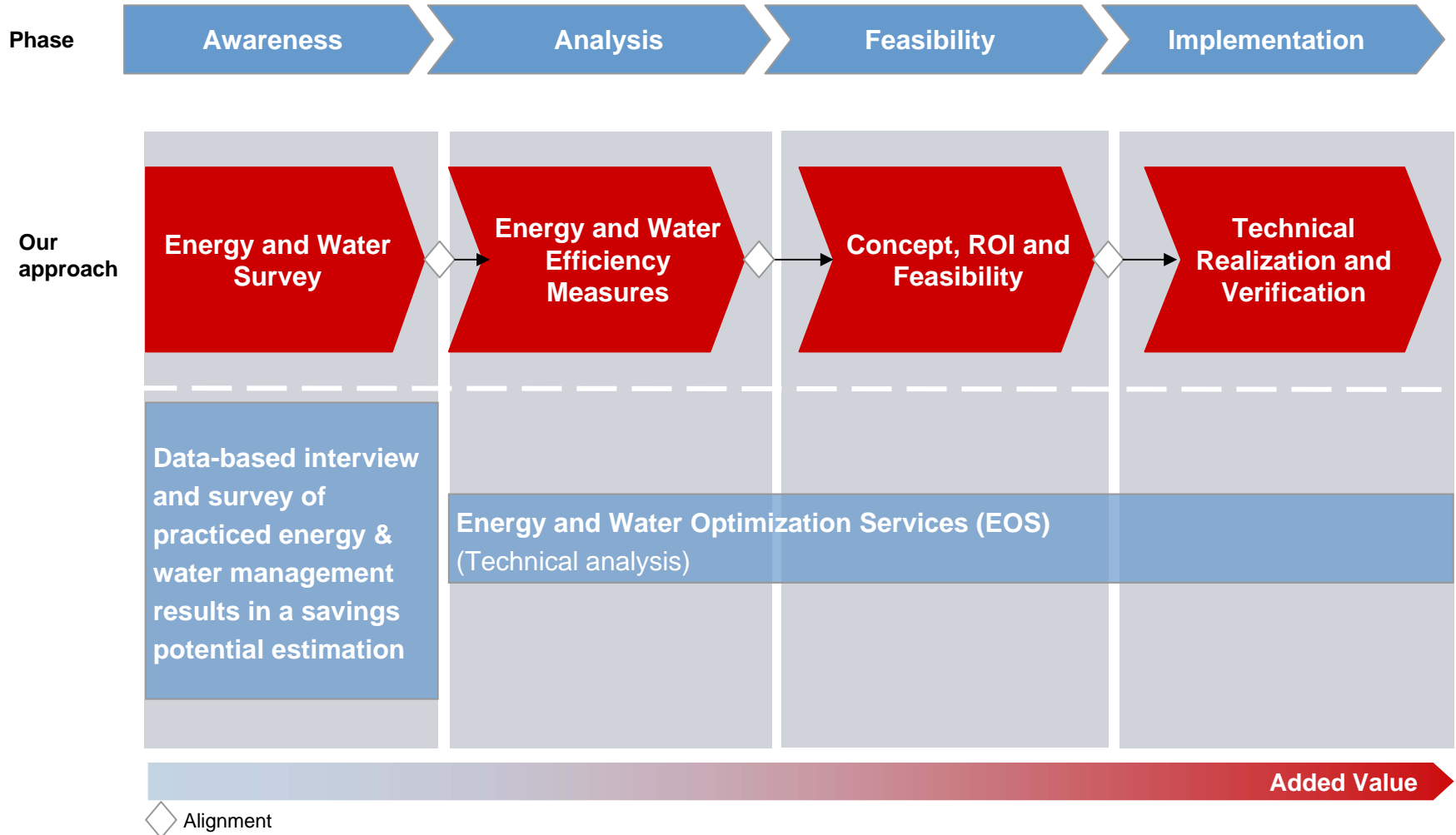
## The Answers

- Ongoing **improvements of existing technologies** (e.g., membranes, clarification)
- Development and **commercialization of breakthrough technologies** (electrochemical desalination, advanced biological treatment, hollow fibres, trace contaminant removal)
- **Combining multiple treatment technologies** to address complex water problems



# The Siemens Water- and Energy- Assessment Model

*typically achieving >20% savings of Energy- and Water bills*



# Siemens helps companies understand their water and energy issues and is now developing an assessment to help understand both in an integrated way



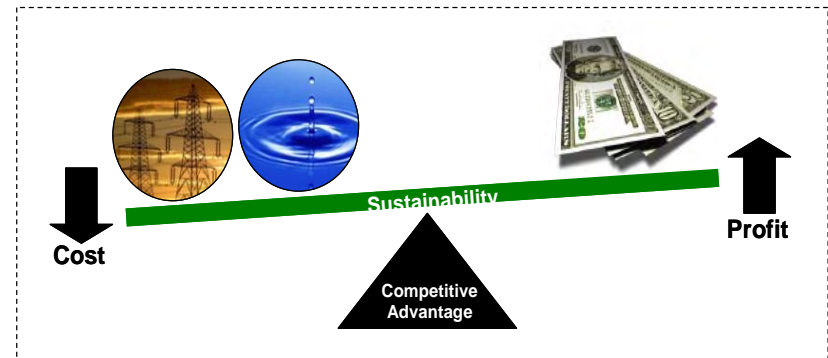
## Energy and Water at Siemens



## Objective

To create an integrated water & energy assessment service that can identify and elaborate measures for water and energy savings...  
 ...that leads to the optimization of resources and thereby positively impacts the customers sustainable and financial goals.

## Integrated audit



## Siemens Water Technologies Solutions

Municipal



Oil & Gas



HPI/CPI



Power



Pharmaceuticals



Electronics



**SWT  
Solutions**

Mining & Minerals



Metals



Food & Beverages

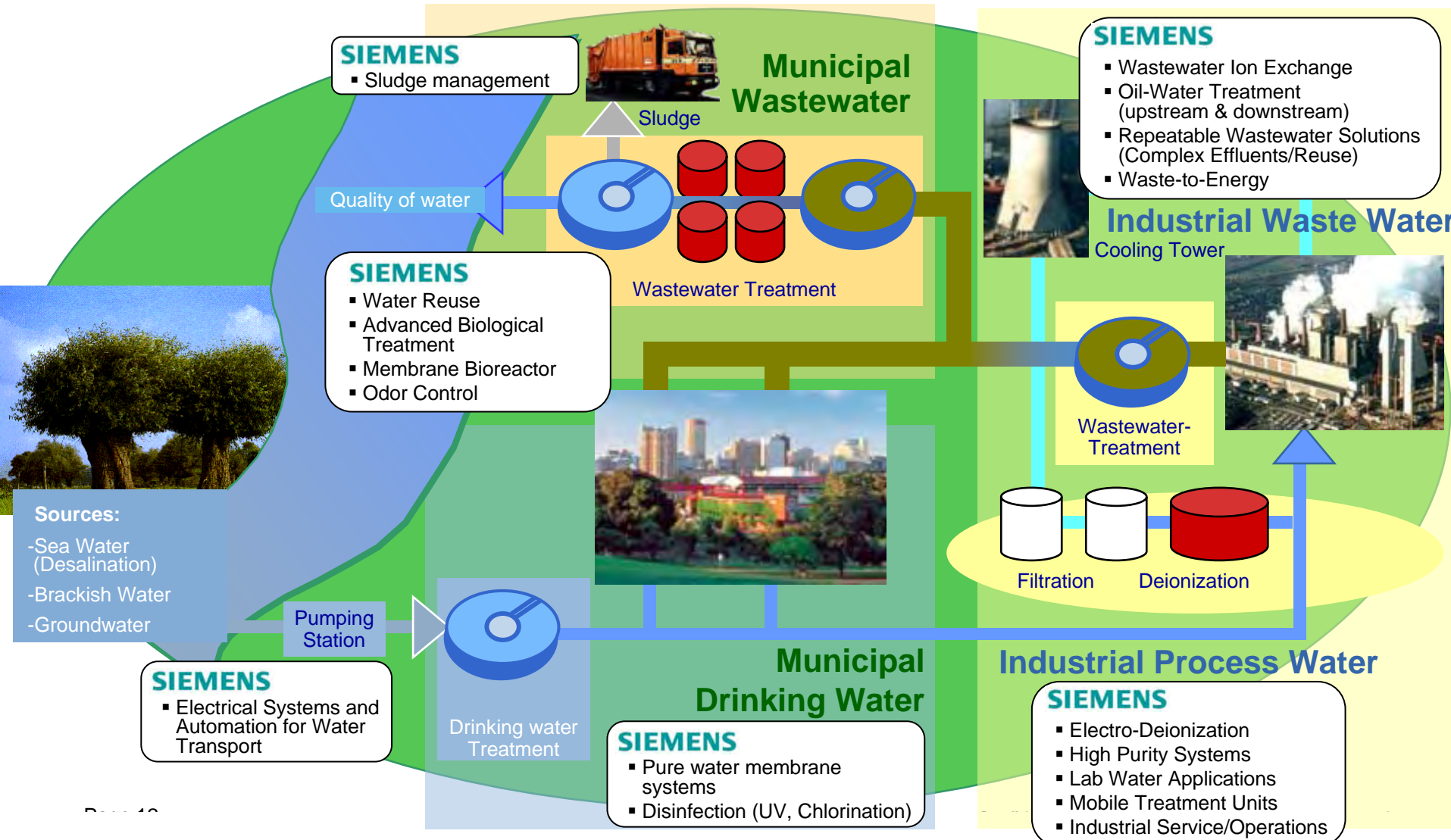


Commercial



# Technologies all along the water cycle **SIEMENS**

(selected)



# Pilot Plants for Desalination

## @ Variable Salinity Plant, PUB Singapore



### E-Desalination

- Develop and demonstrate new desalination technology based on ED/EDI with  $< 1,5$  kWh/m<sup>3</sup> energy demand
- Develop new IX membranes and module types for cost competitive offering by 2012
- Pilot operation of new desal process



## Pilot Plants for Advanced Biological Water Treatment



### Biotechnology “Green Technology”

- Demonstrate feasibility to retrofit large scale treatment plants to approach virtually zero energy consumption, reduce CO2 footprint and reduce sludge generation
- Process contact stabilization and anaerobic sludge digestion; improved denitrification
- 50 m3/day demonstration as basis for future commercialization

### MBR Validation Plant

- 1000 m3/day MembraneBioReactor System at Changi to develop and validate new innovative membrane products and process concepts under full-scale conditions.
- Technology Demonstration site for Siemens to accommodate sales & marketing efforts in ASEAN.
- Collaborative project with PUB. Operations begin in December, 2009



# Upgrade Solution to Minimize Waste, Energy and Improve Discharge: Inegol Industrial Zone , Turkey



### Project Facts

- **Project:** Municipal WWTP with 50% textile contribution
- **Capacity:** 130 MLD
- **Operative:** July 2009

### Siemens Value Provided

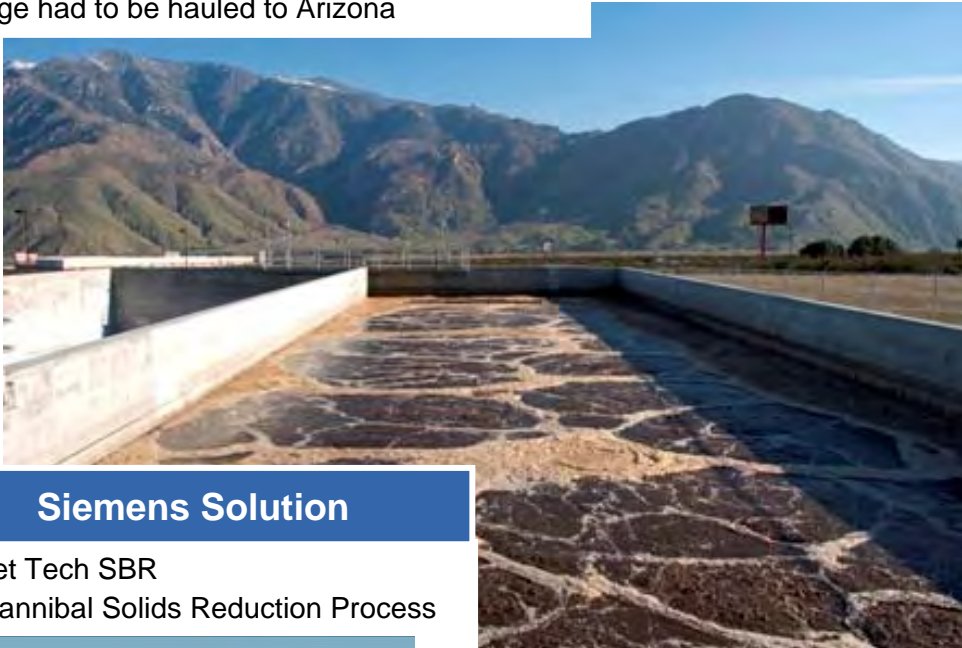
Metric	Conventional	SWT Solution	Savings
<b>Capacity:</b> (in MLD)	55	130	Before vs After
<b>Sludge Reduction for 130 MLD:</b> (in Tons)	152	75	~\$0.3 M/yr savings
<b>Installed Power:</b> (in KW)	3,510	2,441	~\$0.7 M/yr savings
<b>Additional Land Requirement:</b> (in m2)	21,056	7,100	

# Solution to Minimize Waste and Energy Usage: Morongo, CA

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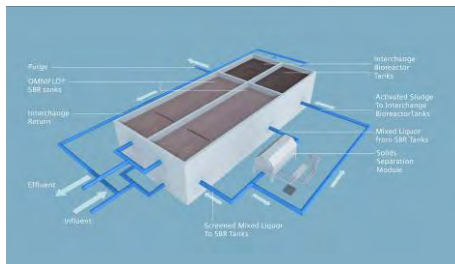
## Customer Perspective

- New Casino required an easy to operate WWTP
- Reduced Energy due to high power costs in CA
- Sludge had to be hauled to Arizona



## Siemens Solution

- Jet Tech SBR
- Cannibal Solids Reduction Process



## Siemens Value Provided

- No Biosolids hauled from the plant since start-up in December 2004
- Significant Power savings of \$44,000/year equivalent to a 52% reduction
- Achieving effluent quality well below required parameters



## Project Facts

- **Project:** Wastewater treatment system
- **Customer/End user:** Morongo Indian Tribe
- **Capacity:** 0.75 MGD/ 3 MLD
- **Operative:** December 2004

# SWT Solution to Minimize Waste & Reuse Healdsburg, CA USA

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## Project Facts

- **Project:** New WWTP
- **Capacity:** 1.6 MGD/6 MLD
- **Operative:** May 2009

## Siemens Value Provided

- Effluent < 5 BOD, 5 TSS and 0.2 NTU Turb
- City revenue through industrial reuse
- Sludge disposal savings of \$174 K/yr

## Siemens Solution

- MBR integrated with Cannibal Solids Reduction Process



# Case Study

## Singha-Brewery: Waste - to - energy

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### Project Facts

- **Project:** Waste Water Treatment Plant  
Capacity: 5320 m<sup>3</sup>/d
- **Customer/End User:** Khon Khaen  
Brewery, Thailand
- **Project Value:** ~USD 2'600
- **Operative:** March 2007

### Location



**Khon Khaen**  
**Major City in**  
**Northeastern**  
**Thailand**



### Scope

#### Total Solution including:

- Pre-Treatment
- Anaerobic / Aerobic Treatment
- Sludge Dewatering
- Chemical Dosing
- Installation and Commissioning

### Benefits

- Net **reduction in energy** costs
- Generated Methane **gas can be used** as fuel
- Discharge **compliance**
- **Enhanced corporate reputation**, community engagement
- **Reduced business risk** from less vulnerability to external electrical; supply

# Singapore Sembcorp NEWater Project at Changi (288 mld )

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Largest Singapore NEWater project (Commissioned)

- Peak flow up to 316 ML/d UF filtrate
- 6 + 1 MEMCOR® CP960 (L20V) units = 6720 membranes-
- 255360 m2 about 30 soccer fields of surface area for filtration



## **What is common in all the plants we have built**

***The lowest Total Cost of Ownership***

***Innovative solutions***

***Substantial Energy Savings***

***Local components were used where appropriate***

***Alignment between local needs with regional priorities and within global framework / guidance of customer organization***

***Long-term partnership***

***Extended services to ensure continuous improvements***

**Water: Our responsibility for a precious resource**

