Republic of South Africa
Durban Municipality, Water & Sanitation Unit

Collaboration Program with the Private Sector for Disseminating Japanese Technology for Energy-Saving Desalination System Promotion in Durban in South Africa

Final Report (Public Version)

February 2016

Japan International Cooperation Agency (JICA)

Hitachi, Ltd.

Table of contents

Abbreviations

BEE: Black Economy Empowerment

B-BBEE: Broad-Based Black Economy Empowerment

CoGTA: Department of Cooperative Governance Traditional Affairs

DWS:Department of Water and Sanitation

DWA:Department of Water Affairs

DPR:Direct Potable Reuse

EWS:eThekwini Municipality Water and Sanitation Unit

IPR: Indirect Potable Reuse

PPP: Public Private Partnership

RFP: Request For Proposal

SALGA: South Africa Local Government Association

Figures and tables

1. Project overview

1.1 Subjects, background and purpose

The rainfall in Republic of South Africa is as small as 500mm per year, and water shortage is an issue in the whole nation. eThekwini Municipality having a 3.6 million population, which is the second largest in Republic of South Africa, is one of the foremost holiday resorts in Africa. But it also has an industrial zone including a factory of Toyota Motor Corporation. Furthermore, it is also one of the most prominent urbanized areas in Africa having a trading port, which is the largest in Sub-Saharan district. Since the demand for water is increasing year after year because of increase of the population and economic growth, eThekwini Municipality is chronically short of water sources. According to a forecast made by eThekwini Municipality, it is anticipated that serious drought condition will arise in 2019 as shown in Figure 1, and it is a large subject for the Municipality.

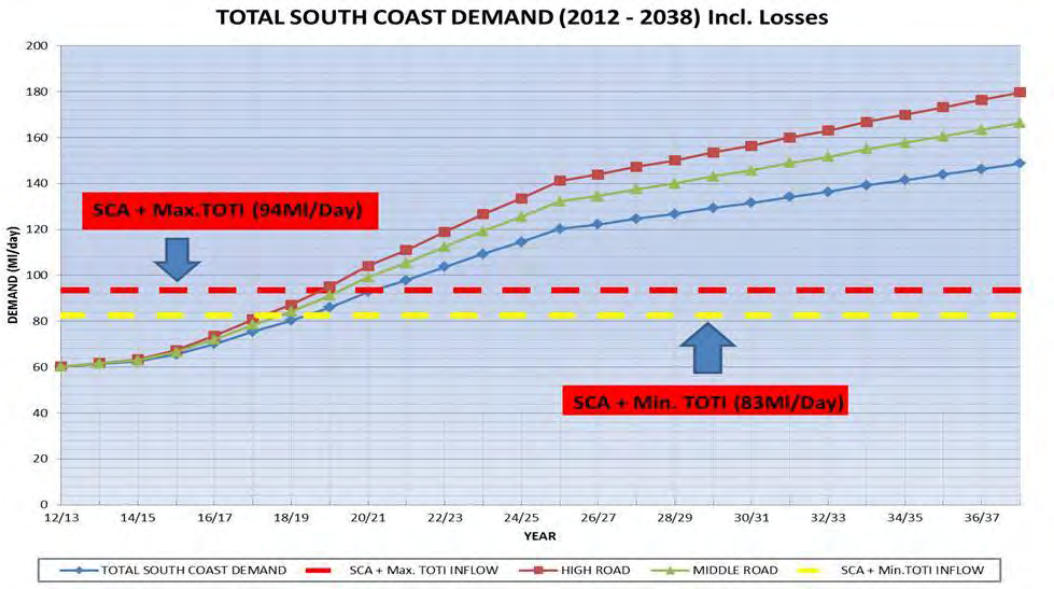


Figure 1 Water demand-supply balance in the Southern area estimated by eThekwini Municipality (provided by the Municipality)
(SAC: South Coast Augmentation, TOTI: Name of a drinking water treatment plant)

In preparation for the shortage in 2019, eThekwini Municipality is planning two wastewater reclaimed water projects for drinking water and two desalination projects because of this reason. By introducing a desalination system possessed by the proposing enterprise, it becomes possible to solve water shortage at operation costs that are lower than those of a desalination system using general reverse osmosis membranes. Stable water supply is expected to make contribution to upgrade of citizens' living, economic growth and industrial growth. Furthermore, this system involves the possibility to make contribution also to elimination of water shortage in the entire nation, and attempts to promote understanding of the government and to identify needs of local governments such as Cape Town involve the possibility to create additional beneficial effects.
Hitachi, Ltd. is of the policy to globally develop social infrastructure businesses such as water business. In Republic of South Africa, Hitachi signed an MOU with The Development Bank of Southern

Africa for the first time as a private enterprise with cooperation in the water infrastructure as the purpose, and has been positively promoting activities toward expansion of water infrastructure business in Republic of South Africa. This project is to conduct operations by entering the water infrastructure construction and water supply business through introduction of Energy-Saving Desalination System "RemixWater" to Durban and to promote dissemination of Hitachi's technology with the purpose to use it as a catalyst for expansion of Hitachi's water infrastructure business in Republic of South Africa.

Energy-Saving Desalination System "RemixWater" is a system that integrates wastewater treatment recycling processes with desalination processes. Because of this reason, it is necessary to obtain permits from multiple departments of municipal bodies, upon their understanding, besides water and wastewater relevant departments, including (1) Permit for use of wastewater treated water, (2) Permit for use of land, (3) Permit for construction, (4) Permit for use of seawater, (5) Permit for execution of ocean civil engineering works, (6) Environmental assessment and (7) Permit for water supply from PPP business.

To implement an infrastructure business, on the other hand, it is necessary that the business is financially supported by the Japanese government, reliance is obtained from Republic of South Africa and eThekwini Municipality, an adequate business model is formulated and the business is positively promoted. Understanding of relevant schemes, laws and legislation of Republic of South Africa and eThekwini Municipality as well as understanding of Japanese schemes by the counterpart are essential because of this reason.

Thus, it is essential for materialization of the project that the South African Government and eThekwini Municipality understand the technology and its necessity as well as Japanese schemes.

Acquisition of understanding of eThekwini Municipality and relevant organizations on the technology of RemixWater, business scheme and Japan's support system to draw a road map toward introduction of RemixWater is a purpose of this project.

1.2 Target area

Durban, Johannesburg and Pretoria

1.3 Implementing agencies of the counterpart

eThekwini Municipality, Department of Water and Sanitation (DWS) of Republic of South Africa, etc.

2. Project implementation policy and method

2.1 Implementation policy

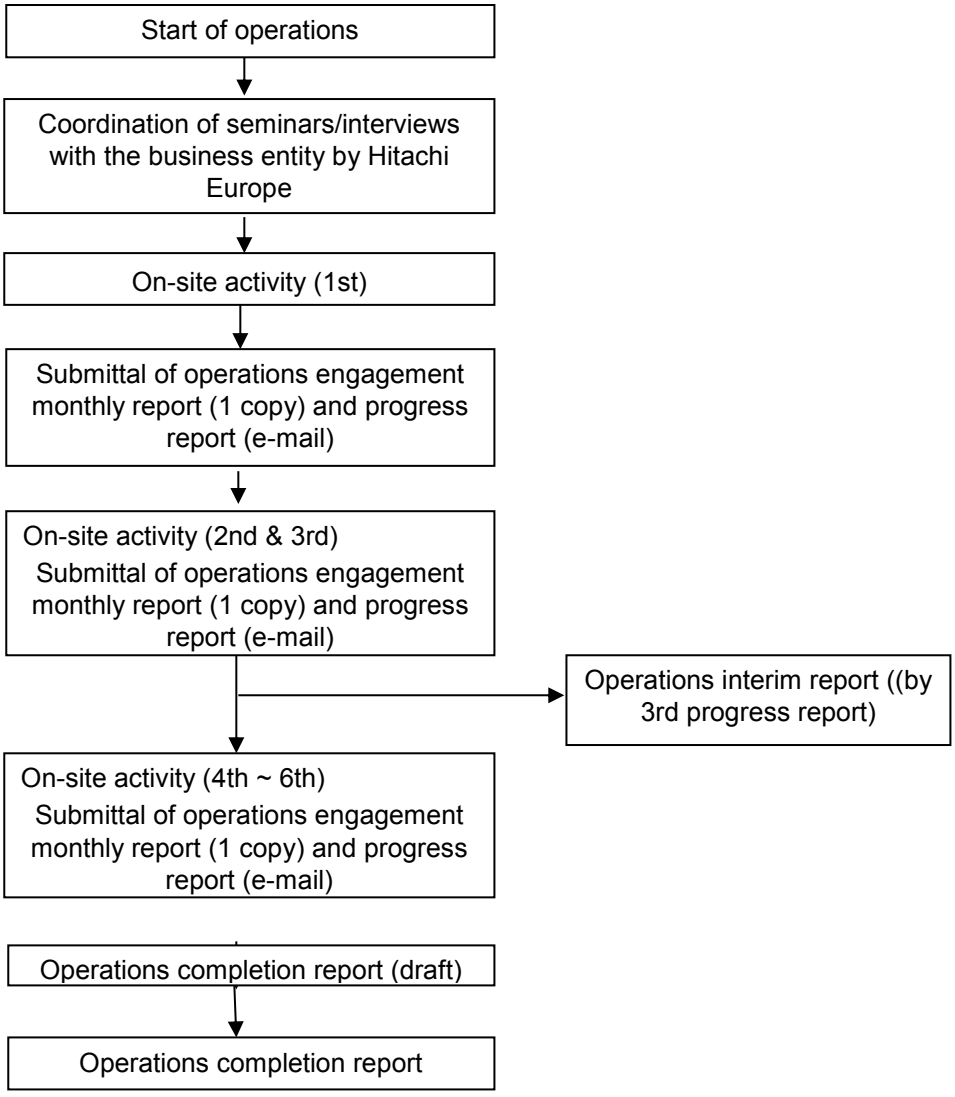
With eThekwini Municipality as the implementation target agency, urge understanding of implementing agencies on the pertinent technology by promoting introduction of Energy-Saving Desalination System (RemixWater) to eThekwini Municipality is urged, and review the possibility of introduction of RemixWater to Durban.

2.2 Method for implementation

Implement technology dissemination and promotion operations by holding on-site seminars and/or by interviews.

2.3 Flow of operations

The flow of operations is indicated below:



2.4 Project implementation structure

Table 1 shows the project implementation structure.

Table 1 Project implementation structure

Name	In-charge operations	Belonging	On-site activity*
Yukiko Ichige	Overall coordination, advance preparation, technological lecture, arrangement of deliverables	Hitachi, Ltd	1,2,3,4,5,6
Koji Uebayashi	Coordination between South Africa and Japan (schedule and confirmation of situation)	Hitachi, Ltd	—
Katsuhiro Mibu	Financial analysis of business model/risk analysis	Hitachi, Ltd	2,4
Katsuhiko Shimizu	Formulation of fund raising plan/business implementation schedule	Hitachi, Ltd	5,6
Takashi Yamaguchi	Technological examination	Hitachi, Ltd	1,3,4
Akihiro Tanaka	Financial examination	Hitachi, Ltd	2,3,4
Satoshi Yoshitomi	Coordination on the Republic of South Africa side	Hitachi Europe, Ltd	1,2,3,4
Dlengezele Nosizwe	Explanation of this project and schedule adjustment	Hitachi Europe, Ltd	1,2,3,4
Fasemore Olufemi	Technological lecture	Hitachi Europe, Ltd	1,2,3,4,5,6
Yukihito Kikugawa	Preparation and operation of seminar rooms	Hitachi Europe, Ltd	1,2,3,4,5,6

* See Table 2 for on-site activity.

The following persons joined on-site activities with their expenses borne by Hitachi.

<1st>

Yutaka Okuno Deputy General Manager, , Water & Environment Solution D,
Infrastructure Systems Company, Hitachi, Ltd.

<2nd>

Akira Yokoyama General Manager,
Global Water Solutions Division Infrastructure Systems Company, Hitachi, Ltd.

Hiromu Nishimura Department Manager,
Business Development Department
Global Water Solutions Division Infrastructure Systems Company, Hitachi, Ltd.

2.5 Time schedule of on-site activities

Table 2 shows the time schedule, description and personnel for on-site activities.

Table 2 Time schedule, description and personnel for on-site activities

Activity	Schedule	Activity description	Personnel
On-site activity 1	2014/9/23-26	Explanation of business of JICA to eThekwini Municipality; on-site investigation in Durban	Hitachi Europe: Yoshitomi, Delengezele, Fasemore, Kikukawa, Ichige, Yamaguchi, Okuno
On-site activity 2	2014/10/24	Promotion of understanding on technology, PPP/Finance and business model by relevant departments of eThekwini Municipality	Yoshitomi, Delengezele, Ichige, Tanaka, Yamaguchi, Mibu
On-site activity 3	2014/11/19-25	Promotion of understanding on technology, PPP/Finance and business model for local banks and development banks; interview with eThekwini Municipality	Yoshitomi, Delengezele, Olufemi, Ichige, Tanaka
On-site activity 4	2015/3/8-14	Promotion of understanding on technology, PPP/Finance and business model for local banks and development banks; preliminary discussions with eThekwini Municipality; preliminary discussions with local research companies (such as consulting companies) for market research in South Africa	Olufemi, Kikukawa, Ichige, Tanaka
On-site activity 5	2015/4/21-25	Publicity of technology to central government ministries and agencies; preliminary discussions with local research companies (such as consulting companies) for market research in South Africa	Olufemi, Kikukawa, Shimizu, Ichige
On-site activity 6	2015/7/27-30	Reporting of termination of the project to eThekwini Municipality and JICA South Africa Office	Olufemi, Ichige

In addition, hearing studies were also conducted in Japan with Japanese and non-Japanese financial institutions regarding financial situation in South Africa and so forth, and they are described later.
Acceleration of the business dissemination promotion is attempted in this project by re-consignment of the following investigations:

・Investigation of B-BBEE laws in Republic of South Africa and their summary

・Investigation of cases of water and wastewater PPP in Republic of South Africa (including eThekwini Municipality)

・Investigation of cases of DPR/IPR in Republic of South Africa

3. Technology dissemination and promotion activities

3.1 Overview of energy-saving desalination technology (RemixWater)

As a part of “Project on Water saving Recycling Systems” of NEDO, a “desalination/recycled wastewater reuse integrated system” was demonstrated in Water Plaza Kita-Kyushu, and this technology was established

in Japan in the course of stable running for about 3 years from April 2011 to February 2014. Since this technology is of energy-saving and low environmental load compared to a desalination system using reverse osmosis (RO) membranes, the raw water is not limited to wastewater only, and evolution of this technology can be anticipated as a “desalination/water reuse integrated system” with EPC (design, procurement, construction) through water supply business as targets in coastal areas of inside and outside of Japan that are facing the issue of water shortage.

This energy-saving desalination technology is described below: It is necessary for a desalination system using RO membranes to supply the seawater to RO membranes at a pressure that is higher than the osmotic pressure produced by the salt concentration in the desalination process using RO membranes for removing salt contained in the seawater. Accordingly, it applies a high pressure of about 6~7MPa using a high pressure pump to cause the seawater to pass through RO membranes. About 50% of the running cost is occupied by the cost of the electricity consumed by the high pressure pump, and extremely high power consumption is a large issue. Furthermore, in the conventional desalination process, the brine having high salinity is discharged from seawater system RO simultaneously with the production of desalinated water. The brine having the salinity level of 7% is discharged to the sea, and the environmental impact is an issue. Figure 2 shows an overview of equipment related to the applied technology.

By integrating desalination process and water reuse process, the technology achieved energy saving and less environmental impact. In the integrated system, intake seawater is diluted by the brine from the sewage system RO process and diluted salinity level in the seawater desalination process requires lower pressure level of 3-4MPa, which save the electricity consumption.

By diluting the intake seawater, the salinity level of the brine from the integrated desalination system RO is about 3.5%, which is almost equal to the seawater, this system suppresses the impact over the ocean environment.

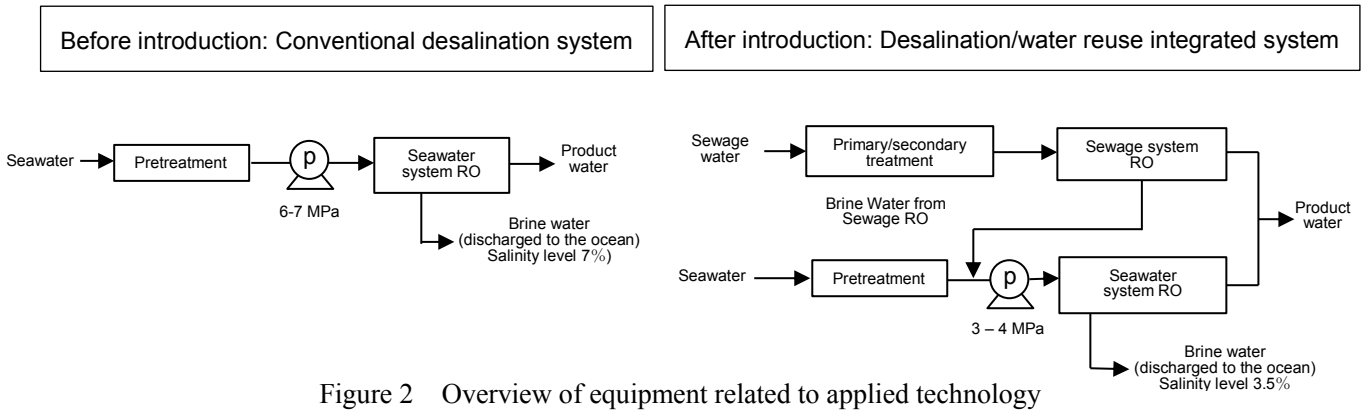


Figure 2 Overview of equipment related to applied technology

3.2 Explanation/reporting of the project to eThekwini Municipality and on-site investigations

We explained this project to eThekwini Municipality on September 25th as the first on-site activity. How this first activity was conducted is shown in Figure 3. It was commented by eThekwini Municipality that this project is welcomed and it is expected to make progress as scheduled. Furthermore, it was agreed that a seminar that will enable concerned parties of eThekwini Municipality to understand this technology will be held in October as the second on-site activity, and eThekwini Municipality promised to cause their top officials to attend the pertinent seminar.

Figure 3 Appearance of 1st on-site activity

On Friday, September 26th, an overview of water infrastructure and water business of eThekwini Municipality were introduced from the Municipality. What were presented at this occasion are briefly described below: Bulk water of 850,000m3/day is supplied to Durban from Umgeni Water (that executes construction, operation and water distribution from drinking water treatment plants for Durban, Pietermaritzburg and others) of Water Board (institution that manages drinking water treatment plants and water distribution in the area; a sub-organization of DWS). Besides, eThekwini Municipality has its own drinking water treatment

plants in five places, and is supplying 850,000m3/day to about one million people. The total extension of the water distribution network is 15,000km, and it includes 280 catchments. Regarding wastewater, eThekwini Municipality operates and manages waste water (wastewater, industrial discharge water) treatment works in 27 places. The piping network is of a total extension of about 8,000km (it is about 11,000km in Yokohama City of almost equivalent population scale), and wastewater/ discharge water of 450,000m3/day is collected and treated. The coverage of drinking water service in the whole city is 92.6% of the population (uncovered areas are Informal Settlement and rural areas), and the coverage of the wastewater service is 78.8% of the population.

Regarding introduction of this Energy-Saving Desalination System, eThekwini Municipality selected the ground of "A" WWTW (WWTW: Waste Water Treatment Works) as a point of introduction of this technology. The points indicated in light green in the map of Durban shown in Figure 4 are waste water treatment works managed and operated by eThekwini Municipality. "A" WWTW is located at about the center of the Durban area facing the Indian Ocean. Its operation was commenced in 1956. The design treatment capacity is 130,000, and actual operation capacity is 80,000m3/day. In addition, the operating capacity is of an increasing trend accompanying increase of the population in the peripheral area. The majority of the waste water comes from local households.

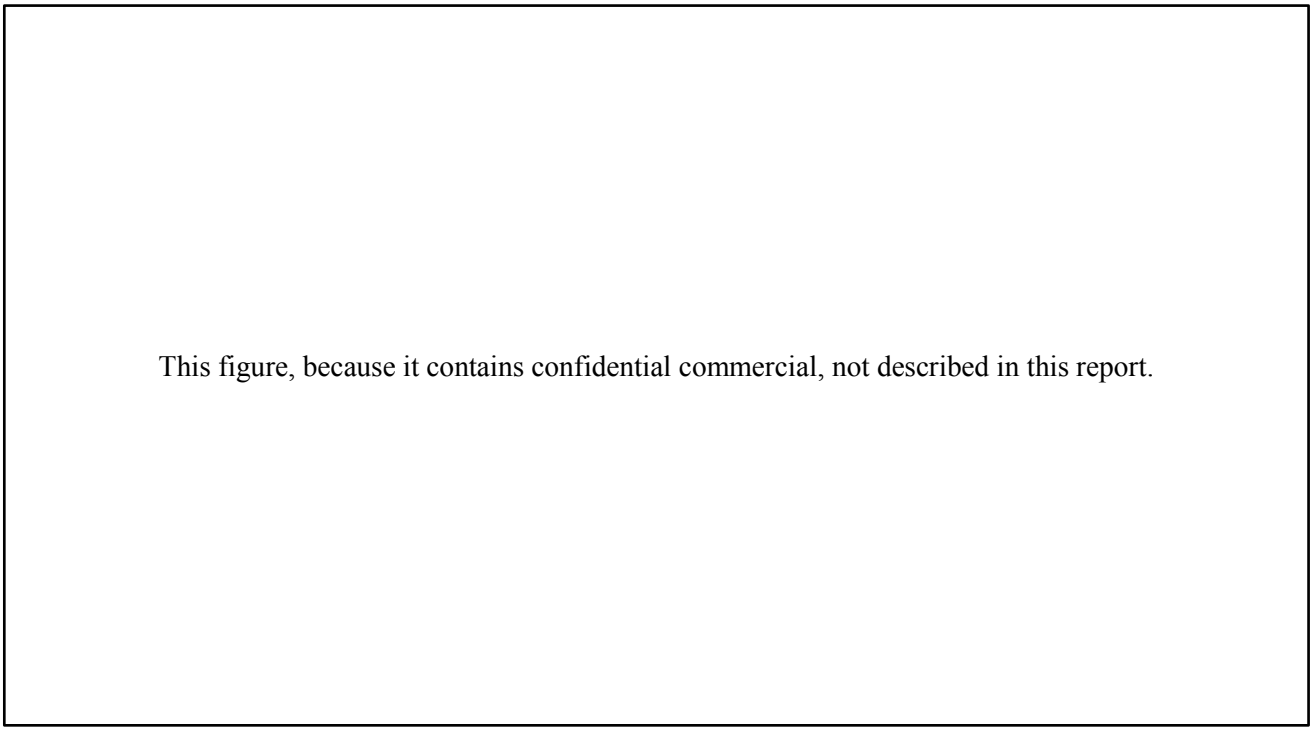


Figure 4　Waste water treatment works and "A" WWTW in Durban
(Source: Prepared and provided by eThekwini Municipality)

During the on-site activity conducted on the 26th, we visited "A" WWTW, scheduled site of project implementation, and also South WWTW located nearby. On the 29th, we visited other waste water treatment works and the water quality analysis laboratory possessed by eThekwini Municipality. Figure 5 shows various facilities.

Figure 5　Water and sewage facilities and analysis laboratory of eThekwini Municipality visited on September 26

3.3 Technology introduction seminar in eThekwini Municipality

As the second on-site activity, we introduced the Energy-Saving Desalination System in a seminar style at Hilton Hotel in Durban on October 24, 2014. The morning session was for executives (those of deputy manager and senior manager class; those from finance, investment and energy departments also attended the session). The afternoon session was for professionals (manager to engineer class, partly senior manager class). Thus two sessions were held in total. The seminar composition is shown in Table 3, and an appearance of the seminar is shown in Figure 6.

Table 3 Composition of technology introduction seminar

Hour	Item	Speaker
9:30	Opening speech	Satoshi Yoshitomi, General Manager of Johannesburg Office of Hitachi Europe, Ltd.
9:40	Address from eThekwini Municipality	Mr. Dhevan Govender, Senior Manager of Commercial And Business Unit, (eThekwini Municipality, Water and Sanitation Unit)
10:00	Hitachi's water business	Akira Yokoyama
10:15	Energy-saving desalination project in eThekwini Municipality	1. Introduction of technology and merits of introduction of this technology at eThekwini Municipality: Yukiko Ichige 2. Structure of PPP business: Katsuhiro Mibu 3. Finance arrangement in a water infrastructure PPP: Akihiro Tanaka
10:45	Introduction of JICA	Yuko Kanto, planning researcher, Republic of South Africa Office, JICA
11:10	Hitachi's social contribution activities	Ms. Nosizwe Delengezele, Manager, Johannesburg Office of Hitachi Europe, Ltd.
11:20	Questions and answers	—
11:30	Closing	

During the opening speech, General Manager, Yoshitomi of Johannesburg Office spoke about the outline of business of Hitachi in South Africa and the relation in the past between eThekwini Municipality and Hitachi. In addition, he expressed appreciative words to eThekwini Municipality for having a strong interest in Hitachi's technology and particularly for positive review regarding introduction of this technology, and requested further cooperation in the promotion of activities toward introduction of this technology in the future.

eThekwini Municipality spoke appreciative words regarding activities of Hitachi in the past, expressed concerning the situation of water shortage in South Africa, "Issues of South Africa include HIV and energy, but the next crisis lies in water" meaning that water shortage is an urgent task for the nation.

Figure 6　Appearance of the seminar

The seminar was of an extremely good atmosphere throughout sessions, and questions and answers were also vigorous. Principal comments and questions are described below:

- The idea is splendid. As wastewater reclaimed water is combined with desalination and processes are rather complicated, its operation in Durban is difficult. I recommend a BOO project instead of BOT project. (Investment senior manager)
- The chemical cost of RemixWater is higher than that of conventional desalination. What is the reason for it?
  → (Answer) Because of use of wastewater-originated water, it is unavoidable that the chemical cost is higher than that of conventional desalination due to the issue of organic matters. However, during demonstration tests conducted for 3 years, we were not able to suppress rise of the pressure difference in the first year. But we were able to optimize the chemical quantity while suppressing the pressure difference in the second year and subsequent.
- Wasn't the desalination unit price compared with a dam?
  → (Answer) As fundamental examination only was made this time, comparison was made only between conventional desalination and Remix based on a request from Water & Sanitation Unit.
- When the cost is compared with recycled wastewater reuse, which is higher?
  → (Answer) RemixWater is higher.
- If recycled wastewater reuse costs less, what are advantages of RemixWater?
  → (Answer) An issue of recycled wastewater reuse is that only about one half of the waste raw water can be reused. In an area where water shortage is serious, there are cases where sufficient waste raw water cannot be supplied from wastewater. In such a case, introduction of RemixWater costs less compared to individual introduction of desalination.
- We are annoyed by the discharge water from an industrial zone located in an inland area. It is discharged to the river mouth without decent treatment. What is the solution to such an issue?
  → (Answer) It varies by the water quality.
- Residents in the vicinity of "A" WWTW are of high environment consciousness. As structures that spoil the scenery are rejected, care should be exercised. Water is discharged from "A" WWTW after primary treatment only at present, and it is in question. There is a policy of the nation that specifies that up to secondary treatment should be executed at every waste water treatment works.

3.4 Technology explanation and project hearing to financial institutions

Technology explanation and project hearing was executed to know opinions from financial institutions. Table 4 shows list of targets of financial institution hearing studies.

Table 4 List of targets of financial institution hearing studies

This table, because it contains confidential commercial, not described in this report.

a) Finance relevant matters

The following comments were obtained regarding finance relevant matters.

Because it contains confidential commercial, this section is not described in this report.

b) Business model relevant matters

The comments obtained concerning the project structure are indicated below:

Because it contains confidential commercial, this section is not described in this report.

c) Comparison of financial institutions

Table 5 shows a comparison of results of hearing studies at financial institutions.

Table 5　Comparison of results of hearing studies at financial institutions

This table, because it contains confidential commercial, not described in this report.

d) Subjects in the future

Because it contains confidential commercial, this section is not described in this report.

3.5 Explanation of technology to central government ministries and agencies and investigation of government financial scheme

To materialize a PPP project in South Africa, it is necessary to obtain a PPP approval from PPP Unit of National Treasury, which is one of central government ministries and agencies.

We interviewed with CoGTA (Cooperative Governance Traditional Affairs http://www.cogta.gov.za/), which is granting subsidies for infrastructure projects run by states and local municipalities. CoGTA introduced us MIG (Municipal Infrastructure Grant), which is the largest grant for municipalities in South Africa. In addition, concerning water administration of municipalities, CoGTA spoke regarding the Metropolitan (eThekwini Municipality is included in this category) level municipalities have sufficient power and they do not need power of central government ministries and agencies such as CoGTA. Table 6 shows results of hearing studies conducted at central government ministries and agencies.

Table 6　Hearing studies at relevant departments of central government ministries and agencies

	Date of interview	Principal actual achievement in South Africa	PPP model	Finance	Others
SALGA (central organization in charge of technologies and systems for municipalities in South Africa)	3/12/2015	Executes introduction of technologies, O&M training and project advices to all of 278 municipalities in South Africa. 97% of the budget is covered by membership fees paid by municipalities in South Africa.	For a PPP municipal cycle, consultation with PPP Unit should be made together with the municipality for sure. At least, consultation by Hitachi alone is no good.	“Regional Bulk Infrastructure Grant” can be used for RemixWater by eThekwini Municipality. It is necessary for the municipality to file an application to National Treasury. The budget is $900mil for 3 years. It may be used for purchase of goods, Civil and PPP.	Commonwealth Game in 2022, for which eThekwini Municipality is the only candidate, seems to become a trigger for this project. It is mentioned that NRW (water leakage measures) is a large subject for South Africa and budget has been allocated to it.
DWS (Department of Water and Sanitation)	3/13/2015		It is recommended that approach to a municipality is implemented directly.	Where the municipality has no budget, use of Regional Bulk Infrastructure Fund of National Treasury is recommended. It is necessary for the municipality to file an application to National Treasury. There is no case DWS is directly involved in this process.	The interviewee has an experience of visiting Japan in 2013 by a JICA program. He is strongly interested in water and wastewater technologies of Japan. The name of this department was changed last year from DWA to DWS. The target was expanded from water only to water and sanitation, and the authority of the department was also expanded. The fields the South Africa Government is focusing are: 1. O&M 2. Inexpensive desalination 3. AMD (mine wastewater treatment) 4. Wastewater treatment He thinks that RemixWater has an extremely large potential in South Africa. In municipalities located along the coastline, there are many desalination plants where installation of equipment was completed but they are not run at all or are run only in an emergency due to high electricity expense.

3.6 Investigation of water infrastructure business in South Africa

By reconsignment of the investigation concerning PPP and water infrastructure projects in South Africa, we conducted activities to enrich contents of these dissemination promotion activities and to accelerate evolution of the business in the future.

3.6.1 Selection of an investigation company

For selection of an investigation company, we prepared an RFP (Request for Proposal) first of all for the contents of investigation and presented it to three companies. We acquired proposals from them after interview, and we then selected a company through careful examination of the proposal and interview.
We selected as candidates three companies, that is, “F” Company, which is a consultant of infrastructure technology in South Africa, “G” Company, which evolves consultation of infrastructure Transmission in a global form, and “H” Company, which is an accounting audit firm having an office also in South Africa.

3.6.1.1 Preparation of investigation contents RFP

We indicated the following contents as RFP.

A. Points of revision to B-BBEE (It was revised on May 1, 2015.)
B. Investigation of desalination matters and PPP matters in South Africa
C. Investigation of DPR/IPR matters in South Africa neighboring nations
D. Summary of action items and schedule in case a RemixWater project is implemented in South Africa eThekwini Municipality
E. Investigation of local enterprises that correspond to the water infrastructure value chain in South Africa

We interviewed each candidate after presentation of this RFP to candidates. Since the field in which each candidate has strength is different, we requested each candidate to make arrangement based on this RFP. We informed them that the time limit and budget should be observed for sure.

3.6.1.2 Screening of proposal and selection of a company

Again the submitted proposals, we implemented interview with “F” Company and “H” Company two times each, and we made discussions with “G” Company on the e-mail basis. We selected “F” Company, which was judged to be advantageous in all aspects of contents, expenses, prices and experiences, as the investigation consignment company as a result. A comparison of three companies is shown in Table 7.

Table 7 Comparison of consigned investigation companies

This table, because it contains confidential commercial, not described in this report.

3.6.2 Results of investigation

3.6.2.1 Investigation period

The investigation period was Monday, May 1 through Tuesday, September 7, 2015.

3.6.2.2 Results of investigation

A. Points of revision to B-BBEE (It was revised on May 1, 2015.)

The Codes of Good Practice of BBEE were changed from seven (7) elements to five (5) elements. It is because of the following view of the government:

1. For five years in the future, the government will make procurement of at least 75% from South Africa.
2. Further strengthening of creation of new industries and black people industries.
3. Strengthening of SME (a Small Medium Enterprise: an enterprise of annual sales 10mil rand to 50mil rand) enterprises

Five elements based on this revision and important points are shown in Table 8.

Table 8 B-BBEE elements and points

Code	Element	Points	Bonus	Total
100	Ownership	25	0	25
200	Management Control	19	0	19
300	Skills Development	20	5	25
400	Enterprise & Supplier Development	40	4	44
500	Socio-economic Development	5		5
	Total Points available	109	9	
	With Bonus points			**118**

Other important points are itemized below:

- It is necessary that an enterprise that is related to public matters has its own BEE compliance.
- The sales level was changed for each of enterprise entry EME (Exempted Micro Enterprises), QSE (Qualifying Small Enterprises) and Generic enterprises.
- To establish an SPC (Special-Purpose Company), each enterprise is requested to conforms to the Codes of Good Practice, and in addition, formation of a JV (Joint Venture) with South African enterprises is also required.

Enterprises are classified to levels shown in Table 9 as a result of scoring by these Codes of Good Practice.

Table 9　BEE level classification

BEE Status	Qualification	BEE Recognition Level
Level 1 Contributor	≧100 points on the Generic Scorecard	135%
Level 2 Contributor	≧95 but ＜100 points on the Generic Scorecard	125%
Level 3 Contributor	≧90 but ＜95 points on the Generic Scorecard	110%
Level 4 Contributor	≧80 but ＜90 points on the Generic Scorecard	100%
Level 5 Contributor	≧75 but ＜80 points on the Generic Scorecard	80%
Level 6 Contributor	≧70 but ＜75 points on the Generic Scorecard	60%
Level 7 Contributor	≧55 but ＜70 points on the Generic Scorecard	50%
Level 8 Contributor	≧40 but ＜55 points on the Generic Scorecard	10%
Non-Compliant Contributor	＜40 points on the Generic Scorecard	0%

B. Investigation of desalination projects in South Africa

Many of large-size water infrastructure projects such as dam projects in South Africa are implemented with loans using tariff revenue and government grants (Municipal Infrastructure Grant and Regional Bulk Infrastructure Grant) as the principal, and the number of PPP matters is not large. Representative desalination matters are indicated below:

Sedgefiled Desalination Plant (Knysna, Western Cape Province)

Site:	Sedgefiled (located in Knysna local municipal area of Southern Cape)
Background:	Knysna Municipality decided introduction of this plant as an emergency measure because of depletion of Karatra River occurred in 2009.
Process:	SWRO system (single pass)
Desalination rate:	1.5MLD (1500m3/day)
Schedule:	Bidding in 2009/10, introduced in 2009/12 (Introduction was decided in 3 months)
Finance:	Budget of Knysna Local Municipality based on the Grant Fund from National Tre

C. Investigation of PPP in South Africa

Gautrain Rapid Rail Link

Overview:	Railroad that connects Pretoria with the airport and Johannesburg
Off taker:	Gautrain Province
Project cost:	R25 Billion(at the time of financial close). It was the largest PPP infrastructure project in Africa in those days.
Schedule:	Commenced the operation in time for Succor World Cup in 2010.

Polokwane Hospital renal dialysis service

Overview:	The first hospital PPP in South Africa. An enterprise provides 100% clinical service. Many of hospital PPPs in South Africa thereafter are copies of this case.

Port Alfred and Settlers hospital

Overview:	Hospital PPP in Eastern Cape Province. An enterprise provides infrastructure and facilities management, and the province government provides a part of clinical service. This case was materialized because there were many retired medical staff in this area.

SanPark concessions

Overview:	The first tourist PPP in South Africa.

D. Investigation of DPR/IPR projects in South Africa and its neighboring nations

Due to the fact that this project makes use of wastewater recycling processes, this investigation was conducted because DPR/IPR matters in South Africa and its neighboring nations can be used for references as precedents.

New Goreangab Reclamation Plant, Windhoek, Namibia

Overview: 80% of Namibia is occupied by deserts and water shortage is serious. In Windhoek, which is the capital of Namibia, DPR has been used for 60 years because of this reason. “Former” Goreangab reclaimed water plant was treating the mixture of surface layer water and wastewater treated water. In the period of water shortage of 1968 to 1997 in Namibia, 18% of the water consumption in Windhoak was covered by this plant in 1997. Thereafter, this New Goreangan Water Reclamation Plant commenced its operation in 2002 after process improvement, expansion and 3-month test run. Figure 7 shows water sources and water distribution system in Windhoak.

Desalination rate: 7500m3/day. It covers 35% of the water demand in Windhoek today. (50% during the period of water shortage)

Operator: The Windhoek Goreangab Operating Company Ltd.

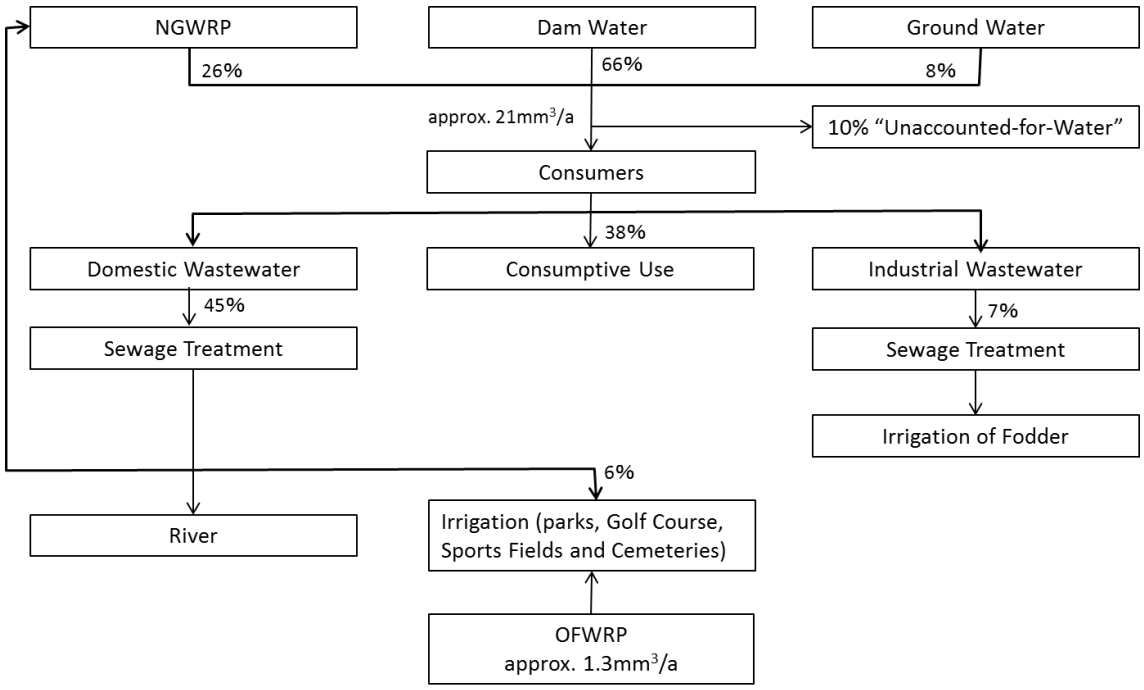


Figure 7 Water sources and water distribution system in Windhoak

(Source: Lahnsteiner, J., Lempert, G., Kim, I., Cho, J., & Kim, S. (2007). Water management in Windhoek, Namibia. Water Science & Technology, 55(1-2), 441–44.)

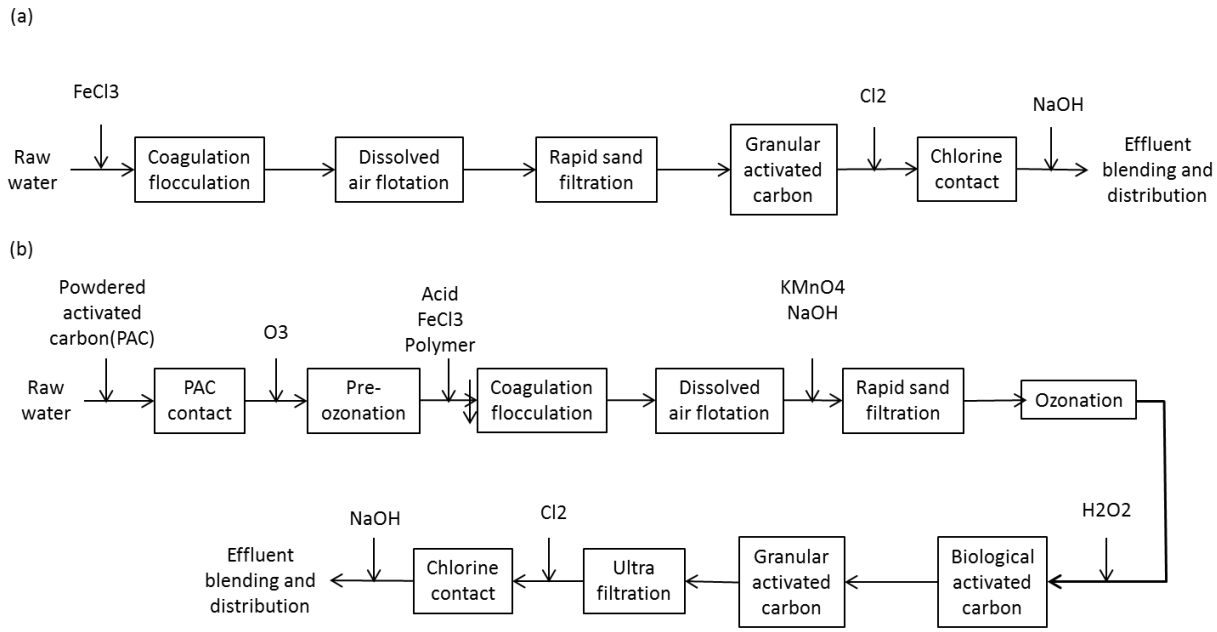


Figure 8 (a) Flow of old system and (b) Flow of present system of Windhoak Reclaimed Water Plant

(Source: du Pisani, P.L. (2005) "Direct Reclamation of Potable Water at Windhoek's Goreangab Reclamation Plant," pp.193-202, in S.J Khanm, M.H.Muston, and A.I Schafer (Eds.) Integrated Concepts in Water Recycling 2005, University of Wollongong, Wollongong, Australia.

Lahnsteiner, J., and G. Lempert (2005). “Water Management in Windhoek/Namibia.” IN: Proceedings of the IWA Conference, Wastewater Reclamation & Reuse for Sustainability, 2005, Jeju, Korea.)

Figure 8 shows the flow of the old system and the flow of the present system. The new system flow introduces UF membranes. Using the WHO standard for the water quality, water sampling and analysis are executed once every 4 hours in this plant. In addition, this plant positively accepts visitors for inspection of the plant site to enhance understanding of residents. Public acceptance and operator training were also positively implemented at this plant.

Beaufort West, Western Cape Province

The Beaufort West Water Reclamation Plant is the first DPR in South Africa. It is located in Beaufort West Municipality. A population of 40,000 people are living in three towns. This plant was constructed because water shortage occurred in Gamka Dam, which is the water source, in 2009-2010. The desalination rate is 2100m3/day, and plant operation was commenced in January 2011. The project is a DBO for running for 20 years, and Water & Wastewater Engineering received an order for construction through public bidding. The project cost was 42mil rand. Figure 9 shows processes of the Beaufort West Reclaimed Water Plant.

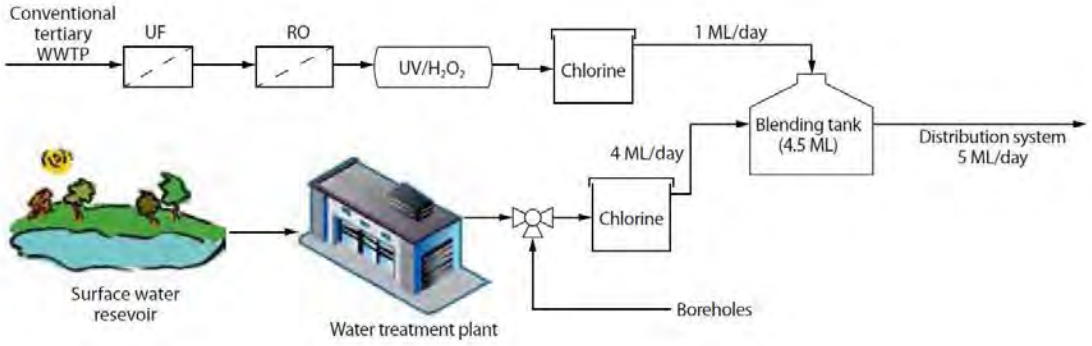


Figure 9 Processes of the Beaufort West Reclaimed Water Plant

The water from a reclaimed water plant and the water from water works are blended at the ratio of 1:4 in this plant and the blended water is directly distributed. The water quality conforms to South Africa’s water quality standard SANS241 (Class 1 Potable Standard), and monitoring of whether the water quality conforms to SANS241 or not is executed every year. Besides, monitoring of the interior of WWTW facilities is implemented by the administrator twice a week and examination of phosphorus and coliform is executed once every month by an external analysis institution. In addition, as monitoring of the Beaufort West Reclaimed Water Plant, monthly laboratory tests and continuous monitoring using online sensors are implemented by a contractor. Although analysis of micro pollutants is not implemented at present because it is expensive, it is scheduled that Umgeni Water test program including such analysis will begin in the future.

In the stage of public participation of this project, many residents of the layer who are unable to purchase bottled water in particular opposed construction of the plant with doubt, “will get sick by drinking such water?” and the argument spread to discussions of being racial discrimination at the same time. However, since no

other means for mitigating water shortage was available, use of the reclaimed water plant was accepted shortly. Public participation is a fruit of easy-to-understand EIA and the strategy of dialogue with residents. This strategy included insertion of articles on the project and results of water quality analysis in local papers, visit of students and pupils to the plant, conference presentation, support from local political parties and transparency of the municipality.

Table 10 shows results of investigations conducted by DWA in 2011 on other reuse water projects. Matters for industrial water and mine water constitute the majority. But it is understood that reclamation projects for drinking are scheduled in Emalahleni Municipality and Steve Tshwane Municipality.

Table 10 Wastewater recycling projects in South Africa (DWA, 2011)

Source of Reclaimed Water			Reclaimed Water User		Type or Re-use	
Water Authority	Facility	Level of treatment	Institution/ Organization	Category of use	Planned /unplanned	Direct/Indirect
City of Cape Town	City of Cape Town WWTW	Secondary, tertiary	Chevron Refinery & Other Users	Industrial (e.g Chevron), process water	Planned	Direct
Saldanha	Urban Stormwater	Storage, infiltration	Municipality	Recharge of aquifer	Planned	Direct
City of Johannesburg	-	Secondary, disinfection	Kelvin Power Station	Industrial, cooling water	Planned	Direct
Rustenburg	Rustenburg WWTP	Secondary, disinfection	Platinum Mines	Metallurgical process and mining process water	Planned	Direct
City of Tshwane Metropolitan Municipality	Rooiwal WWT	Secondary, disinfection	Rooiwal Power station	Industrial, cooling water	Planned	Direct
eThekwini Municipality	Southern WWTP	Secondary, tertiary	Mondi Paper Company	Industrial, cooling water	Planned	Direct
Sasol, Sasolburg Municipal WWTP	Sasol 1 WWTP	Secondary trickling filtration	Sasol, Sasolburg	Industrial Process water	Planned	Direct
Anglo American Thermal Coal	Emalahleni Water Reclamation Plant	Advanced, disinfection	Emalahleni Municipality	Drinking and municipal water	Planned	Direct
Optimum Coal Holdings	Optimum Water Reclamation Plant	Advanced, disinfection	Steve Tshwete Municipality	Drinking and municipal water	Planned	Direct
Steve Tshwete Local Municipality	Boskrans Wastewater Treatment Plant	Secondary, disinfection	Kanhym Feed Lots	Agro industry use	Planned	Direct
Anglo American Thermal Coal, Vaal Colliery	Lethabo Water reclamation Plant	Advanced membrane treatment	Lethabo Power Station	Industrial, cooling water	Planned	Direct
Polokwane Municipality	Pietersburg Wastewater Treatment Plant	Secondary, disinfection	Platinum Mines	Mining and metallurgical process water	Planned	Direct
City of Johannesburg	Southern Wastewater Treatment Works	Secondary, disinfection	Water users along Middle Vaal River	Full Spectrum	Planned	Indirect
City of Johannesburg	Northern Wastewater Treatment Works	Secondary, disinfection	Water users along Crocodile West River	Full spectrum	Planned	Indirect
City of Tshwane	Zeekoegat Wastewater Treatment Works	Tertiary, disinfection	City of Tshwane via Wallmanstha Plant	Potable	Planned	Indirect
Msunduzi Local Municipality	Darvill Wastewater Plant	Secondary, disinfection	Umgeni Water	Potable from Inanda Dam	Planned	Indirect
Emalahleni Local Municipality	Wastewater Treatment Works	Secondary, disinfection	Loskop Dam water users	Mainly irrigation, but full spectrum	Planned	Indirect

E. DPR/IPR projects for municipalities in South Africa

The following procedure was indicated as the method for promotion of DPR/IPR projects for municipalities in South Africa.

STEP 1. Feasibility study of the entire project

Grasping of needs, examination of water quality, examination of the site, selection of adequate business operator and concerned parties, approval of fruits from the customer

STEP 2. EIA (environment impact assessment)

Implementation of adequate specialist study, acquisition of consents of of local residents, acquisition of necessary licenses

STEP 3. Pilot plant

Raising of funds, examination of equipment, design, construction, running and acquisition of approval from the customer

STEP 4. Upgrade to full-scale plant

Raising of funds, construction of a business model, securement and development of the site, examination of equipment, design, construction, running and acquisition of approval from the customer

F. Investigation of local enterprises that correspond to water infrastructure value chain in South Africa

Because it contains confidential commercial, this section is not described in this report.

4. Outcomes of the project

The following outcomes were obtained as a result of on-site activity of six times in total and a number of activities in Japan.

4.1 Outlook of introduction of this technology in eThekwini Municipality

Many personnel of eThekwini Municipality attended the technology seminar, and they fully understood the technology. Based on the result of this seminar, eThekwini Municipality expressed a strong desire for implementation of a feasibility study and technology demonstration with demonstration equipment, and a feasibility study could be started in fiscal 2015 based on the will of eThekwini Municipality. A feasibility study is currently in progress, and an approval on a demonstration running project with demonstration equipment was granted by the congress of eThekwini Municipality in November 2015. eThekwini Municipality wants to introduce this technology that makes use of PPP scheme in the commercial stage. Figure 10 shows the South African PPP approval process specified by National Treasury.

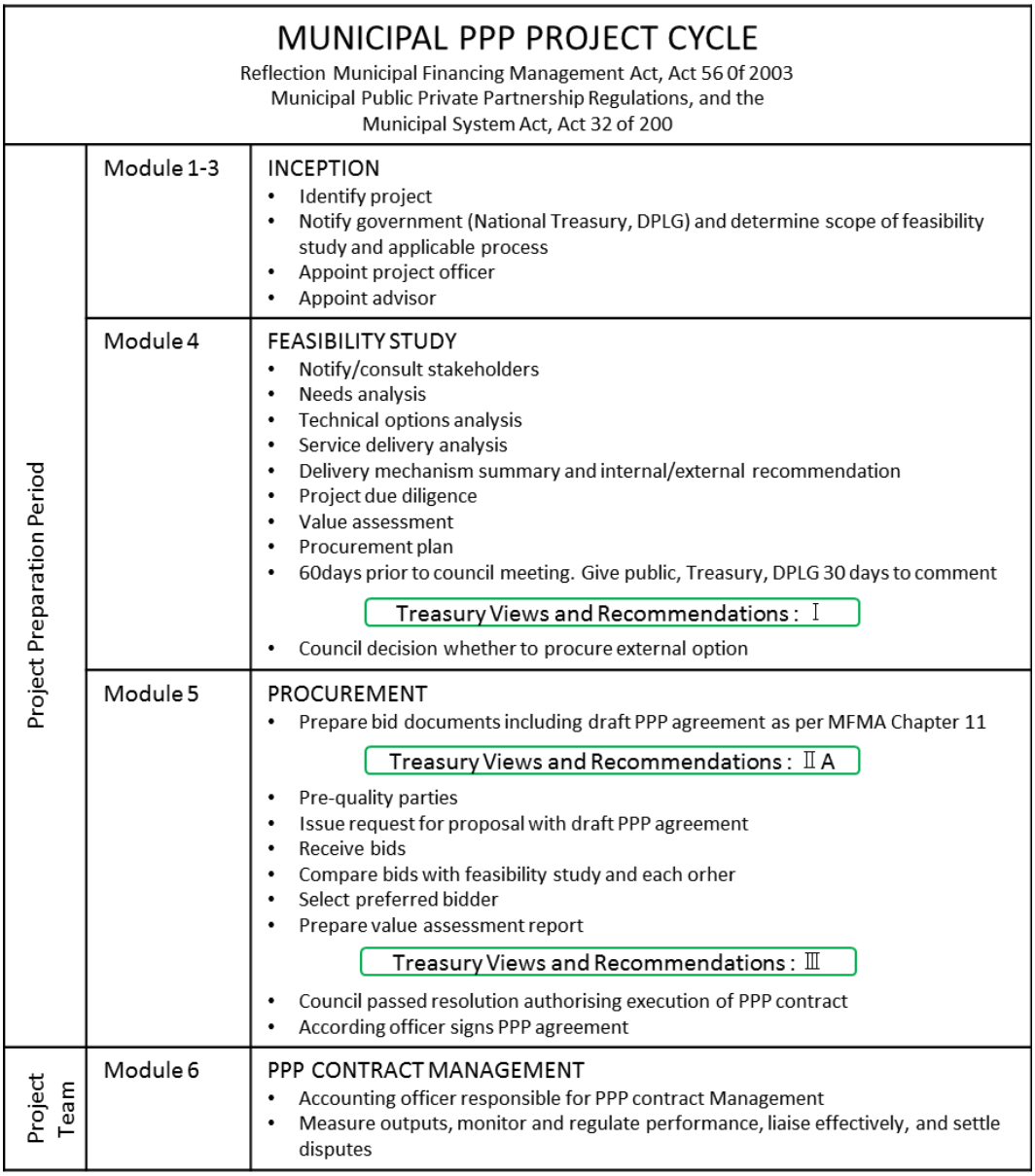


Figure 10 South African PPP approval process (specified by National Treasury)

(Source: Municipal Service Delivery and PPP Guidelines)

PPP for municipalities is stipulated in MFMA (Municipal Finance Management Act) No. 56 of 2003, and it is necessary for a municipality to follow this process. eThekwini Municipality also recognizes it. Figure 11 shows the PPP scheme in the eThekwini Municipality RemixWater project.

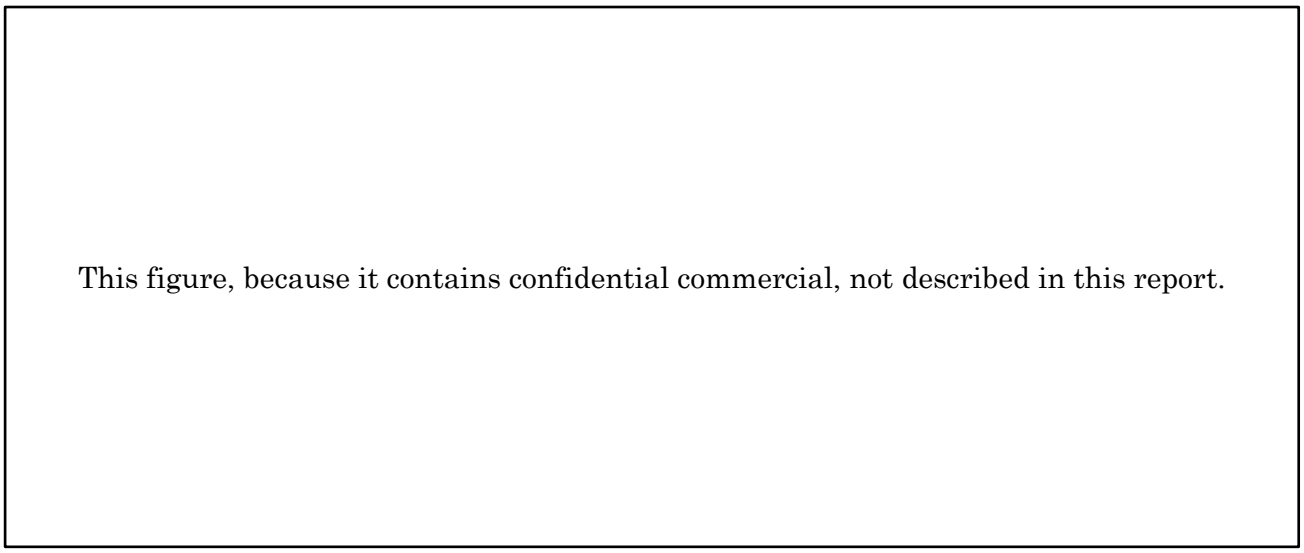


Figure 11　PPP scheme in eThekwini Municipality Remix Water project

4.2　Financing for PPP water infrastructure project in South Africa

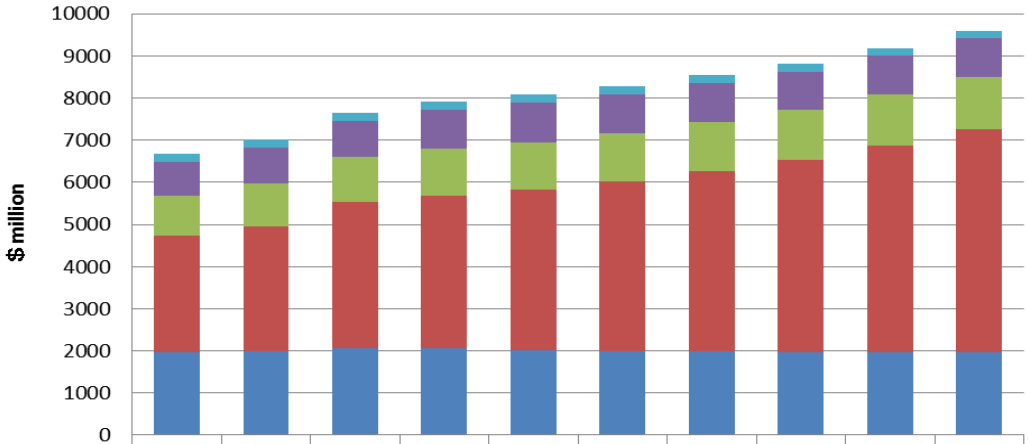
Because it contains confidential commercial, this section is not described in this report.

4.3 Water infrastructure business in South Africa

We obtained an outlook concerning effectiveness of water infrastructure business in South Africa through hearing studies with financial institutions and external consigned investigation.

5. Evolution of business in the future

We conducted these technology dissemination promotion activities with the purpose to introduce Energy-Saving Desalination System "RemixWater" to eThekwini Municipality, to make entry to the water infrastructure construction and water supply business and to use such activities as a catalyst for expansion of Hitachi's water infrastructure business in Republic of South Africa. Figure 12 shows a forecast of desalination market scale by technology by GWI (Global Water Intelligence).



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
ED-EDR	191.3	191.7	191.7	192.8	189.7	186.7	183.4	180	177.3	174.5
Other RO	802	846.8	846.8	930.6	938.9	929.5	919.9	913.6	911	909.9
BWRO	958.7	1009.7	1073.7	1114.6	1124.8	1136.9	1165.7	1193.3	1223	1256.9
SWRO	2762.1	2975.1	3485.1	3631.8	3799	4029.3	4281.5	4554.6	4905.9	5291.5
Thermal	1970.7	1986.9	2056.6	2054	2026.3	2000.1	1983.7	1966.4	1958.9	1956

Figure 12 Forecast of desalination market scale by technology (GWI)

According to a forecast made by GWI, desalination by the SWRO membrane method will grow at an annual rate of 5-7% up to 2020, and it is possible to disseminate this technology to points to which desalination by the SWRO membrane method can be applied.

As already described in the preceding chapter, dialogue that allows for PPP businesses in the future and their relevant activities are in progress with eThekwini Municipality, and evolution of businesses described below is under examination for the future. As target matters, concrete matters were extracted based on the market information Hitachi uniquely collected through external investigation institutions.

(1) Inside of Republic of South Africa

Because it contains confidential commercial, this section is not described in this report.

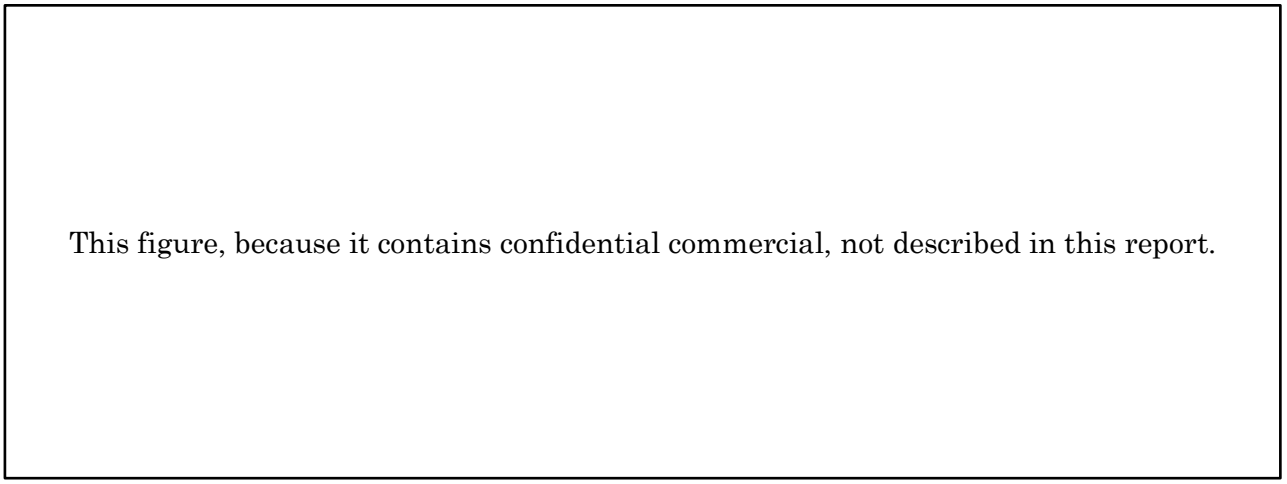


Figure 13　Dissemination plan in eThekwini Municipality

The possibility of accomplishment of further cost reduction can be indicated as a development effect that is expected through the business after implementation of these operations. Implementation of a demonstration project is planned in eThekwini Municipality after termination of demonstration of these operations, and optimization of the running method and optimization of chemical injection will be attempted through the demonstration running, in an effort for cost reduction. The possibility of introduction to emerging nations can be enhanced by accomplishment of cost reduction.
Japan ODA may possibly be applicable for the project as one of the desalination projects under discussion between Japan and developing countries.

Since Republic of South Africa is classified as “Upper-Middle-Income Countries”, ” Grant aid for PPP Project between Japanese Private Entity and South African Municipality” might be applicable and to be considered to introduce the ODA scheme.

Supplementary material 1: Seminar material

Of slides shown during the technology introduction seminar held for personnel of the Municipality on October 24, 2014, portions other than non-disclosed information such as customer information are shown. Materials including customer information are omitted.

A. Slides that introduce technology and project

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Contents

1.1 . Background - RSA

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- RSA is a water scarce country due to low levels and below average amounts of annual rainfall (500mm/yr).
- Currently, RSA is experiencing severe water shortages especially at the larger metros of Johannesburg and eThekwini.
- Government, including the Minister of Water and Sanitation, have recently been involved in emergency discussions to resolve the water crisis issue in RSA.
- Metro's have been urged by government to urgently look at technologies and options to resolve this crisis
- Water and energy continue to be high priority sectors for the South African government.
- RSA also faces challenges of aging infrastructure and lack of sufficient ground water to support its water provision requirements.

1.2. Background - eThekwini

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- eThekwini Municipality is :
  - The second most populated municipality in RSA
  - A famous resort city, as well as a highly industrialized city
  - Has potential for higher economic growth
  - Is currently experiencing concerns over water scarcity and dealing with water shortages.

- Dam levels across the municipality are at 95% yield, when the preferred yield level is 99%.
- For example , Hazelmere dam is currently at 46% level, an indication of the serious water scarcity challenge facing the municipality.
- Thus, lower than expected dam yields, population migration and rapid densification around areas where water is availed, continues to put pressure on the municipalities ability to provide sufficient water especially in outlying areas. As a result, the city has even considered **WATER RESTRICTIONS** in some areas.
- **eThekwini Municipality needs to have a sustainable long-term strategy and solution for bulk water supply**
- eThekwini municipality has worked tirelessly to investigate supplementary water sources in preparation for current and future water shortages. And with various partners have conducted feasibility studies on desalination, water reuse, dam construction and reduction of non revenue water.
- Post the visit (March 2013) to Japan by EWS and Umgeni Water, both parties showed interest in Hitachi's energy-saving desalination, which led to the conclusion of a MOU between Hitachi and EWS for Pre-FS of Hitachi's energy-saving desalination

1.3. Purpose of the Pre-Feasibility Study

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The purpose of the Seminor is to demonstrate an understanding of :

1. Hitachi's understanding of eThekwini's bulk water needs and current challenges.
2. Comparative exercise between Hitachi's energy-saving desalination and conventional desalination focusing on technical, cost (CAPEX and OPEX) and environmental impact.
3. Investigation of probable finance schemes and business models.

1.4 Overview of Social Conditions of eThekwini

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- The second most populated municipality in RSA
- A famous resort city, as well as a highly industrialized city
- Has high economic growth. 65% GDP of KZN.
- Has a fast growing population ; The figures shown on the table are conservative, as the eThekwini area experiences a large influx of migrations from other countries. It is assumed that the population size may be 20% more as a result of unaccounted inhabitants.

Population Growth

Year	Population Estimate
2012	3 446 447
2013	3 480 726
2014	3 517 157
2015	3 555 868
2016	3 596 543
2017	3 638 918
2018	3 682 524
2019	3 727 032
2020	3 772 097
2021	3 818 499

IDP(Integrated Development Plans) GOAL by eThekwini Municipality

"By 2030, eThekwini will be Africa's most caring and liveable city"

eThekwini Municipality needs to have a sustainable long-term strategy and solution for bulk water supply

2.1 Current Bulk Water Supply Scenario to the KZN Coastal Region

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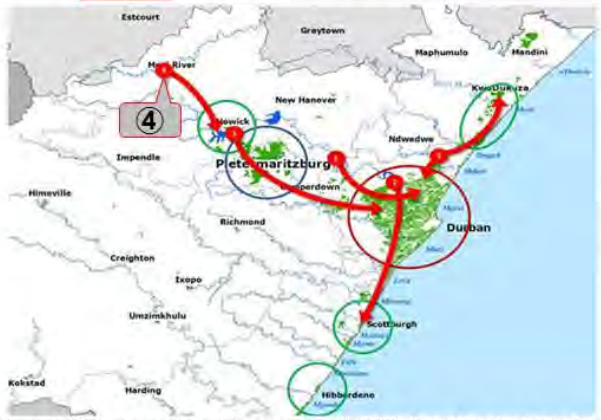
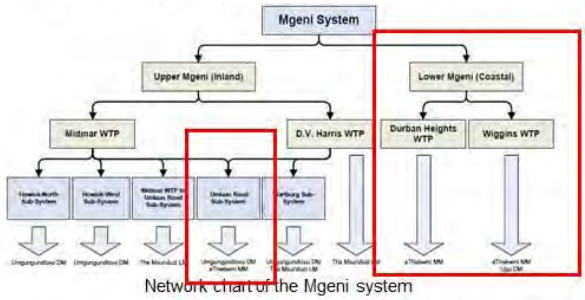


Current bulk water supply strategy to supply the KZN Coastal metropolitan Area

Water is distributed in KZN from an inland water source into the coastal areas by Umgeni Water.

The KZN coastal area is serviced by three bulk water distribution systems; The Mgeni, Mdloti and Mvoti systems. (The water source is the Mooi River④)



Network chart of the Mgeni system

The Mgeni system is divided into two supply areas:

1. Upper Mgeni (Inland)
2. Lower Mgeni(Coastal)

The lower Mgeni system and The upper Mgeni (Umlaas road sub) system supply water to eThekwini Municipality

2.2 The Mgeni system under water demand vs supply pressure

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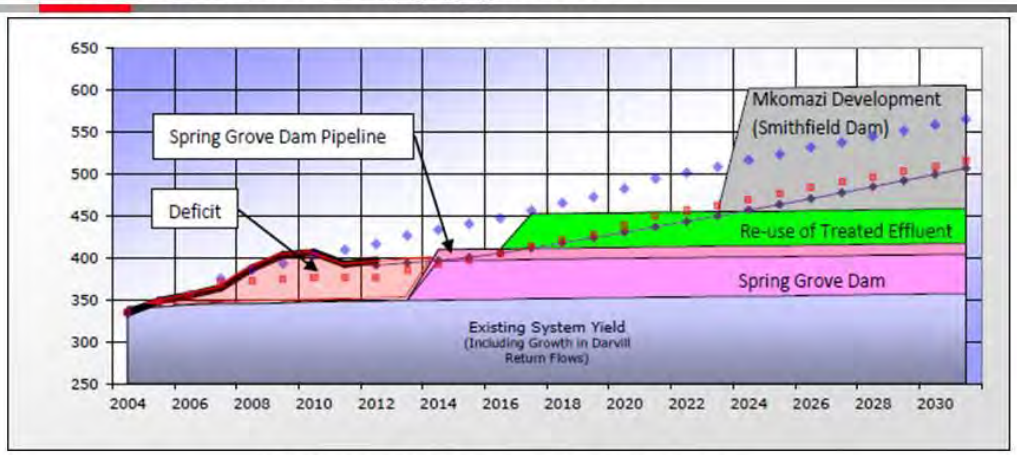

Water reconciliation situation in the Mgeni System

The purple line indicates the latest water demand estimated by Umgeni Water. **The blue dot line** (high demand scenario) indicates previous demand estimated at the KZN Water Reconciliation Study (Umgeni Water 2007). **The red dot line** (low demand scenario) indicates demand estimated by Water Conservation and Water Demand Management (WC/WDM) initiatives. **Real demand is shown with a black line** until 2012. Should the re-use of treated effluent project and the Smithfield Dam upgrade be implemented as planned, sufficient water will be provided. However based on the current schedule, Smithfield Dam upgrade will only be implemented in 2024.

The Mgeni system is currently under water demand vs supply pressure.

4.Energy related challenges

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Energy Shortage

- South Africa is currently experiencing energy shortages due to demand vs supply.
- eThekwini Municipality is currently looking at an annual 10% reduction of energy usage by all its departments.

Electricity Tariffs

- Electricity tariffs increased to approximately 6.5% in FY 2013/2014. FY 2014/2015 was increased by 10% from July.
- Eskom has been granted permission to increase electricity tariffs by an average of 10% annually until 2018.

eThekwini municipality MUST consider energy-saving technologies when addressing its water supply challenges

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5.1 Energy-saving seawater desalination system

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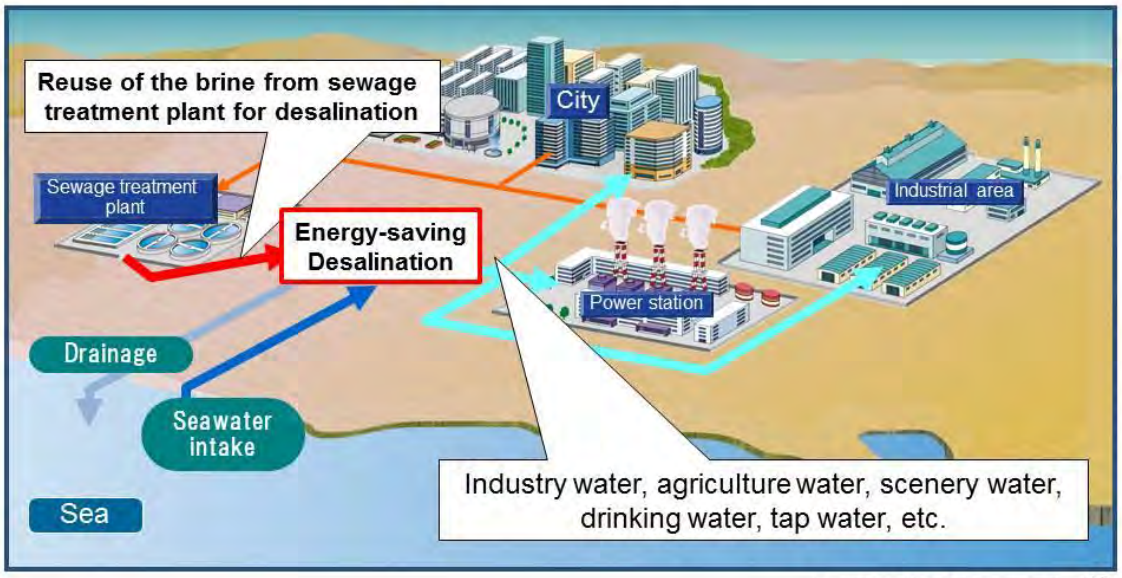
Integrated system between seawater desalination and sewage treatment system



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5.2 A Proven Technology

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■Verification test project by public-private partnerships

Website : http://www.suidou.city.kitakyushu.lg.jp/waterplaza/en/

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5.3 Overview of Verification Plant

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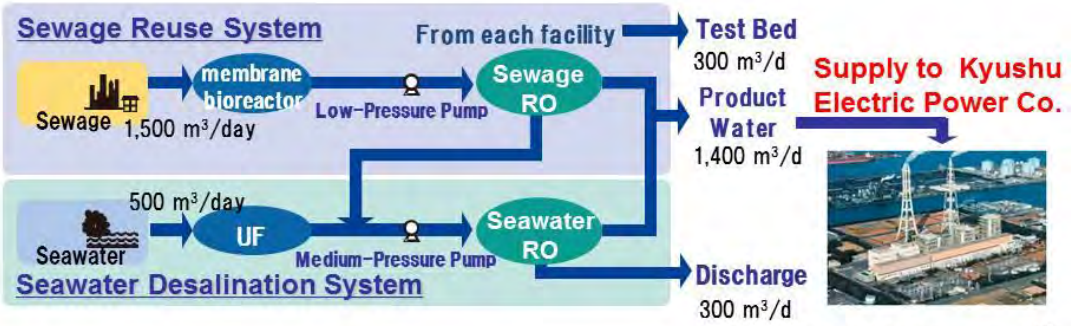
■Period：2010.12～2013.11
■Location：Water Plaza Kitakyushu

3years operation was completed

■ Process of Demo Plant



6.High Level Technical comparison of Energy-saving desalination and conventional desalination

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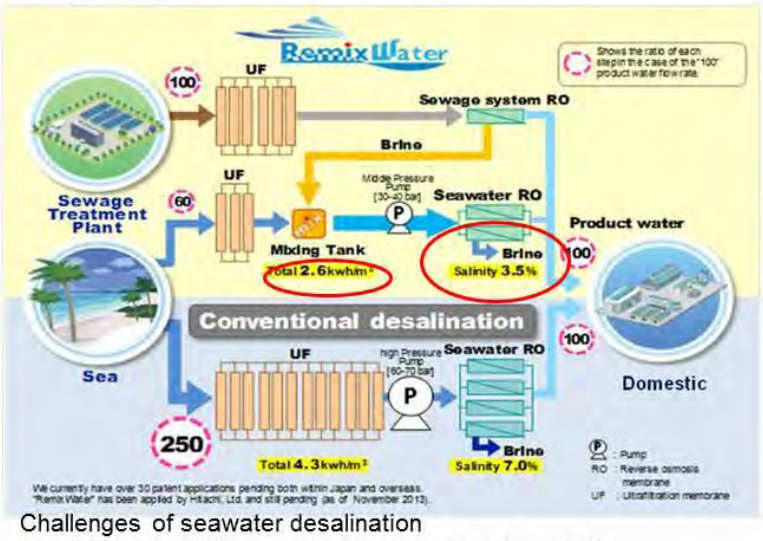
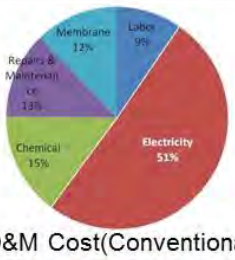
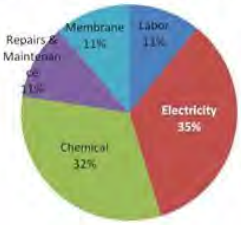




O&M Cost(Conventional)



O&M Cost(Hitachi)

Challenges of seawater desalination

1. High electricity consumption by seawater salinity
2. Environmental efficiency by brine

Properties	Hitachi		Conventional	
Electricity consumption	2.6KW-hr per cubic meter of treated water	60%	4.3KW-hr per cubic meter of treated water	100%
Brine	3.5% salinity and less volume of brine produced (37.5% of feed ends up as brine)	50%	7% salinity and large volume of brine produced.(60% of feed ends up as brine).	100%

Supplementary material 2: Overview of banks in South Africa

Local banks in South Africa are expressed in general in a form of "Four major banks + one". Four major banks are ABSA, NedBank, FirstRandGroup and StandardBank, and + one is Investec. A document that coordinates "Four major banks + one" is indicated as a supplementary material.

HITACHI
Inspire the Next

Contents

1. Major Banks in South Africa
2. Bank Comparison & Sector Expertise
3. Infrastructure Project Finance

1.1 Major Banks in South Africa

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BANK	YEAR FOUNDED	MAJOR SHAREHOLDER	NATURE OF BUSINESS
ABSA	1991	• Barclays Bank Plc (55.52%)	• Personal & Business Banking • Investment Banking
Investec	1974	• Public Investment Corporation (SA) (14.0%) • Allan Gray (SA) (8.6%)	• Private Banking • Investment Banking
Nedbank	1888	• Old Mutual Life Assurance Company (SA) (51.8%)	• Personal & Business Banking • Investment Banking
First Rand Group	1998	• RMB Holdings Ltd (33.9%) • Public Investment Corporation (SA) (8.7%)	• Personal & Business Banking • Investment Banking
Standard Bank	1862	• Industrial and Commercial Bank of China (20.1%) • Public Investment Corporation (SA) (13.3%)	• Personal & Business Banking • Investment Banking

2.1 Bank Comparison & Sector Expertise

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Bank	FY 2013 (Headline Earnings R mn)		Sector Expertise
	Total	Investment Banking	
ABSA	8,266	2,492	• Power, Utilities and Infrastructure • Natural resources • Consumer & Retail • Healthcare and Pharmaceuticals • Real Estate • Technology Media & Telecoms • Transport & Logistics
Investec (Operating Profit before tax)	7,328	-	• PPP/Social Infrastructure Finance • Power Finance • Telecoms Finance • Transport Finance
Nedbank	8,670	1,726	• Infrastructure (Including PPP in Road, Rail, Water, Industrial & Social Infrastructure) • Energy (Electricity, Oil & Gas, Biofuels) • Telecoms
RMB (First Rand Group)	18,663	5,342	• Power (Including Renewable Energy) • ICT • Healthcare • Transport
Standard Bank	17,194	6,555	• Oil & Gas • Power & Infrastructure • Telecommunications and Media

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2.2 Bank Comparison

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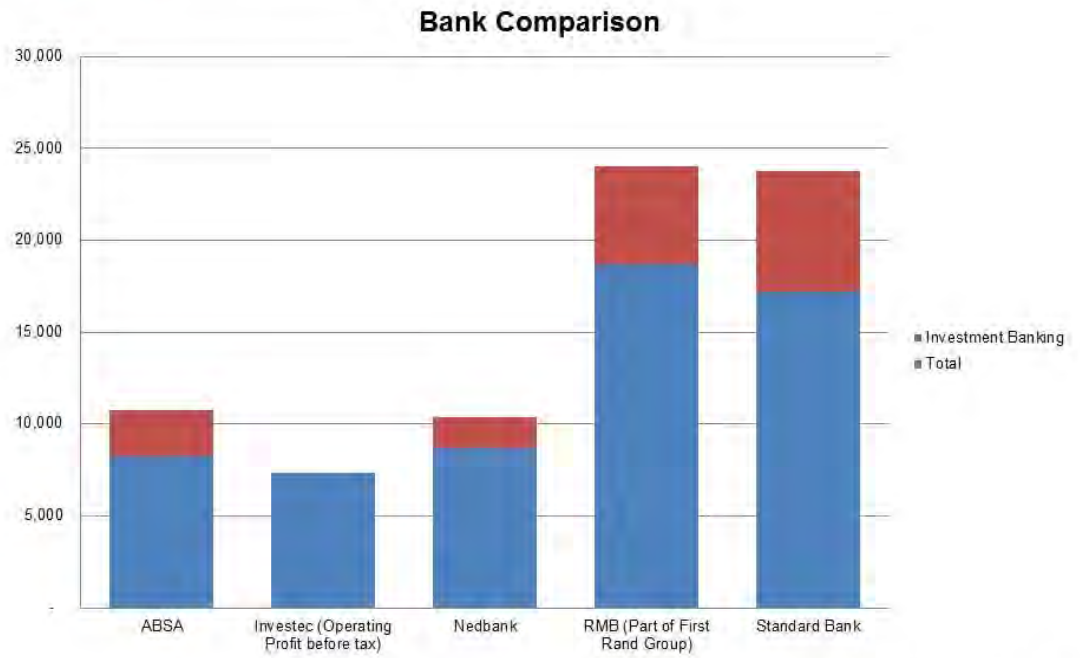

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3.1 Projects Financed

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Bank	Project	Sector	Country	Year	Value (R mn)	Funding Structure/Role
ABSA (ABSA Capital)						
	Bokpoort CSP	Power	South Africa	2013	5,000	Joint mandated lead arranger, providing part of the 18-year debt funding
	Peaker Power OCGT Projects (GDF Suez IPP Gas Turbine Peaking Plants)	Power	South Africa	2013	9,700	Lead arranger, senior lender, account bank, hedge co-ordinator and hedge provider
	Six projects, including Wind, Solar PV and Concentrated Solar Power under the government's third Independent Power Producer (IPP) Procurement round	Power	South Africa	2013	10,800	Secured mandates to provide R10.8 billion worth of debt funding to the six projects
RMB						
	Gibela infrastructure development project.	Transport - Rail	South Africa	2013	51,000	Providing a multi-disciplinary advisory, guarantees and funding solution to Alstom and Gibela

3.2 Projects Financed

HITACHI
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Bank	Project	Sector	Country	Year	Value (R mn)	Funding Structure/Role
Investec						
	Bokpoort CSP	Power	South Africa	2013	5,000	Lead Arranger and Underwriter for the debt
	Sishen PV	Power	South Africa	2013	2,300	Joint mandated Lead Arranger and Underwriter for the debt
	West Coast One (Wind)	Power	South Africa	2013	2,000	Co-developer and shareholder, joint Mandated Lead Arranger for the debt.
	Eternity Power Co-Generation	Power	South Africa	2013	155	Investor and Sole Lender
	GDF Suez IPP Gas Turbine Peaking Plants	Power	South Africa	2013	9,700	Coordinating Mandated Lead Arranger, Sole Documentation Bank, Sole Modelling bank and hedging bank

3.3 Projects Financed

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Bank	Project	Sector	Country	Year	Value (R mn)	Funding Structure/Role
Nedbank (Nedbank Capital)						
	Mulilo Kakamas	Power	South Africa	2013	570	Lead arranger and co-funder
	Tsitsikamma	Power	South Africa	2013	2,900	Lead arranger and sole funder
	Gouda	Power	South Africa	2013	2,670	Lead arranger and co-funder
	Amakhala	Power	South Africa	2013	3,900	Co-Lender
	Moyeng West Coast (GDF Suez)	Power	South Africa	2013	2,000	Lead arranger and co-funder

3.4 Projects Financed

HITACHI
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Bank	Project	Sector	Country	Year	Value (R mn)	Funding Structure/Role
Standard Bank						
	Scatec Solar Linde	Power	South Africa	2013	1,200	Sole lead arranger and underwriter
	BusaMed Hospital	Healthcare	South Africa	2013	420	Sole mandated lead arranger, and provider of R230 mn project finance facility
	Scatec Solar Dreunberg	Power	South Africa	2013	2,350	Securing project funding, providing transactional services and products, performance guarantees and interest-rate and foreign-exchange hedging.
	CFM Ports and Railways	Transport	Mozambique	2013	1,200	Lead arranger and lender

