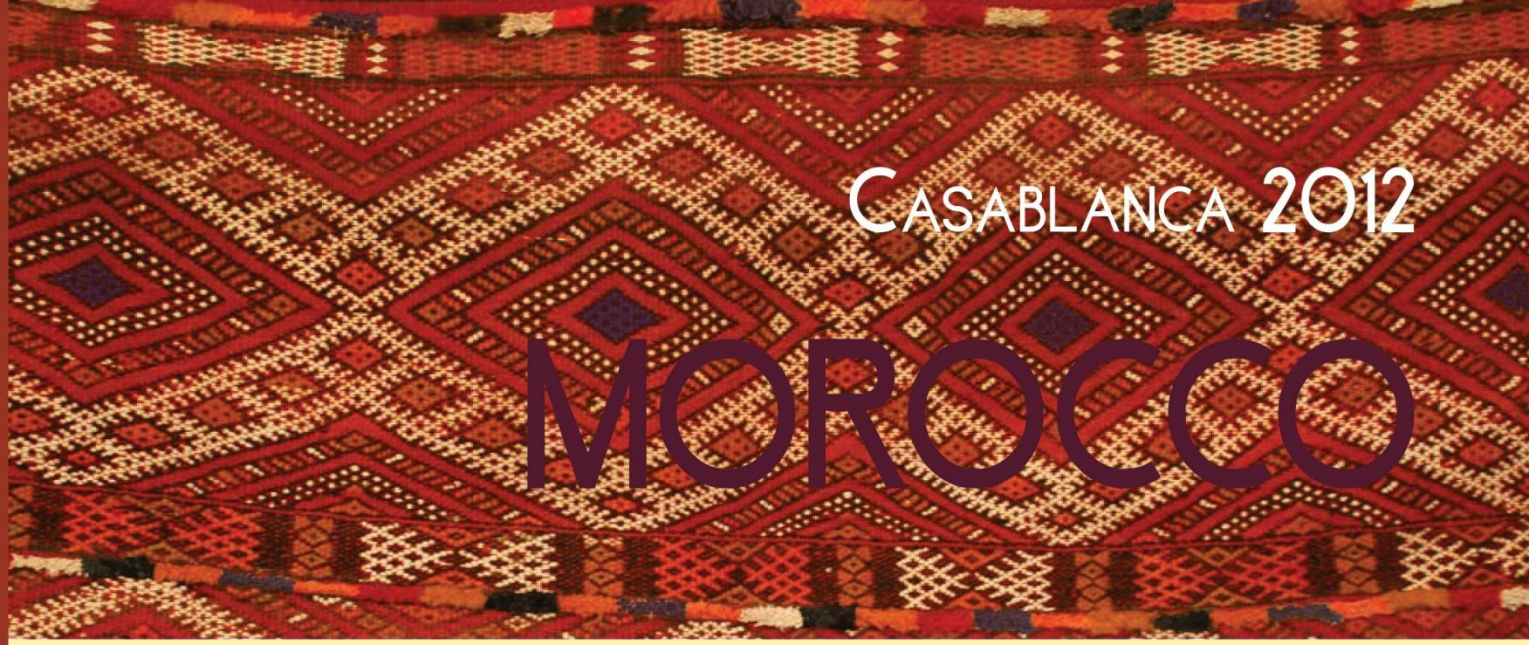
International Conference on Desalination and Sustainability

1 - 2 March 2012



Safi, A Private Public Partnership Experience in Desalination and Water Reuse

Olivier Crasson - Head of Concessions & PPPs – BESIX Middle East

MOR12-011

in cooperation with

supported by

Content

1. WATER REUSE & DEMAND IN THE GCC
2. BESIX
3. AJMAN SEWERAGE SYSTEM AND SAFI
4. CONCLUSION

1. WATER REUSE & DEMAND IN THE GCC

Introduction

PROBLEMS	EVIDENCE	CAUSES	IMPORTANCE
Limited water resources	Depletion of water per capita	Arid region combined with population growth	Socio-economic development slowing down
Inefficient water use	Irrigation losses, leakages & wasteful water use	Lack of awareness, prices, regulation & increasing demand	Increasing water scarcity
Deterioration of water quality	Contamination, sea water intrusion, groundwater depletion	Discharge, overextraction, lack of penalties & studies	Heavy soil damage with important impact on environment
Weak institutions	Duplication of efforts & inefficient water management	Uncertain responsibilities, lack of technical capacities	Poor water strategy development and lack of decision makers

1. WATER REUSE & DEMAND IN THE GCC

Introduction

OVERALL WATER DEMAND

Currently: ~444 billion gallons	Agriculture accounts for 70-80% of demand

PRODUCTION COST

TSE: ~USD 0.6/m3	Desalination: ~USD 1.6/m3

CONSUMPTION

TSE: only 2 million m3	Desalination: 30 million m3

CONSEQUENCES

KSA has mandated that 11% of water use has to come from TSE	**Abu Dhabi to reuse the entire TSE produced from their STP's**

MOR12-011

1. WATER REUSE & DEMAND IN THE GCC

Reuse Options

IRRIGATION

- Major use of TSE
- Importance of water quality
- Polishing not required

AGRICULTURE

- Potential use of TSE
- Water quality critical
- Polishing required

INDUSTRIAL

- Reduction on potable water demand
- High water quality adds value to the customer
- Polishing required (EDR/RO)

1. WATER REUSE & DEMAND IN THE GCC

Reuse Options

ACQUIFER RECHARGE

- High water quality very important
- Further polishing is required

RECREATIONAL

- Lakes, ponds, golf course irrigation
- High water quality important
- Further polishing may not be required

1. WATER REUSE & DEMAND IN THE GCC Standards

KEY WATER QUALITY VALUES

BAHRAIN	OMAN	UAE (ABU DHABI)
• Turbidity < 2 NTU • Helminth Ova < ct / 100l	• Feacal Coliforms < 100 cfu / 100 ml	• Feacal Coliforms < 100 cfu / 100 ml • Helminth Ova < 1 ct : 100 l

MOR12-011

1. WATER REUSE & DEMAND IN THE GCC Standards

TSE STANDARDS							
COUNTRY	TYPE	TDS MG/L	TSS MG/L	AMMONIA MG/L	BOD MG.L	FC MPW/100ML	REMARKS
QATAR	Irrigation	2,000	50	15	10	2.2	
	Landscape	2,000	-	15	50	2.3	
BAHRAIN	Misc.	n/a	10	1	10	< 1,000/100 ml	
KSA	Irrigation	n/a	10	1	10	< 1,000	
OMAN	A	1,500	15	5	15	200	
	B	2,000	30	10	20	1,000	on heavy metals
DUBAI	Irrigation	1,000	10	1	10	20	
ABU DHABI	P1	n/a	10	n/a	10	< 100	Legionella criteria
	P2	n/a	20	n/a	10	< 1,000	
	P3	n/a	30	n/a	20	n/a	

1. WATER REUSE & DEMAND IN THE GCC
Reliability

RELIABILITY OF TSE QUALITY FOR REUSE ENSURED BY:

- Secondary – Tertiary Treatment
- Conventional technology- Sand Filters / Disc Filters
- MBR and SBR technology
- N.F. and R.O.
- U.F.
- No one process fits all uses for Reuse
- Merits of local systems for Reuse

1. WATER REUSE & DEMAND IN THE GCC
Operation and Maintenance

OPERATION & MAINTENANCE ISSUES / CHALLENGES:

- Need for control of discharges into sewage network

  → mitigate upset of sewage treatment process
- Process stability
- Risk Mitigation:
  - TSE Storage
  - Emergency Lagoons
  - Importance of Lab Testing
- TSE 'polishing' required higher skill levels
- Reliability of Operations is key to growth of Reuse

MOR12-011

2. BESIX

BESIX

- Contracting
- Real Estate Development
- Concessions & Assets
- Water Treatment
- Roads
- Foundations

- **Largest Belgian Construction Company**
- **Turnover of 1,802 million EUR in 2010**
- **Currently active in 15 countries (European Union, Eastern Europe, Middle East, Central Asia, North Africa and Central Africa)**
- **17,000 employees worldwide**

http://www.besix.com

MOR12-011

2. BESIX

BESIX

- Contracting
- Real Estate Development
- **Concessions & Assets**
- **Water Treatment**
- Roads
- Foundations

- **Extensive experience in Concessions and Water Treatment**
  - **AJMAN PPP (as Shareholder, EPC contractor and Operator)**
    - **1st PPP in the UAE**
    - **50,000 m^3 / day WWTP**
    - **240km, 22 pumping stations**
    - **25 years operation and maintenance (incl. direct billing to residents)**
    - **Further details in the next chapter**
  - **ABU DHABI ISTP2 (as Shareholder, EPC contractor and Operator)**
    - **2 WWTP with a combined treatment capacity of 430,000 m^3 / day**
    - **25 year operation and maintenance**

2. BESIX

BESIX

- Contracting
- Real Estate Development
- **Concessions & Assets**
- **Water Treatment**
- Roads
- Foundations

- **Extensive experience in Concessions and Water Treatment**
  - **Sharjah Sewage Treatment Works**
  - **Al Saja'a TDF & Treatment Plant**
  - **Jumeirah Sewage Treatment Plant**

Further details and projects can be viewed on:
http://www.besix.com/Projets/Environment.aspx

2. BESIX

BESIX

- Contracting
- Real Estate Development
- Concessions & Assets
- Water Treatment
- Roads
- Foundations

- **Present in Morocco since 2004 through its subsidiary**

BESIX SOMAGEC

  - **Tanger Med 1**
  - **Tanger Med 2**
  - **Mazagan Beach Resort & Spa**
  - **Morocco Mall (OPC)**

MOR12-011

3. AJMAN SEWERAGE SYSTEM & SAFI Key milestones

1995
- Gov. decision to involve private sector

2001
- 1st concession agreement

2002
- Commercial closing

2003
- Start construction

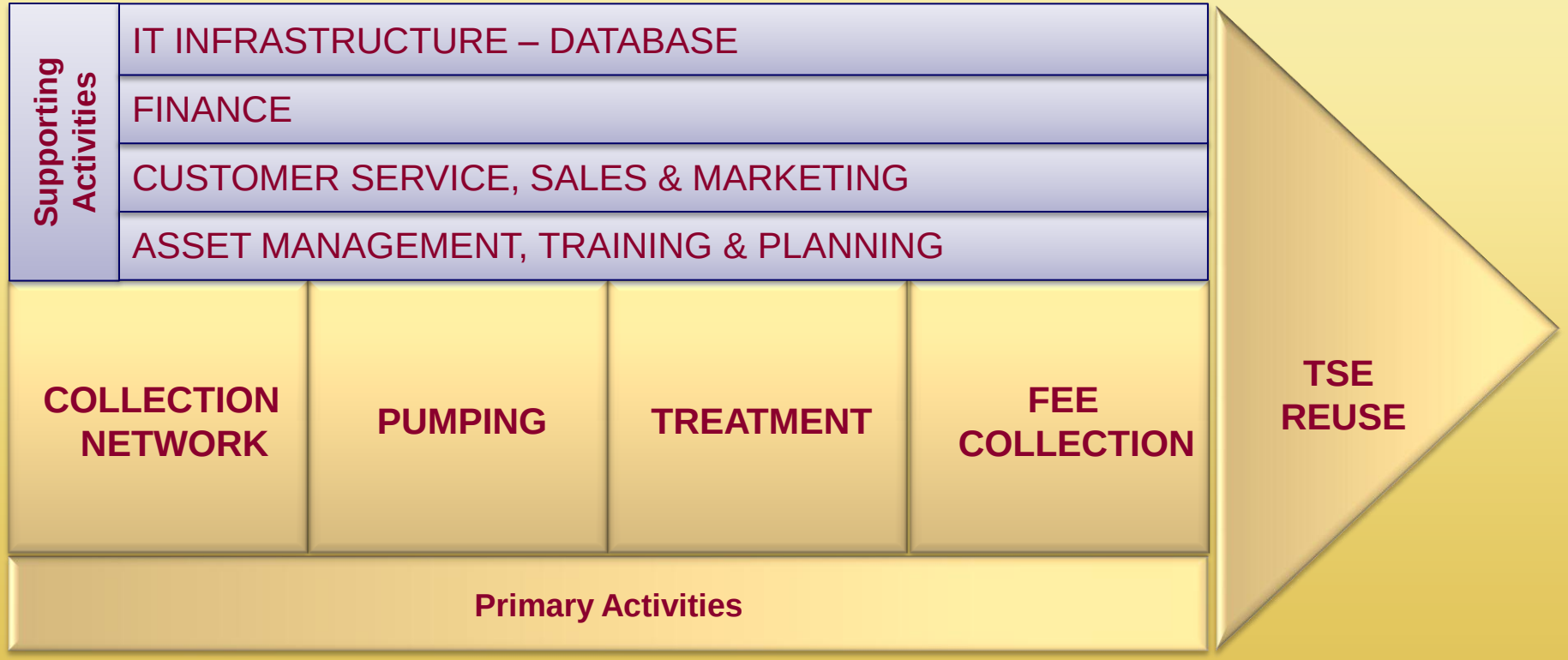
2004
- Project suspended

2005/2006
- Restructuring

2010
- Start of TSE irrigation program

2011
- Expansion of project
- New opportunities

3. AJMAN SEWERAGE SYSTEM & SAFI Value Chain



MOR12-011

3. AJMAN SEWERAGE SYSTEM & SAFI Opportunity

- Treated Sewage Effluents property of the Government of Ajman
- Out of 50,000 m^3/day:
  - 15,000 m^3/day are used for irrigation
  - 2,000 to 8,000 m^3/day are further treated (Municipality RO Plant) and sold
  - The balance is discharged into the sea
- The RO plant does not produce sufficient quantity to meet the demand.

- A further investment is requested but the public authority is reluctant to take the commercial risk.

3. AJMAN SEWERAGE SYSTEM & SAFI Opportunity

- Discussions have started between partners (Government / Municipality / BESIX) in June 2011
- Letter of Intent in June 2011
- Memorandum of Agreement signed in July 2011
- Incorporation of Safi
- on 1st September 2011
- A new Public Private Partnership
  - 25% AIMS Group (Municipality)
  - 75% BESIX

3. AJMAN SEWERAGE SYSTEM & SAFI Opportunity

- Purpose of this Water Reuse Company: commercialisation of treated effluents produced by the Ajman Sewerage Company.
- Exclusive rights for 20 years
- Asset: RO Plant
- Strategy:
  - Develop a long term and sustainable water reuse policy, together with the public authority
  - Reduce the volume of water discharged into the sea

3. AJMAN SEWERAGE SYSTEM & SAFI

2011

- Market Survey
- Quick Wins (Membranes) ➔ 500,000 USG per day
- Fit for construction purposes

2012

- Capacity ramp-up 500 – 900 USG per day
- Upgrade MF capacity
- Installation of first disc filter

2013

- Double capacity ➔ 1,800,000 USG per day (membranes, MF units and disc filter)

2014

- Diversification
- Potable water

MOR12-011

4. CONCLUSION

- Establish a strong relationship with your public partner. Patience...
- Keep your concession contract in a safe... And be flexible...
- Keep in mind your vision and execute your strategy ... Fast
- Water reuse can be viable without subsidies
- “Save the water”: don’t talk about it. Act !
- Water reuse is a fantastic business opportunity. Take it !