An Overview of the GCC Unified Water Strategy, 2016-2035

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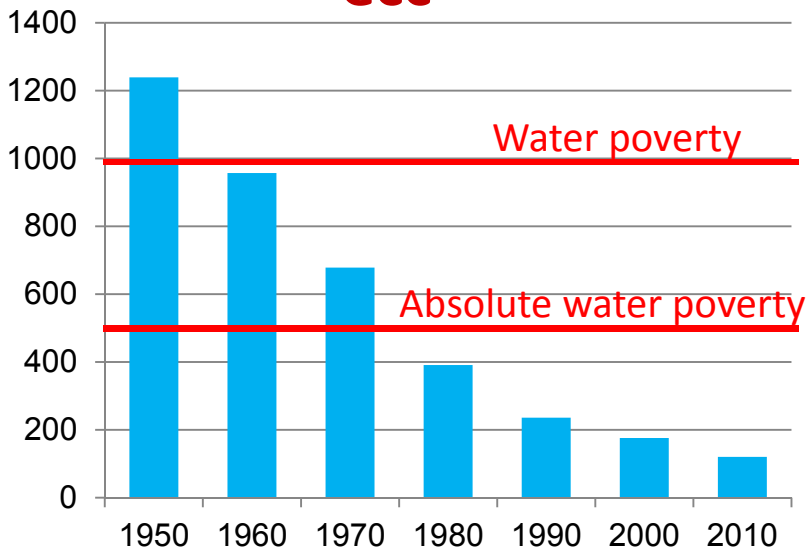
Overview

- Introduction
- Main GCC Water Sector Challenges
- The GCC Unified Water Strategy (GCC UWS 2016-2035)
- Future Scenarios and Cost Analysis
- Conclusion and Recommendations

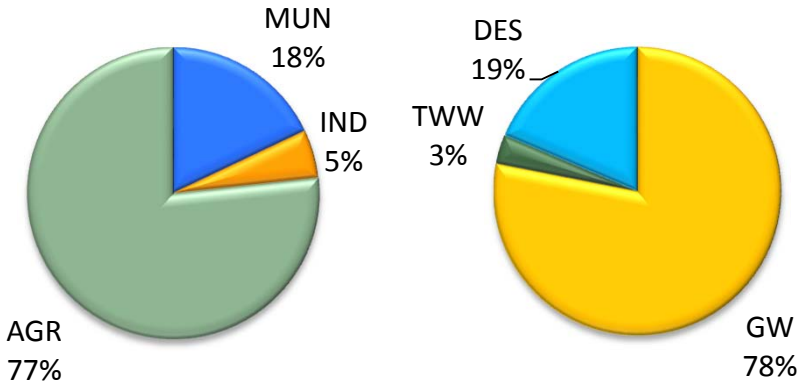
Introduction

- Extremely poor WR endowment
- Very low per capita renewable freshwater resources
- Rapidly declining due to escalating population growth
- Unprecedented economic and social transformation associated with continuous increase in water demands in all sectors
- Main water users are agricultural, municipal, and industrial; Main water sources are groundwater, desalination, and treated wastewater

Trends in Per capita water share in GCC



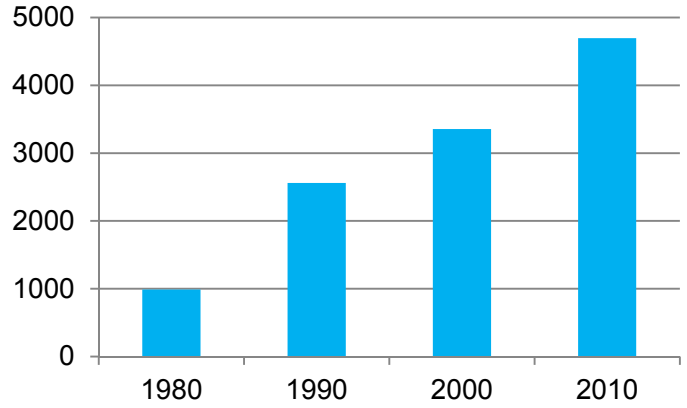
Water Uses and Resources in GCC



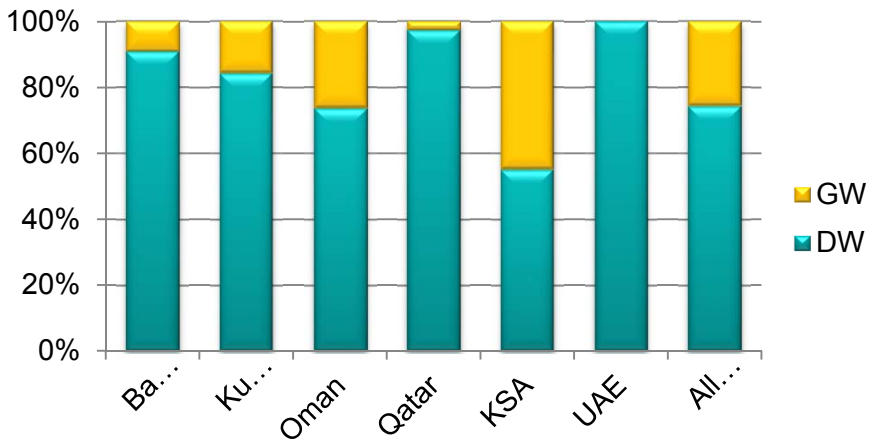
Main GCC Water Sector Challenges

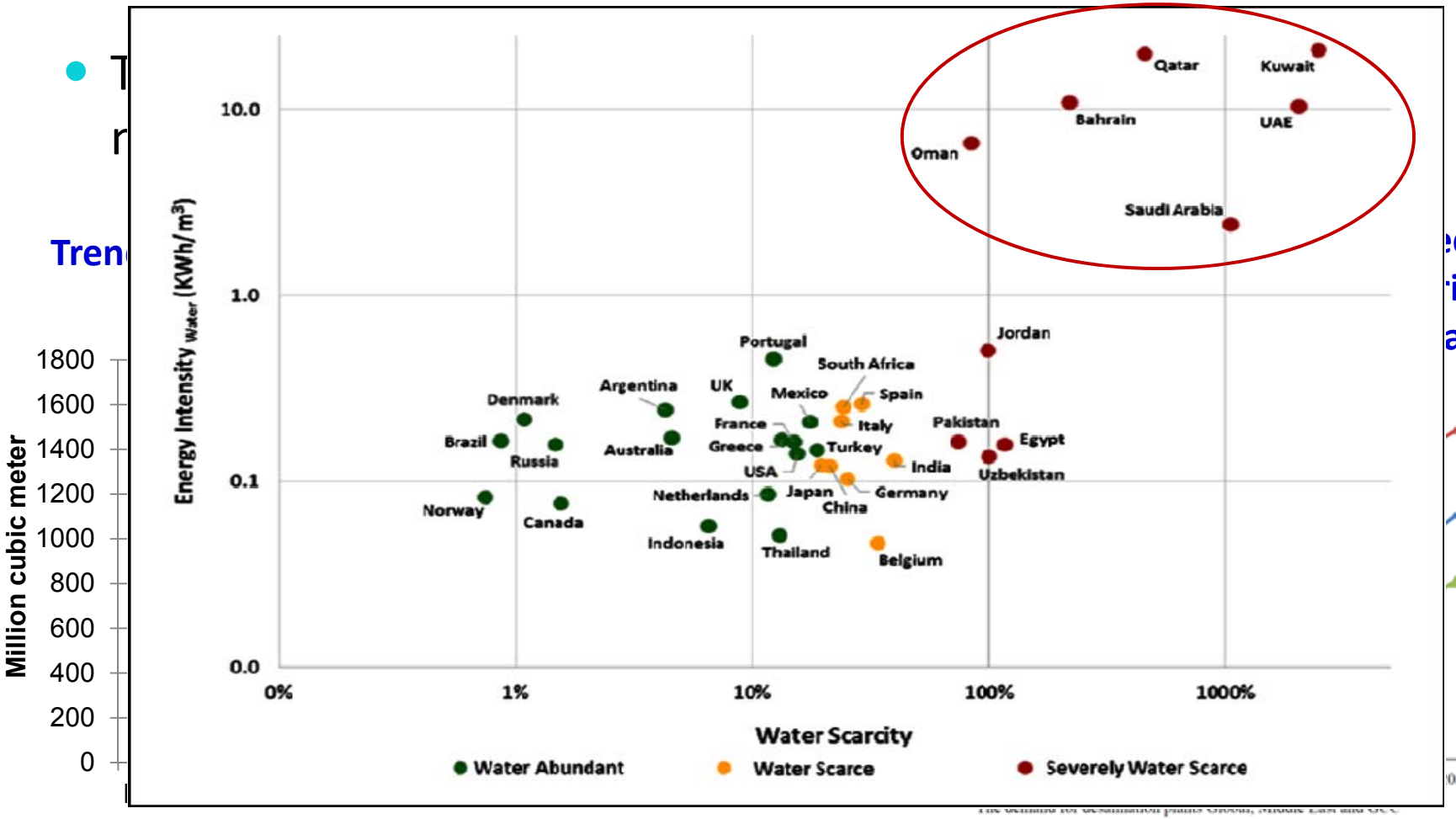
- Escalating municipal water demands (population & urbanization growth, consumption patterns, and network losses)
- Massive expansion in desalination
- Increasing financial (low cost recovery), economic (energy-intensive), and environmental costs (brine discharge and GHGs), and with limited added-value to GCC economies (imported technology)

MUN water consumption in GCC, MCM



GCC MUN Water Sources, 2010/12





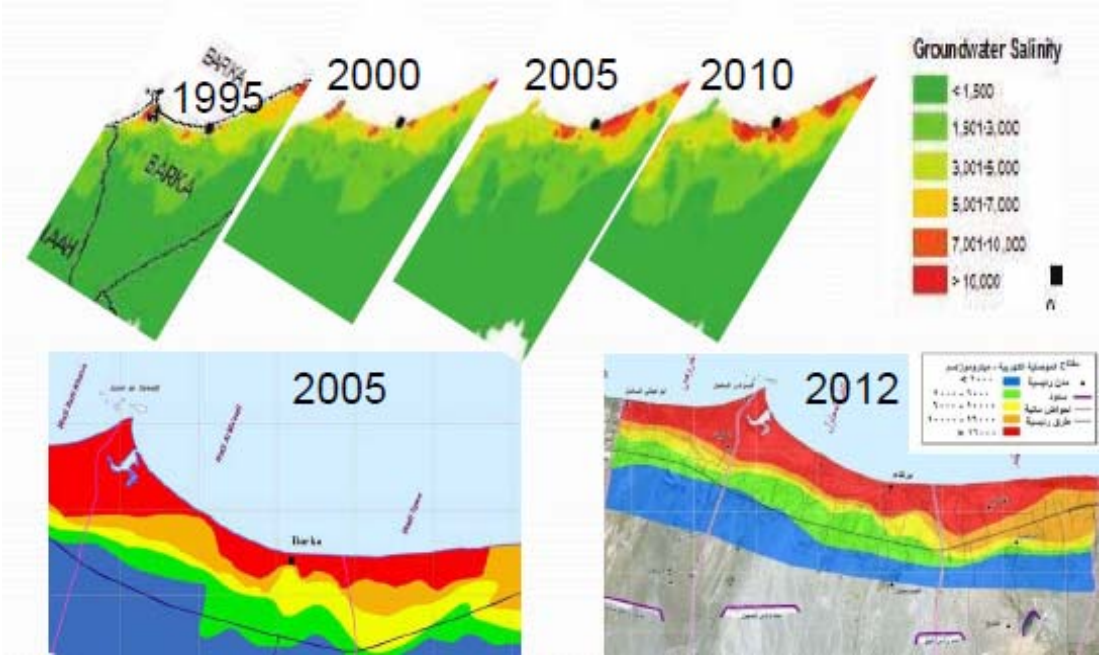
(Ansari, M. S., 2013)

A Strong Water-Energy Nexus

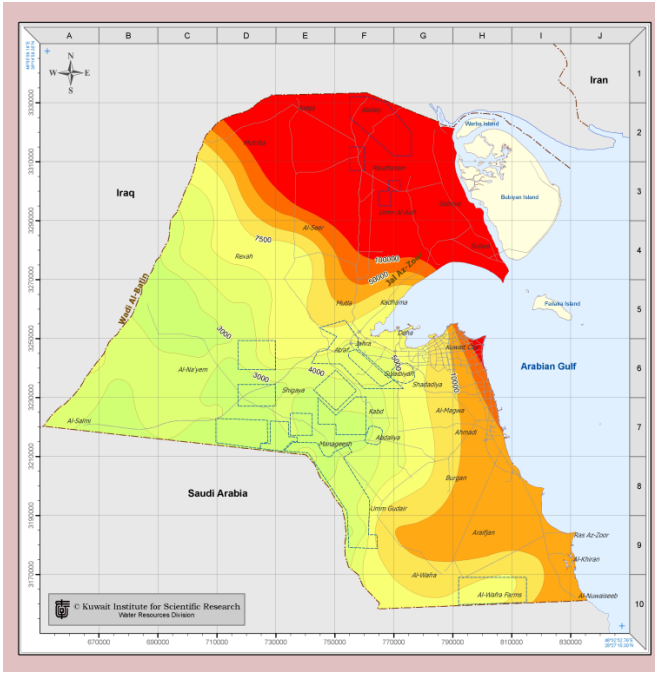
10 – 33% of primary fuel consumption is used in desalination

- Over-exploitation and deterioration of renewable GW and rapid mining of non-renewable GW (by the agricultural sector, threatening the sustainability of both water and agriculture)

Sea water intrusion & salinization in south Al-Batinah, Sultanate of Oman (Al-Amri, *et al*., 2014)



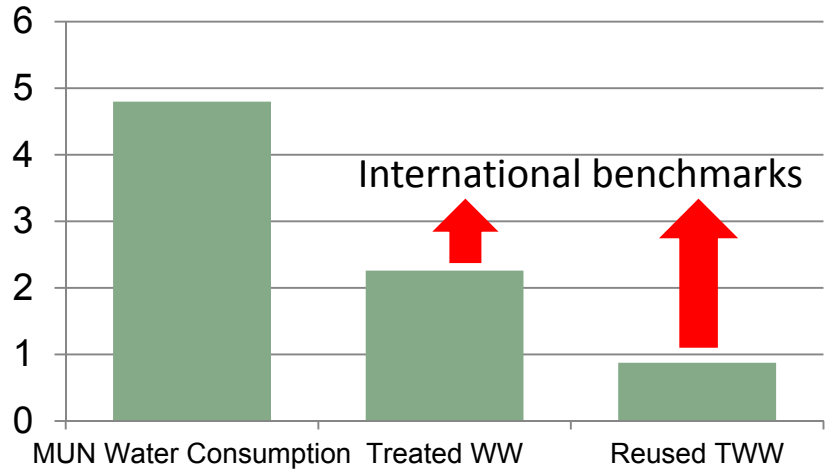
Saltwater intrusion in Dammam aquifer in Kuwait (KISR)



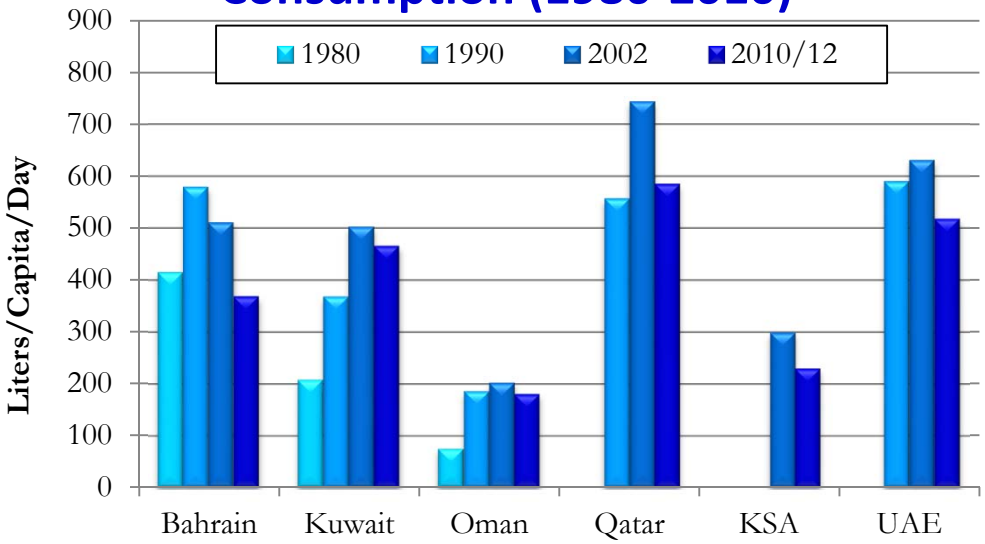
- Low efficiency of wastewater recovery (<50%) and large mismatch between wastewater treatment levels and reuse (40%): major lost opportunities under GCC scarcity conditions

- Low water efficiency in the municipal sector
  - High per capita consumption in many countries
  - High network physical leakage in some countries
  - Limited recycling and reuse

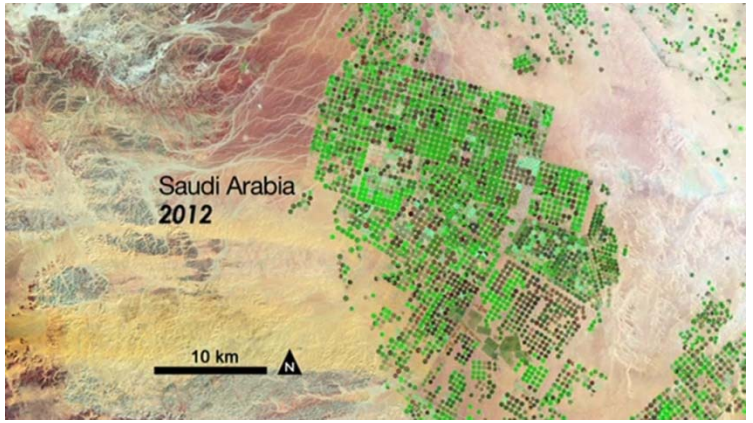
MUN water consumption, treated and reused WW in 2012, in BCM



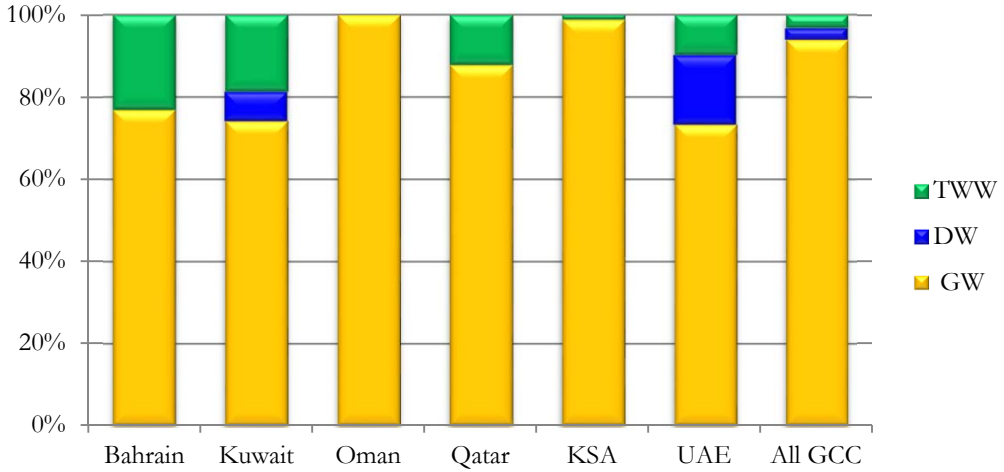
GCC Municipal per capita water Consumption (1980-2010)



- Agricultural water consumption continues to grow without consideration to the limited water resources
- Exaggerated water demands due to:
  - Very low Irrigation efficiencies (25-40%)
  - Cultivating high water consuming crops
  - Absence of well metering/charges for groundwater used in agriculture

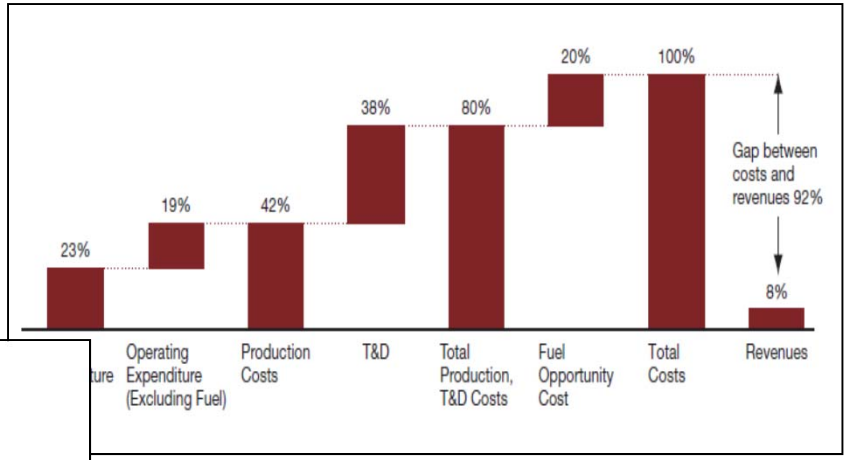


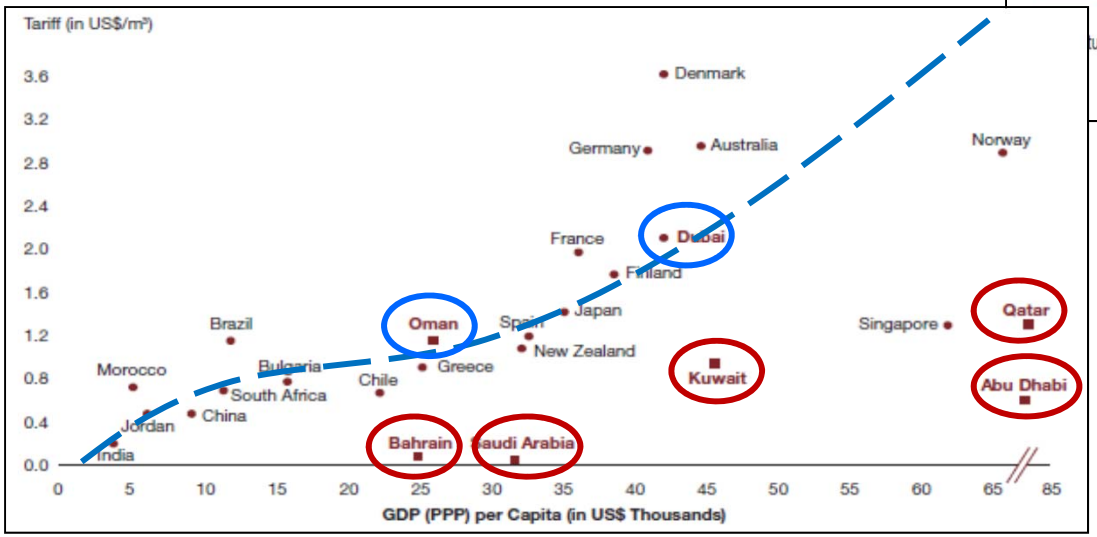
GCC Agricultural Water Sources (2010/12)



- WS&S Utilities have low levels of cost recovery (financial sustainability), with very limited degrees of freedom in controlling demands (majority of drivers are external, e.g., political economy, however recently changing)

Average cost of water production, transmission, distribution and subsidies (%) in the GCC countries (Strategy&, 2014)

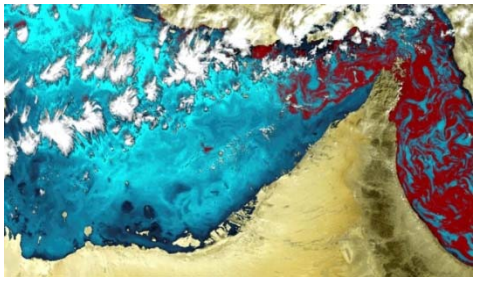




Water Tariff vs. GDP per capita (2012), (adopted from Strategy&, 2014)

- High vulnerability of GCC desalination plants and water supply system; numerous risks: natural or man-made, unintentional or intentional
- **Threats to Desalination Plants**
  - Maritime contamination (e.g., nuclear and wastewater)
  - Maritime pollution (e.g., oil and chemical spills, red tide)
  - Natural disasters (e.g., hurricane, seawater flooding)
  - Actual combat (e.g., targeting desalination facilities)
- **Threats to Water Supply System**
  - Power outage; Hacking of SCADA system; Intentional contamination of the domestic water supply

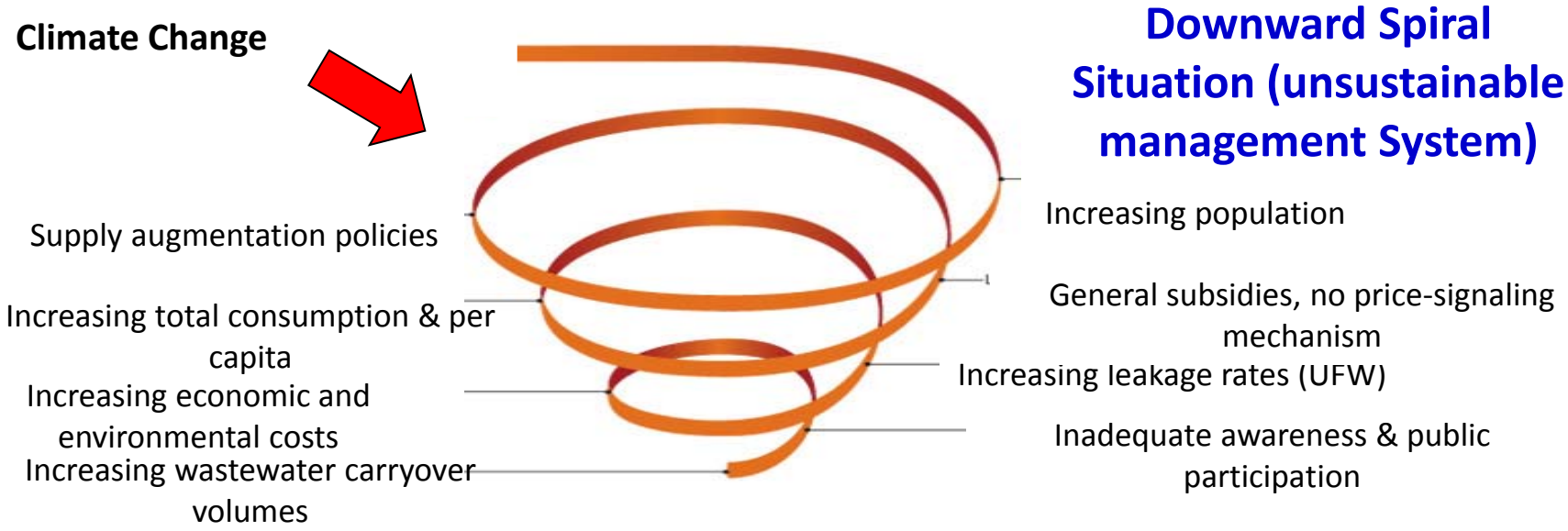
Oil Spills



HABs

Cyclones

- Inadequate water governance: institutional and legislative frameworks, institutional capacity and human resources, data and monitoring, stakeholders participation, compliance (overall non-conducive enabling environment)
- Dominance of sectoral planning and management; emphasize mainly on technical and operational aspects to increase the efficiency and optimize supply side of management



The GCC UWS 2016-2035

- **Vision Statement**

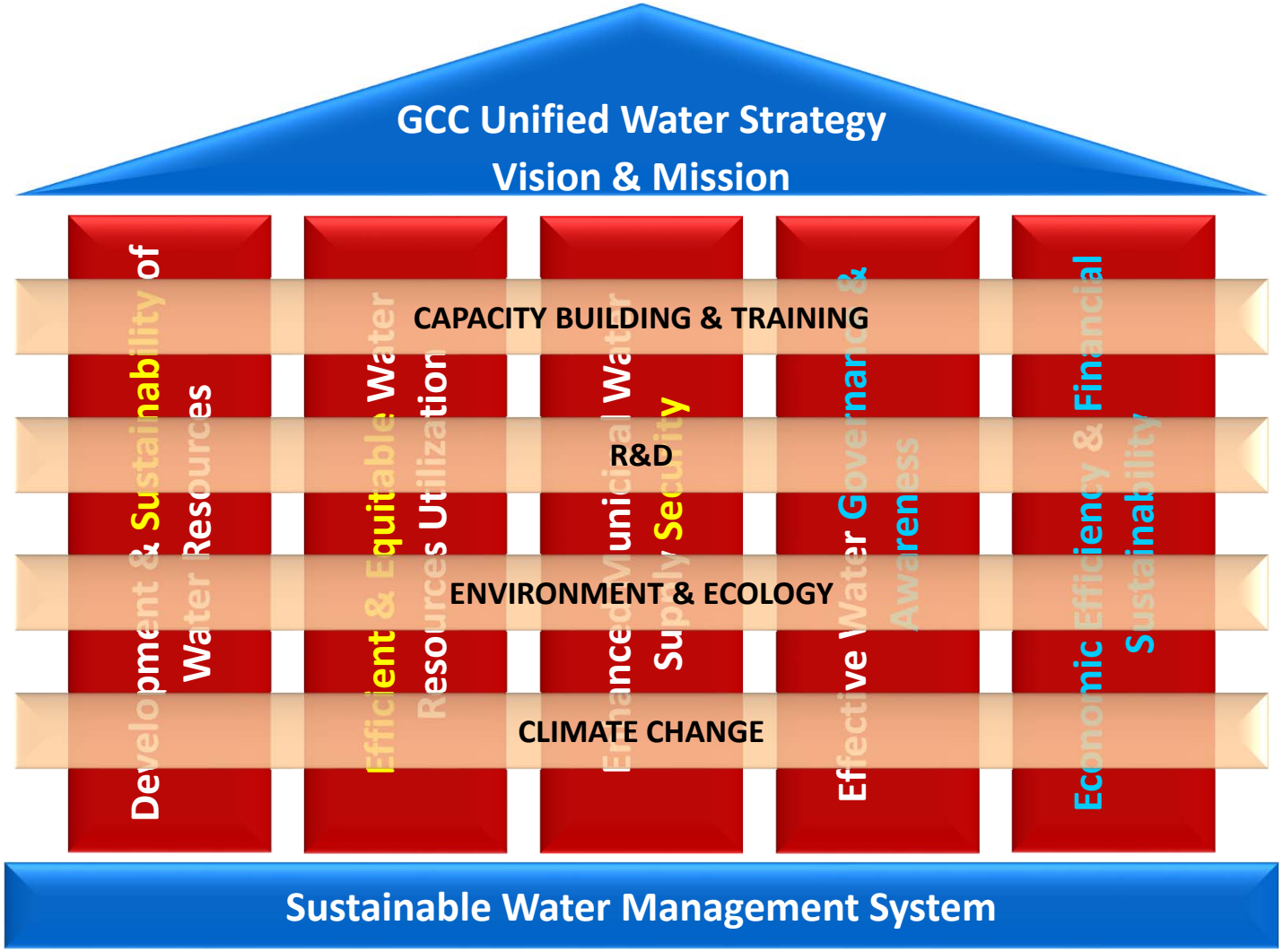
  By 2035 the GCC countries have established **sustainable**, **efficient**, **equitable**, and **secure** water resources management systems contributing to their sustainable socio-economic development

GW management, WW reuse, energy efficiency, AGR efficiency, governance, awareness, financial and economic, …

Water security, Acquiring desalination technology, benchmarking WSS utilities, …

- **Mission Statement**

  To align GCC states' national water strategies and master plans with a unified GCC water management strategy that **foster joint initiatives** and **strengthen the capacities of each country** in achieving a rational, integrated, efficient, and sustainable management of their water resources


GCC Unified Water Strategy
Vision & Mission
Development & Sustainability of Water Resources
Efficient & Equitable Water Resources Utilization
Enhanced Municipal Water Supply Security
Effective Water Governance & Awareness
Economic Efficiency & Financial Sustainability
CAPACITY BUILDING & TRAINING
R&D
ENVIRONMENT & ECOLOGY
CLIMATE CHANGE
Sustainable Water Management System

Theme 1: Development and Sustainability of Water Resources

SO1: To acquire technology development, manufacturing of desalination and water treatment plants, and diversification of energy resources

SO2: To develop and protect conventional water resources

SO3: To maximize wastewater collection, upgrade treatment and increase economic and safe use of treated wastewater and sludge

Theme 2: Efficient and Equitable Water Resources Utilization

SO4: To achieve the highest international standards of water and wastewater services

SO5: To increase water efficiency and manage demands in the municipal and industrial sectors

SO6: To establish a water-efficient and rational agricultural sector compatible with the available water resources

Theme 3: Enhanced Municipal Water Supply Security

SO7: To secure water supply during emergencies and disasters

Theme 4: Effective Water Governance and Awareness

SO8: To improve governance in the water sector to achieve effective and integrated water resources management

SO9: To achieve a water-oriented society in GCC countries

Theme 5: Economic Efficiency and Financial Sustainability

SO10: To minimize water supply economic costs and increase cost recovery without sacrificing quality of service

Development, enhancement, & improvement Themes

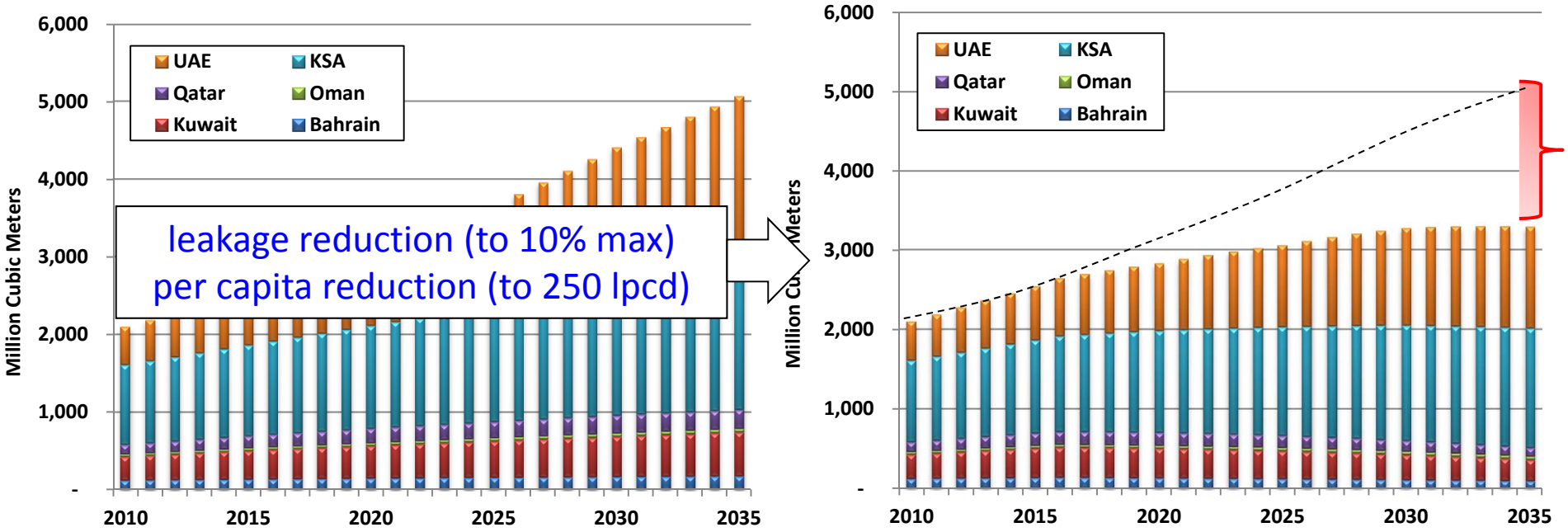
Governance, control, & incremental uplift Themes

Selected Main KPIs and Targets of the GCC UWS

No.	KPI	Target
1	Desalination capacity manufactured/owned locally to total desalination capacity in GCC countries	10% by 2035
2	Share of renewable energies in the water sector in each GCC country (based on set targets by GCC countries for renewable energy; COP21, SDGs)	10% at least by 2035
3	Collected wastewater to municipal water supply in each GCC country	60% by 2030
4	Reused treated wastewater to total treated in each GCC country	90% by 2035
5	Physical leakage in the municipal distribution network in each GCC country (weighted average of all regional utilities in the country)	10% maximum by 2035
6	Per capita water consumption it the municipal water sector (calculated after deducting the physical leakage)	250 liters/capita/day maximum by 2035
7	Average irrigation efficiency in each GCC country	60% minimum by 2035
8	Development of integrated emergency preparedness plan in each GCC country	By 2020
9	Existence of a unified tariff framework and guideline for water sources and uses in the GCC countries	By 2018
10	Cost recovery of water supply utilities	100% of operation and maintenance costs by 2025, and 100% of total costs by 2035

Future Scenarios and Cost Analysis

Potential municipal water supply savings



Cumulative Savings between BAU and GC UWS management Interventions (2016-2035)

	WS Required	WS Financial Cost	Desalination Energy Requirement	Desalination GHGs	WW Generated	WW Treatment Cost
Anticipated GCC overall Savings	32 Billion CM (19%)	56 Billion US$	45 Billion CM natural gas/ or 290 Million bbl oil equivalent)	422 Billion ton CO2e	15 Billion CM	16 Billion US$

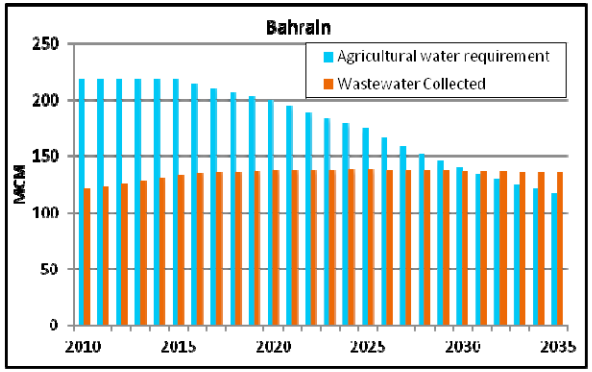
Potential water savings in the agricultural sector & potential contribution of wastewater to total water budget

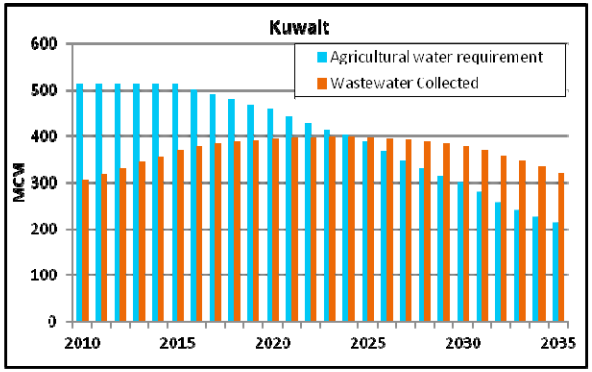
Reduction in per capita water consumption to 250 l/d

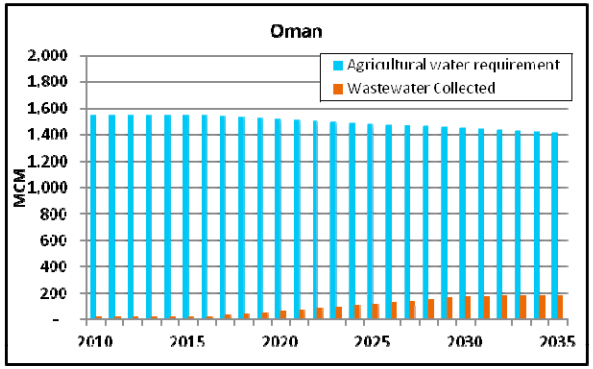
Increasing wastewater collection rate to 60% minimum

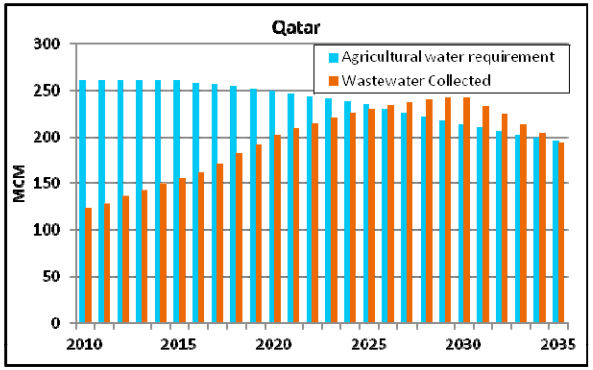
Increasing irrigation efficiency to 60% minimum

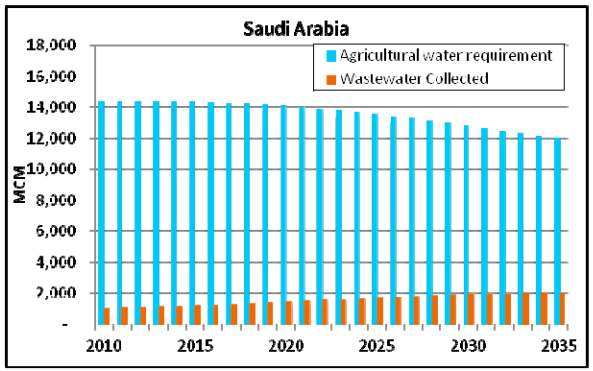
Bahrain, Kuwait, and Qatar can fulfill all their agricultural water needs by treated wastewater

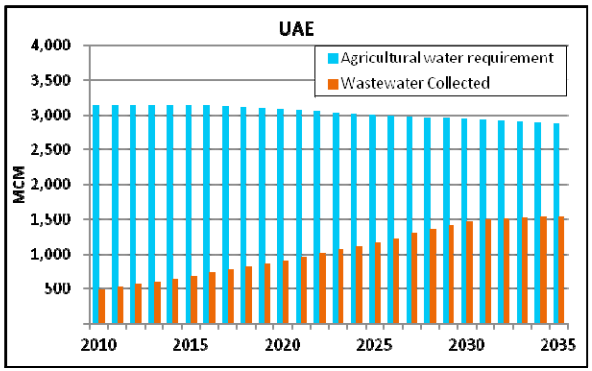












Conclusion and Recommendations

- Development of the GCC UWS represents **a major milestone** for the long and intricate path for coping with the water scarcity in the arid GCC countries
- **Implementation** of the strategic objectives and policies set in the strategy would **result in a multitude of successive benefits** and contributes directly to the sustainable development goals of the GCC countries
- **Failure** to achieve the set targets of the strategy would result in **increase in the sector's associated financial, economic and environmental costs**, which might eventually impact the GCC countries efforts in achieving their socio-economic development goals

Thank

You