هـيـئـة الـبـيـئـة - أبـوظـبـي
Environment Agency - ABU DHABI

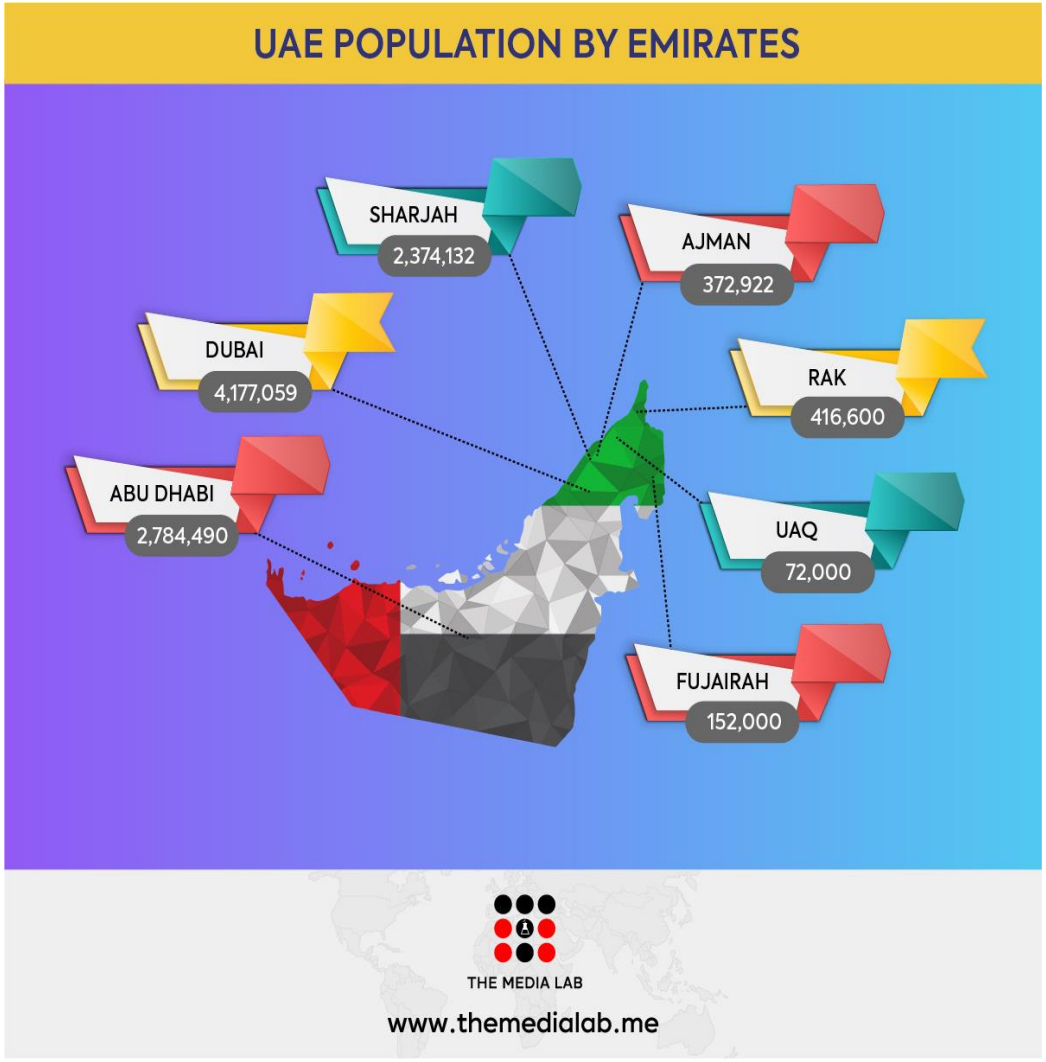
Powering Desalination through Solar Energy

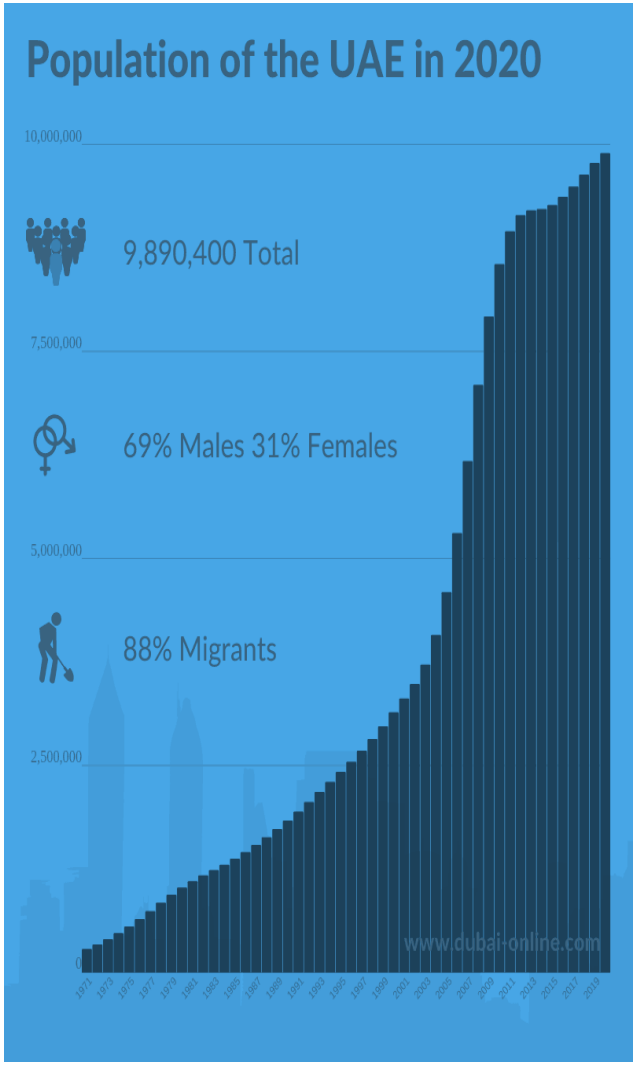
Dr Mohamed Dawoud

AN AMAZING DEVELOPMENT STORY (ABU DHABI)

Classification: Restricted - مقيدة

AN AMAZING DEVELOPMENT STORY (ABU DHABI)





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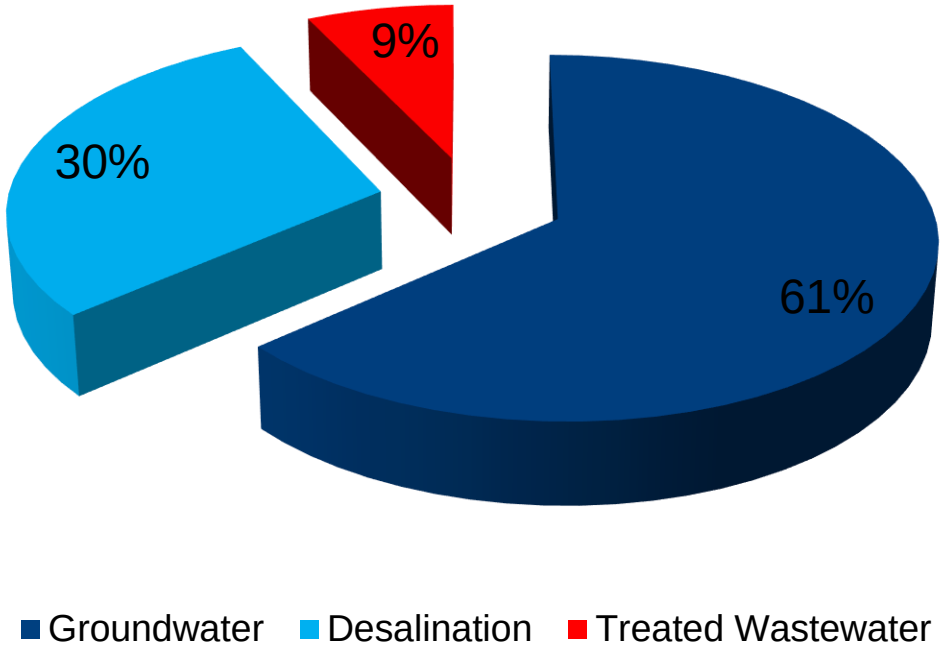
THREE RESOURCES



Total Water Supply = 3,454 Mm^3/Year

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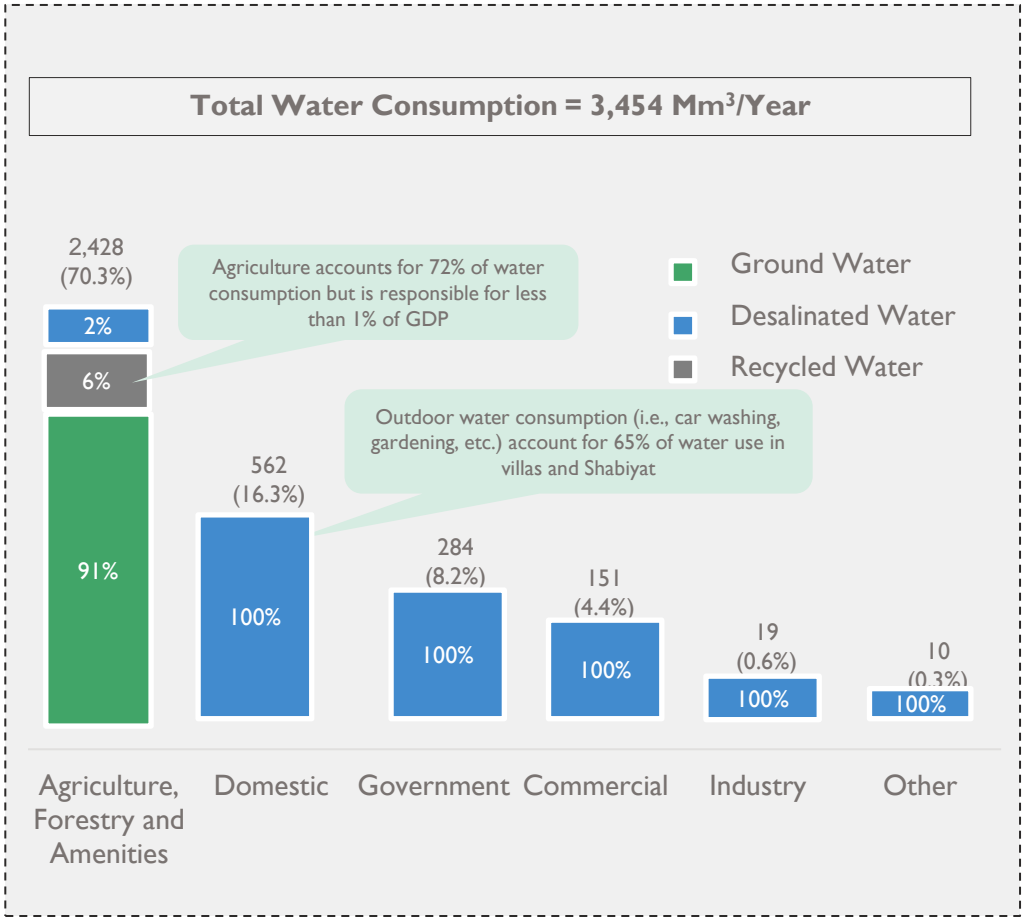
WATER DEMAND IN ABU DHABI EMIRATE



Source: SCAD (2014) Abu Dhabi Statistical yearbook; EAA& RTI (2009): International, Demand-Side Management for Electricity and Water Use in Abu Dhabi; RSB (2013): Supporting ADEV2030,
Note: Groundwater is estimated based on 2011 data. The data about groundwater for the year 2012 is under methodological review by EAD due to concerns about the accuracy of data resulting from the lack of a reliable metering system in the wells. For the time being, it is assumed that groundwater production and consumption is maintained constant at the levels of 2011

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CHALLENGES AND THREATS

- Aridity and Scarcity
- Institutional and Legal Fragmentations
- External Threats
- Internal Threats
- Climate Change

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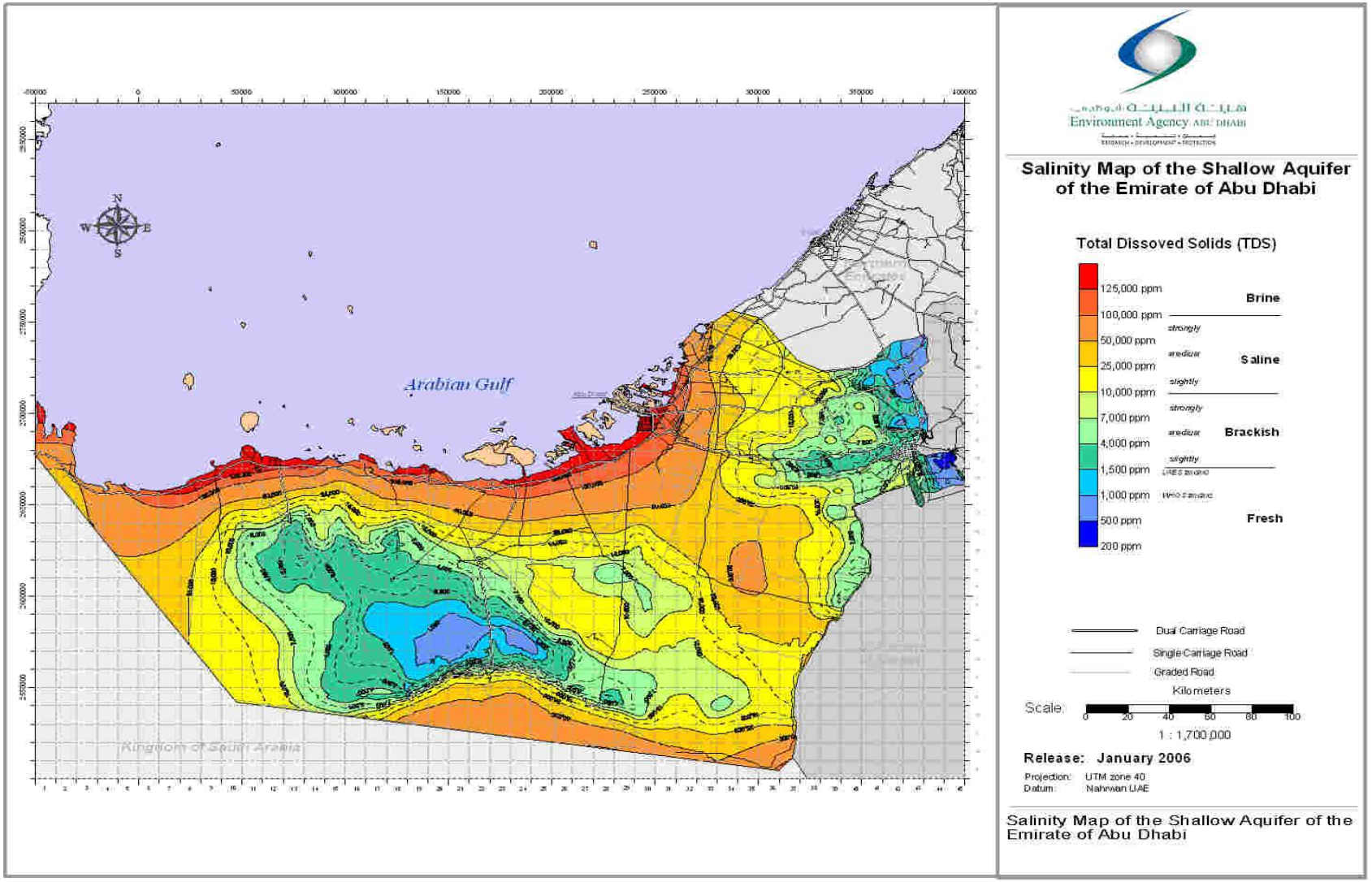
GROUNDWATER DERTIORATION



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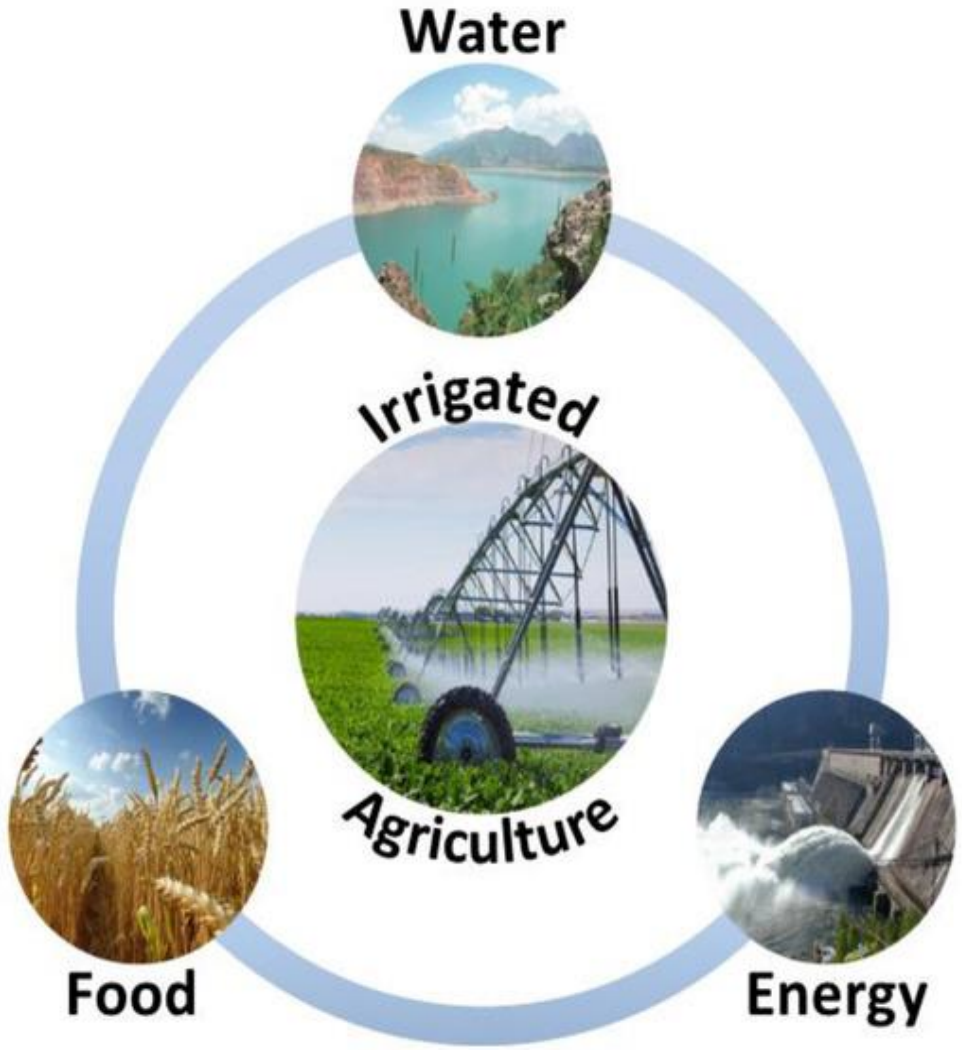
WATER, FOOD AND ENERGY NEXUS



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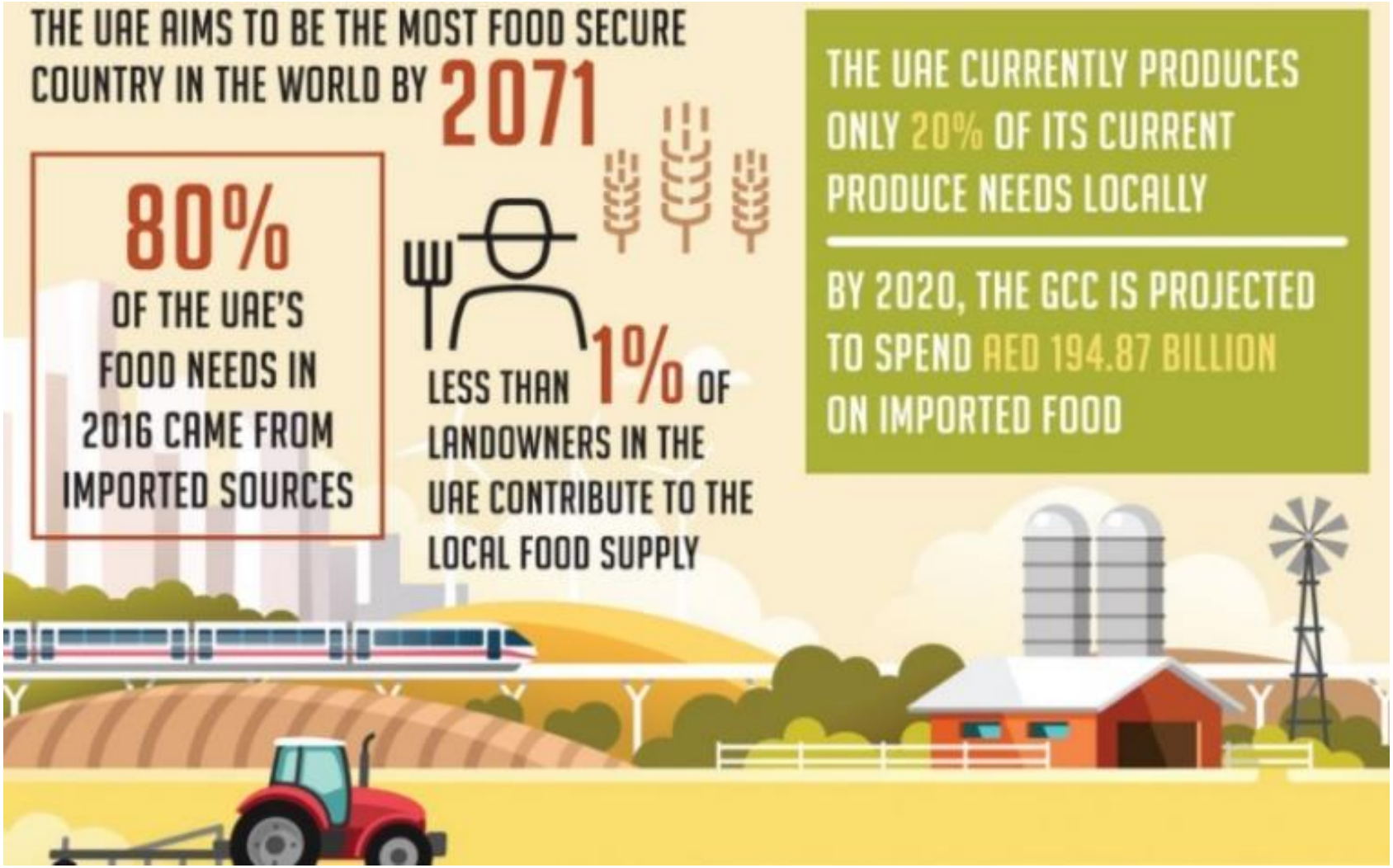

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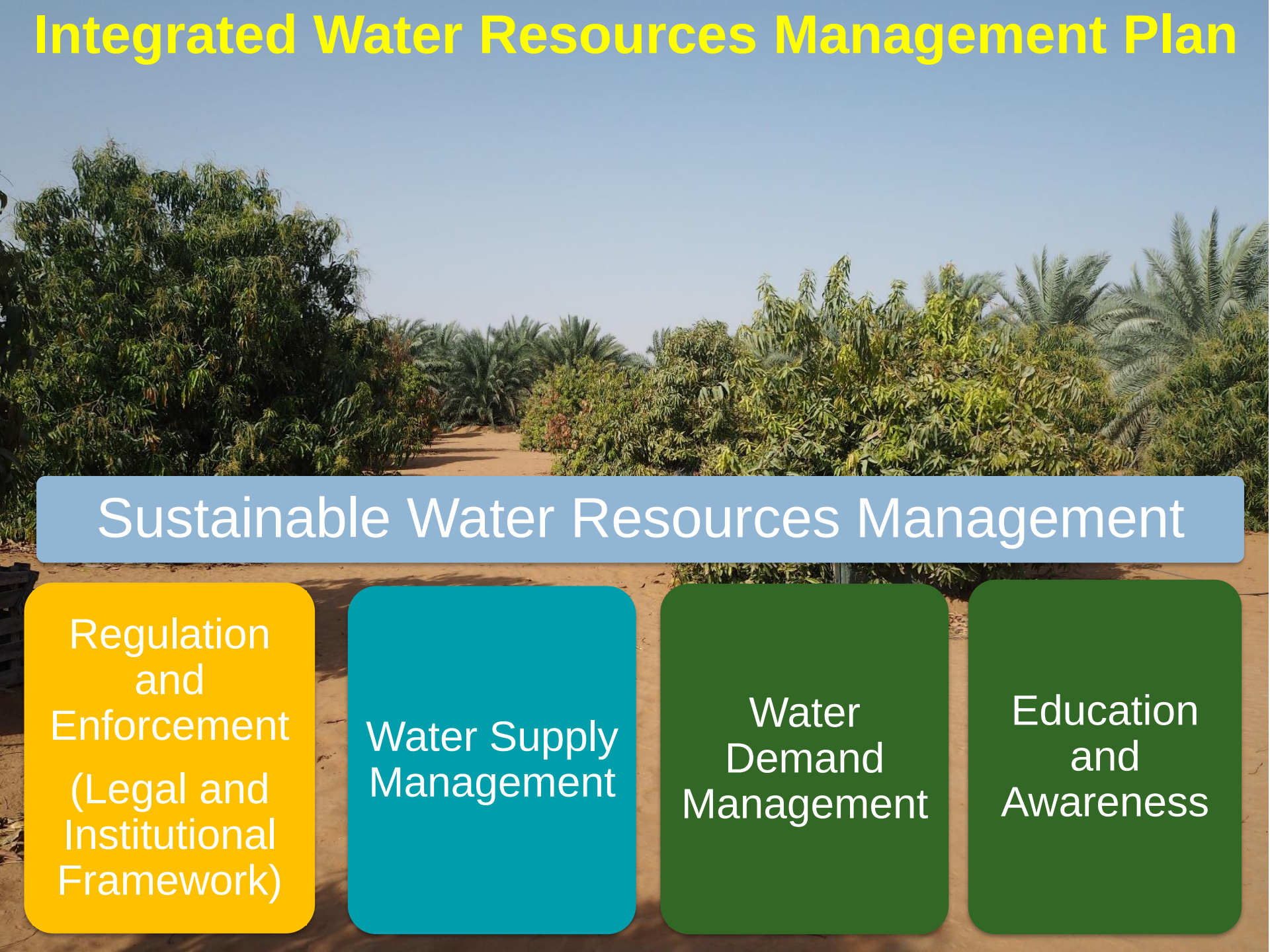
Integrated Water Resources Management Plan



Sustainable Water Resources Management

- Regulation and Enforcement (Legal and Institutional Framework)
- Water Supply Management
- Water Demand Management
- Education and Awareness

ENVIRONMENT AGENCY – ABU DHABI PILOT PROJECT

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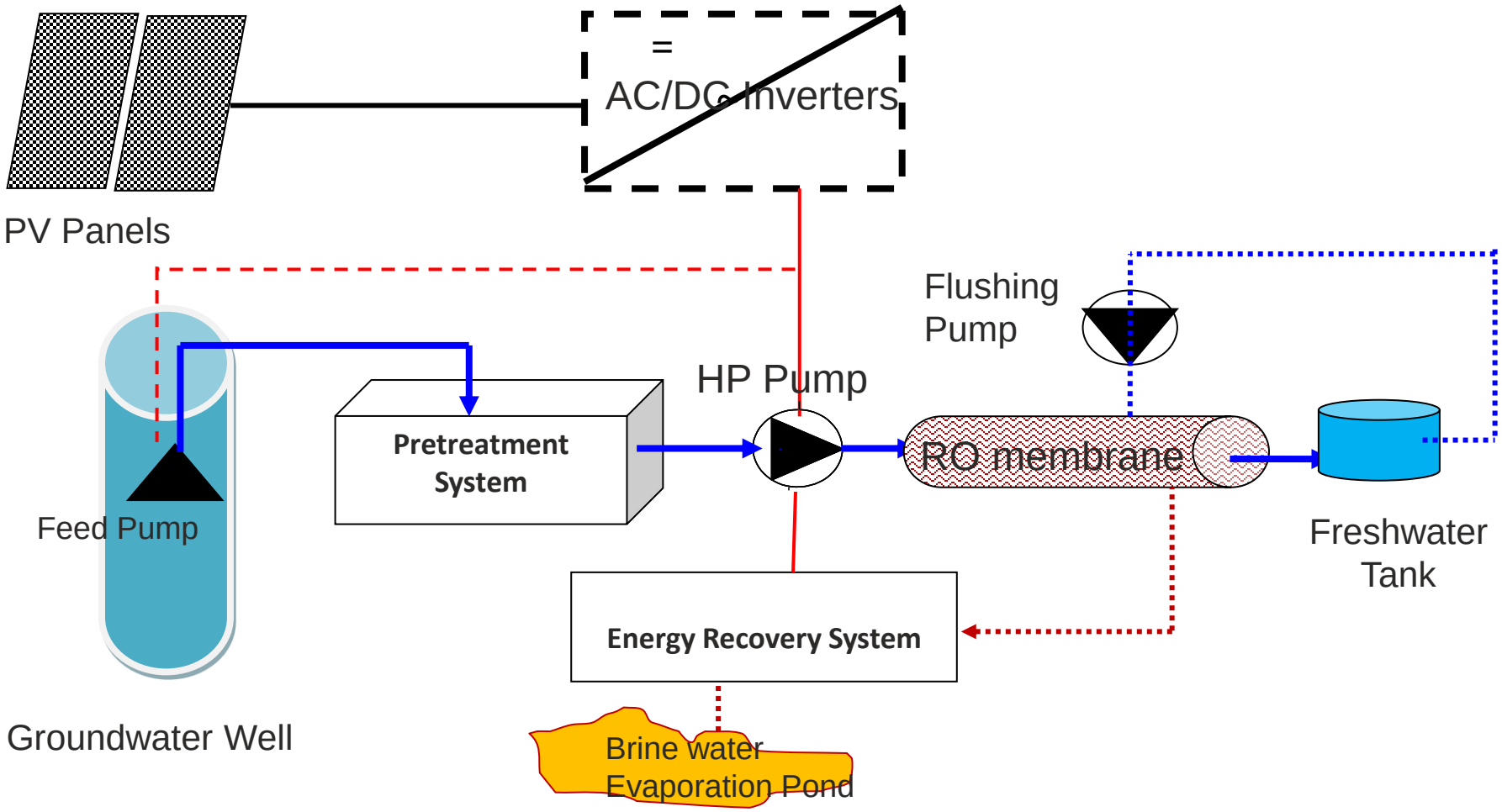

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MASDAR PILOT PROJECT AT GHANTOUT

- 1,500 – 2,500 m3/day water production
- 5 pilot plants
- A report published on the program found that solar-powered reverse osmosis is up to 75% more energy efficient than the thermal desalination technologies currently used in the UAE
- Demonstration stage: April 2014 – July 2016

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MASDAR PILOT PROJECT AT GHANTOUT

Technology Provider	Desalination Technology	Capacity of Pilot Plant [m^3/d]
Abengoa	Reverse Osmosis and Membrane Distillation	1,000
Suez	Reverse Osmosis and Liquid Ionic Membrane	100
Trevi Systems	Forward Osmosis	50
Veolia	Reverse Osmosis	300
Mascara	PV Powered Reverse Osmosis	30

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MASDAR PILOT PROJECT AT GHANTOUT

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NEW 200MIGD RO PROJECT AT TAWEELAH

- 200 MIGD Reverse Osmosis (RO) at Taweelah with 41MW of Solar (PV on rooftops and land surrounding the plant)
- Independent Water Project (IWP); the world's largest RO plant.
- Enable :
  - Decoupling water from power generation
  - Reduce consumption of marginal gas cost (especially during winter)
  - Enhancing security of supply (especially in winter),
  - contribution to CO2 reduction
- Construction by Abengoa (Spain) and SEPCO III (China)

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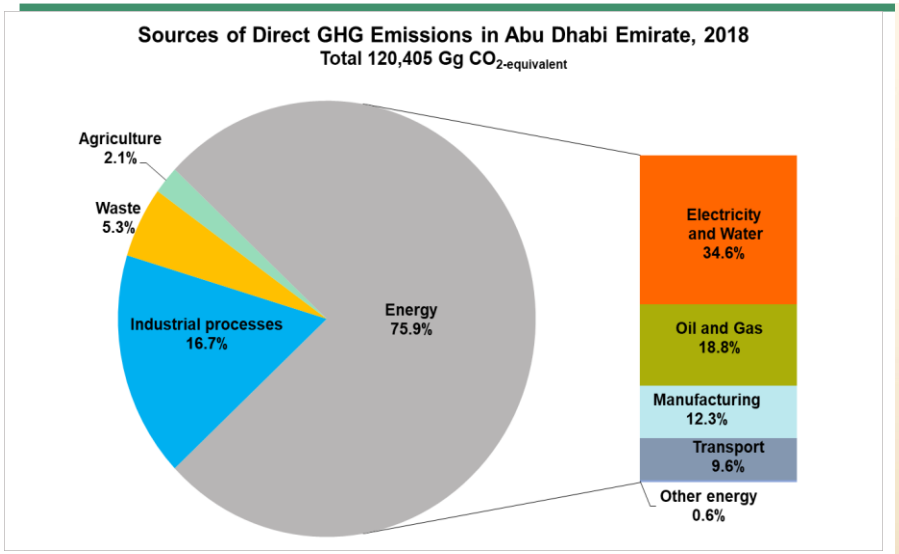
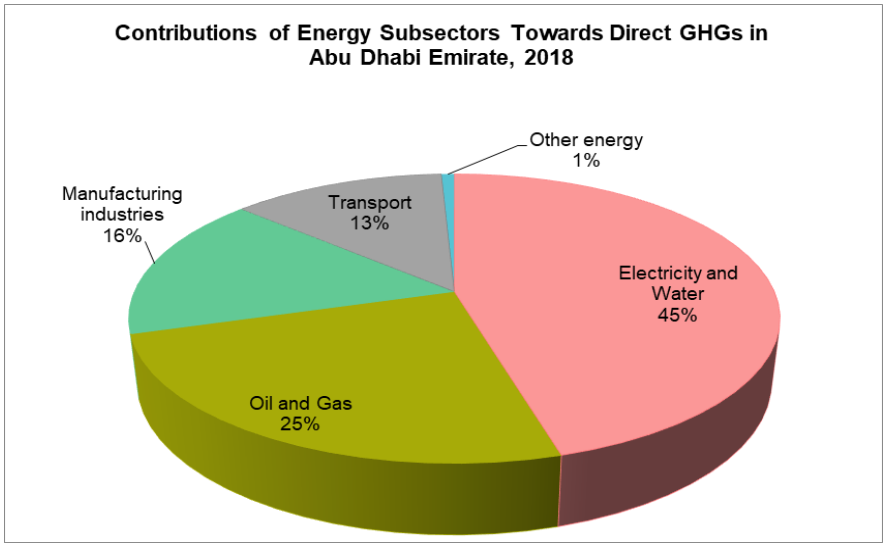
ADVANTAGES OF SOLAR DESALINATION





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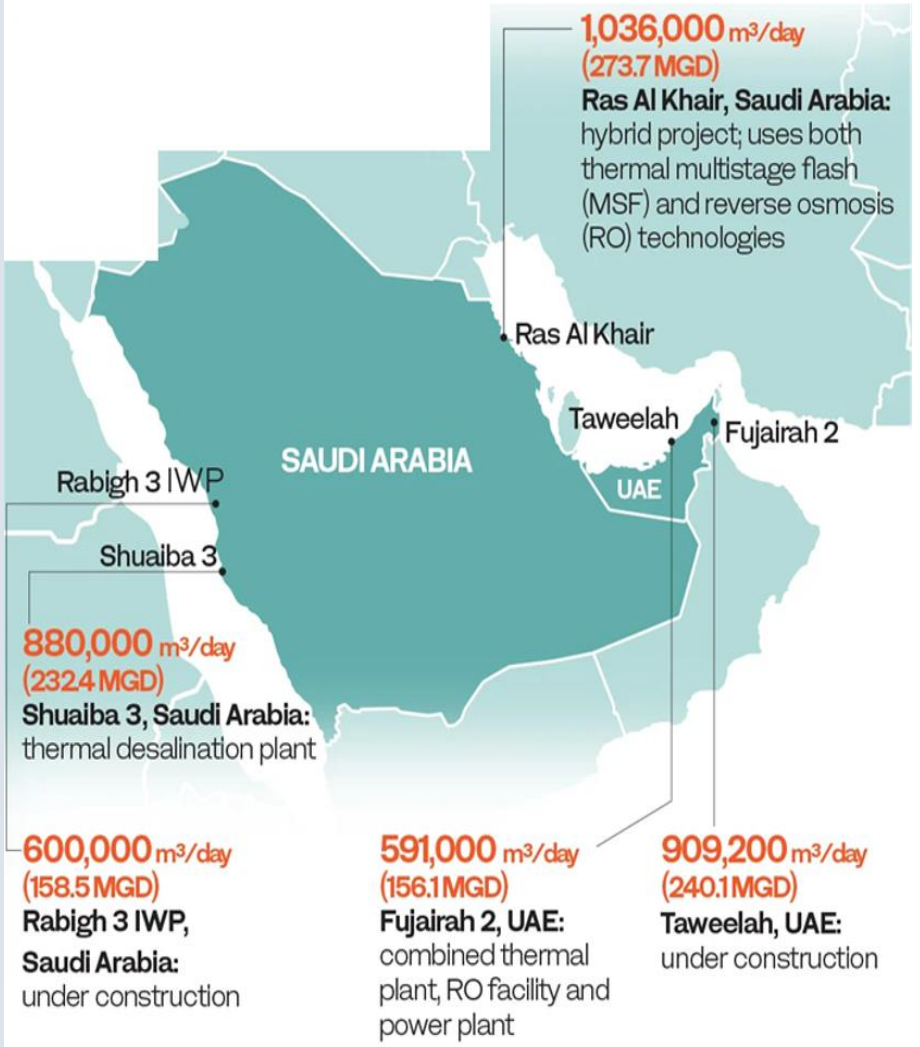
FROM THERMAL DESALINATION TO MEMBRANE DESALINATION

Why is it Better?

Flexible
Unlike thermal desalination, RO does not have to be integrated with a power plant which supports and underpins De-Coupling Strategy

Environment Friendly
RO Produces the lowest airborne emissions per m^3 of water produced with no waste heat generated and no impact on ambient seawater temperature

Cost Efficient
RO is a more efficient proccess, reducing costs due to improved technology and Energy Recovery Systems



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THANKS

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