EU GCC Clean Energy Network II

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Clean Energy R&I Collaboration and Funding Opportunities workshop

Renewable Energy Desalination: moving forward for collaboration

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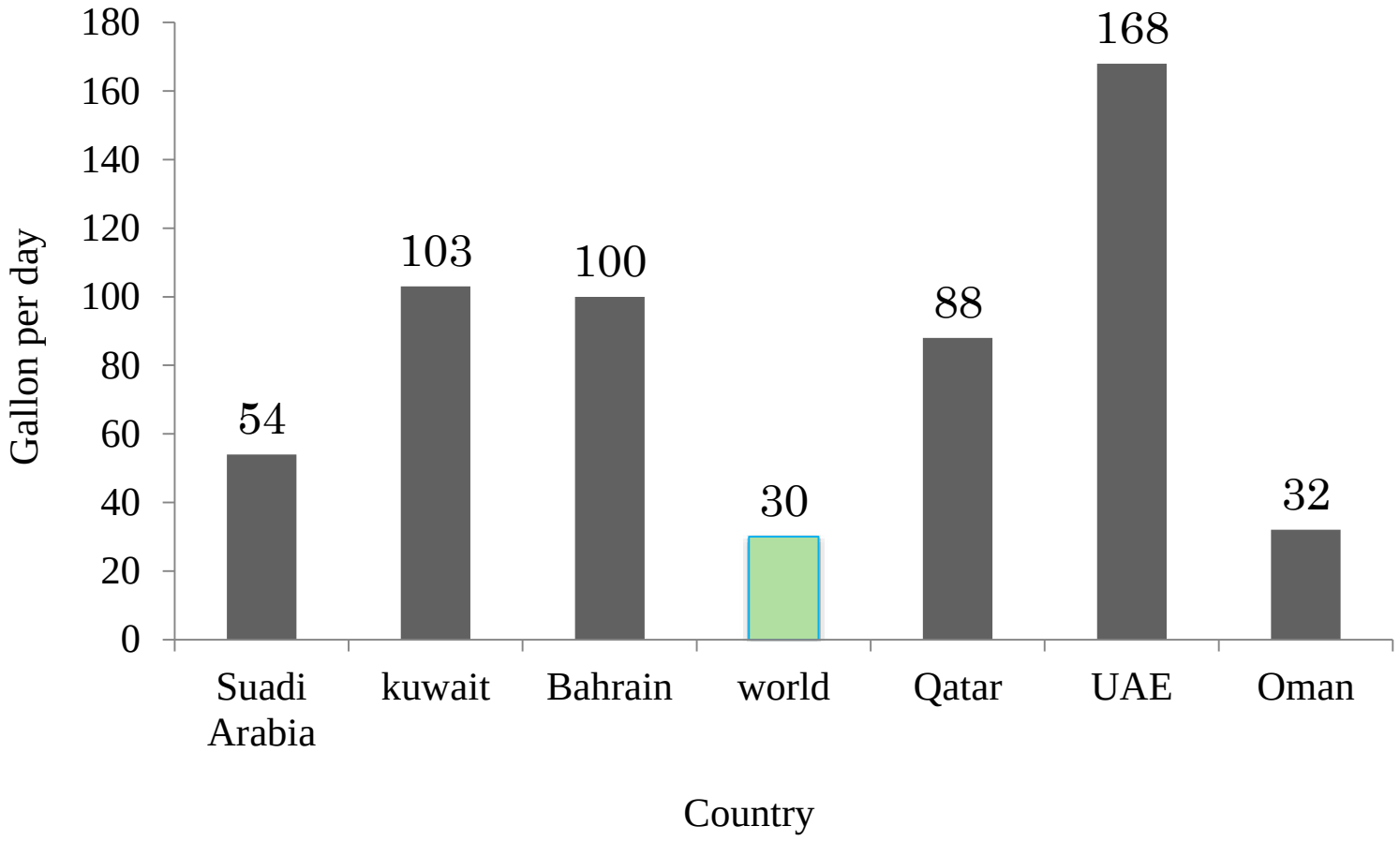
Outline

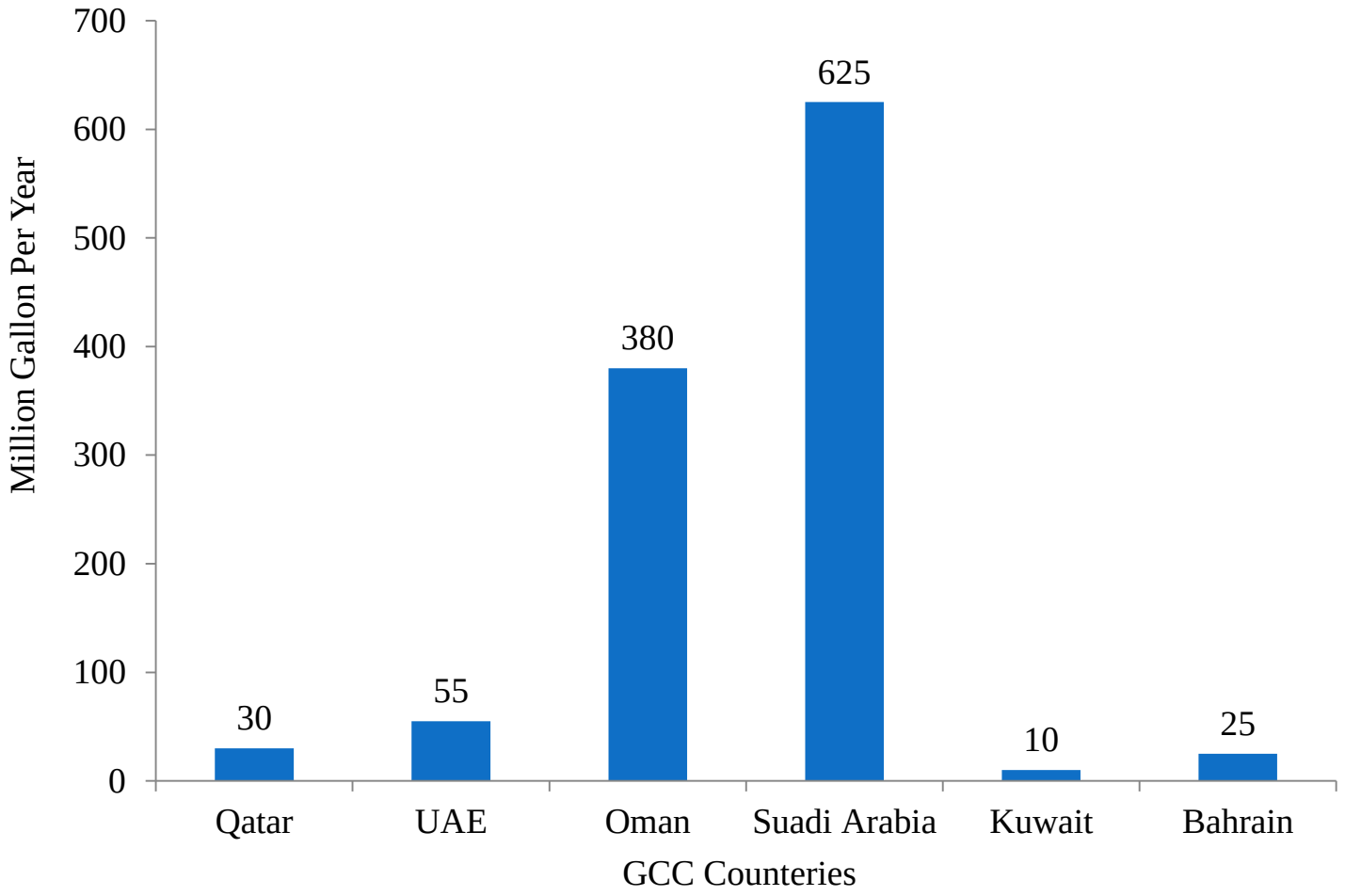
- Water **Scarcity**
- Integrating RE and Desalination
- RE Desalination Systems in the ME
- Water, Power, RE Nexus

Water Share Per Person in GCC

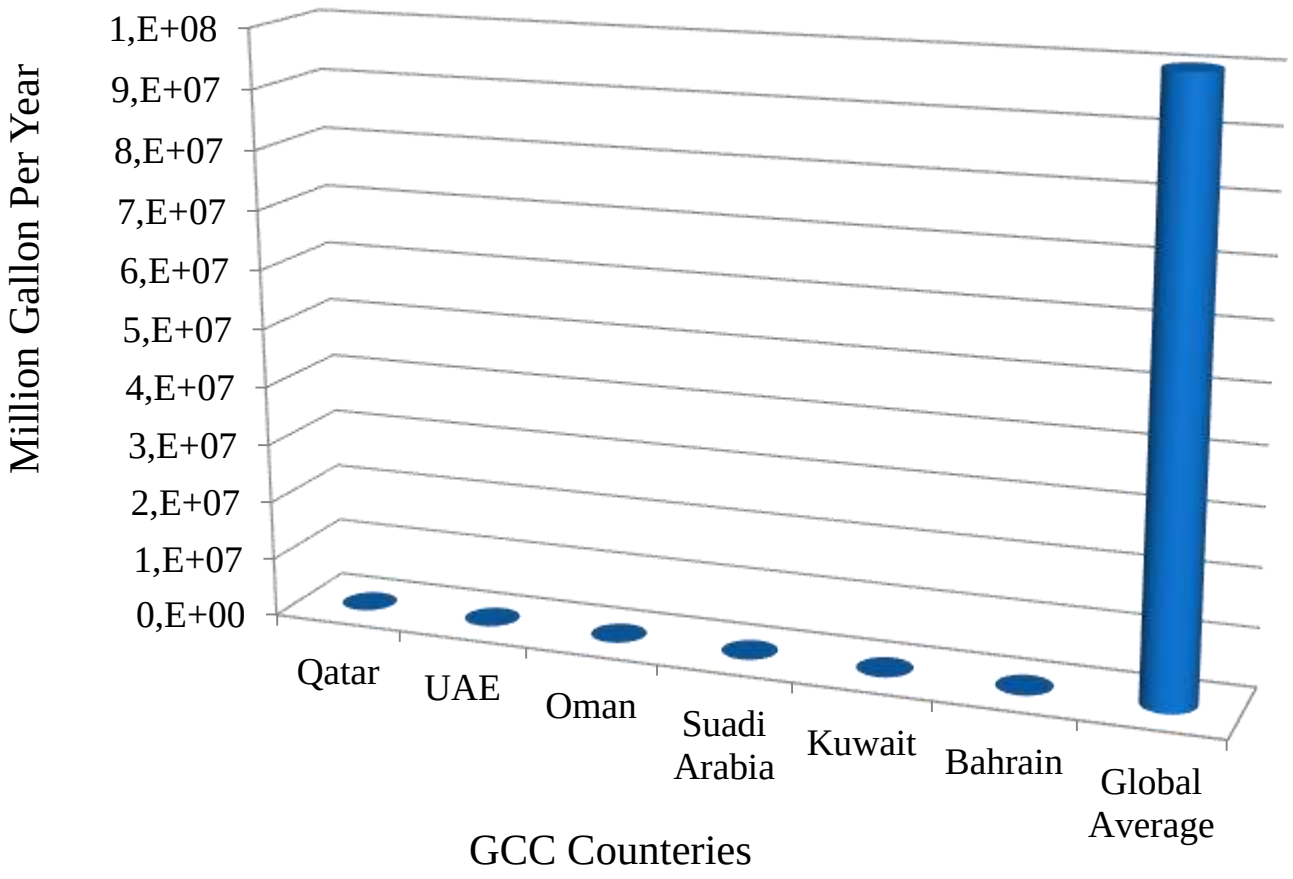


**Data Taken From The Ministries Of Water From All GCC Countries

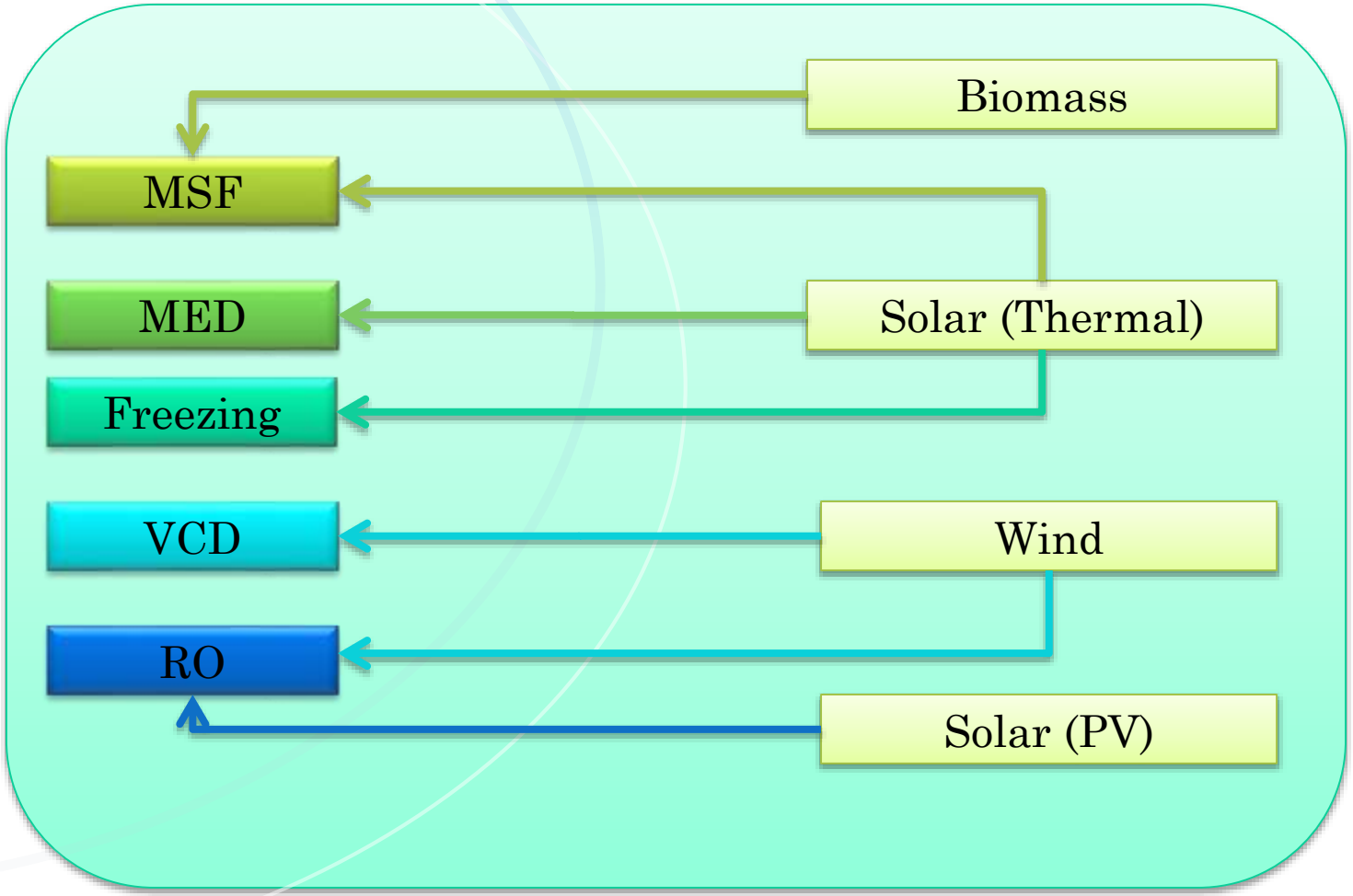
Renewable Fresh Water Resources For GCC



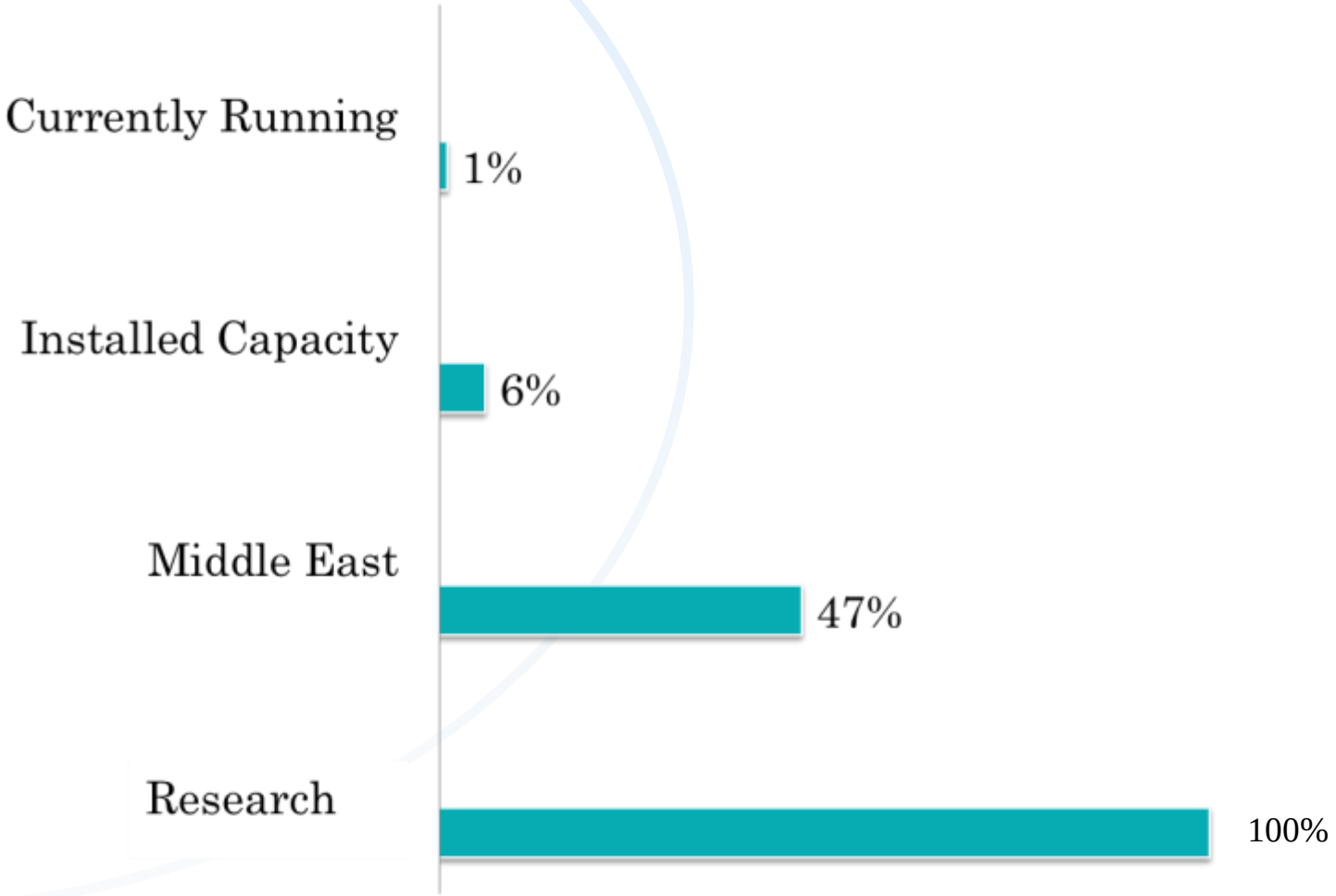
Renewable Fresh Water Resources



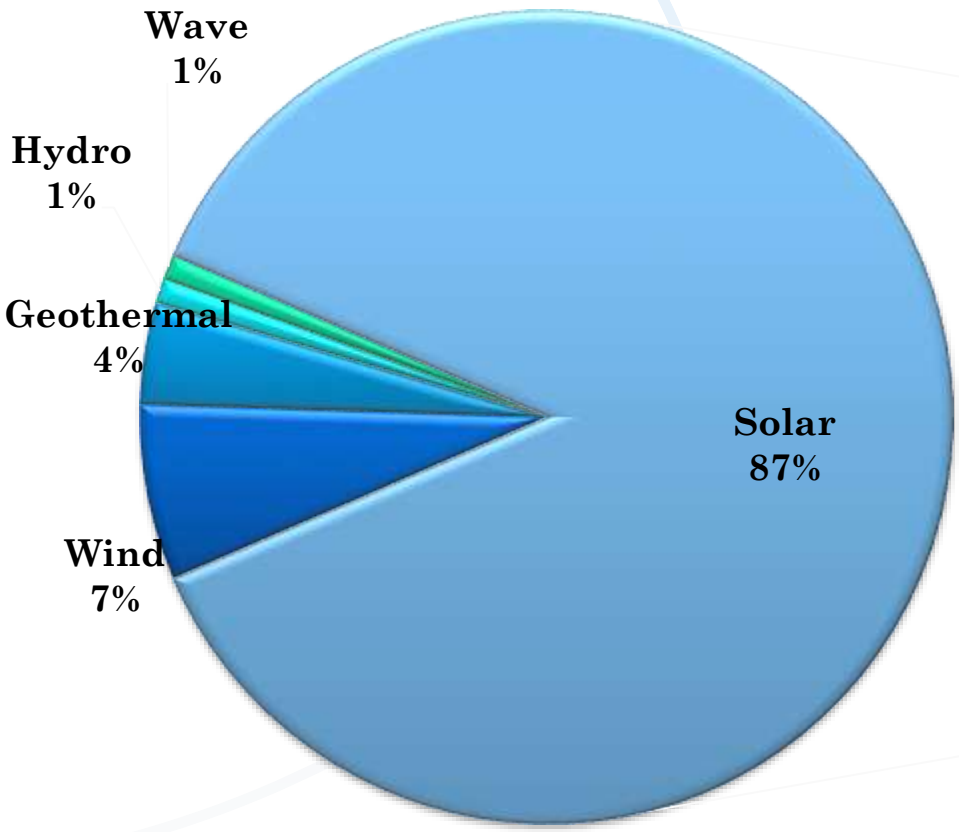
Integrating RE and Desalination

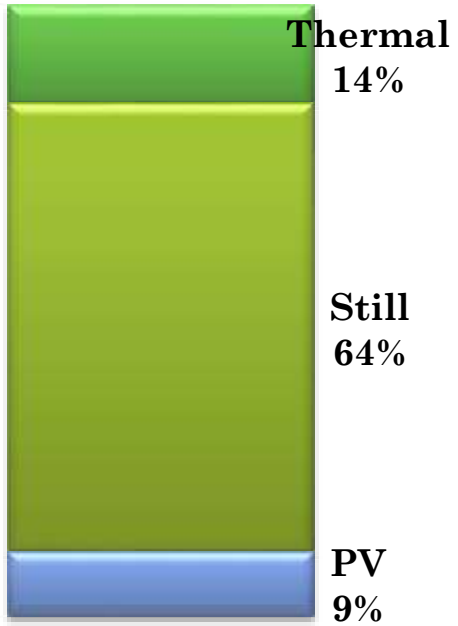


RE Desalination Systems in the Middle East



Integrating RE and Desalination





Solar Still

Many solar stills have been invented and tested over a period of almost 100 years, where a solar still covering about 4450 m^2 and providing fresh water (22.70 m^3/day) was built in an arid area of Las Salinas, Chile in 1872 and operated for many years.

The highest capacity recorded is 5.8 m^3/m^2/day.

Hidd II production 92592 m^3/day, which requires a solar still with an area of approximately 1.6 km^2.

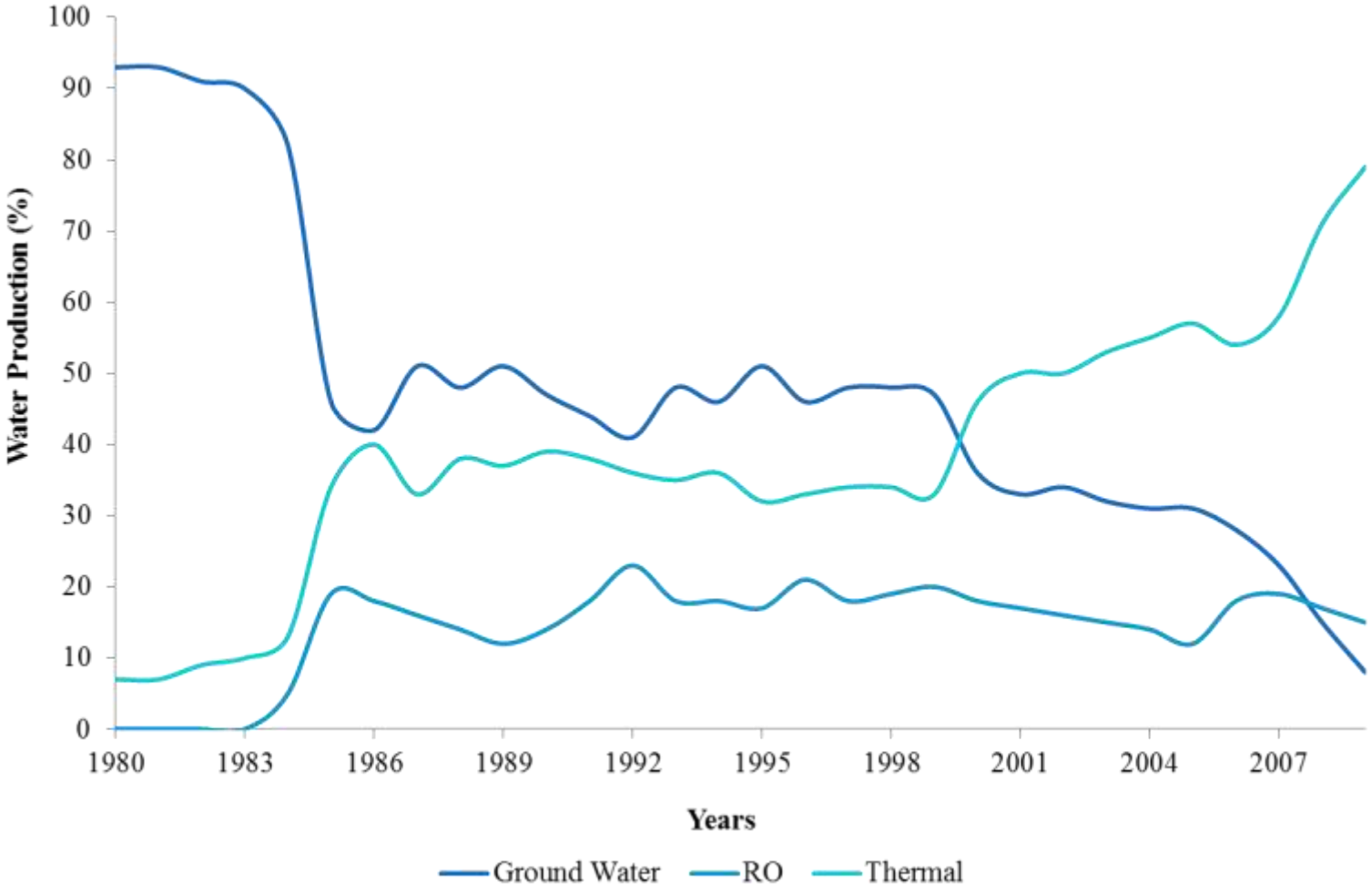
Solar thermal desalination in GCC

In 1984 a one million Dollar MED station coupled with thermal collectors was constructed in Um Nar, UAE, it was the world first largest renewable energy station with a capacity of 120 m^3/day. The station was decommissioned in 2003 as a consequence of privatization of the water and power sector in UAE (El-Nashar and Al-Baghdadi 1998; El-Nashar and Samad 1998; El-Nashar 2003).

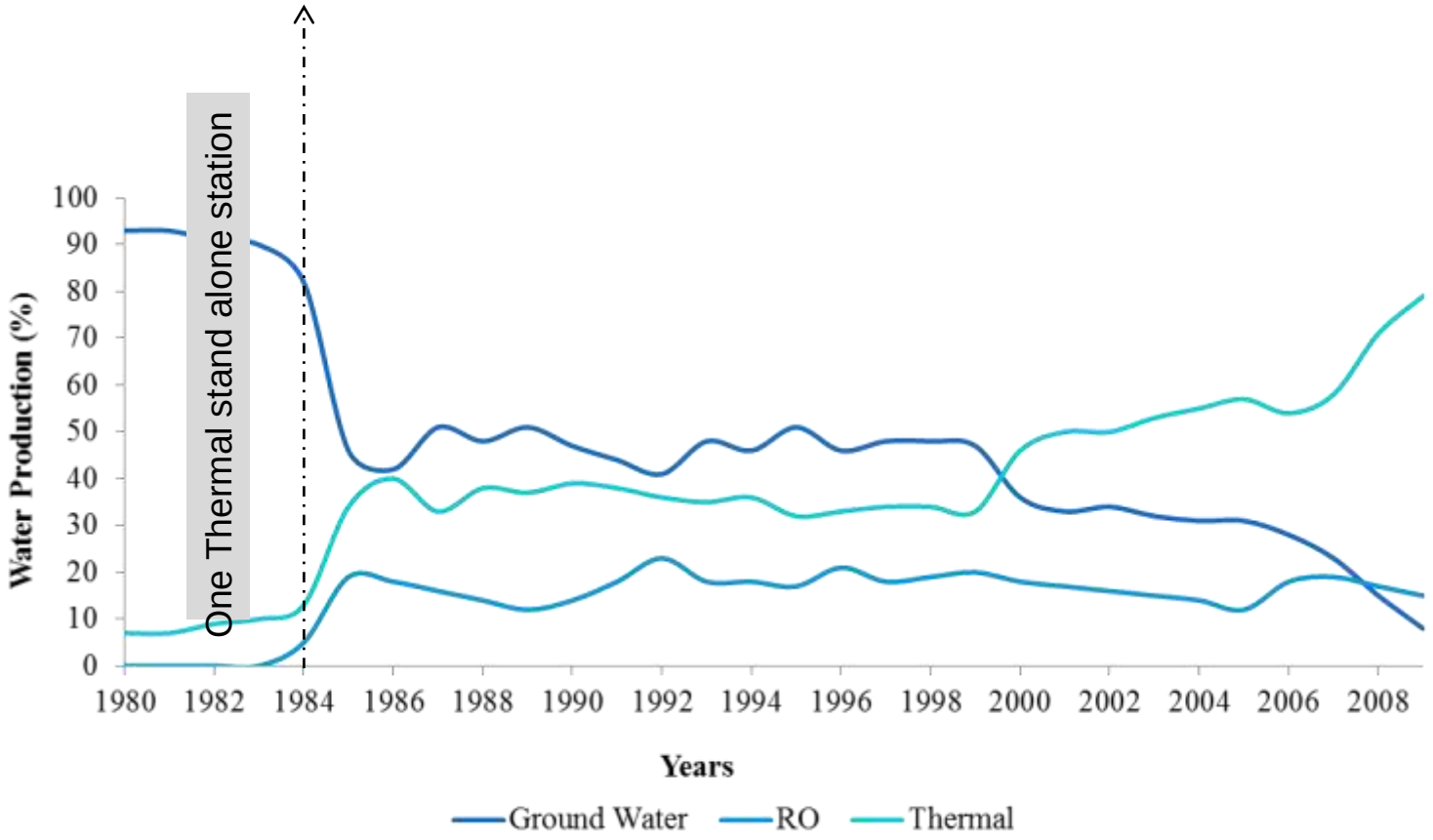
Solar thermal desalination in GCC

Number of small systems were installed before Um Nar station, where they could not survive more than two years; the most famous station is Yanbu solar freezing desalination which was installed with capital cost of 35 million dollars in 1984 with a capacity of 200 m^3/day and decommissioned in 1986 for financial problems.

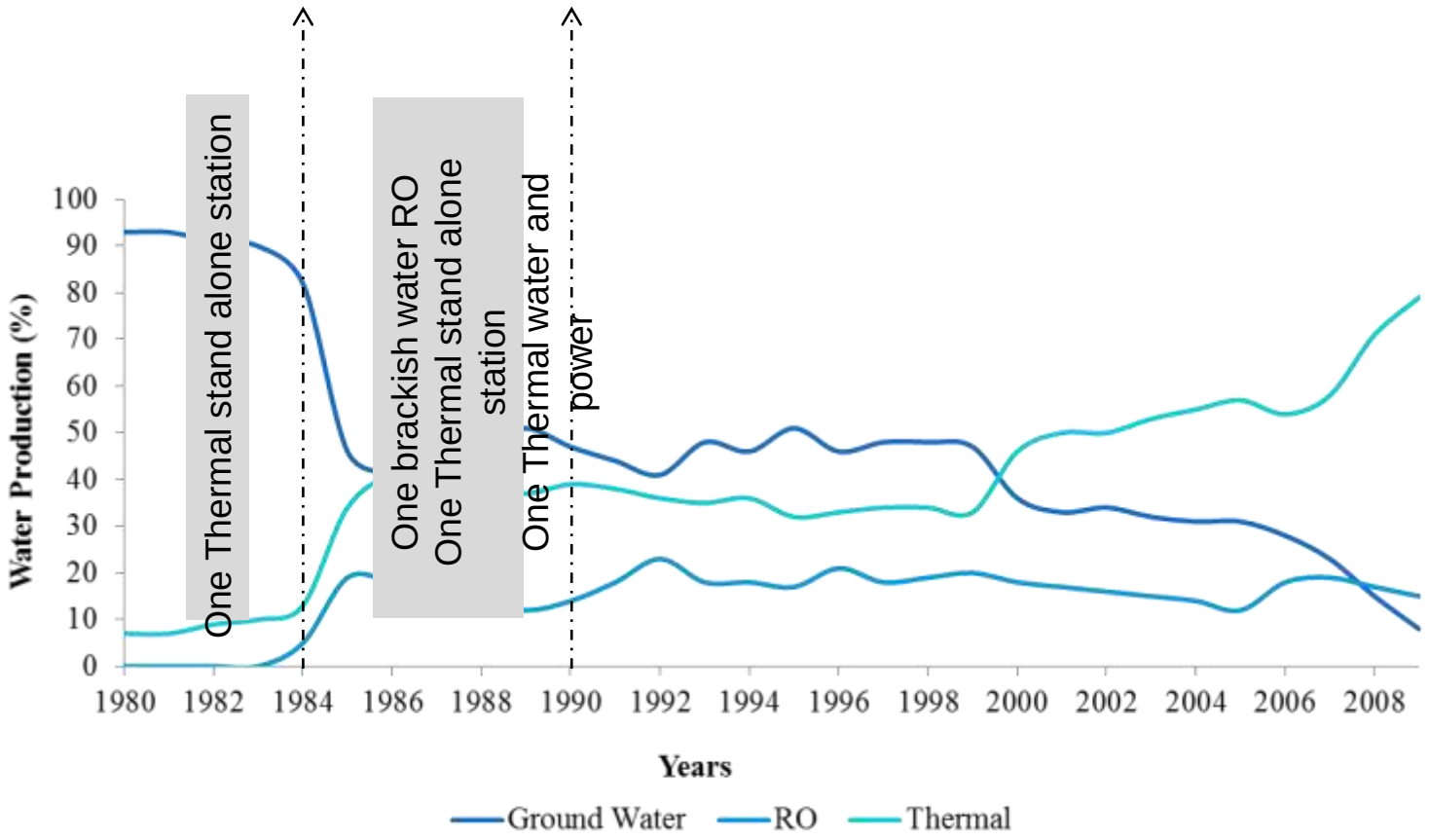
Water Production ..... Bahrain



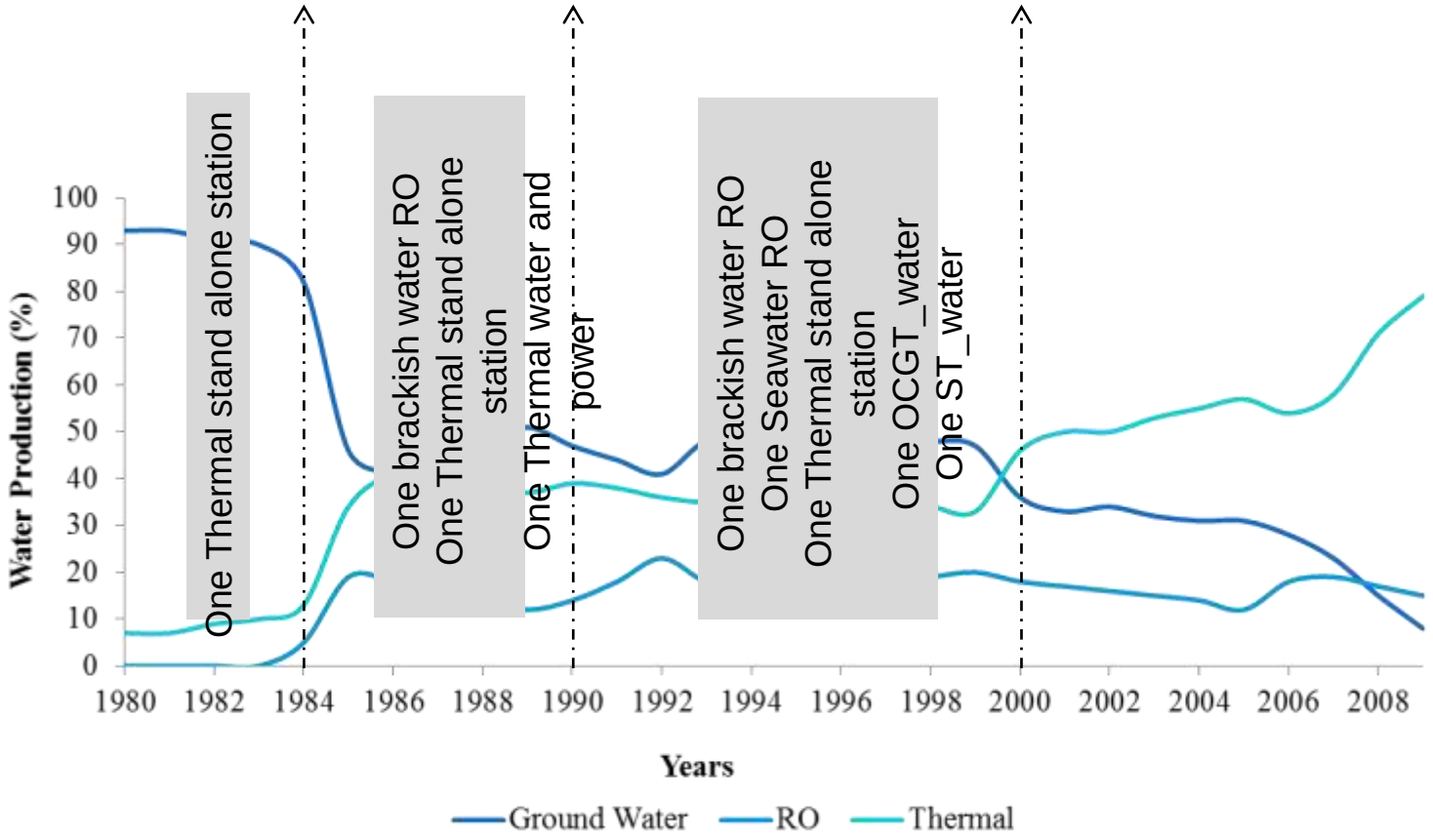
Water Production



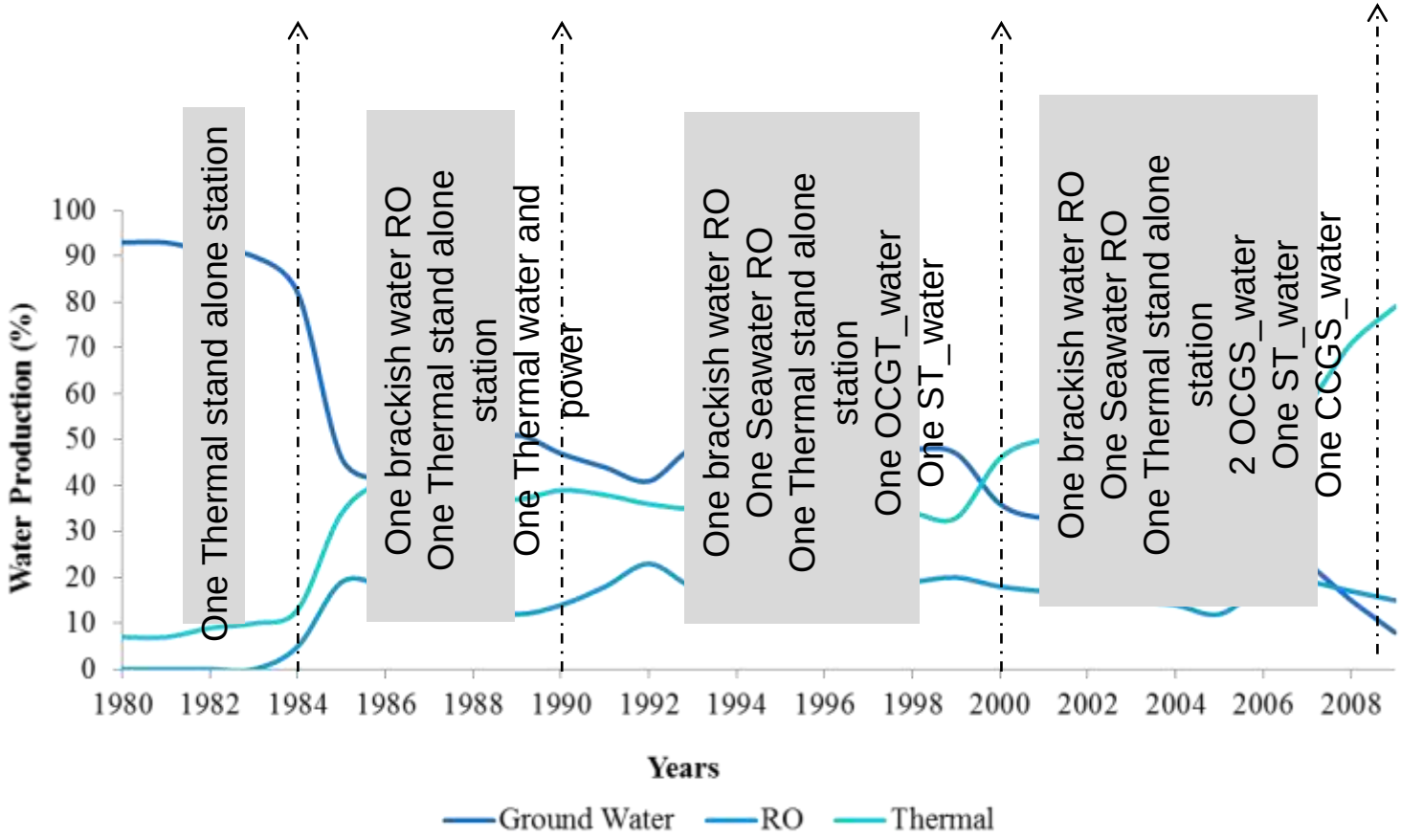
Water Production



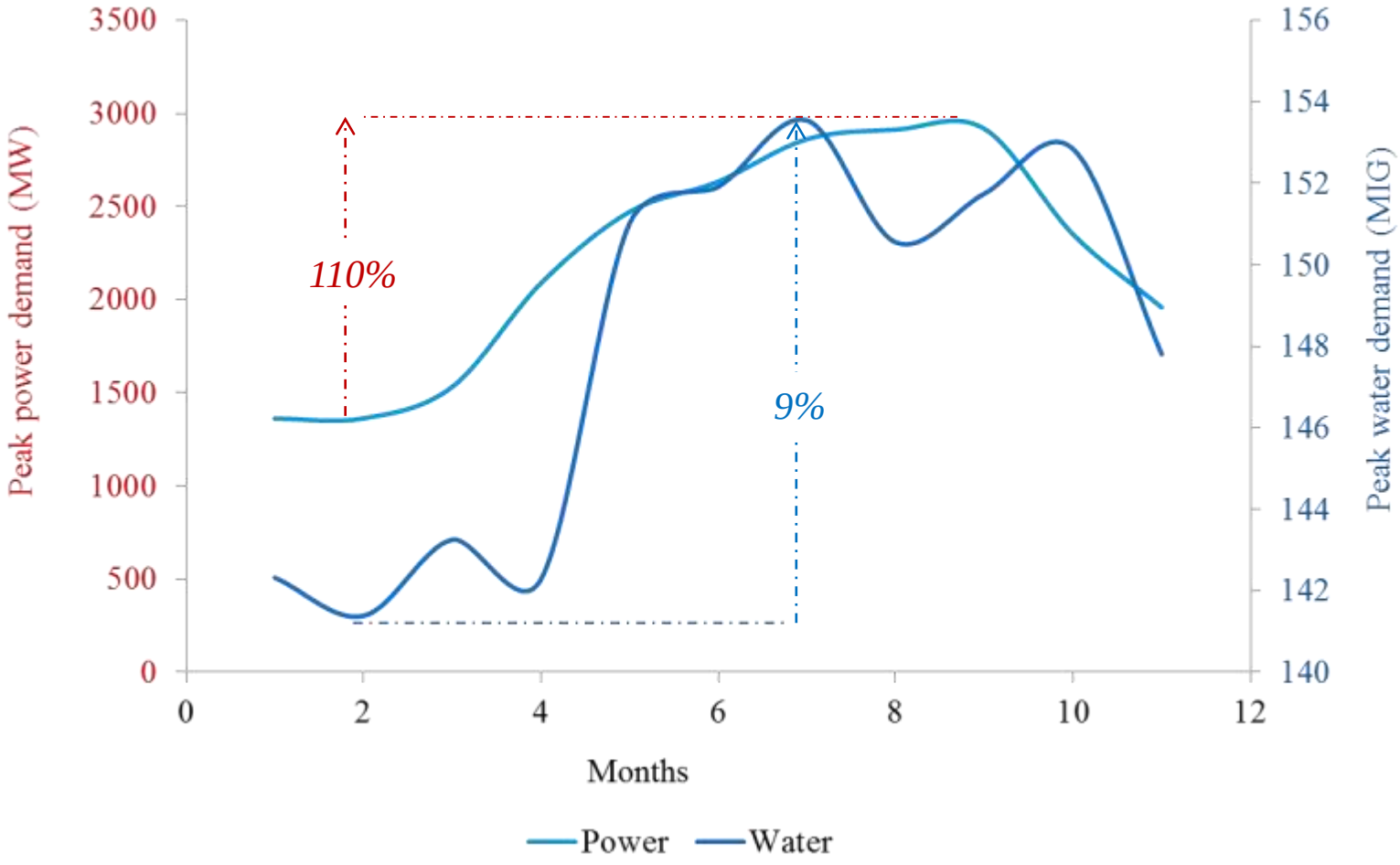
Water Production



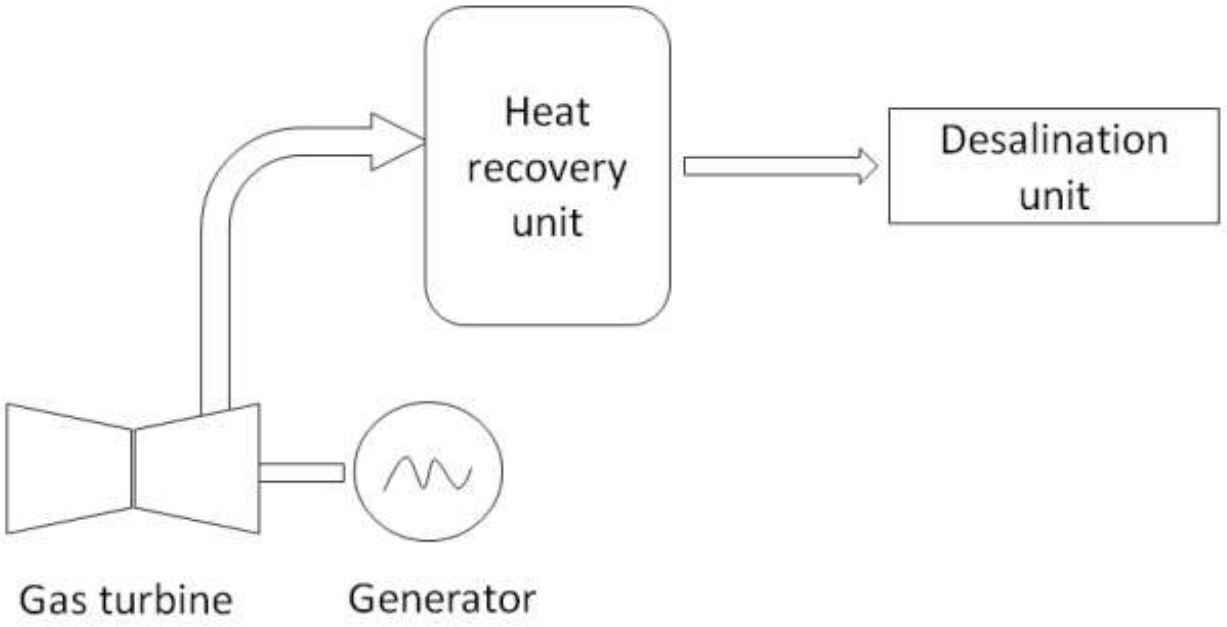
Water Production



Water and Power monthly peak demand



Thermal Technologies …Conventional



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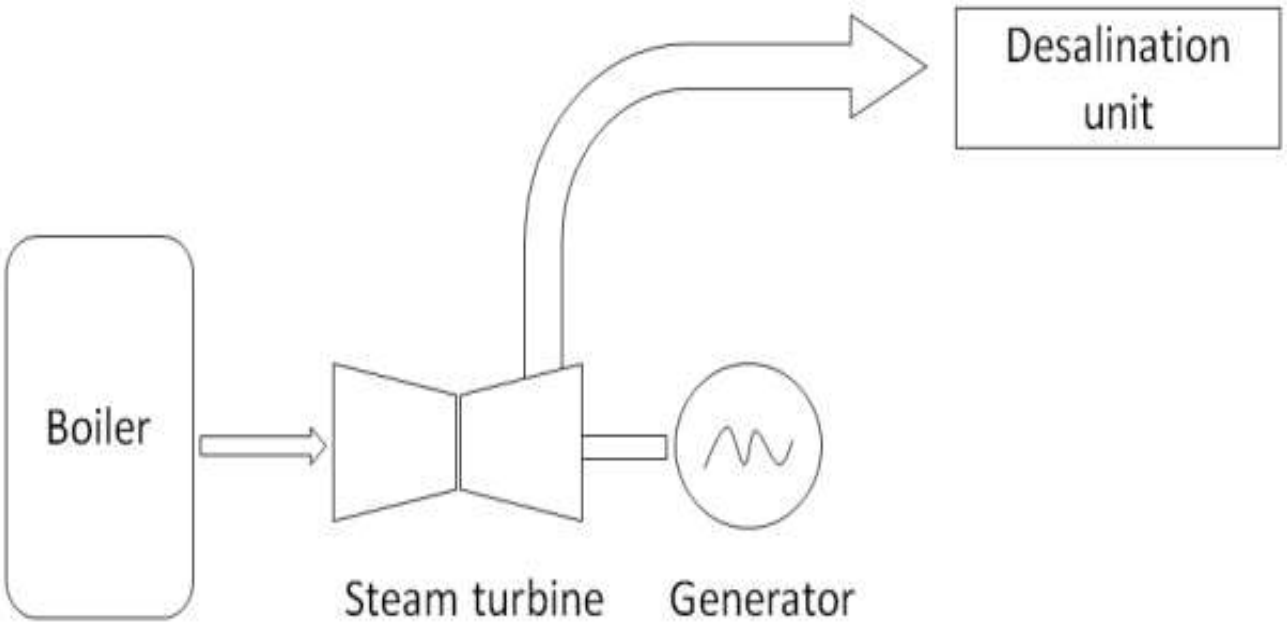
Thermal Technologies …Conventional



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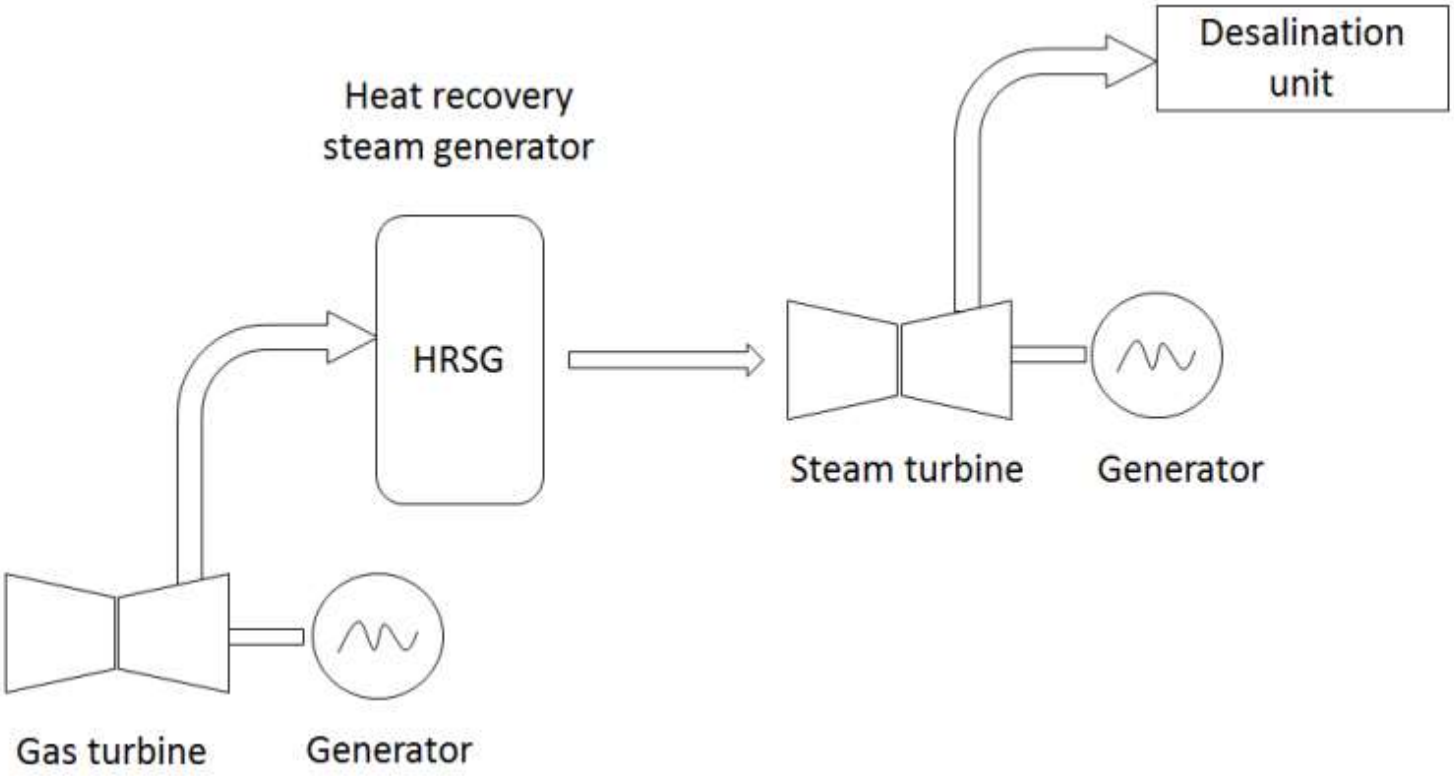
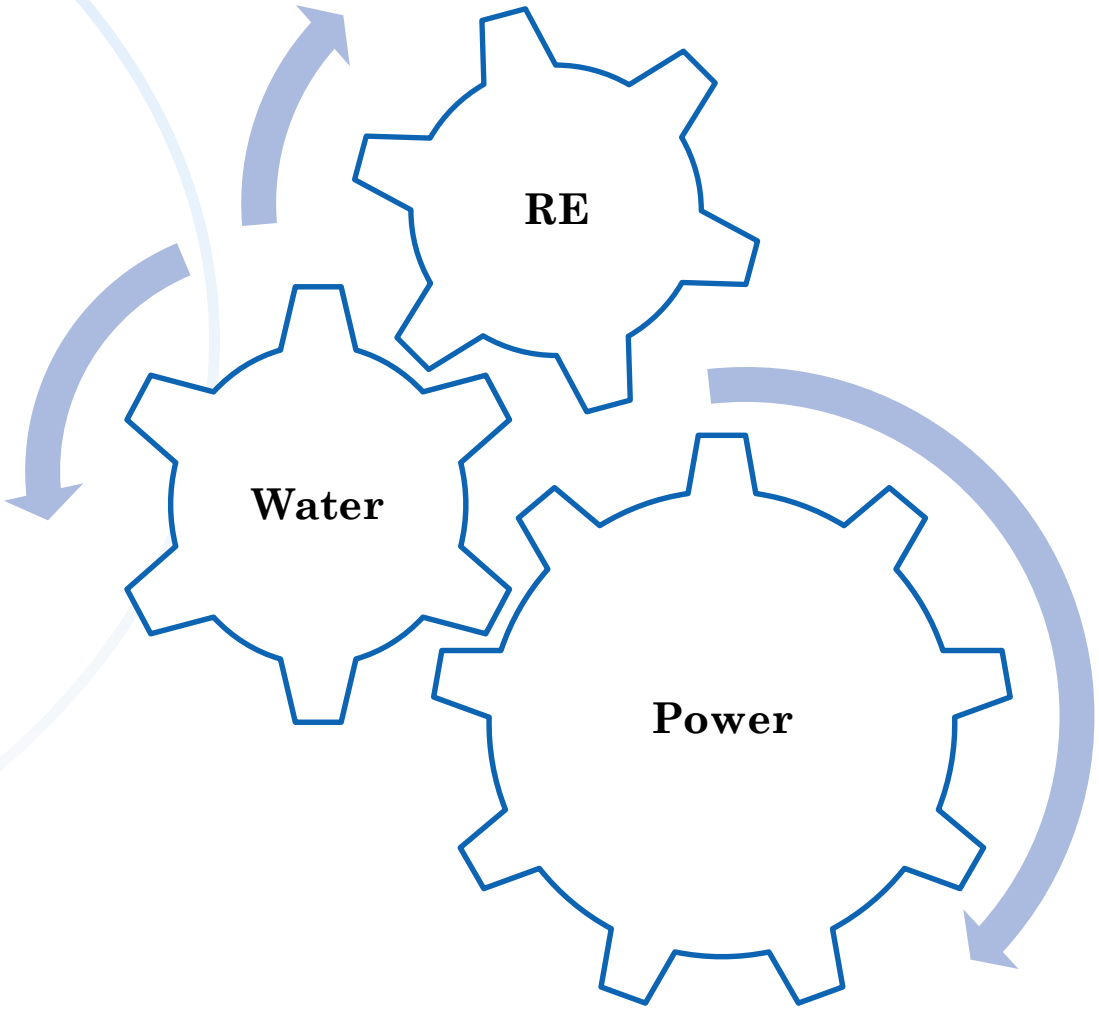


CCGT

Conclusions:

1. Water and power demand are not correlated.
2. Energy and water systems are interdependent.
3. The need to address the challenges to the integration of Renewable Energy into the power-water system.

Water, Power and Renewable Energy Nexus



Water, Power and Renewable Energy Nexus

Three Strategic Pillars to Address the Water, Power and Renewable Energy Nexus:

1. Establish a national network includes; water and power authorities, private sector and research institutions related to this nexus, the main aim of this network is to address the local challenges and possible research areas.
2. Identify potential partners for supporting the research and collaboration.
3. **Call for a sponsored regular symposiums to address the challenges and provide a research proposals**.

Water, Power and Renewable Energy Nexus

Research/symposium topics:

1. Optimize the energy efficiency of power and water, production, transmission, and end use systems.
2. Enhance the reliability and resilience of energy and water systems.
3. Exploit productive synergies among water and energy systems.
4. Introduce/Increase the RE contribution in the efficient production of water and powert.

Thank you