

Development of Solar Energy in the Gulf

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GreenGulf Inc.



23th November 2010 – Gulf Solar Congress- Accelerating solar development in the Gulf

Strictly Private and Confidential

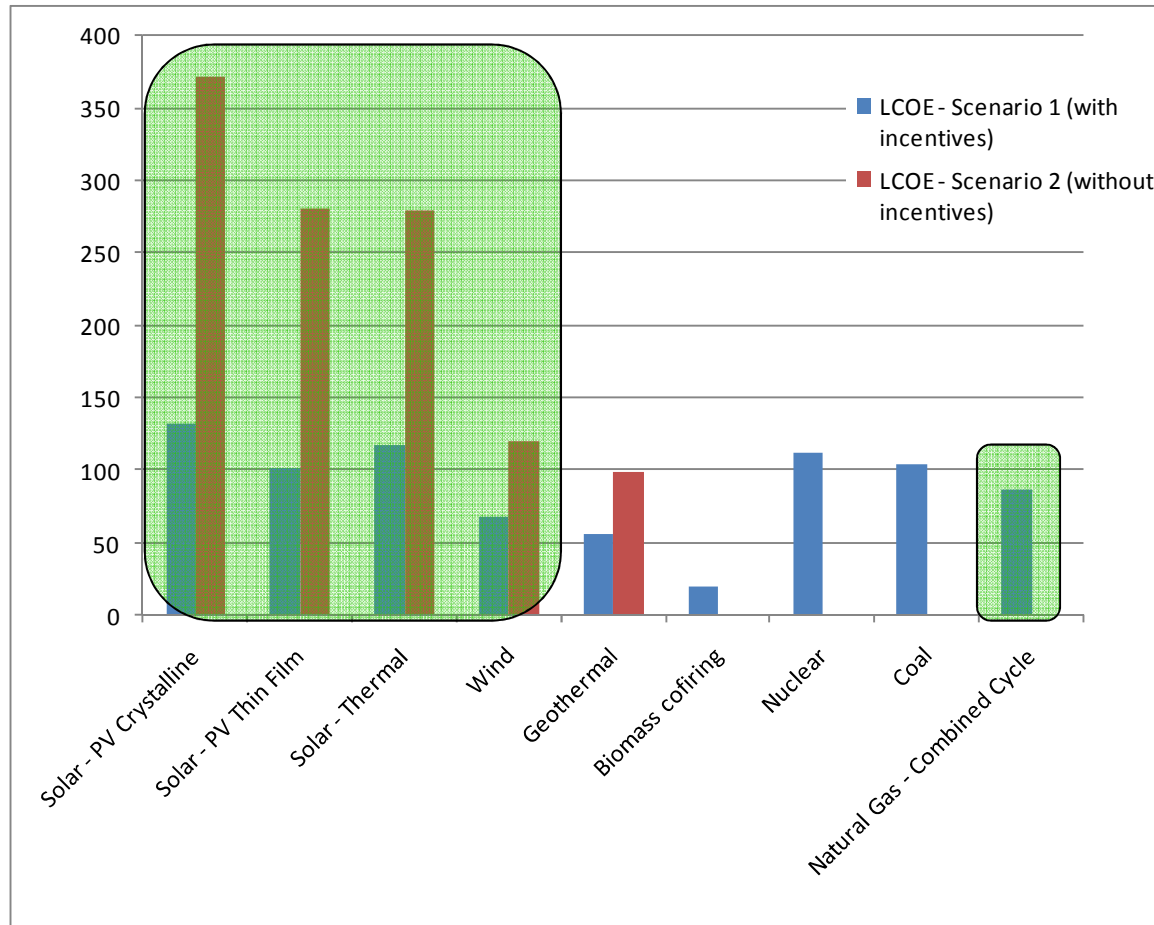


AGENDA

- Drivers for Clean Technology
- Current Challenges
- Regional Initiatives
- Development of Solar Energy in the Middle East

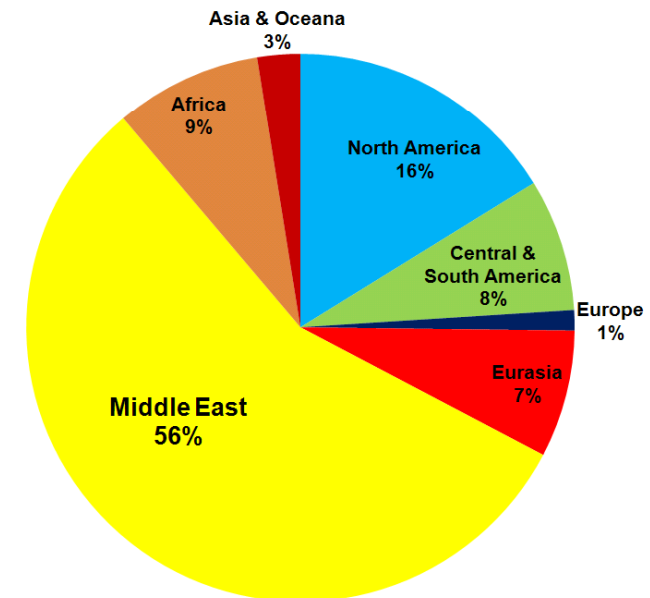


WHY RENEWABLE ENERGY?



Source: Levelised Cost of Energy Analysis v2.0, Lazard 2008

World Oil Reserves by Region



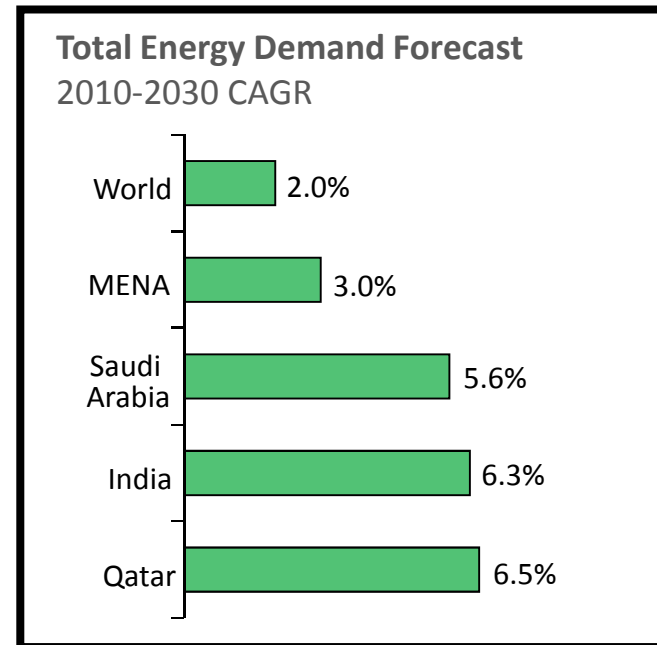
Data source: US Energy Information Administration from Oil and Gas Journal (2007)
Oil includes crude oil and condensate

The cost of electricity produced by non fossil fuel is significantly greater than that produced by burning fossil fuels



WATER & ELECTRICITY DEMAND IN MIDDLE EAST

	2008	2015	Growth
Electricity demand	672 TWh	1,010 TWh	50%
Water consumption	277 km ³ per year	390 km ³ per year	40%
Population	199 million	230 million	15%



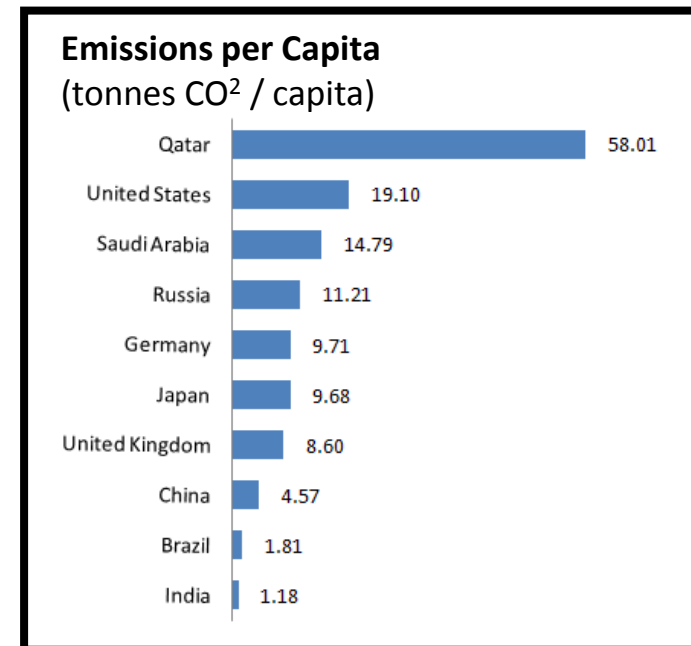
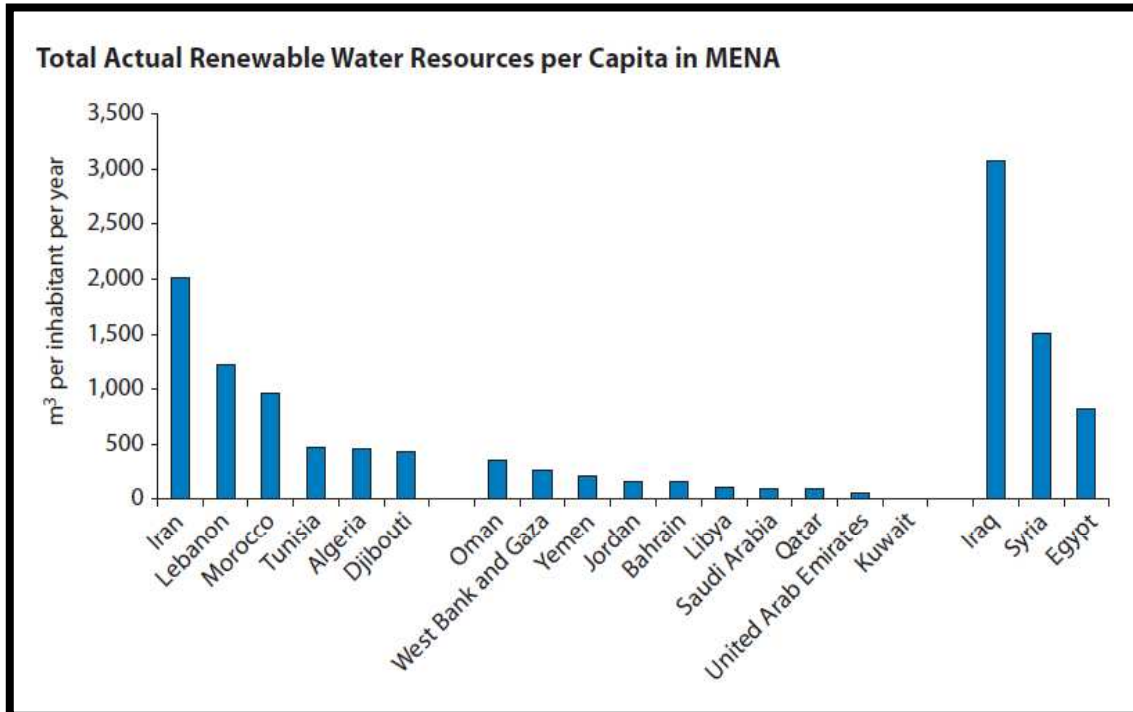
- MENA's energy consumption in the recent years has grown faster than that of any other region in the world, due to expansion of energy-intensive industries and population growth.
- Saudi Arabia is using 15% of its oil output currently for producing electricity and for desalinization, and in 10 years, it will have to be using 20%.

Source: MEED, IEA, AQUASTAT, UNESCO, GG Research

**Population and economic growth will drive a continued increase
in power requirements and energy efficiency in the short term**



DRIVERS FOR CLEAN TECHNOLOGY

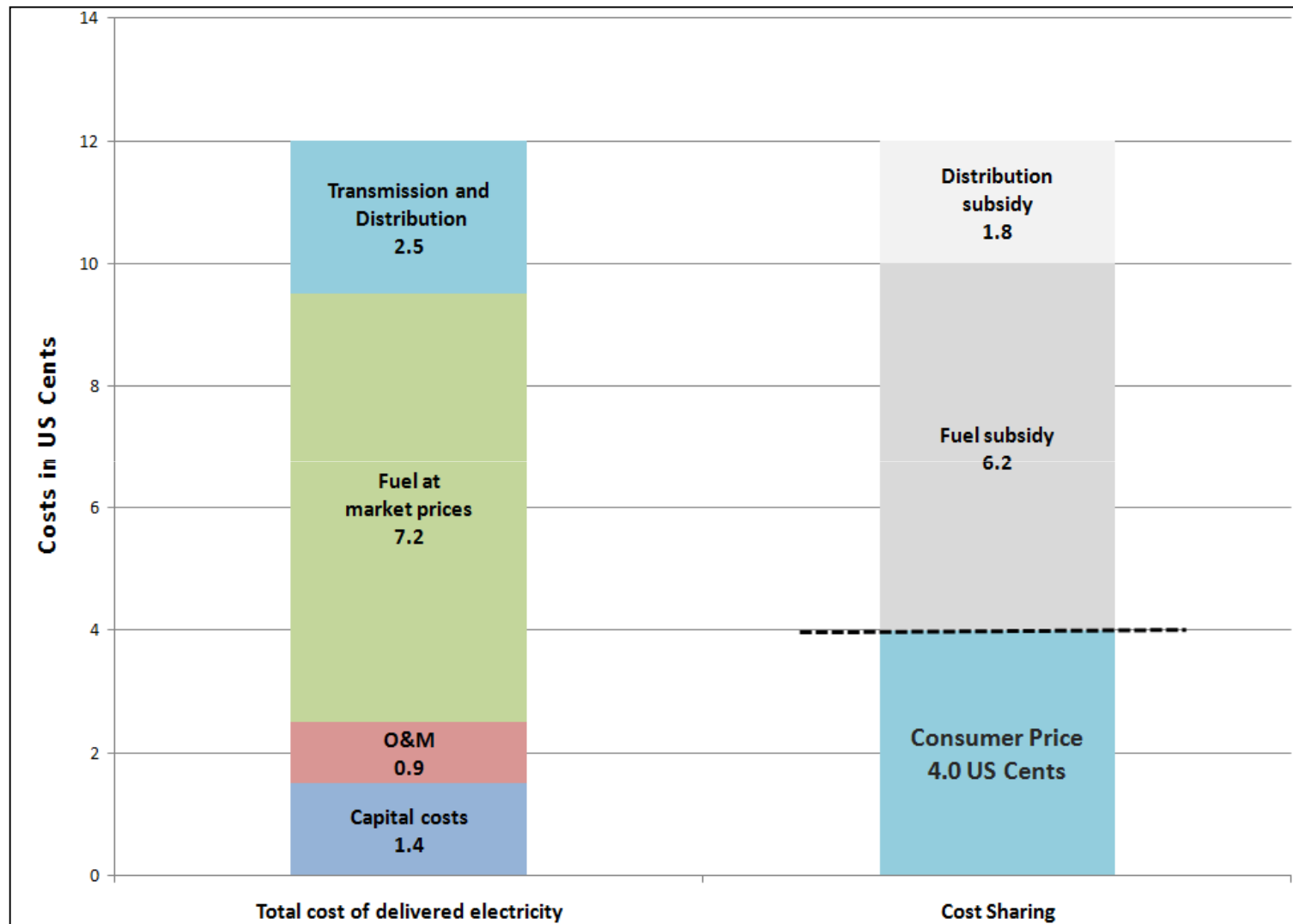


Source: IEA, AQUASTAT

Fresh water sources in the Middle East and North Africa are scarce and water requirements are served through desalination facilities further compounding energy demands



ILLUSTRATIVE COST OF ELECTRICITY GENERATION IN GCC

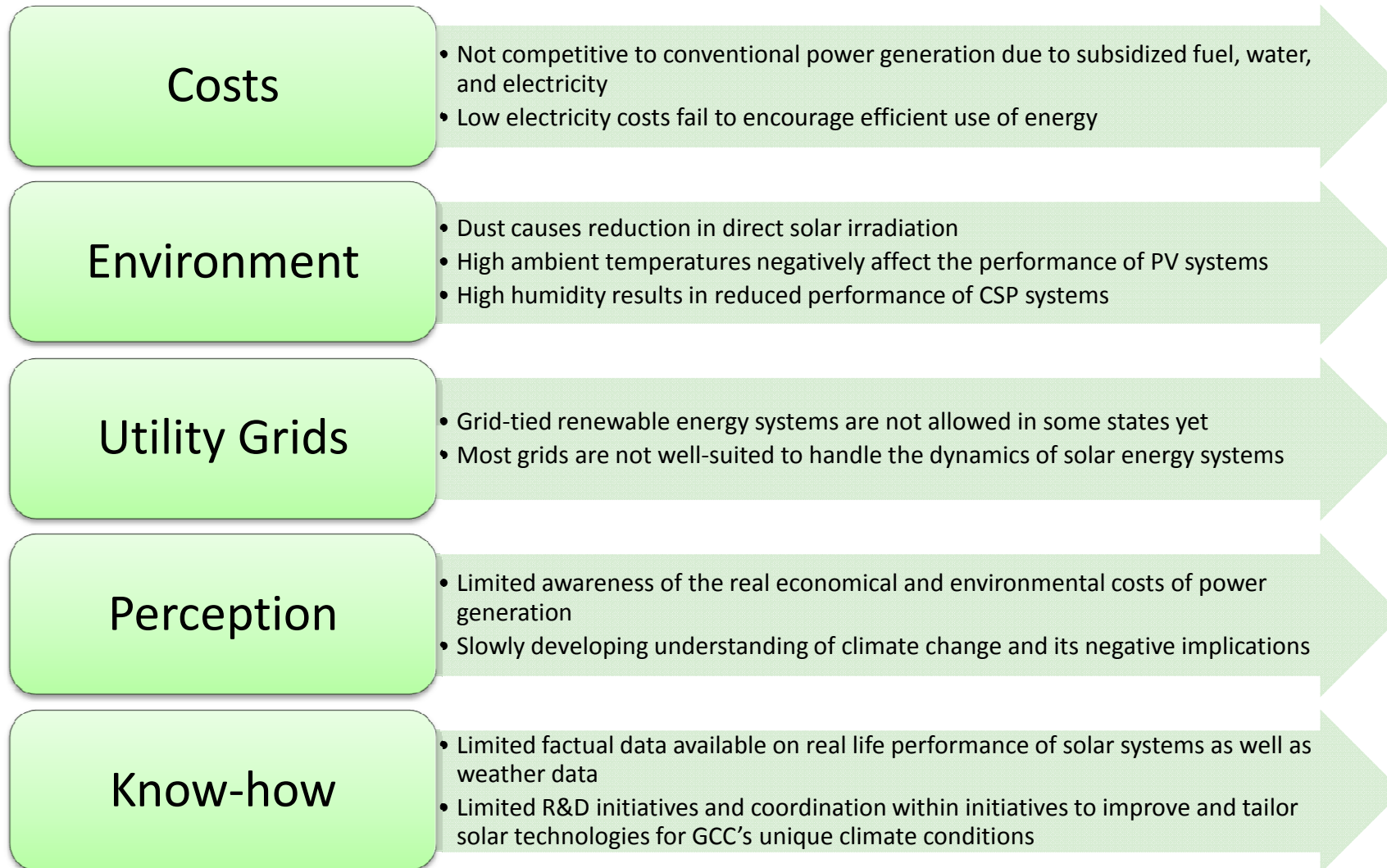


Source: A New Source of Power, The Potential for Renewable Energy in the MENA Region, boox&co. 2010.

With subsidies, end-consumers in the GCC pay less than half of the actual cost of the electricity they use.



CURRENT CHALLENGES TO SOLAR IN THE GCC



Like any technology, solar energy faces various economical, technical, and social challenges in the Gulf that must be tackled in order to drive the solar industry in the region

REGIONAL CLEAN ENERGY INITIATIVES

Saudi Arabia



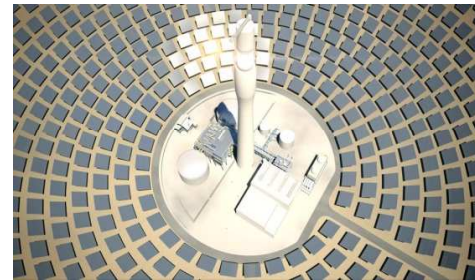
- King Abdullah University of Science & Technology Solar Research
- Announced a 15% Renewable Energy target by 2020
- Saudi Aramco developing off-grid PV projects around the country
- Large scale solar desalination plants study and rollout
- 3 polysilicon facilities currently planned
- ACWA Power developing large scale clean energy platform internationally



Abu Dhabi



- Commitment to generate 7% from Renewables by 2020
- First large-scale PV power plant in the region (10MW)
- First utility-scale CSP power plant in the region (100MW): Shams 1 (Total / Abengoa)
- Introduction of Feed-in tariff scheme for rooftops in 2011
- MASDAR and TAQA investing heavily in clean energy technology and infrastructure globally



Oman



- Tender for a major solar power plant (up to 250 MW) with plans for further roll-out

Kuwait



- Plans to generate 5% of electricity demand from renewables by 2020
- Working to develop a 250MW combined gas and solar power plant



Bahrain



- Goal to begin utilizing solar and wind power for electricity in the next few years

GCC countries are taking major steps towards developing clean technology and assets – both domestically and internationally



QATAR INITIATIVES

Major projects underway:

- Qatar National Vision 2030
- Qatar National Food Security Programme
- Barwa's Qatar Sustainability Assessment System
- DOHA LAND - Musheireb Heart of Doha
- Qatar National Convention Centre
- Feasibility study for solar desalination by Kahramaa
- QF-SolarWorld poly-silicon plant in Ras Laffan Industrial City
- QSTP Solar Testing Facility



Key Initiatives are taking place that are laying the foundation for the use of clean technology in Qatar



TEST FACILITIES & PILOT PROJECTS

Evaluating PV and solar thermal products, both commercial and emerging, under Middle East climate conditions

Starting point for relationships with technology developers and manufacturers

Data supports investment cases for solar projects in the region



Test facilities and pilot projects are crucial in understanding and commercializing solar technologies in the unique GCC climate



REQUIREMENTS FOR A STRONG SOLAR MARKET

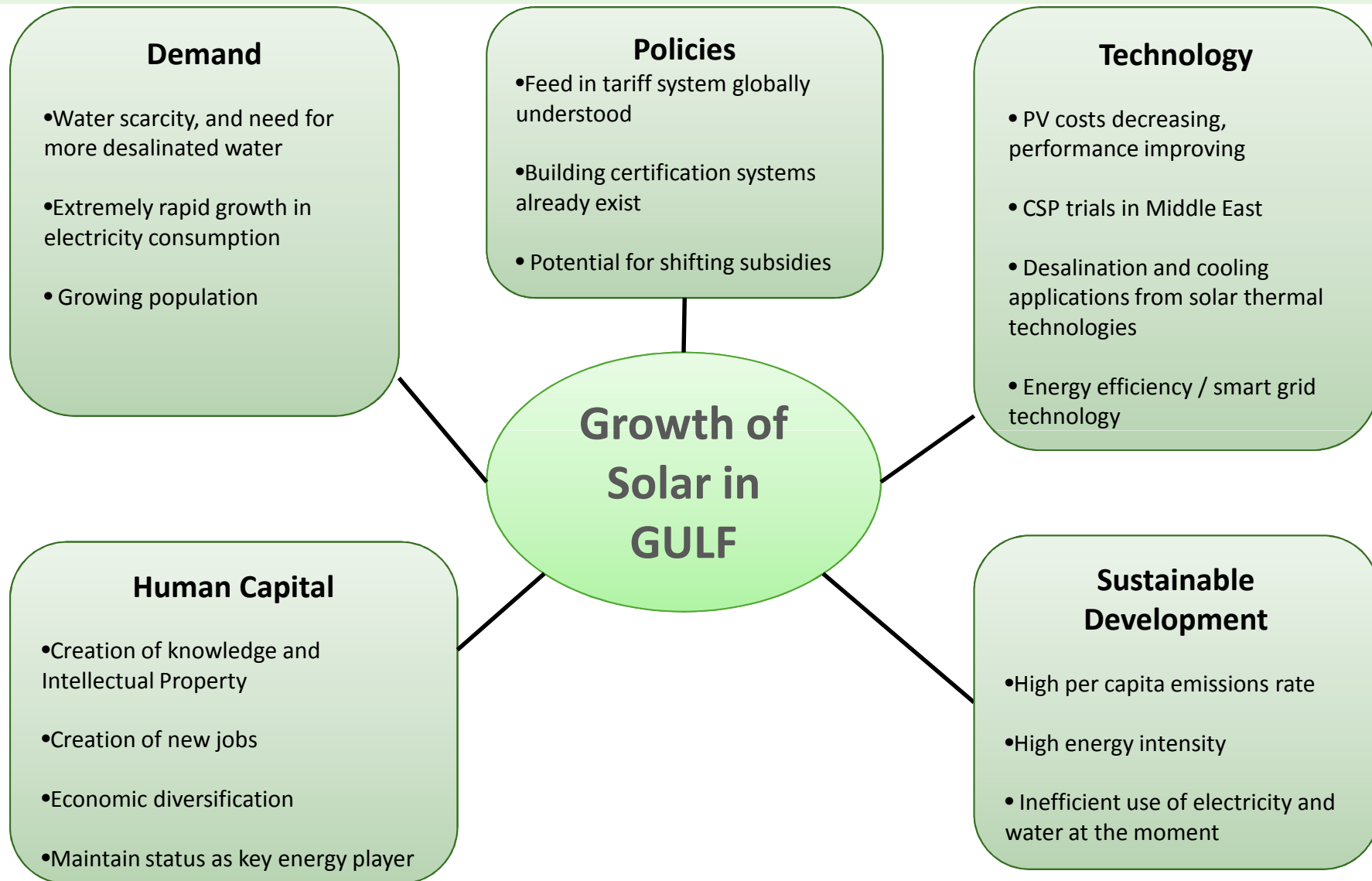
Growth of a Regional Solar Market

Government	Market	Utilities
<ul style="list-style-type: none"> • Develop a long term “Energy plan” with a clear renewable energy strategy • Clear Leadership – entity must lead policies for implementation • Landmark Projects – support major projects to create awareness at an early stage • Attractive financing throughout the chain • Encourage regulations for buildings, grants, etc 	<ul style="list-style-type: none"> • Private Sector Participation – IPPs, service providers • Local Manufacturing Sector in solar related activities • Project Pipeline Certainty – through support from government institutions, the Market must present a clear project pipeline to ensure a sustainable development of the solar market 	<ul style="list-style-type: none"> • Technical Grid Integration – enable grid connections for RE and establish plan to modify the grid. • Establish Feed-in-tariffs for domestic and industrial use • Pilot Projects and Test Facilities – take a leadership role in providing infrastructure to encourage basic testing and R&D for solar activities in corresponding markets.

Govt. leadership, project pipeline certainty, and cooperation from local utilities are key growth factors



REASONS FOR SOLAR GROWTH IN GULF



Solar is due to grow in the Gulf due to several economic, and social factors



GREENGULF OVERVIEW

Background

- Clean Tech & Renewable Energy advisory business
- Founded in Doha in 2008
- Strong partnership culture
- Committed to the development of solar and renewable energy to address climate change

Business Profile

- Core expertise includes finance, regulatory policy, legal and tax. Areas of focus:
 - 1) Developing Renewable Energy Projects
 - 2) Policy , Technology and Advisory Services
 - 3) CleanTech Investments



Thank you



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