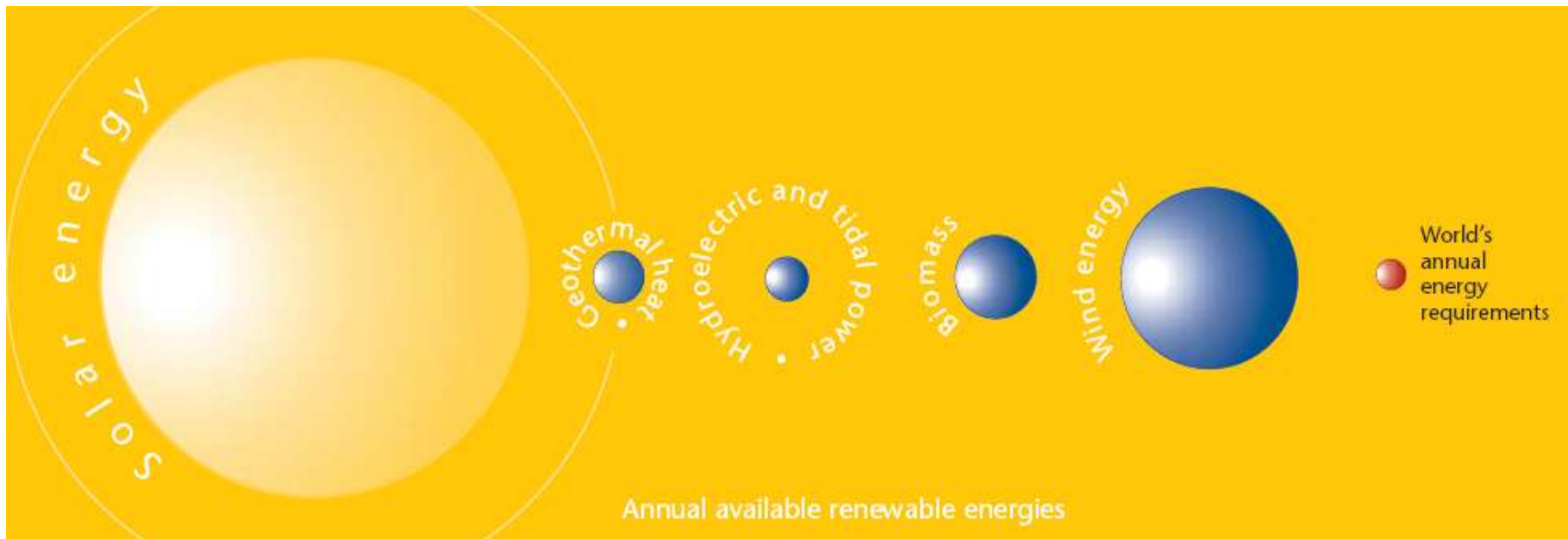

Solar Days

Opportunities for Solar Energy
in the Middle East

Dubai, April 20, 2009

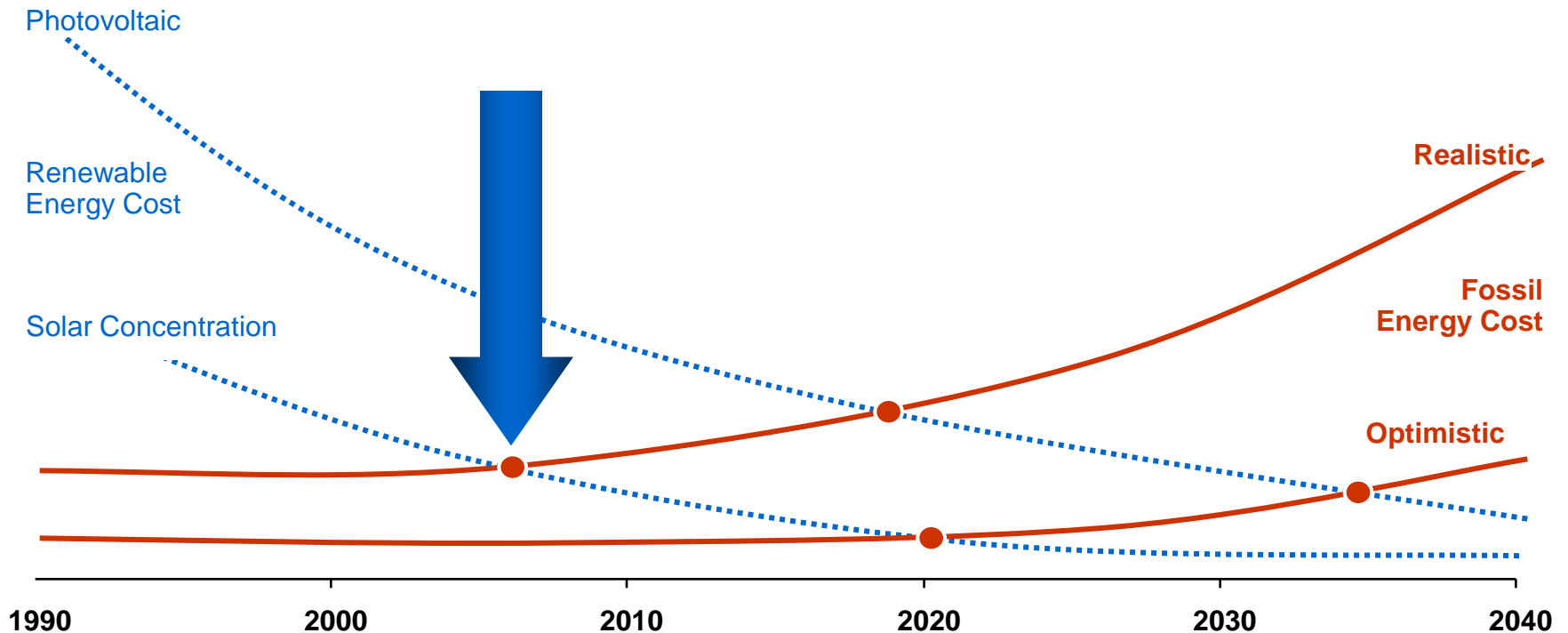
Although renewable energies represent a small percentage of power generation today, the future potential is massive



1% of the Sahara desert can produce 100% of the world's annual energy requirements from solar power!

Two things are for certain: Fossil energy prices will rise and renewable energy prices will decline

Electricity generation cost (illustrative)

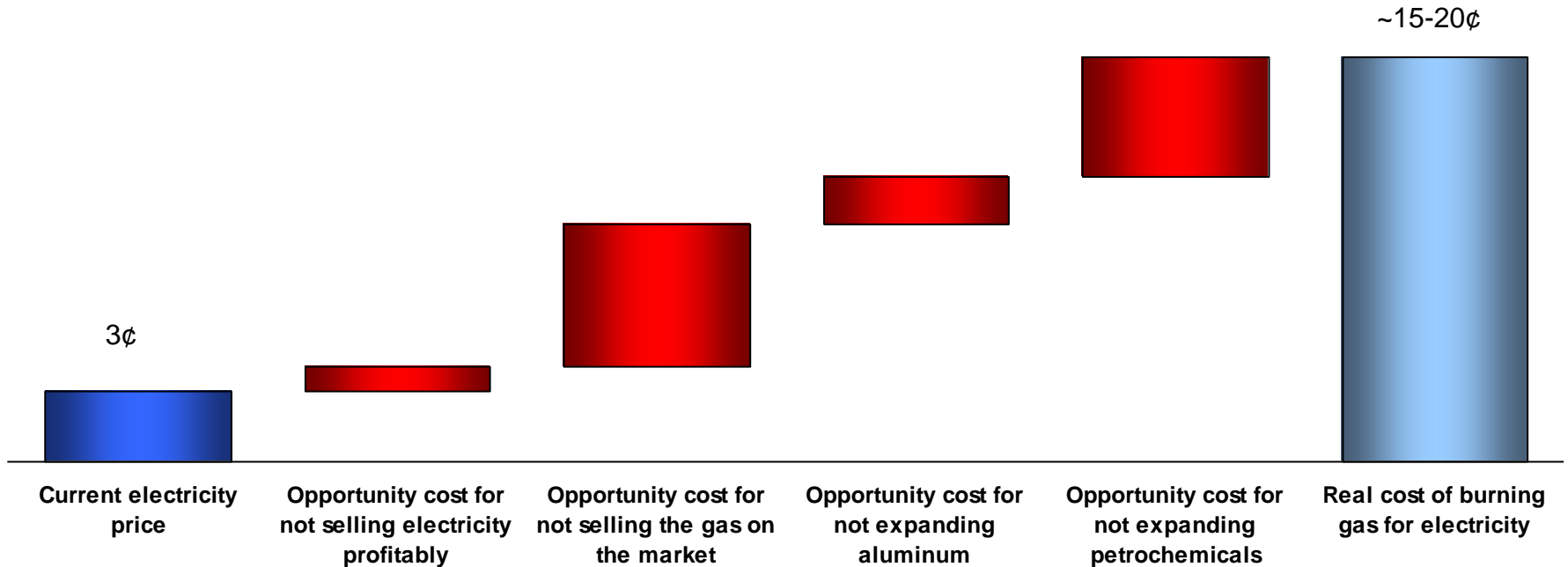


Solar power will become cost competitive in the near future

The real cost of burning natural gas for electricity is much higher than the current electricity price

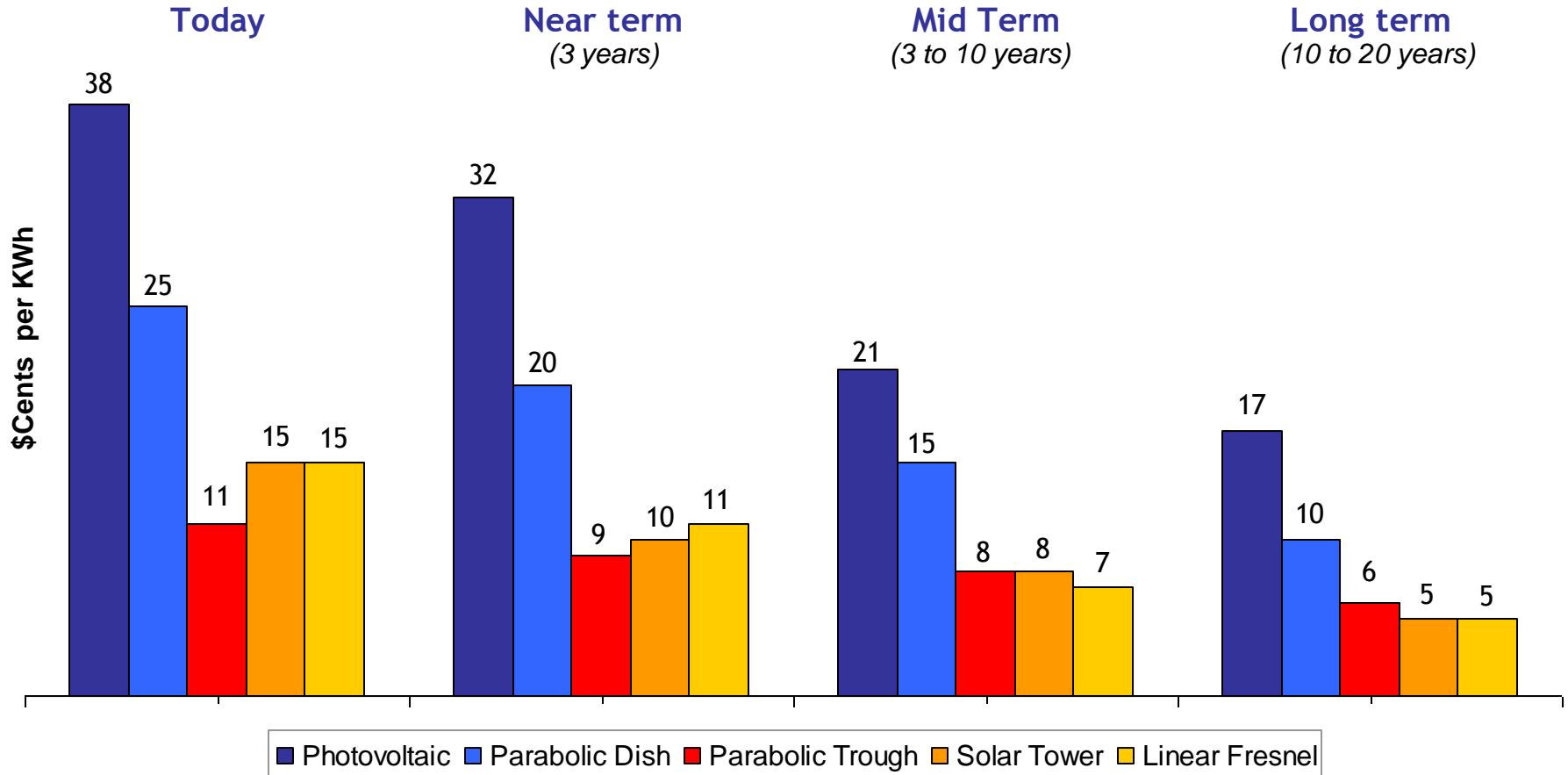
Real cost of burning gas for electricity (\$cent/kWh)

Illustrative



The cost per KWh is decreasing and becoming competitive

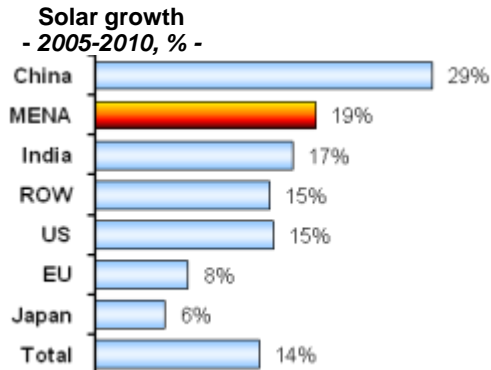
Solar Power Generation Costs in USD Cents/kWh



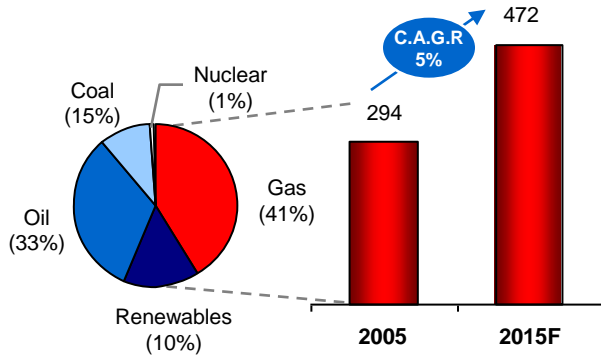
Source: National Renewable Energy Laboratory USA, German Aerospace Center (DLR), U.S. Department of Energy (DOE)

MENA can benefit from the growing renewable energy industry which will quickly gather a foothold

1. Booming Market for Solar Energy



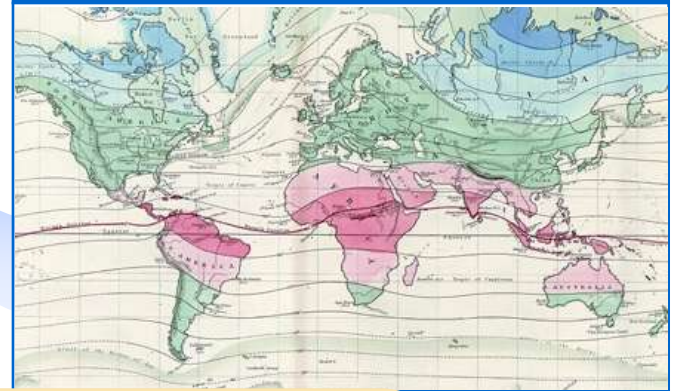
2. MENA Demand For Electricity



3. Improved Technology



4. Abundant, Strong Sunlight



Key drivers for renewables industry in MENA

The Gulf is optimally suited for solar power investments

Solar power can be integrated in co-generation plants to produce electricity, cooling and desalinated water

Supply of total energy demand

Impact for MENA



Electricity

- Solar energy supplies a reliable baseload to the energy portfolio and frees up peak generation capacities



District Cooling

- Cooling makes up 80% of all energy needs in the Gulf



Desalination

- Solar desalination is highly efficient

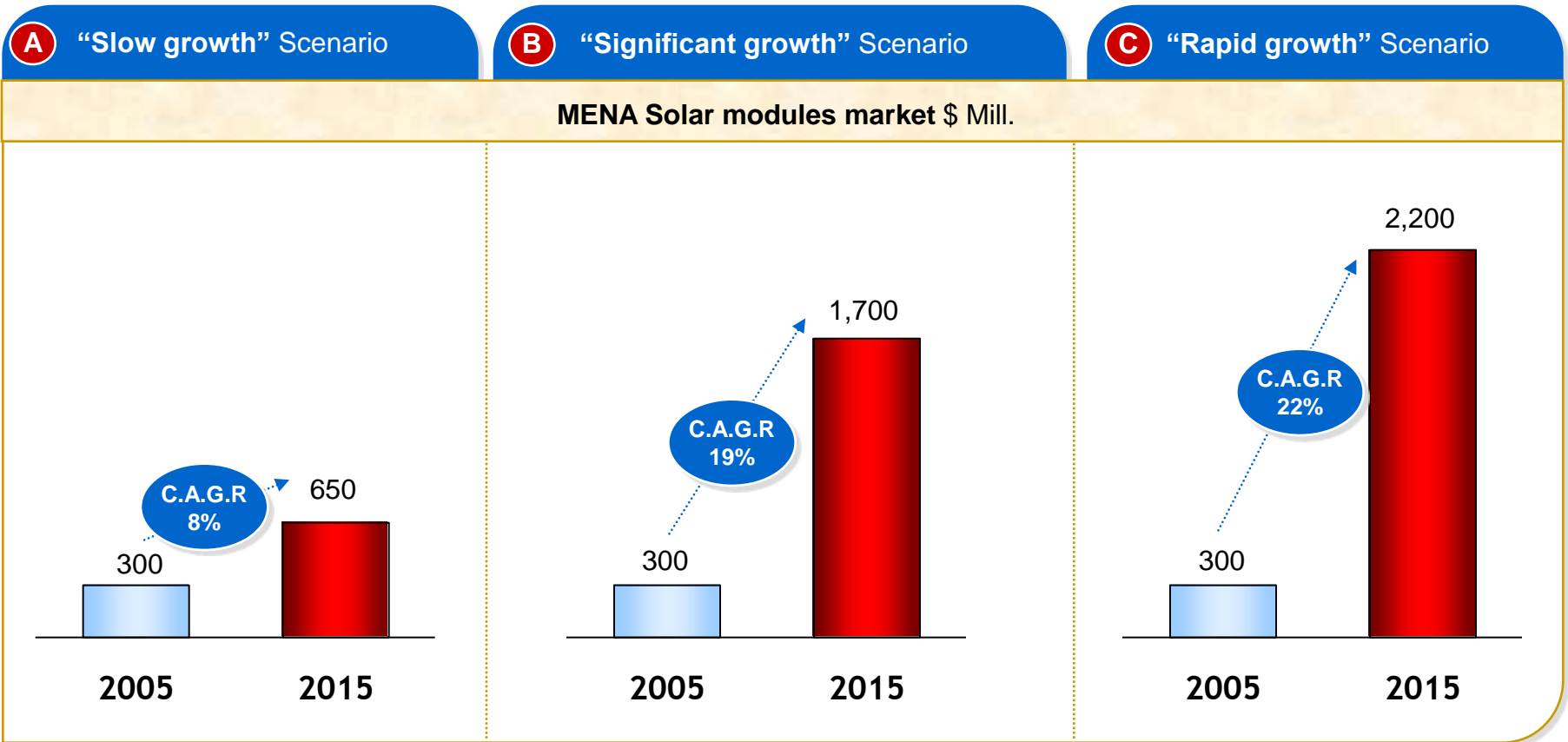


Industrial Steam

- Heat can be stored for nighttime production or used for industrial application

Plant and Energy Center need to be designed jointly to maximize economical and ecological efficiency

MENA demand for solar modules is expected to increase between 8% and 22% annually



There are a number of rationales for MENA to build a solar energy industry, most of them of tactical nature

Energy Generation:

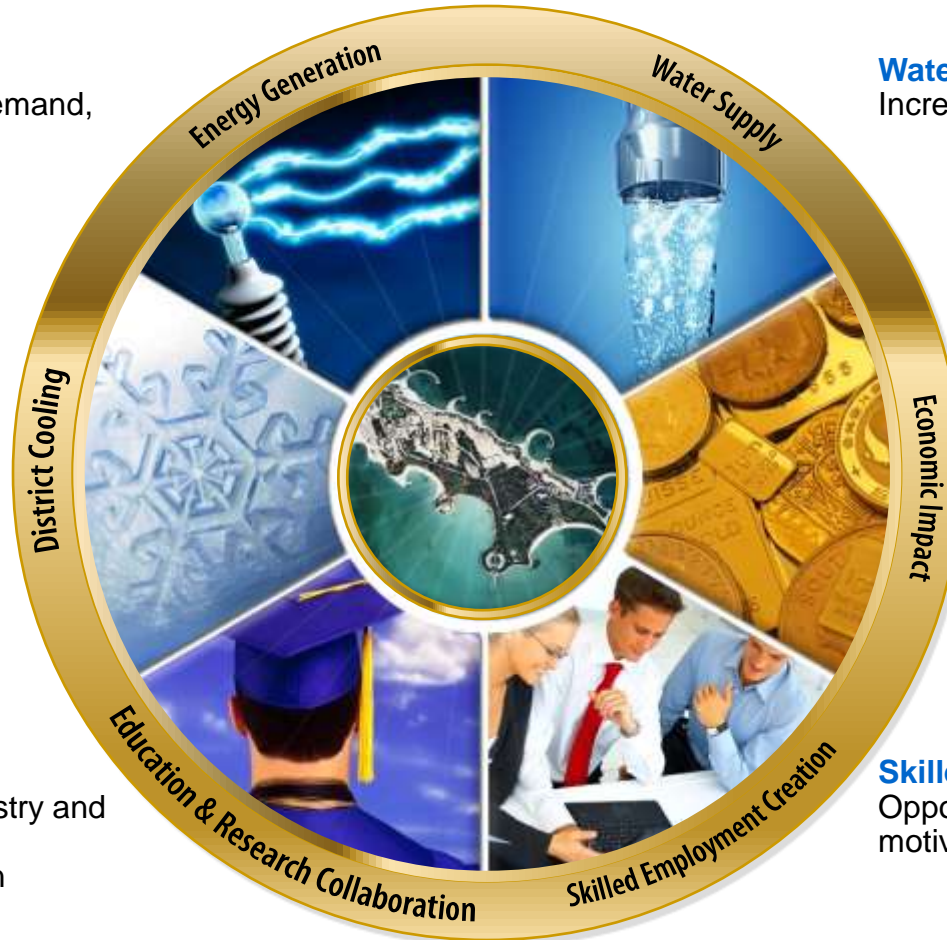
Satisfy growing domestic demand,
improve value
add of remaining reserves

District Cooling:

Increase supply of
cooling at lower
energy cost

Education & Research:

Collaboration between industry and
academia to support skills
development and innovation



Water Supply:

Increase supply of desalinated water

Economic Development:

Contribute through supporting
industries
directly and indirectly

Skilled Employment Creation:

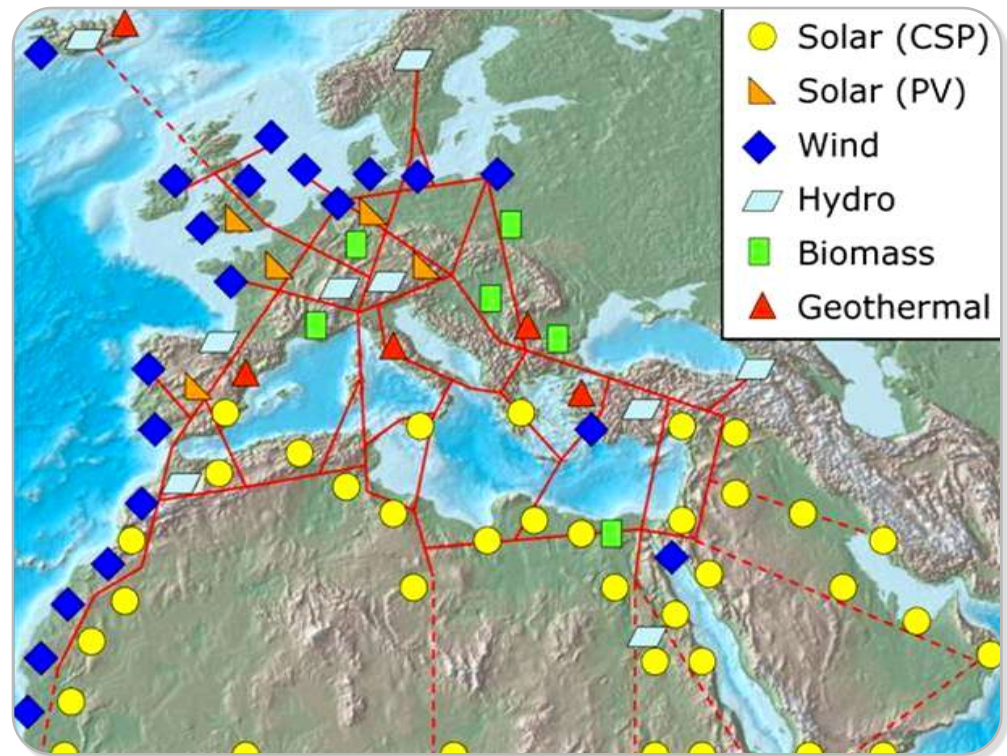
Opportunities for higher value,
motivational jobs

The strategic motivation is to remain the world's power supplier even after oil & gas...

One way of exporting energy could be TREC, a supra-regional energy-sharing network based on renewables

Trans-Mediterranean Renewable Energy Cooperation (TREC)

- The **TREC Concept** is to boost the generation of electricity and desalinated water by solar thermal power plants and wind turbines in the Middle East and North Africa (MENA) and to transmit the clean electrical power via High Voltage Direct Current (HVDC) transmission lines throughout those areas and as from 2020 (with overall just 10-15% transmission losses) to Europe.
- The technologies that are needed to realize the concept are already developed and some of them have been in use for decades
- Several studies by the German Aerospace Center (DLR) confirm the viability of this concept and the usefulness of realizing it very soon.



MENA governments and private sector need to address five key areas to drive the solar agenda

Five elements of a “National Renewable Growth” strategy

