Renewables opportunities for the MENA region

ACWA POWER

ACWA Power

Founded in 2004 in the Kingdom of Saudi Arabia

Developer/Investor + Operator

Electricity Generation + Desalinated Water Production

- Saudi Arabia 13% of Electricity + 40% of Desal Water
- Oman 12% of Electricity + 17% of Desal water
- Jordan 59% of Jordan's Electricity

15,300 MW + 2.24 m cum/day water

Leading Developer of Middle Eastern Origin

- Now operating in GCC Region + Jordan + Turkey + Morocco + South Africa + Mozambique

Owned by 10 Saudi conglomerates and 2 public sector entities

ACWA POWER

Our Involvement in Renewable Energy

Corporate target of 5-10% of energy production from renewables by 2030

Building a portfolio of renewable energy assets of 1500 MW by the end of 2017

Our approach to renewable energy is no different to that for fossil fuel based production; relentless focus on achieving the lowest cost at that given time and lowest whole life cost through out the contracted period to future proof against inevitable reductions in tariffs.

Photo Voltaic Technology:

- Own and operate a 60MWp plant in Bulgaria ;and
- Submitted a tender for a 100MW in Makkah

Concentrated Solar Power (CSP) technology:

- 50MW plant – Bokpoort - under construction in South Africa
- 160MW plant - Noor 1, Ouarzazate - under construction in Morocco

ACWA POWER

Karadzhalovo PV IPP

- Solar PV plant located in Karadzhalovo, Bulgaria rated at 60MWp and expected to produce 81,000 MWh p.a.
- Operating since March 2012 and dispatching electricity to the Bulgarian power grid via an off-take arrangement for a 20 year term on a Feed in Tariff framework with the state-owned Natsionalna Elektricheska Kompania.
- Plant operation and maintenance activities by NOMAC and Sun Edison with equal shares of ownership.
- Plant is predicted to avoid approximately 48,600 tonnes of CO_2 emissions per annum.

Location	Karadzhalovo, Bulgaria
Offtaker	Natsionalna Elektricheska Kompania (National Electric Company)
Power	60 MWp
Configuration	Solar Photo-Voltaic (PV)
Project Cost	SAR 652M, USD 174M
Commercial Operational Date	Q1 2012
Acquisition Date	July 2012
ACWA Power Share	42%
Contract Type & Term	PPA-BOO 20 years
Operator	JV of NOMAC and SunEdison

Bokpoort CSP IPP

- Bokpoort CSP is a greenfield independent power project (IPP) being developed as part of South Africa's renewables IPP program
- Capacity of 50 MWe net power output with the largest thermal storage size (c. 9.3 hours) for a plant of this scale
- Among the most efficient solar plants and so is predicted to generate >200 GWh/year
- Thermal storage capability provides energy to meet South Africa's peak demand period from 5pm to 9pm.
- Construction started in September 2013 and commercial operation is scheduled for December 2015

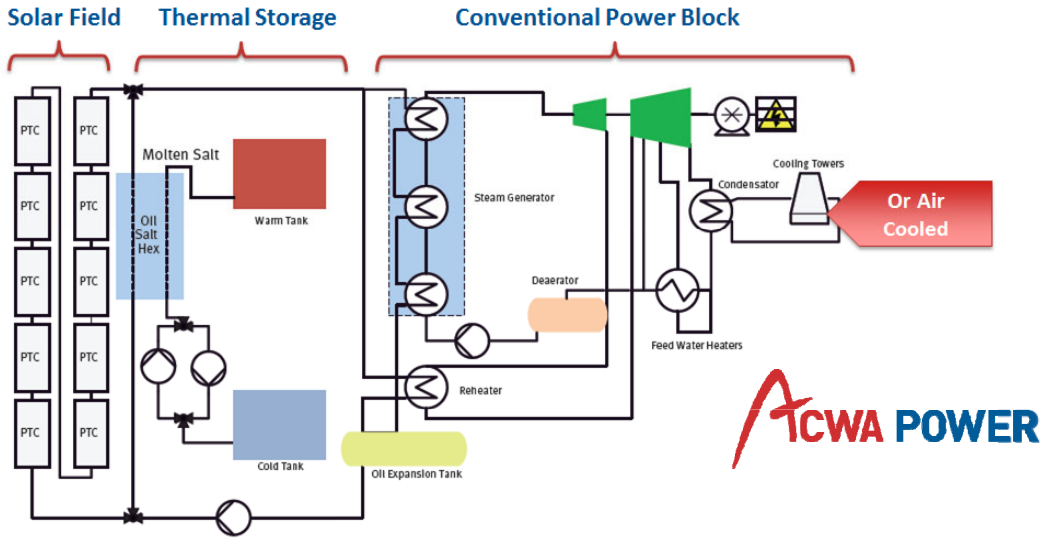
Location	Northern Cape Province, South Africa
Offtaker	Eskom Holdings SOC Ltd
Power	50 MW (net)
Configuration	CSP Parabolic trough with approx. 9.3 hours storage.
Project Cost	SAR 2,1303M, USD 530M
Commercial Operational Date	December 2015 (forecast)
Contract Type & Term	PPA-BOO 20 years
Operator	NOMAC

ACWA POWER

Noor 1 CSP IPP

Location	Ouarzazate, Morocco
Offtaker	Moroccan Agency for Solar Energy
Power	160 MWe
Configuration	Concentrated Solar Power using parabolic troughs and 3 hours of molten salt thermal energy storage
Project Cost	SAR 3,083 Mn, USD 822 Mn
COD	Q2 2015 (forecast)
Contract Type & Term	PPA-BOOT 25 years
Operator	NOMAC, with EPC Contractor oversight for the first 3 years

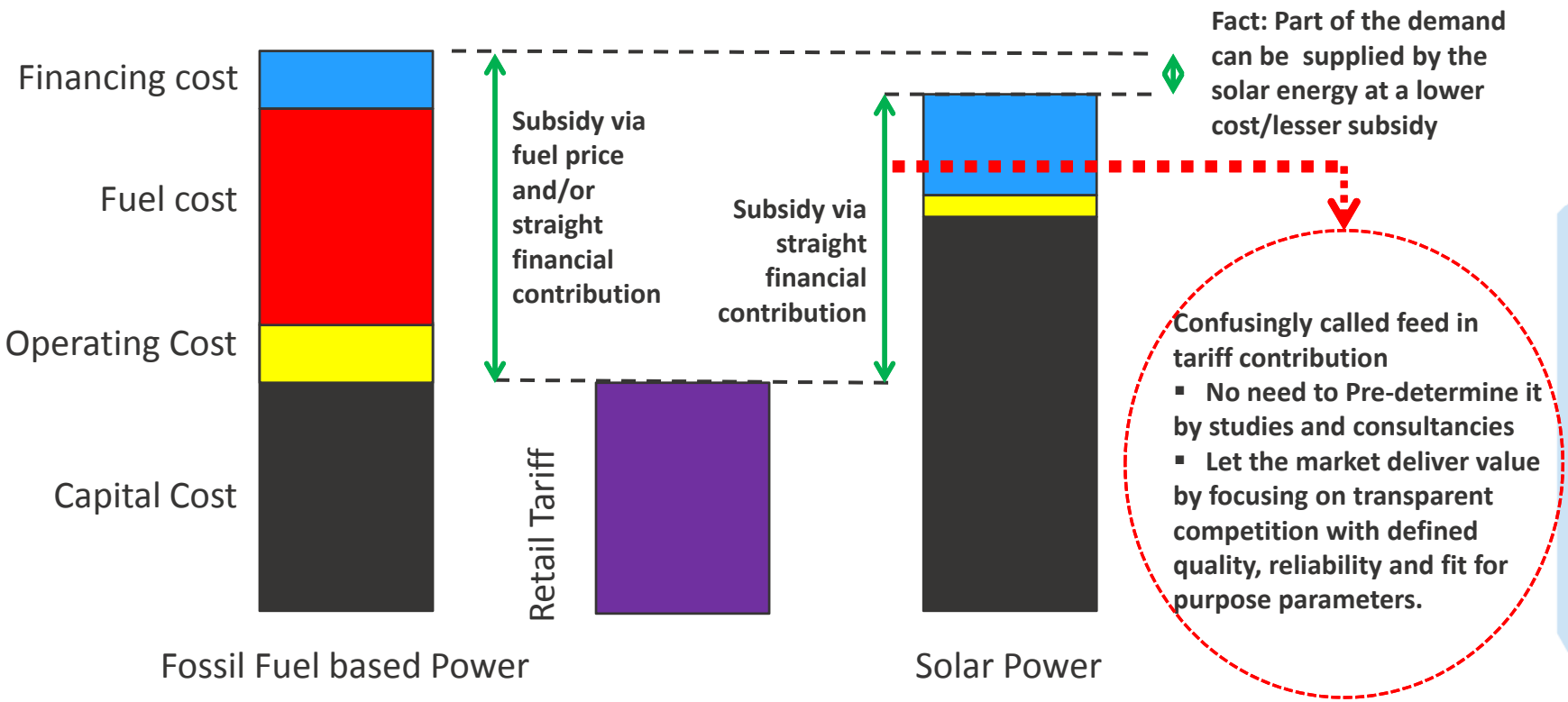
- Noor 1 is greenfield IPP CSP project being developed by the Moroccan Agency for Solar Energy (MASEN)
- First project of the Noor Solar Complex that aims for 500MW of utility-scale solar power plants using various solar technologies.
- Noor 1 is 160 MW CSP with 3 hours of thermal energy storage.
- Construction started October 2013 and commercial operation is scheduled for mid-2015



Business case for renewables in the MENA region

ACWA POWER

Fact – Electricity is subsidised in every country in MENA

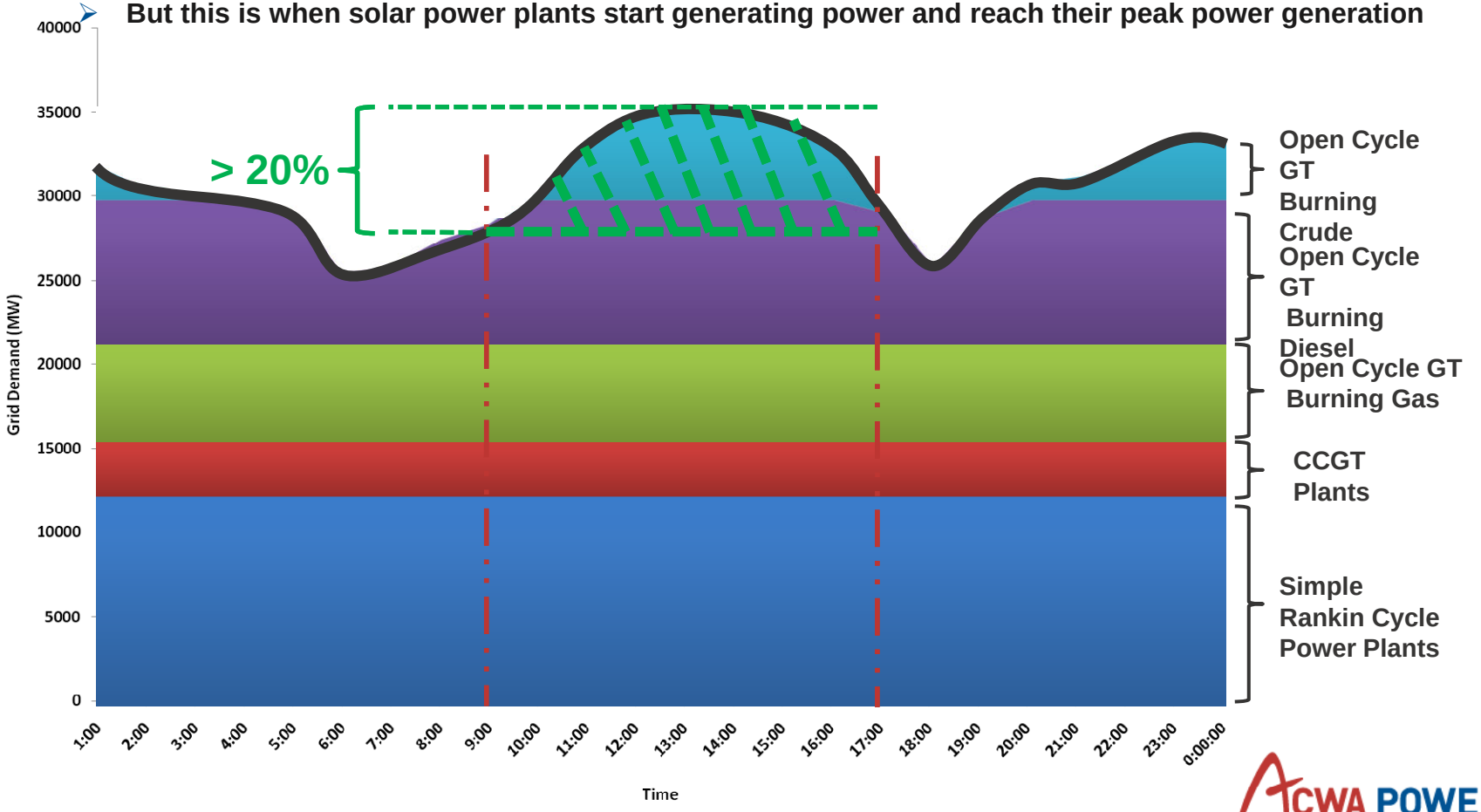


- **Objective must be to understand the magnitude of subsidy and minimize it; regardless of fuel being oil, gas or coal or sun or wind ….**

ACWA POWER

Daily energy demand versus supply in Saudi Arabia

- As the sun shines, air conditioning load ramps up…
- Plants struggle to keep up with demand, and increasingly inefficient and expensive are put to use…
- But this is when solar power plants start generating power and reach their peak power generation

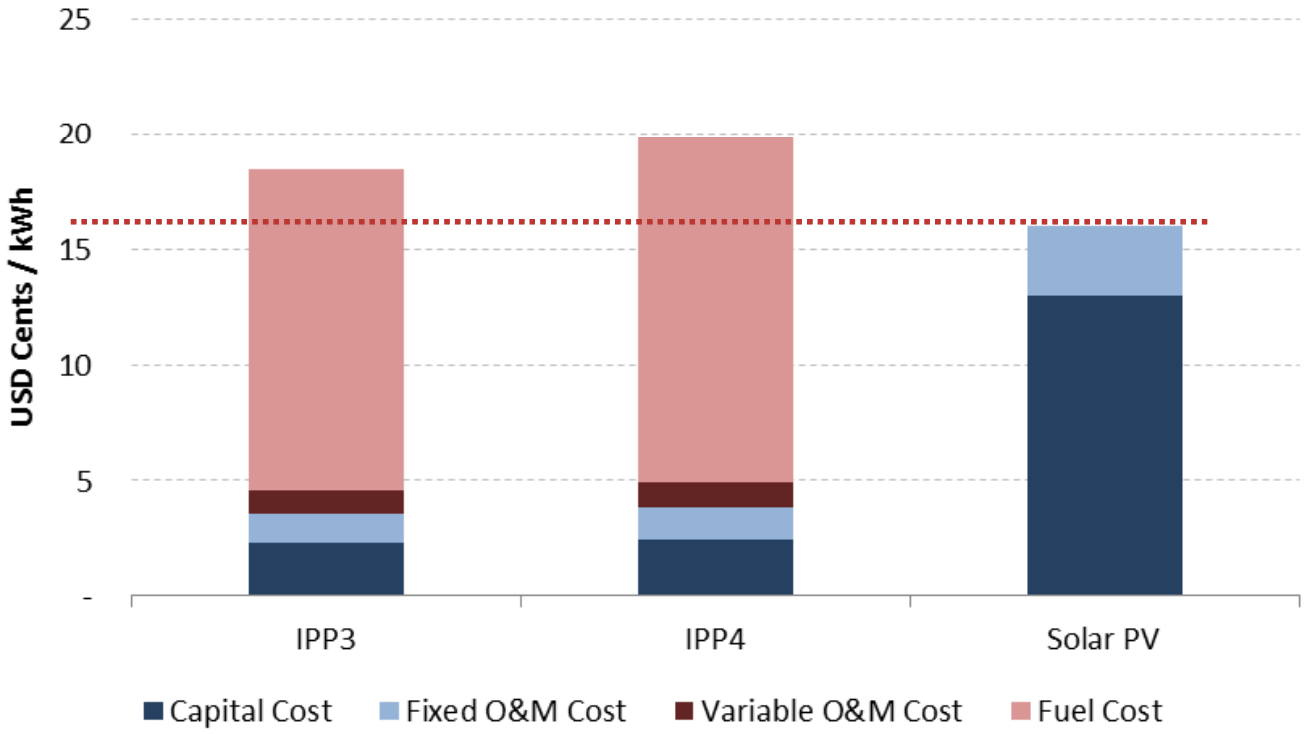


ACWA POWER

Grid Parity in Jordan

for electricity generation when the sun shines

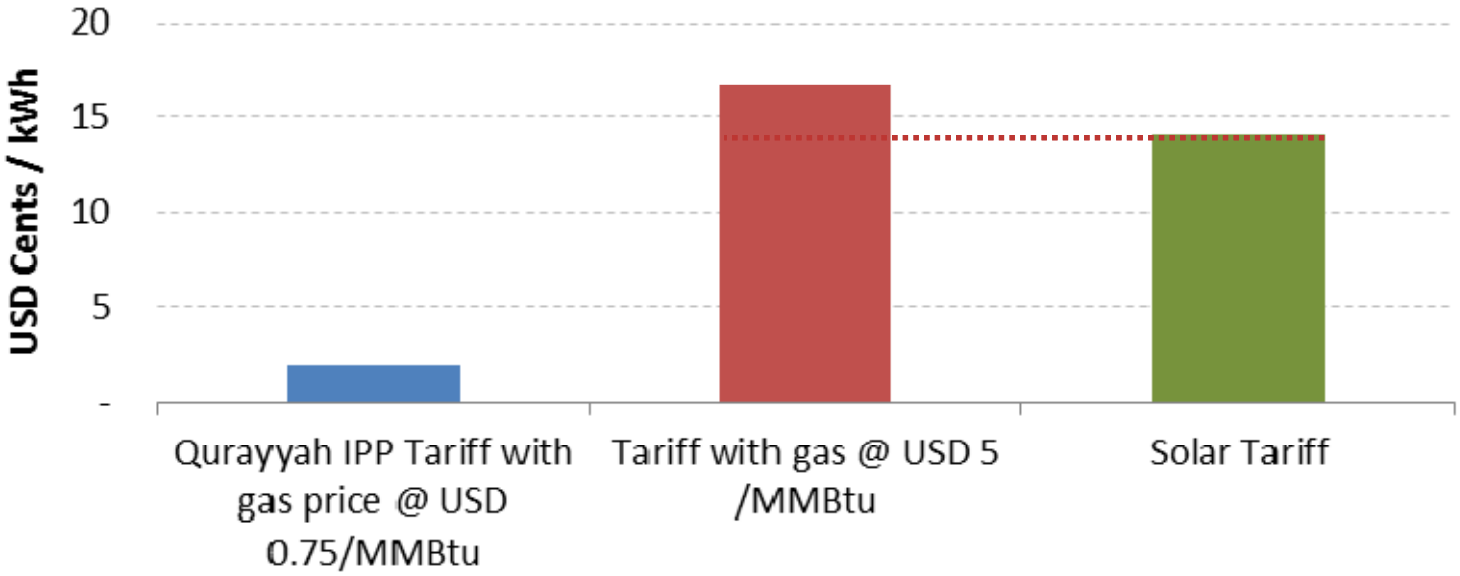
- Jordan reached grid parity sometime ago….



ACWA POWER

Grid Parity in Saudi Arabia (Gas as fuel)

for electricity generation when the sun shines

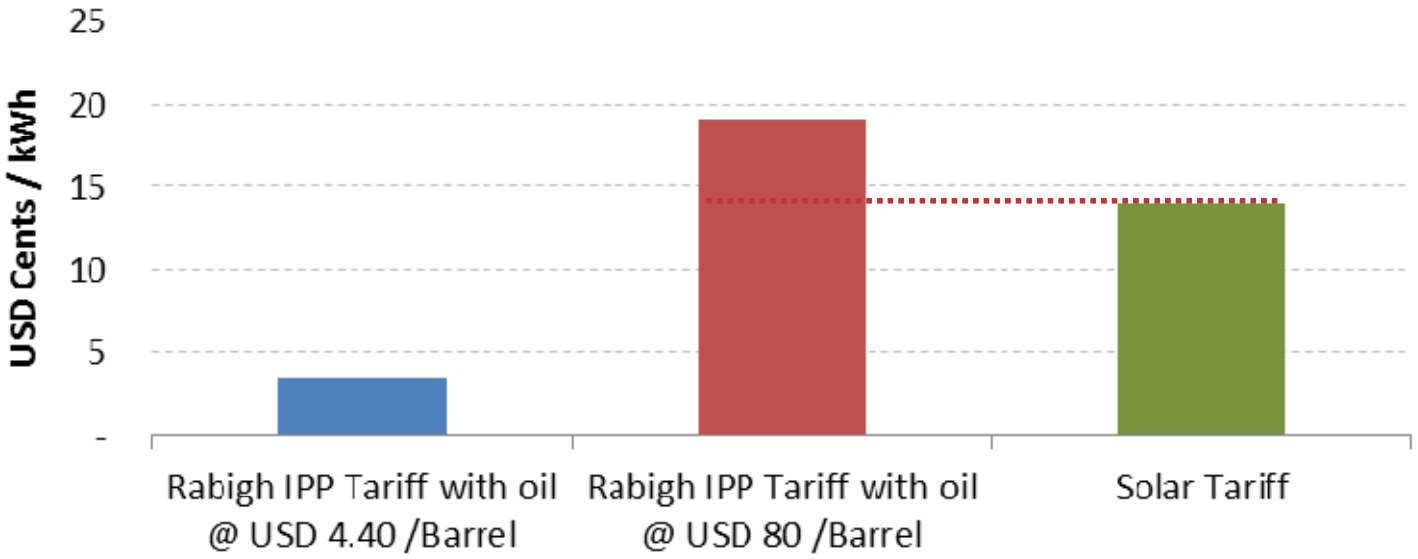


ACWA POWER

Grid Parity in Saudi Arabia (Oil as fuel)

for electricity generation when the sun shines

- Saudi Arabia's 2012 national budget is based on oil priced at US$ 80 / barrel
- Therefore, even Saudi Arabia, the world's leading oil explorer has reached grid parity…. for electricity generated when the sun shines.

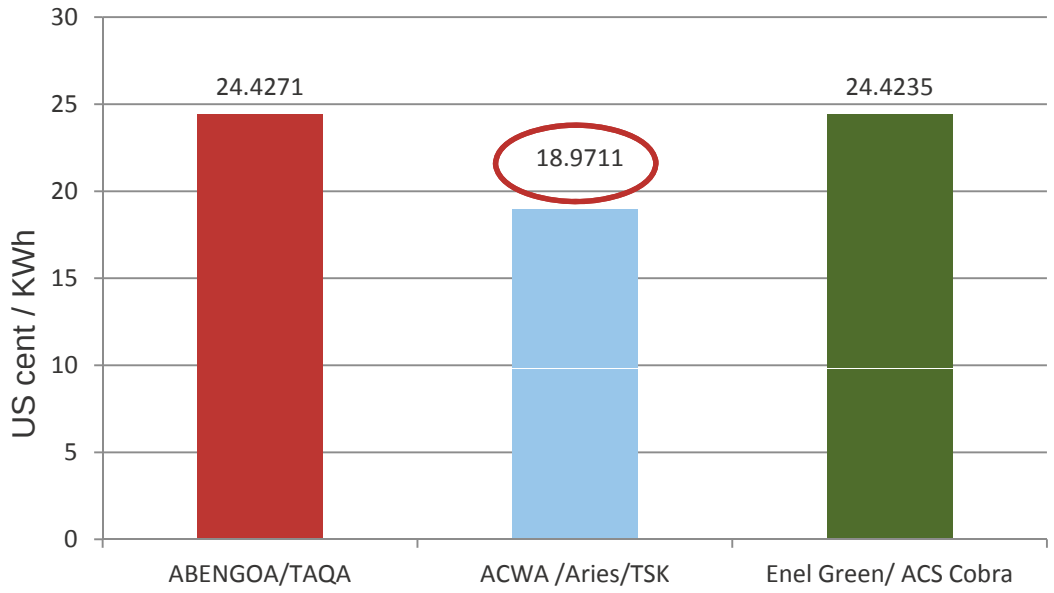


ACWA POWER

Noor 1 – a case study

Noor 1 CSP IPP set a new tariff benchmark

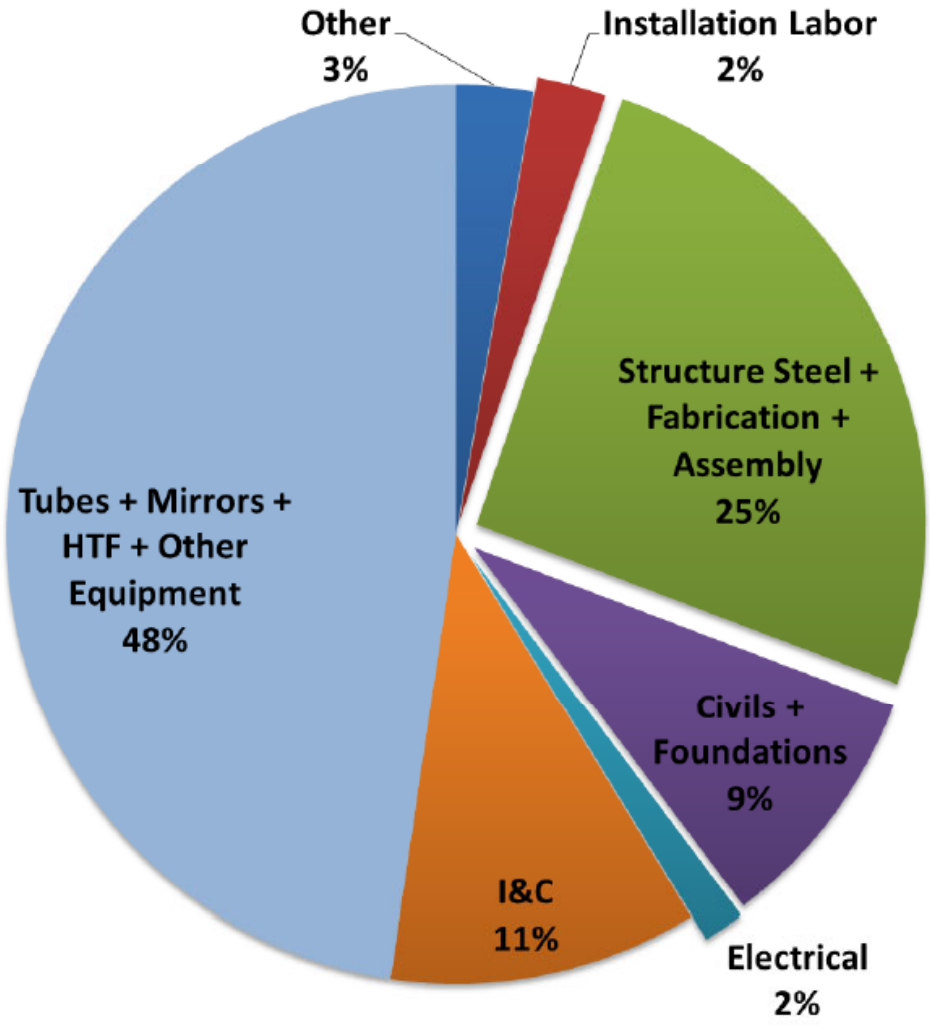
- First true competitive procurement of a CSP power across the globe without any subsidy in the form of Feed-in-Tariff or any embedded prior acquired equipment



- Typically all plants have been developed by contractors or major equipment suppliers being the lead investor. Contractor and operator have little incentive to optimize or minimize tariff as they responded to feed in tariff.
- The lowest Feed in Tariff that had been achieved in CSP before this tender was US $37.5 cents.

ACWA POWER

Solar Field Significant Localization Potential



Based on the current Moroccan market industrial capacity, the following elements can be localized:

- ✓ Installation Labor ~ 100%
- ✓ **Structure Steel + Fabrication + Assembly ~ 100%**
- ✓ Civils + Foundations ~ 100%
- ✓ Electrical ~ 100%

ACWA POWER

Local vs. International Value

(Noor 1 CSP Plant based on Moroccan market)

- ACWA Power's experience is that on the first project >40% of the EPC value and up to 90% of the O&M can be delivered more cost effectively using local content and suppliers
- Once a pipeline is established over 65% of the EPC value can be easily localized.

Activity	Proportion	Local	International
Eng. & Project Management	2%		2%
Earth Movement	4%	4%	
Solar Field (incl. HTF system)	50%	21%	29%
Mirrors	6%		6%
Tubes	8%		8%
Steel Structure	12%	5%	7%
Monitoring System	1%		1%
HTF System	6%	1%	5%
I&C (Solar Field)	1%		1%
Elec. Equip. (Solar Field)	1%		1%
Civil Works	11%	11%	
Collector Assembly	4%	4%	
Power Block	28%	9%	19%
Mechanical Equipment	17%	1%	16%
Electrical Equipment	3%	1%	2%
Civil Works	4%	4%	
Mechanical Erection	3%	2%	1%
Electrical Erection	1%	1%	
Thermal Storage	16%	7%	9%
Total EPC Cost	**100%**	**41%**	**59%**

ACWA POWER

Conclusion

The Compelling case for Renewable Energy

1. It is financially viable today to meet a certain level of electricity demand in all of the MENA region using renewable energy.
2. PPP/IPP model of service delivery will ensure delivery of maximum value (lowest possible cost of electricity generation)
3. Development of this new source of energy will provide an opportunity to create new local industrial capacity and skilled and semi skilled employment opportunities.

ACWA POWER

Thank You