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ENERGY SOLUTIONS

The Case for Renewable Energy in Iraq

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EUROSOL Background

What it IS, What it does

- Small Renewables EPC contractor
- Consulting and engineering
- 20+ years of experience
- HQ in Germany – MENA subsidiaries
- Engineering > Procurement > Construction
- Focus on Solar PV
- Projects in KSA, Jordan, Qatar, Kuwait, Turkey
- Off-grid, hybrid, Solar-diesel, On-grid, 0-15 MW

What it IS NOT

- Developer
- EPC for large PV

Table 1: Solar (PV, CSP, ISCC) installation overview in MWAC (this table includes neither rooftop projects nor large-scale projects below 10 MW)

COUNTRY	AWARDED / TENDER	CONSTRUCTION	OPERATIONS
AFGHANISTAN	30	10	
ALGERIA			353
EGYPT		1,800	30
JORDAN	52	453	467
KUWAIT		50	10
MOROCCO		520	180
PAKISTAN		100	
SAUDI ARABIA	300		
UAE	760	1,970	323
TOTAL	**1,142**	**4,903**	**1,363**

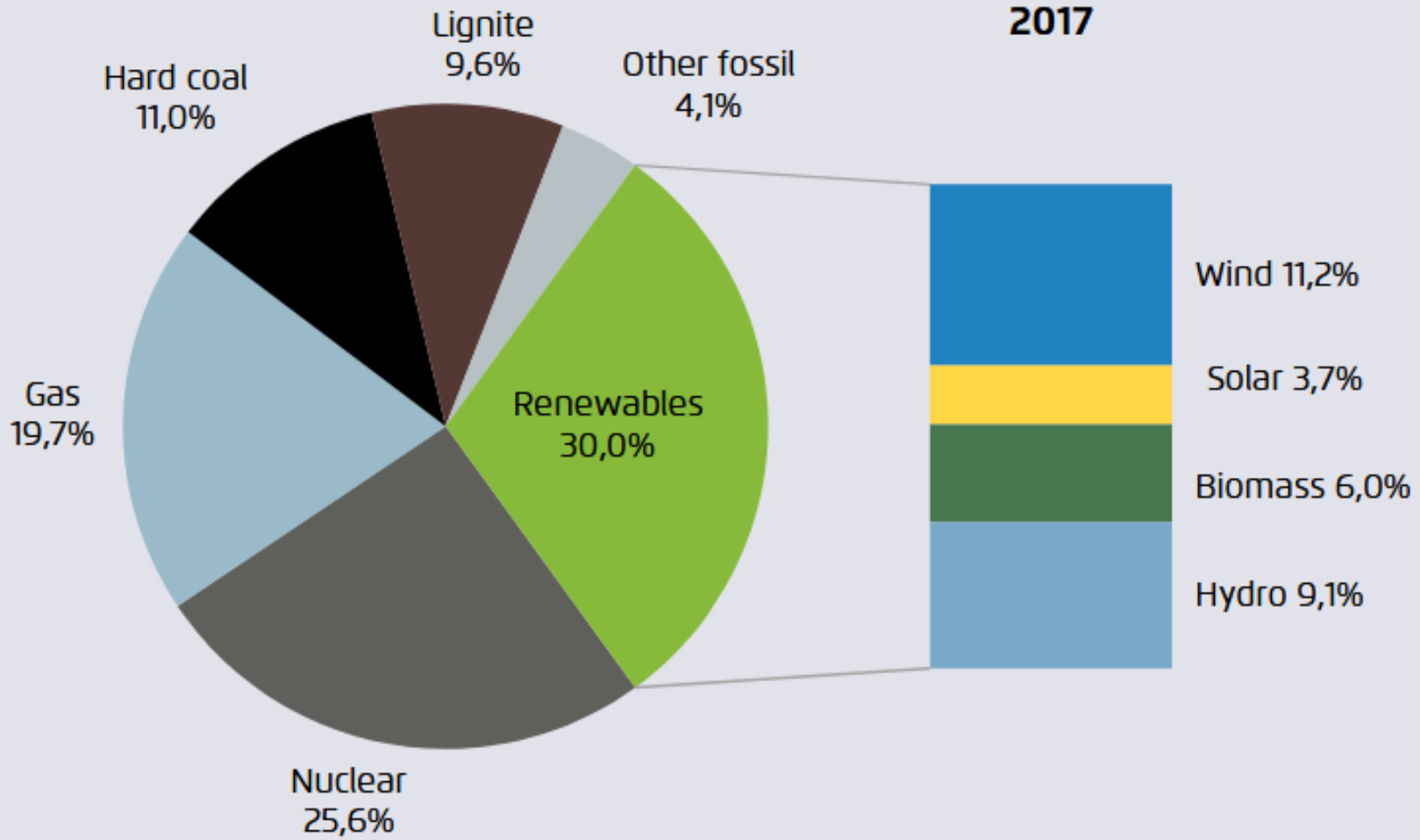
Source: Middle East Solar Industry Association (MESIA) – Solar Outlook Report 2018

Table 3: PV pipeline 2018

COUNTRY	COUNTRY	CAPACITY	STATUS	CLIENT
BAHRAIN PV	Bahrain	200	Announced	EWA
SOLAR IPP (WEST NILE)	Egypt	600	Prequalification	NREA
SOLAR IPP (KOM OMBO)	Egypt	200	Bid Stage	EETC
ROUND 3	Jordan	200	Bid Stage	MEMR
RISHA PV	Jordan	50	Financial Close	NEPCO
WATER AUTHORITY JORDAN	Jordan	30	Prequalification	Water Authority Jordan
KNPC	Kuwait	1,000	Bid Stage	KNPC
NOOR MIDELT	Morocco	800	Bid Stage	MASEN
IBRI	Oman	500	Prequalification	OPWP
PDO – 100MW	Oman	100	Prequalification	PDO
QATAR PV	Qatar	200	Announced	Kahramaa
MULTIPLE SITES	Saudi Arabia	6,400	Announced	REPDO
TUNISIA PV	Tunisia	70	Bid Stage	STEG
TOZEUR PV	Tunisia	10	Bid Stage	STEG
SWEIHAN II	UAE	1,200	Announced	ADWEA
DEWA PHASE V	UAE	300	Announced	DEWA
TOTAL	**11,860**			

Source: Middle East Solar Industry Association (MESIA) – Solar Outlook Report 2018

Europe current state for renewables



EUROSTAT data to 2015, 2016 and 2017 are own calculations

Europe current state for renewables

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Negatives

- Fragmented market
- Aging transmission system
- Aging distribution system
- Inability to integrate with conventional
- Lack of available land
- Solar potential (for PV)
- Restricted locations (for wind)

- Need for Energy Storage

Positives

- Extensive grid coverage
- Stable environment
- No political risk
- No unforeseen disasters
- Expensive conventional energy
- Environmental conscience

Iraq current state for renewables

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Positives

- One market
- Marginal transmission system
- Marginal distribution system
- Plenty of available land
- High Solar potential (for PV)
- Potential locations (for wind)

Negatives

- Extensive grid coverage
- Stable environment?
- No political risk?
- No unforeseen disasters?
- Expensive conventional energy?
- Environmental conscience

- Need for Energy Storage

Environment vs. Bank Accounts

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Cost of Energy

Bank Accounts

- It MAKES SENSE!
- Not because we are environmentalists …
- … but because we want $$$ in our bank accounts!

The Renewable Energy Project Development Office's (REPDO) 300 MW Sakaka project in Saudi Arabia reported the lowest PV LCOE (2.34 US$ cents per kWh) in the MENA region

Timeframe for planning & deployment

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The Time is NOW……

- Renewables are already cheaper than conventional
- Sound budgeting of energy costs
- Avoid inevitable energy cost increases
- 2019 projections point to another 10%+ decrease in project costs

Planning for…

- Distributed generation
- Pico-grids, micro-grids
- Smart grid
- Solar, solar, solar….
  - Scaling
  - Incremental installation
  - Maintenance
  - Resilience to destruction
- Energy Efficiency in buildings

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We appreciate Your attention