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Renewable Energy Program in Jordan

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Section 5. Score review

Rapidly changing market circumstances and an updated methodology produced a very novel set of country scores in this year's Climatescope. A new country topped the overall leader board, while others saw their scores and rankings decline somewhat. Chile ranked first for the first time ever, followed by Jordan, Brazil, India and Rwanda (Figure 29).

Figure 29: Climatescope score of top 15 countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chile</td>
<td>2.63</td>
</tr>
<tr>
<td>India</td>
<td>2.57</td>
</tr>
<tr>
<td>Jordan</td>
<td>2.54</td>
</tr>
<tr>
<td>Brazil</td>
<td>2.52</td>
</tr>
<tr>
<td>Rwanda</td>
<td>2.31</td>
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<tr>
<td>Philippines</td>
<td>2.29</td>
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<tr>
<td>China</td>
<td>2.28</td>
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<tr>
<td>Mexico</td>
<td>2.25</td>
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<tr>
<td>Peru</td>
<td>2.24</td>
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<tr>
<td>Thailand</td>
<td>2.24</td>
</tr>
<tr>
<td>Taiwan</td>
<td>2.22</td>
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<tr>
<td>Argentina</td>
<td>2.20</td>
</tr>
<tr>
<td>Senegal</td>
<td>2.16</td>
</tr>
<tr>
<td>Nigeria</td>
<td>2.14</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>2.13</td>
</tr>
</tbody>
</table>

Source: Climatescope
Jordan’s wide portfolio of stable clean energy policies and transparent incentives have propelled the country to 3rd overall in Climatescope 2018. Jordan’s clean energy policy framework includes clean energy targets, auctions, renewables portfolio standards that apply specifically to regulated utilities, net metering, and tax and debt incentives. This has facilitated 730MW of wind and solar capacity additions in 2015-2017, with another 1GW currently under construction.

**Why Investment Security is High in Jordan (Incentives)**

- Clear Development Path of the Government of Jordan
- Stable Political and Regulatory Frameworks
- Adequate and Transparent Public Policies
- Clear Financial and other Support Schemes (tax regime)
- Well defined Infrastructure Provisions (land, grid connections, etc.)
Key Figures of the Jordan Electricity Sector (2018)

- Installed Capacity (Conventional): 3800 MW
- Installed Capacity (RE): 1130 MW (Including small systems)
- Peak Load: 3205 MW
- Per Capita Electricity Consumption: 1701 KWh
- Total Electricity Generation: 19755 GWh
- Total Electricity Consumption: 17541 GWh
- Renewables Contribution to Installed Capacity: 23%
- RE Projects Contribution to Gen. Electricity: 10.8%
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Figures of the Jordan Energy Sector (2018)

- High dependency on imported energy (92%)
- Cost of consumed energy (10.0% of GDP)
- Annual growth of primary energy demand (-3.0%)
- Annual growth of electricity demand (0.2%)
Jordan enjoys world class quality Solar and Wind Energy

- Wind speeds could reach 9.0 m/s in some places.
- Wind projects are site specific, feasible and competitive without further concessional support.
- High solar radiation figures of 5 – 7 kWh/m² per day with about 300 sunny days per year.
- PV is very mature compared to CSP and CPV.
National Energy Strategy 2025

The target set to reach 20% of generated electricity from RE by 2025.

NREAP

The National RE Action Plan is prepared in cooperation with the EU Program REEE II to be announced soon.
Regulatory Framework

This law allows investors to identify and develop grid-connected electricity production projects through the so called unsolicited or direct proposal submission.

Regulatory Framework

➢ Directive on reference Pricelist Record for the calculation of electrical energy purchase prices (ceiling prices) from different RE technologies.

➢ Directive governing the sale of electrical energy generated from small RE systems (Roof Tops) with fixed purchase prices (Net-Metering).

➢ Directive governing the electric power wheeling for self-consumption.
Regulatory Framework

➢ Directive on the costs of connecting RE facility to the electrical system.


➢ Bylaw No. (73) of 2012 on regulating procedures & means of conserving energy & improving its efficiency
Regulatory Framework

➢ Bylaw No. (49) of 2015 on establishing the Jordan Renewable Energy and Energy Efficiency Fund (JREEEF).
Regulatory Framework

- The Directive Governing the Sale of Electrical Energy Generated from RE Systems related to the Article (10/B) of the RE & EE Law
- Directive on reference Pricelist Record for the calculation of Electrical Energy purchase prices from RES related to Article (2) of the RE & EE Law
- Directive on the Costs of Connecting RE Facility to the Distribution System for DP and CBS related to Article (9/B) of RE & EE Law
- Directive of Electric Energy wheeling from RES for self-consumption according to the article No. (17) of RE & EE Law and articles No. (7/B/3) and (9/B) from the Electricity Law No. (64)

Jordan RE and EE Fund (JREEEF): By-Law No. 49 of 2015

Tax exemption for RE & EE By-Law No. 10 of 2013,

Updated By-Law of RE & EE Taxes exemption By-Law N° 13 of 2015

General Electricity Law Law No. 64 of 2002

Nuclear Energy Law Law n°42 of 2007
Renewable Energy Development Schemes

More than 2400 MW of Wind and Solar PV projects are expected to be developed in Jordan until 2021, 1430 MW of them are already operational.

We follow a policy of 4-tracks-approach to develop renewables:

- Direct Proposal scheme
- Competitive Bidding
- EPC Turn-Key projects
- Small Scale RE Schemes (Net Metering)
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Operational Solar Energy Projects

5 MW / Azraq Solar PV
Spanish Grant/ EPC
Atersa & Ennera
Operational Apr 2015

10 MW / Philadelphia Solar PV
Mafraq/ Direct Proposal
Operational Oct 2015

13 MW / Zatari Solar PV
German Grant/ EPC
Belectric Gulf
Operational Oct 2017

200 MW / Solar PV
Direct Proposals Round I
Int. + Local Developers
Operational 2016

10 MW / Solar PV
Direct Proposal/ Air Force Operational May 2018

103 MW / Qweira Solar PV
Gulf Grant/ EPC/ TSK+Environema
Operational July 2018

467 MW
of Small Scale Solar PV Operational Systems

50 MW / AES-Mitsui/
Solar PV Direct Proposal- Generation Co.
Operational Sep 2019

1058 MW

50X4=200 MW / Solar PV
Direct Proposals Round II
Operational 2018-2019
Operational Wind Energy Projects

117 MW/ JWPC Wind/ Tafila Direct Proposal Operational Sep 2015

80 MW/ Ma’an Wind Gulf Grant/ EPC/ Elecnor 66 MW Operational Sep 2016 14 MW Operational Sep 2017

372 MW

86 MW/ Green Watt/ Wind Direct Proposals Round I Operational Oct 2018

89 MW/ KEPCO/ Wind Direct Proposals Round I Operational July 2019
Renewable Energy Projects Under Construction - PV

50 MW / Acwa/ Solar PV
Direct Proposals- Generation Co.
To be Operational in 2019

200 MW/ Masdar /Solar PV
Governmental Initiative
To be Operational in 2020

46 MW Solar PV/ South Amman
German Grant/ EPC
To be Operational in 2019

50 MW/ Hussayniah Solar PV/
Direct Proposal
To be Operational in 2020

5 MW / Azraq/ Solar PV
EU Grant/ REEE II/ EPC
To be Operational in 2019

200 MW of Small Scale Solar
PV Systems

551 MW
Renewable Energy Projects Under Construction - Wind

- 45 MW / Alcazar/ Wind Direct Proposals Round I
  To be Operational in 2019

- 100 MW / Mass/ Wind Direct Proposals Round I
  To be Operational in 2019

- 50 MW / Abour/ Wind Direct Proposals Round I
  To be Operational in 2020

- 50 MW/ Daehan/ Wind Direct Proposals Round I
  To be Operational in 2020

Total: 245 MW
RE Projects in Jordan
November 2019

1430 MW
Operational

796 MW
Under Construction

150 MW
In the Pipeline

305 MW
Projects

351 MW
Projects

150 MW
Projects

591 MW
Net Metering

305 MW
Net Metering

150 MW
(In addition to net Metering & Wheeling)

372 MW
Wheeling

245 MW
Wheeling

162 MW
Net Metering & Wheeling

200 MW
Net Metering & Wheeling

Total Capacity: 2376 MW
Estimated Investment in Projects only: 3,081 mUSD
Renewable Energy Projects in the Pipeline

150 MW / Solar PV
Direct Proposals Round III
Under Negotiation

Energy Storage 30 MW/ 2 hrs
- Ramp-rate control
- Energy shift
Direct Proposal/ Under Tendering
Operational 2019

200 MW
Net Metering & Wheeling
Solar PV Systems
Feasibility Study for CSP

Will Concentrated Solar Power (CSP) be an optimal generation option between now and 2030? What are the optimal specifications for CSP in Jordan?

Will CSP be an optimal way to balance variable renewables? Will CSP contribute to energy security?

Will CSP be part of a lowest cost energy mix?

Will CSP help Jordan implement its Nationally Determined Contribution (‘NDC’)?

Would concessional donor climate financing enable the financial viability of CSP?

The Study has to answer the following questions:
Feasibility Study for Water Pump Storage

Also in cooperation with the EU Program REEE II, a Feasibility Study for Water Pump Storage has been done.
Template Contractual Documents
(Transparent Process – Minimum Risk - Less cost)

➢ Instructions for developing RE projects (IRPP)

➢ Prequalification requirements

➢ Power Purchase Agreement (PPA)

➢ Land Lease Agreement (LLA)

➢ Government Guarantee Agreement (GGA)
Conclusion

➢ Jordan has laid down the necessary Policy and Regulatory framework for Renewable Energy that attract commercial investments.

➢ Template contractual documents (PPA) and Instructions for developing RE projects do exist.

➢ Expected installed capacity for renewable energy projects to be reached by 2021 is more than 2400 MW that will form about 30% of electrical installed capacity and 20% of electricity generation.

➢ Jordan is now a leading country of Renewable Energy in the MENA Region.
Thank You