Regional Integration of Energy Markets: Europe and North Africa

Kevin Sara, CEO TuNur Ltd
MENA CSP workshop, Ouarzazate, March 2017
The EU already imports over 50% of its energy needs.
Replacement Market: 50GW to be replaced by low carbon resources by 2030

COAL GENERATION DECLINING AND NEED FURTHER REDUCTION TO MEET COP21 TARGET

EXISTING NUCLEAR FLEET AGEING AND REDUCING CAPACITY

Source: Climate Analytics

Source: Carbon Brief
Growth Market: deep decarbonisation of energy system will drive demand for electricity

**DISRUPTIVE IMPACT OF ELECTRIC VEHICLES**

**Electric Cars Go Mainstream**

- Plug-in vehicles hit the accelerator
- EVs boost electricity demand by 8%

**4 TO 5 FOLD INCREASE IN ELECTRICITY DEMAND**

- The Wuppertal Institute predicts that a full decarbonisation (without EE offensive) would lead to a 4 to 5 fold increase of power demand in Germany

Source: Bloomberg New Energy Finance

Source: Wuppertal Institute
CSP Exports from MENA to Europe are part of the solution

![Graph showing CSP, offshore wind, nuclear, and PV production]

<table>
<thead>
<tr>
<th>TuNur CSP</th>
<th>Offshore wind</th>
<th>Nuclear</th>
<th>Solar PV</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Only generate during high value hours of the day, eg 7am–11pm, or 2pm-10pm</td>
<td>• Intermittent over the 24h of the day</td>
<td>• Constant throughout the day</td>
<td>• Intermittent during day light hours</td>
</tr>
<tr>
<td>• No generation during low value hours</td>
<td>• Generates at average capacity during low demand periods</td>
<td>• Full capacity during low demand periods</td>
<td>• Does not generate at night</td>
</tr>
</tbody>
</table>
CSP exports from North Africa are Competitive

Prices Alternatives EU

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PPA</td>
<td>20yrs</td>
<td>20yrs</td>
<td>15yrs</td>
<td>15yrs</td>
<td>35yrs</td>
<td>20yrs</td>
<td>20yrs</td>
<td>20yrs</td>
</tr>
<tr>
<td>PPA duration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target</td>
<td>April 2017 planned tender</td>
<td>Target prices</td>
<td>Plus other subsidies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Exporting Solar from North Africa - March 2017
Why Tunisia?

Exporting Solar from North Africa - March 2017