RENEWABLE ENERGY
5 KEY REASONS TO INVEST IN RENEWABLES IN SAUDI ARABIA

1. Unlimited Natural Endowment for Renewable Energy Production

2. Government Commitment to Unlock the Renewable Energy Sector

3. Access to Large Regional Market

4. Advanced Knowledge-Based Market

5. Investor-Centric Ecosystem
RENEWABLE ENERGY SOURCES

SAUDI ARABIA IS NATURALLY ENDOWED WITH RENEWABLE ENERGY SOURCES, PARTICULARLY SOLAR AND WIND

SOLAR

- Saudi Arabia lies in the middle of the “sun belt”

- Average of 8.9 hr/day of sunshine; and an average horizontal solar radiation of 5,600 Wh/m²

- Solar irradiation is well above average irradiation of high potential solar areas globally
  250 w/m² vs. 100-200 w/m²

WIND

- Annual average onshore wind speeds is around 6.0 and 8.0 m/s

- Wide areas enjoy onshore wind speed (7+ m/s) well above a standard economic viability speed

Source: Renewable Resource Atlas
SAUDI ARABIA’S SOLAR IRRADIATION

A WIDE RANGE OF SAUDI ARABIA’S LANDSCAPE ENJOYS STRONG SOLAR AND WIND NATURAL ENDOWMENT

High potential of solar irradiation across most provinces, and mainly in Tabuk and Asir

KSA SOLAR IRRADIATION MAP

Source: KSA Renewable Resource Atlas
High potential of wind energy along the northeast, central regions and mountains in the western region

Source: KSA Renewable Resource Atlas
**SOLAR ENERGY PRODUCTION**

**KSA’S NATURAL ENDOWMENT POSITION IT AMONG THE BEST COUNTRIES GLOBALLY**

*for solar and wind energy production*

**SAUDI ARABIA IS RANKED AS 6TH COUNTRY WITH HIGHEST POTENTIAL FOR PRODUCTION OF SOLAR ENERGY**

**TOP 10 COUNTRIES**

For energy resource potential in centralized solar (PV on land)

K Petajoule/Year

<table>
<thead>
<tr>
<th>Country</th>
<th>K Petajoule/Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
<td>62.3</td>
</tr>
<tr>
<td>Botswana</td>
<td>52.0</td>
</tr>
<tr>
<td>China</td>
<td>47.3</td>
</tr>
<tr>
<td>India</td>
<td>44.3</td>
</tr>
<tr>
<td>Australia</td>
<td>39.9</td>
</tr>
<tr>
<td>Egypt</td>
<td>33.9</td>
</tr>
<tr>
<td>South Africa</td>
<td>30.1</td>
</tr>
<tr>
<td>Mexico</td>
<td>29.2</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>26.5</td>
</tr>
<tr>
<td>Senegal</td>
<td>25.0</td>
</tr>
</tbody>
</table>

**GREAT MIX OF NATURAL RESOURCES PLACES SAUDI ARABIA AMONG THE BEST FIELDS TO DEPLOY RENEWABLES**

*Source: Shell global energy resources database*
KSA IS RANKED AS THE 13TH COUNTRY WITH HIGHEST POTENTIAL FOR PRODUCTION OF ONSHORE WIND

TOP 15 COUNTRIES

For energy resource potential in wind (onshore)

K Petajoule/Year

GREAT MIX OF NATURAL RESOURCES PLACES SAUDI ARABIA AMONG THE BEST FIELDS TO DEPLOY RENEWABLES

Source: Shell global energy resources database
Located within the sun-belt, SAUDI ARABIA HAS HIGH POTENTIAL FOR PRODUCTION OF ENERGY USING SOLAR POWER

Centralized Solar Potential in PJ/Year

- 25,000+
- 2,000-25,000
- 220-2,000
- 0-220

Source: Shell global energy resources database
Located within the Hardley Cell, **KEY AREAS IN SAUDI ARABIA ARE STRONGLY WESTERLY THROUGHOUT THE YEAR**

**WORLD MAP FOR ENERGY RESOURCE POTENTIAL IN WIND (ONSHORE)**

Onshore Wind Potential in PJ/Year

- 600+
- 75-600
- 8-75
- 0-8

**Source:** Shell global energy resources database
Renewable sources constitute a small fraction of the energy mix

TODAY

<1%

RENEWABLE ENERGY SHARE

GOING FORWARD

Saudi aims to heavily increase the share of renewables energy

>30%

RENEWABLE ENERGY SHARE

Note: Share of renewables from total KSA's generation capacity

Source: IRENA, REPDO
UNLOCKING THE RENEWABLE ENERGY SECTOR

COMMITMENT TO UNLOCK THE RENEWABLE ENERGY SECTOR

ESTABLISHMENT AND GROWTH

An initial target of generating 27.3 GW of renewable energy by 2024 and 58.7 GW by 2030

FOCUS ON LOCALIZATION

Localizing significant portion of the renewable energy value chain in the Saudi economy, including R&D, manufacturing, among other stages
HIGH AMBITION TO ESTABLISH A STRONG GROWING SECTOR, LONG-TERM VISIBILITY

SAUDI TARGETS TO INCREASE RENEWABLE ENERGY GENERATION CAPACITY TO 58.7 GW BY 2030

Capacity targets

Share of renewables in KSA’s total generation capacity

Source: REPDO, Overview of Saudi Arabia’s Renewable Energy Program (Jan 2019), Team analysis
BACK-UP: SAUDI ARABIA SIGNIFICANTLY INCREASED ITS RENEWABLE ENERGY TARGETS AND LONG TERM VISIBILITY

PLANNED CAPACITY (GW)

Source: REPDO, Overview of Saudi Arabia’s Renewable Energy Program (Jan 2019), Team analysis
MEIM AND PIF ARE WORKING ON COMPLEMENTARY TRACKS TO PROMOTE LOCALIZATION OF MANUFACTURING

<table>
<thead>
<tr>
<th>TRACK</th>
<th>DEVELOPMENT APPROACH</th>
<th>ALLOCATED PROJECTS (% OF RE CAPACITY)</th>
<th>OBJECTIVES</th>
</tr>
</thead>
<tbody>
<tr>
<td>TENDERED BY REPDO</td>
<td>❯ Competitive tender</td>
<td>30%</td>
<td>❯ Enable price discovery</td>
</tr>
<tr>
<td></td>
<td>❯ Increasing local content requirements</td>
<td></td>
<td>❯ Attract private investments</td>
</tr>
<tr>
<td></td>
<td>❯ Negotiated deal with international partner for project development</td>
<td></td>
<td>❯ Promote market innovation</td>
</tr>
<tr>
<td></td>
<td>❯ Captive offtake from large scale manufacturing (200 GW)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIRECT PLACEMENT BY PIF</td>
<td>❯ Competitive tender</td>
<td>70%</td>
<td>❯ Fast-track localization</td>
</tr>
<tr>
<td></td>
<td>❯ Increasing local content requirements</td>
<td></td>
<td>❯ Target exports of RE equipment</td>
</tr>
<tr>
<td></td>
<td>❯ Negotiated deal with international partner for project development</td>
<td></td>
<td>❯ Develop Giga-scale projects</td>
</tr>
</tbody>
</table>

Source: REPDO, Overview of Saudi Arabia’s Renewable Energy Program (Jan 2019), Team analysis
PROJECTS WILL BE DEPLOYED IN 35+ PARKS SPREAD ACROSS THE KINGDOM

35+ parks to be developed by 2030

SPREAD across the Kingdom to promote regional development

TECHNOLOGY agnostic deployment of projects

Source: REPDO, Overview of Saudi Arabia’s Renewable Energy Program (Jan 2019), Team analysis
PARKS ARE BEING PRE-DEVELOPED TO BOOST PROJECTS BANKABILITY AND EXPEDITE EXECUTION

**PRE-DEVELOPMENT STUDIES**
- Geotechnical
- Hydrology
- Energy Yield
- Grid Impact
- Environmental
- Permitting

**PRE-DEVELOPMENT ADVANTAGES**
- Solar and wind resources well understood
- Land and grid information accessible to developers
- Level playing field between all developers
- Expedited project tendering and delivery

Source: REPDO, Overview of Saudi Arabia’s Renewable Energy Program (Jan 2019), Team analysis
BY END OF 2019, ~13 GW WILL BE PRE-DEVELOPED

REPDO is on track to complete all pre-development studies for sites with a total capacity of ~13 GW by end of 2019

A grid “Operational System Impact” study reveals that ~13.5 GW of renewables can be integrated without any upgrades

Source: REPDO, Overview of Saudi Arabia’s Renewable Energy Program (Jan 2019), Team analysis
### 12 PRE-DEVELOPED PROJECTS WILL BE TENDERED DURING 2019 WITH A CAPACITY OF ~3.1 GW

#### REPDO TENDERING PLAN (MW)

<table>
<thead>
<tr>
<th>Tendered</th>
<th>Pre-Developed</th>
<th>2019 Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sakaka</td>
<td>Qurayat</td>
<td>2,225</td>
</tr>
<tr>
<td>300 Wind Solar</td>
<td>Alfaisalia</td>
<td>850</td>
</tr>
<tr>
<td>Dumat Al Jandal</td>
<td>Saad</td>
<td></td>
</tr>
<tr>
<td>400 Wind Solar</td>
<td>Wadi Adwawser</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yanbu</td>
<td></td>
</tr>
<tr>
<td>Vawi Adwawser</td>
<td>300 Wind Solar</td>
<td>850</td>
</tr>
<tr>
<td>Alras</td>
<td>70 Wind Solar</td>
<td></td>
</tr>
<tr>
<td>Jeddah</td>
<td>Yanbu</td>
<td></td>
</tr>
<tr>
<td>45 Wind Solar</td>
<td>850</td>
<td></td>
</tr>
<tr>
<td>45 Wind Solar</td>
<td>3,075</td>
<td></td>
</tr>
<tr>
<td>Rafha</td>
<td>45 Wind Solar</td>
<td></td>
</tr>
<tr>
<td>Jeddah</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mahad Dahab</td>
<td>20 Wind Solar</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** REPDO, Overview of Saudi Arabia’s Renewable Energy Program (Jan 2019), Team analysis
IN ADDITION, SAUDI ARABIA SET 30% LOCALIZATION REQUIREMENT IN 2017, AIMED TO INCREASE TO OVER 50% GOING FORWARD

LOCALIZATION REQUIREMENT TARGETS

- 30% Localization Requirement (2017)
- 40%-60% Localization Requirement (2018)
- Continuously increasing Localization Requirement (Future)
Beyond local consumption, KSA manufacturers have the opportunity to serve 17 GW in the GCC region.

Source: IRENA
THREE KEY FACTORS MAKE EXPORT OF RENEWABLE ENERGY TO NEIGHBORING COUNTRIES FAVORABLE

1. GEOGRAPHICAL ADVANTAGE
   Saudi Arabia is located at a close proximity to the GCC countries and thus has a logistical advantage (i.e., lower transportation cost, shorter delivery time) over other European and Asian source countries.

2. TRADE AGREEMENTS WITH OTHER ARAB COUNTRIES
   Following GAFTA:\footnote{Greater Arab Free Trade Area} Goods produced in any of the GAFTA member countries shall be exempted from duty in any other member country.

3. FAVOURABLE TRADE REGULATIONS ON INDUSTRIAL GOODS
   Saudi Arabia has set favourable trade regulations on the export of industrial products/equipment.
STRONG KNOWLEDGE-BASED MARKET IS DEVELOPED ACROSS MULTIPLE DIMENSIONS

Advanced R&D and Innovation

Pioneer Development Projects

Comprehensive Market Information Database

Source: NIDLP strategy
SAUDI OFFERS ADVANCED RENEWABLE RESOURCE DATABASE

Providing beneficiaries with detailed data and information

DESCRIPTION AND OBJECTIVES

- KACARE’s renewable resource monitoring and mapping program (RRMM), focused on monitoring and mapping the renewable energy resources in Saudi Arabia, installed stations starting 2013
- RRMM program includes the operation, calibration, and maintenance of renewables
- Online data portal, contains up-to-date information on renewable energy resources in KSA
- Four main renewable energy sources are covered: solar, wind, geothermal, waste-to-energy

DATA AVAILABLE

- **Solar**
  Satellite model-geo-model covering (direct normal irradiance [DNI], global horizontal irradiance [GHI], and diffuse horizontal irradiance [DHI]), plus related meteorological and dust parameters
- **Solar**
  Satellite model-SUNY/ Albany
- **Wind**
  Mesoscale model-Vestas: modeled wind speed, wind direction, temperature, density
- Additional datasets within the Atlas, such as roads and the electric grid, help provide context for the resource data

Source: Renewable resource atlas

BENEFICIARIES

- Power project developers and financers
- Researchers
- Academics
- Government entities
- Industries

PARTNERS

- **Universities**
  e.g., KAUST
- Technical Colleges and Institute
  e.g., TVTC
- International Organization
  e.g., IRENA, Battelle, SRC
- Government
  e.g., SEC, SWCC
RENEWABLE RESOURCE ATLAS

MONITORING STATIONS

- 70+ stations
  Solar monitor locations

- ~10 stations
  Wind monitor location

SATELLITES MAP  KSA SOLAR MAP  WIND SPEED MAP
REPDO OFFERS AN ONLINE PORTAL PROVIDING DIRECT ACCESS TO DOMESTIC SUPPLIERS DATA AND INFORMATION

DESCRIPTION AND OBJECTIVES

- REPDO developed “We Supply Renewables” as a user generated portal that allows companies based in Saudi Arabia to showcase their products and services to international developers participating in the National Renewable Energy Program (NREP).
- This portal offers international companies direct access to the on-ground expertise necessary to comply with the local content requirements of the National Renewable Energy Program (NREP).
- All supplier registrations are reviewed by REPDO local content team before posting online.

DATA AVAILABLE

- Number of NREP projects
- Number of registered Saudi suppliers
- Suppliers by regions and size
- Suppliers by supply chain category
- List of selected suppliers with their profile including Key statistics, contact info, company bio, products and services they provide

BENEFICIARIES

- NERP project developers and financers
- Manufacturers
- Government entities
- Industries

PARTNERS

- Saudi Arabia General Investment Authority (SAGIA)

1. This is a review only, not endorsement or official preferred suppliers.
WEBSITE

www.wesupplyrenewables.com.sa

SUPPLIERS & PROJECT LOCATION MAP
INVESTOR-CENTRIC ECOSYSTEM IS ESTABLISHED BY THE GOVERNMENT FOR PRIVATE SECTOR INVESTORS

Clear governance and regulatory framework
Incentives to attract private sector investors

Saudi established a clear governance, reassuring investors and raising confidence in the market

Clear governance set for the Renewables sector....

Ministry of Energy, Industry and Mineral Resources (MEIM)
National Renewable Energy Program (NREP)
Renewable Energy Project Development Office (REPDO)

... reassuring investors

Enhance credibility
Provide transparency
Enhance assurance to the private sector

Program implementation, and procurement management
Independent Regulator
CLEAR ALLOCATION OF ROLES ALONG THE VALUE CHAIN

SECTOR ROLE ALLOCATION

Developers/OEMs

<table>
<thead>
<tr>
<th>SECTOR OWNER</th>
<th>SECTOR PLANNER/ PROMOTER</th>
<th>SECTOR REGULATOR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Renewable Energy Project Development Office (REPDO)</td>
<td>Saudi Standards, Metrology and Quality Organization (SASO)*</td>
</tr>
</tbody>
</table>

* And other standardization agencies based on export locations
Source: Team analysis
LICENSES ISSUER
Ministry of Commerce & Investment
SAGIA

FUNDER/INVESTOR
Saudi Industrial Development Fund (SIDF)

EXECUTOR
Private Sector
### INCENTIVES

**SAUDI OFFERS A WIDE RANGE OF INVESTOR-CENTRIC INCENTIVES**

<table>
<thead>
<tr>
<th>INCENTIVE</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CUSTOM DUTY EXEMPTION</strong></td>
<td>Customs duty exemptions for primary raw materials, manufacturing equipment, and spare parts (not available in KSA)</td>
</tr>
<tr>
<td><strong>CUSTOM DUTY DRAWBACK</strong></td>
<td>Refund to importers/exporters of raw material imports that are processed in Saudi Arabia and re-exported as more finished products</td>
</tr>
<tr>
<td><strong>LOANS</strong></td>
<td>Up to 75% of project financing through soft loan by SIDF</td>
</tr>
<tr>
<td><strong>LAND INCENTIVES</strong></td>
<td>Land for lease starting from $0.26 per sqm</td>
</tr>
<tr>
<td><strong>NATIONALIZATION INCENTIVES</strong></td>
<td>Up to 15% (for male) and 20% (for female) of the monthly salaries of KSA nationals employees to be covered by HRDF</td>
</tr>
<tr>
<td><strong>OWNERSHIP</strong></td>
<td>100% foreign direct ownership allowed</td>
</tr>
<tr>
<td><strong>REPATRIATION OF CAPITAL</strong></td>
<td>No restrictions on repatriation of capital</td>
</tr>
</tbody>
</table>

Source: Responsible entities
KEY GOVERNMENTAL ENTITIES
RELEVANT FOR INCENTIVES

SAUDI INDUSTRIAL DEVELOPMENT FUND (SIDF)
Provide financial and advisory services needed to support the growth and development of the localization

SAUDI INDUSTRIAL PROPERTY AUTHORITY (MODON)
Responsible for the development of industrial cities with integrated infrastructure and services, and with the highest global standards and specifications

SAUDI EXPORT PROGRAM
Provide funding and guarantee/insurance facilities for exporters, needed to increase competitiveness and mitigate risks associated with international trade transactions

ROYAL COMMISSION FOR JUBAIL AND YANBU (RCJY)
Execute infrastructure plan and manage multiple industrial cities mainly oriented toward energy intensive industries

Source: Responsible entities
ABOUT SAUDI GENERAL INVESTMENT AUTHORITY
Saudi General Investment Authority is the Kingdom’s investment promotion agency. Our priorities are to attract and develop foreign investment, enhance the nation’s investment climate, increase the ease of doing business, and eliminate obstacles from investors’ journey.

To discover the countless opportunities, across major economic sectors, that Saudi Arabia has to offer:

CONTACT US NOW

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