

# **Analysis of Saudi Arabia's Green Energy Industry: Current Situation and Future Perspectives**

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## **Introduction**

As a key component of Saudi Arabia's post-oil diversification plans and — to some extent — its efforts to boost its reputation as an environmentally responsible member of the international system, the kingdom has recently set itself several ambitious 'green energy' goals. Thus far, these include: specific short- and medium-term renewable energy capacity targets; the development of relevant public-private sector partnerships; the boosting of relevant foreign direct investment; the localization of the production of relevant equipment / research and development into relevant technologies; key changes to the legal and regulatory framework; and the establishment of a new umbrella strategy.

Thus far, it seems likely most short-term targets will be missed, however the scale of the kingdom's commitment to the sector and its apparent centrality to the current Saudi administration's economic planning and Crown Prince Muhammad bin Salman Al-Saud's (MBS) personal legitimacy suggest that even if most specific objectives are unachievable, there will at least have been a significant step in the right direction.

## **Vision 2030 and Green Energy - Origins and Rationale**

Mindful of the need to prepare for a post-oil future and — in the meantime — reduce its own domestic dependency on hydrocarbon fuels and promote an image of environmental accountability, Saudi Arabia has a long history of trying to promote renewable energy sources. Under the King Abdullah bin Abdul-Aziz Al-Saud administration, for example, a new King Abdullah City for Atomic and Renewable Energy was established in 2010.<sup>1</sup> Its objectives included establishing a national policy on non-oil energy, and launching projects to generate electricity using nuclear and renewable energy sources to achieve a sustainable national energy mix.

By the time of MBS's accumulation of greater powers, however, between 2015-2017 (as minister of defence, then deputy crown prince, then crown prince), little seemed to have been achieved by any of the previous administration's initiatives. Notably, in 2016 renewable energy sources contributed only a negligible portion of total energy production,<sup>2</sup> while renewable energy accounted for only 0.7 percent of the kingdom's total domestic energy

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<sup>1</sup> See [Royal Decree of 17/04/2010 on the King Abdullah City for Atomic and Renewable Energies \(KARARE\) – Policies – IEA](#)

<sup>2</sup> See [Saudi Arabia Middle East RE SP.pdf \(irena.org\)](#)

consumption.<sup>3</sup> Moreover, by 2016 Saudi Arabia's total domestic electricity consumption had risen dramatically to 341 TWh (up from 219 TWh in 2010).<sup>4</sup> Eating into the kingdom's hydrocarbon export capacity at a time of unprecedented budget deficits (\$98 billion in 2015 - equivalent to more than 15 percent of GDP),<sup>5</sup> and with Riyadh having withdrawn more than \$115 billion from its reserves in order to cover the shortfall,<sup>6</sup> there was undoubtedly increased pressure on the new administration to kickstart the renewable energy sector. Also concerning, and attracting international criticism of 'fossil fuel energy overuse',<sup>7</sup> the kingdom's CO2 emissions had continued to rise, reaching 531 Mt in 2015 (up from 418 Mt in 2010).<sup>8</sup>

## **Vision 2030 and Green Energy - Overall Objectives**

In this context, the MBS administration's post-oil diversification masterplan — Saudi Vision 2030 — included a number of overall renewable energy-related objectives. Launched in April 2016, it called for:

- Achieving environmental sustainability in order to 'fulfil our Islamic, human and moral duties' and as a 'responsibility to future generations and essential to the quality of our daily lives'.
- An emphasis on developing partnerships between the private sector and government entities in order to build the renewable energy sector (as such, similar to the emphasis on public-private partnerships for other non-oil sectors).
- An emphasis on Saudi Arabia's numerous comparative advantages in becoming a major renewable energy producer (notwithstanding its status as a major hydrocarbon energy producer). Notably, a recognition of its 'impressive natural potential for solar and wind power', its abundance of inputs such as silica and petrochemicals, and its large existing cadre of energy-related professionals.
- An emphasis on localizing the production of renewable energy-related equipment and infrastructure, in partnership with the private sector (as such, similar to the kingdom's objective of building a domestic military equipment industry, and part of its overall objective of growing the manufacturing sector).
- An emphasis on 'localizing a significant portion of the renewable energy value chain' by boosting Saudi-based research and development in renewable energy technologies (as such, part of the kingdom's overall objective of boosting the knowledge economy).
- Reviewing the legal and regulatory framework in order to facilitate private sector investment in the renewable energy sector.

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<sup>3</sup> See [Renewable energy consumption \(% of total final energy consumption\) - Saudi Arabia | Data \(worldbank.org\)](#)

<sup>4</sup> See [Saudi Arabia - Countries & Regions - IEA](#)

<sup>5</sup> See [Saudi Arabia reveals cuts plan to shrink \\$98bn budget deficit | Saudi Arabia | The Guardian](#)

<sup>6</sup> See <https://www.bloomberg.com/news/articles/2016-01-28/russia-set-for-oil-record-as-it-mulls-action-with-opec-on-prices>

<sup>7</sup> See [CO<sub>2</sub> EMISSIONS, ENERGY CONSUMPTION, AND ECONOMIC GROWTH IN SAUDI ARABIA on JSTOR](#)

<sup>8</sup> See [Saudi Arabia - Countries & Regions - IEA](#)

- Establishing a new umbrella strategy — the King Salman Renewable Energy Initiative — to coordinate all strands of the kingdom’s renewable energy-related policies and projects.<sup>9</sup>

## **Vision 2030 and Green Energy - Specific Objectives**

Initially, the original Vision 2030 document stated that Saudi Arabia was aiming to produce 9.5 gigawatts of renewable energy by 2023 (with no set target for 2030),<sup>10</sup> with a follow-up statement (from the National Renewable Energy Programme) claiming there would be an interim 2020 target of 3.45 GW.<sup>11</sup>

However, in late 2018 the Renewable Energy Project Development Office (REPDO) announced that the 2023 target had been substantially increased to 27.3 GW, while a new 2030 target of 58.7 GW was also announced. Adding more detail, the late 2018 revisions also clarified that the 2023 target would be reached by installing 20 GW of photovoltaic solar capacity, 7 GW of wind capacity, and 300 MW of concentrated solar capacity. Scaling up, the 2030 target would be reached by installing — across 35 different ‘energy parks’ — a total of 40 GW of photovoltaic solar capacity, 16 GW of wind capacity, and 2.7 GW of concentrated solar capacity.<sup>12</sup>

With regard to investment, the late 2018 revisions also revealed that REPDO would be responsible for private sector competitive tendering for 30 percent of the planned new capacity, while the Public Investment Fund (PIF) would be responsible for bringing on board international investors, to help build 70 percent of the planned new capacity.<sup>13</sup>

In October 2020 the CEO of the Saudi National Grid put forward a fresh 2025 target of 30 GW (somewhat in line with the REPDO’s 2023 target), and with regard to investment projected that over \$20 billion would flow into the sector over the next decade.<sup>14</sup>

In January 2021, the minister of energy announced that Saudi Arabia wanted 50 percent of its electricity consumption to come from renewable sources by 2030, claiming ‘we will be another Germany when it comes to renewables’. Adding more detail, he stated that the remaining 50 percent would come from natural gas, rather than oil, and that eventually (but without setting a time frame) the kingdom would become carbon neutral.<sup>15</sup>

## **Implementing Vision 2030 - New Projects and Developments**

In early 2017 REPDO announced its first private sector tender, for a 300 MW ‘independent power project’ and a 400 MW wind project; and in November 2018 it was confirmed that a

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<sup>9</sup> See [Saudi\\_Vision2030\\_EN.pdf \(saudiembassy.net\)](#)

<sup>10</sup> See [Saudi\\_Vision2030\\_EN.pdf \(saudiembassy.net\)](#)

<sup>11</sup> See [MEED | BREAKING: Saudi Arabia sets new 58.7GW renewable energy target for 2030](#)

<sup>12</sup> See [MEED | BREAKING: Saudi Arabia sets new 58.7GW renewable energy target for 2030](#)

<sup>13</sup> See [MEED | BREAKING: Saudi Arabia sets new 58.7GW renewable energy target for 2030](#)

<sup>14</sup> See [Saudi Arabia expects more than \\$20 bil investment in renewables over a decade: official | S&P Global Commodity Insights \(spglobal.com\)](#)

<sup>15</sup> See [‘We will be pioneering’: Saudi Arabia reveals 50% renewables goal by 2030, but is that realistic? | Recharge \(rechargenews.com\)](#)

local consortium (ACWA Power – part-owned by the PIF) had been successful.<sup>16</sup> In January 2019 REPDO then announced it was going to tender 11 solar projects with a total capacity of 2.2 GW (including a 600 MW facility in Mecca province). In April 2019 it further announced that it was going tender wind power projects with a total capacity of 850 MW,<sup>17</sup> with the facilities expected to come online later this year (in 2022). In January 2020 it also announced plans to tender four further solar projects with a total capacity of 1.2 GW.<sup>18</sup> It is understood that 49 companies (28 of which were Saudi-based) pre-qualified, and the projects are now underway.

As part of its mandate to boost foreign investment in the sector, in October 2016 the PIF signed agreements with Japan's SoftBank to set up a \$100 billion technology fund (the SoftBank Vision Fund) to support Vision 2030 objectives, and in March 2018 it was announced that SoftBank would be developing solar energy plants in Saudi Arabia as part of a \$200 billion investment.<sup>19</sup> In 2019 it was reported that the PIF would also be playing a major role in funding REPDO's planned wind power projects, and would have overall responsibility for a 2.6 GW solar complex in Mecca province (which would include the abovementioned REPDO 600 MW facility).<sup>20</sup>

In October 2021 Saudi Aramco provided further details of its nascent involvement in the sector, revealing that it would be taking a 35 percent stake in a 1.5 GW solar power project being managed by the PIF (the Sudair Project - via ACWA Power). Significantly, ACWA Power's CEO indicated that he expected future collaborations to follow the same template.<sup>21</sup>

Pushing forward with its agenda, the King Abdullah City for Atomic and Renewable Energy has recently launched: a National Data Center for Renewable Energy (to support localized research and development and to provide accurate information for potential investors); a Renewable Energy Technologies Localization Program (to also support localized research and development, while encouraging private sector involvement); and a Human Capacity Building Initiative (to provide suitable education and training needs for Saudi citizens intending on working in the sector).

## **Conclusion - Current Status and Future Perspectives**

Thus far, little of the promised capacity increase seems to have materialized, with Saudi Arabia understood to have installed only 397 MW of new renewable energy capacity (394 MW of which is solar) by the end of last year. Furthermore, it is understood that no new megawatt-

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<sup>16</sup> See [MEED | BREAKING: Saudi Arabia sets new 58.7GW renewable energy target for 2030](#)

<sup>17</sup> See [The plan to turn Saudi Arabia into a renewable energy leader | Saudi Arabia 2019 | Oxford Business Group](#)

<sup>18</sup> See [Saudi Arabia expects more than \\$20 bil investment in renewables over a decade: official | S&P Global Commodity Insights \(spglobal.com\)](#)

<sup>19</sup> See [MEED | BREAKING: Saudi Arabia sets new 58.7GW renewable energy target for 2030](#)

<sup>20</sup> See [The plan to turn Saudi Arabia into a renewable energy leader | Saudi Arabia 2019 | Oxford Business Group](#)

<sup>21</sup> See [Saudi's ACWA to develop \\$30 billion of renewable projects by 2030 with Aramco, PIF | S&P Global Commodity Insights \(spglobal.com\)](#)

scale projects were actually tendered over the course of 2020-2021,<sup>22</sup> despite the abovementioned REPDO announcements and the Ministry for Energy originally stating it would tender projects with a total capacity of 1.47 GW.<sup>23</sup>

Certainly, in terms of domestic energy consumption, there has only been a very small rise in domestic energy consumption from renewable sources (rising from 0.7 percent in 2010 to 1.6 percent in 2018),<sup>24</sup> and oil and natural gas still account, respectively, for about 62 percent and 38 percent of energy consumption (as per the most recent 2020 figures).<sup>25</sup>

However, in terms of slowly moving in the right direction, the situation in all these areas is believed to be improving, with fresh data from 2022, when available, expected to demonstrate modest advances. Moreover, with regard to annual total domestic electricity consumption — and an easing of pressure on the kingdom — there already appears to have been a significant plateauing, with 354 TWh in 2019 (as per the most recent figures — up only 3.3 percent from 2016's 342 TWh). Meanwhile, CO<sub>2</sub> appears to have been successfully brought down in recent years, standing at 495 Mt (down 6.8 percent from 2015's 531 Mt).<sup>26</sup> In this more optimistic context, private sector interest appears to remain healthy, with a recent public offering of ACWA Power (the winning contractor on abovementioned REPDO projects) seeing the company valued at over \$14 billion.<sup>27</sup>

Looking ahead, in both economic and political calculations, it seems likely that Saudi Arabia's commitment to developing and investing in the sector — even if specific targets continue to be missed — will continue unabated, and will undoubtedly improve the kingdom's overall position over the course of the decade. Vision 2030, after all, is central to the MBS administration's post-oil diversification plans, and it seems reasonable to assume that all components of the masterplan — including the development of the renewable energy sector — will remain key priorities. Likewise, Vision 2030 is clearly a vital pillar of MBS's personal political legitimacy, with the crown prince having consistently marketed himself as the man who can fix Saudi Arabia's economic situation and improve its international standing (in this case, as an environmentally responsible state).

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<sup>22</sup> See ['We will be pioneering': Saudi Arabia reveals 50% renewables goal by 2030, but is that realistic? | Recharge \(rechargegenews.com\)](https://rechargegenews.com)

<sup>23</sup> See [Saudi Arabia expects more than \\$20 bil investment in renewables over a decade: official | S&P Global Commodity Insights \(spglobal.com\)](https://spglobal.com)

<sup>24</sup> See [Renewable energy consumption \(% of total final energy consumption\) - Saudi Arabia | Data \(worldbank.org\)](https://worldbank.org)

<sup>25</sup> See [International - U.S. Energy Information Administration \(EIA\)](https://eia.gov)

<sup>26</sup> See [Saudi Arabia - Countries & Regions - IEA](https://iea.org)

<sup>27</sup> See [Saudi Arabia's biggest IPO since Aramco surges in debut | Business and Economy News | Al Jazeera](https://aljazeera.com)

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