

VISION 2030 AND THE BIRTH OF SAUDI SOLAR ENERGY

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A solar sector is emerging as part of Saudi Arabia's economic diversification plans under the Vision 2030. Makio Yamada offers an analysis of policy and institutions governing the country's expansion into "yellow oil." Rising domestic oil consumption, young citizens' entry into the job market, and reduced solar panel production costs have driven the launch of the solar industry in the kingdom. Growth of the industry had previously been hindered by institutional ambiguity and fragmentation, but the government restructuring in May has paved the way to its eventual rise by unifying necessary administrative functions under the newly-created super-ministry.

KEY POINTS

- ◆ The new Saudi leadership, led by King Salman and his son Deputy Crown Prince Mohammed, will exercise control over the country's next giant, non-oil industry, which Saudis call "yellow oil," or solar energy
- ◆ The initial driver behind the Saudi government's interest in the use of solar power was its intention to preserve the kingdom's capacity to export oil in light of rising domestic consumption; the Vision 2030 also underscores the industrial aspect of solar energy
- ◆ Following the succession in January 2015, the new leadership found the country's institutional framework for the solar sector problematic; the government restructuring in May 2016 unified the necessary administrative functions for the sector
- ◆ Insufficient human capital may be an impediment to the growth of the industry; the National Transformation Program 2020 has set ambitious goals to boost the country's technical education, but its feasibility remains to be seen

INTRODUCTION

The announcement of Vision 2030, the Saudi state's new economic blueprint, in late April was followed by a major government restructuring 12 days later. The highlight of this restructuring was the creation of a powerful multitasking ministry, the Ministry of Energy, Industry, and Mineral Resources (M.O.E.I.M.R.), headed by Khalid A. al-Falih, a former health minister and C.E.O. of Saudi Aramco. M.O.E.I.M.R. replaced the Ministry of Petroleum and Mineral Resources (M.O.P.M.R.) by absorbing the administrative functions for industrial policy from the former Ministry of Commerce and Industry (renamed the Ministry of Commerce and Investment in the restructuring) and those for electricity policy from the former Ministry of Water and Electricity (dissolved in the restructuring).¹

It was seen as the largest government restructuring in the economic field since 1975. In that year, following the succession after the death of King Faisal (r. 1964–75), the Ministry of Industry and Electricity (M.O.I.E.) was created by King Khalid (r. 1975–82). M.O.I.E. absorbed the administrative functions for industrial policy that had hitherto belonged to M.O.P.M.R. and those for electricity policy from the Ministry of Commerce.² The latest restructuring re-inserted industrial policy into the ministry administering the oil industry after four decades and incorporated electricity policy for the first time. What this implies is the intention of the new regime, which



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is led by King Salman and his son Deputy Crown Prince Mohammed, to exercise control over the country's next giant, non-oil industry, which Saudis call "yellow oil" (an-naft al-asfar), or solar energy.³

YELLOW OIL FOR ECONOMIC DIVERSIFICATION AWAY FROM OIL

Renewable energy has rapidly been making inroads into the global energy market in the past few years. Last year, global investments in renewable energy were more than double the amount spent on new coal and gas-fired plants.⁴ The sector today employs 8.1 million workers globally, and 2.8 million of them are engaging in the production of solar modules.⁵ The International Energy Agency predicts that solar energy will account for over 5 percent of the global power production capacity by 2020.⁶

Vision 2030 identifies renewable energy as one of the pillars of economic diversification away from oil. It sets an “initial target” of producing 9.5 gigawatts (GW) of power from renewable energy. The projects will be pursued under the “King Salman Renewable Energy Initiative,” details of which are expected to be announced soon.⁷ The National Transformation Program 2020, which was announced in early June following the Vision 2030, set the target of 3.45GW, or 4 percent of the total power consumption, by 2020. The program also aims to employ 7,774 workers in the renewable and nuclear energy sectors combined by 2020.⁸

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Renewable energy consists of different sources of energy such as solar, wind, wave, and geothermal. Among them, solar is considered a particularly promising source of non-hydrocarbon energy in Saudi Arabia, as the Arabian Peninsula is one of the most sunshine-rich places in the world.⁹ In spite of its exceptionally long (over 3,000 hours annually) sunlight hours, solar, however, has never been harnessed as a major source of energy in Saudi Arabia or in other G.C.C. countries.¹⁰ The country’s installed solar power capacity was only 23 megawatts (MW) at the end of 2015, while that of the U.A.E., which has the largest installed solar capacity among the G.C.C. countries, was

128MW at the same time.¹¹ These numbers are strikingly small given the amount of sunshine the region receives. The installed solar capacity of Germany, a country endowed with only half the sunlight hours in the Gulf (slightly above 1,500 hours annually), was 40 GW – more than 300 times the U.A.E.’s and 1,700 times Saudi Arabia’s.¹²

Nevertheless, supported by the decline in the cost of solar modules, the G.C.C. countries are currently undergoing a “quiet revolution” in solar energy.¹³ The largest solar power project currently under execution in the region is the 800MW Phase III of the Mohammed bin Rashid Al Maktoum Solar Park in Dubai. The Dubai Electricity and Water Authority, which oversees the development of the park, aims to install 5GW capacity by 2030.¹⁴ Investors are concurrently eyeing Saudi Arabia, which they expect to be a “crown jewel” of the Gulf solar market once the industry takes off.¹⁵ The Saudi government has been studying the use of solar power in the kingdom since the creation of the King Abdullah City for Atomic and Renewable Energy (K.A.C.A.R.E.) in 2010 by the royal decree of the previous king Abdullah (r. 2005–15).

The initial driver behind the Saudi government’s interest in the use of solar power was its intention to preserve its capacity to export oil in light of the rising domestic consumption of oil for power. One study estimates that Saudi Arabia will be a net oil-importing country in the late 2030s if domestic oil consumption continues to in-

crease at its current pace.¹⁶ K.A.C.A.R.E. previously announced its plan to produce 41GW, nearly a third of the country's projected power need, from solar energy by 2032, in addition to 17GW from nuclear energy and 9GW from wind. (However, the target year was pushed back to 2040 in January 2015,¹⁷ and now the plan seems to have been abandoned.¹⁸

In addition to such energy-mix policy, the Vision 2030 also places an emphasis on the industrial side of renewable energy. It states:

“We will support promising sectors and foster their success so that they become new pillars of our economy. In the manufacturing sector, we will work towards localizing renewable energy and industrial equipment sectors.”

“We will also seek to localize a significant portion of the renewable energy value chain in the Saudi economy, including research and development, and manufacturing, among other stages.”

These statements reflect the government's awareness that acceleration of the process of economic diversification is an urgent matter. While the low price of oil has certainly been magnifying such awareness, the essence of the problem lies in the demographic shift within the kingdom. The majority of Saudi Arabia's national population of 21.1 million are young citizens born after the first oil boom period.¹⁹ While the public sector, currently employing over 3.4 million citizens (out of 5.2 million employed citizens), was capable of absorbing the vast majority of Saudi workers during past pe-

riods of labor-scarcity, the sector is bloated today and has little additional capacity to employ.²⁰ As a result, the number of jobless young citizens has been increasing, with the country's youth unemployment rate estimated to be over 40 percent.²¹ Currently, nearly a third of the country's national population – around 7 million – are still in schools or preschools, but they will enter the labor market over the next 15 years, needing jobs to support themselves and their families.²²

This demographic time-bomb puts pressure on the government to nurture new industries, especially labor-intensive ones that can create greater numbers of job opportunities than the machine-oriented oil and gas industry. This task is also pressing as the country's petrochemical industry, a leading non-oil industrial sector in the Saudi economy in the past three decades, is losing its advantages in the global economy today, which is attributable to multiple factors, such as the insufficiency of domestic gas feedstock, the industry's shrinking cost-competitiveness due to the low global oil prices and higher domestic fuel prices (as a result of the lifting of fuel subsidies), and increasing self-reliance in one of its major markets, China.²³

DECONSTRUCTING AND RECONSTRUCTING THE INSTITUTIONAL FRAMEWORK

While banking on solar as the country's new source of energy and employment, the kingdom's new leadership, following the succession in January 2015, found the country's existing institutional framework for the solar industry problematic. First, the initiative for the development of the industry had been taken by the institution that was a legacy of the previous king: K.A.C.A.R.E. Only a week after the succession, King Salman disbanded the Supreme Council of K.A.C.A.R.E., together with other institutions under the direct leadership of the previous king, such as the Supreme Economic Council, which was replaced by the Council for Economic and Development Affairs chaired by Mohammed bin Salman.²⁴

Under the new leadership, new players have begun to be promoted in the Saudi solar industry. In July 2015, an announcement was made that the country's first solar power plant will be set up in al-Aflaj, near the capital city, Riyadh. This planned 50MW solar power plant will be created through the cooperation of three institutions: Saudi Technology Development and Investment Company (Taqnia), Saudi Electricity Company (S.E.C.), and the King Abdulaziz City for Science and Technology (K.A.C.S.T.).²⁵

Taqnia, which will be responsible for the construction and the operation of the project, is fully owned by the Public Investment Fund (P.I.F.), a sovereign wealth fund. Originally created in 1971, P.I.F. has been empowered as the new regime's investment arm. In light of Deputy Crown Prince Mohammed bin Salman's plan to develop it into a \$2 trillion mega fund through Saudi Aramco's I.P.O., P.I.F. and Taqnia have rapidly been making inroads into the country's emerging industrial sectors, such as automotive (e.g. P.I.F.'s joint venture with a Korean firm to create an auto assembly plant in the Sudair Industrial City) and defense equipment (e.g. Taqnia will locally manufacture multipurpose helicopters and cargo aircraft), in addition to solar energy.²⁷ Taqnia entered the solar industry in 2014 through its 50 percent acquisition of Sun & Life, a developer involved in Saudi Aramco's 10.5MW solar project.²⁸

S.E.C., which will prepare land for the project and purchase the generated electricity from the plant, is a utility monopoly, 74 percent of which is owned by the Saudi government. The company had been seeking opportunities in the solar industry since its launch of a small-scale 500 kilowatt (kW) pilot solar power plant on Farasan Island in the Red Sea in 2011.²⁹ Following the announcement about the al-Aflaj project, the company also revealed the creation of two integrated solar combined cycle (I.S.C.C.) plants in Duba (in the northwest of the country) and Waad al-Shamal (in the north of the country) in late 2015.³⁰

K.A.C.S.T., which will provide solar photovoltaic (P.V.) modules to the project, is a governmental institution originally created in 1977 for the development of science and technology in the kingdom. It had reportedly been struggling to attract top-quality scientists and researchers in the 2000s, before international attention shifted away to the King Abdullah University for Science and Technology (K.A.U.S.T.), a research-oriented university established by the previous king in 2008.³¹ Under the new leadership, K.A.C.S.T. has been given a leading role in cooperating with the country's industry-related institutions and in supporting the country's industrial diversification process through its research and development (R&D) activities.³² Since 2010, K.A.C.S.T. has been running small-scale pilot P.V. assembly lines.³³

Second, K.A.C.A.R.E. had been slow to make progress in the country's solar industry in the past because its mandate was unclear, and the administrative functions related to the industry were spread across multiple ministries without effective coordination being achieved. By its nature, the solar industry stretches over three administrative fields: energy, industry, and electricity. In the field of energy, media reports suggest that K.A.C.A.R.E.'s relationship with the former M.O.P.M.R. had grown into a competitive one. The former oil minister Ali al-Nuaimi reportedly disagreed with K.A.C.A.R.E. on the way projects were being planned. For instance, M.O.P.M.R. al-

legedly preferred that leadership in the industry be taken by a state-owned enterprise rather than ceded to private firms, as had been originally envisaged by K.A.C.A.R.E.³⁴

Saudi Aramco, a state-owned oil company whose partial privatization is now under review, has been warming up its own solar initiative.³⁴ Out of the existing 23MW installed solar power capacity in the kingdom, the largest project is Saudi Aramco's 10.5MW solar car park project for the

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al-Midra Tower in Dhahran. Saudi Aramco implemented this project in December 2012 in cooperation with Japan's Solar Frontier, a subsidiary of Showa Shell, a Japanese refinery firm, 15 percent of which is owned by Saudi Aramco.³⁶ Saudi Aramco and Showa Shell have also been in talks over the possible production of solar modules in the kingdom.³⁷

The solar industry, together with other emerging manufacturing sectors, such as plastics, auto components, and assembly, has been one of the key industrial sectors targeted by the country's National In-

dustrial Clusters Development Program (N.I.C.D.P.) set up during the time of the previous king.³⁸ In cooperation with the Saudi Arabian General Investment Authority (S.A.G.I.A.), N.I.C.D.P. has been working on inviting foreign direct investment, both from the West and Asia, to create the production base for the targeted industries.³⁹ Foreign investors in the Saudi solar industry will be required to assist in the Saudization of the industry through their contribution to R&D activities in the kingdom as well as their compliance with local content requirements and labor nationalization quotas.⁴⁰ N.I.C.D.P. was previously co-administered by the Ministry of Commerce

“S.E.C. is likely to become a major player in the Saudi solar industry.”

and Industry and M.O.P.M.R. Following the restructuring, M.O.E.I.M.R. has begun to undertake the management of N.I.C.D.P, with its minister also chairing the board of directors of the institutions overseeing the kingdom’s industrial zones, such as R.C.Y.J. and Modon.⁴¹

Finally, in the field of electricity, S.E.C. previously operated under the former Ministry of Water and Electricity. The electricity sector is integral to the solar industry because solar power plants beyond the size of self-sufficiency must be connected to the grid networks in order to sell generated electricity to the market. In addition, the pricing of electricity matters greatly in

relation to the commercial viability of the projects.⁴² Because of these factors, S.E.C. is likely to become a major player in the Saudi solar industry too. In June 2016, following the government restructuring, the company announced that it was seeking bids from international developers for two other 50MW solar power plants in al-Jawf and Rafha (north of the country).⁴³

LOOKING AHEAD

While the administrative ambiguity and fragmentation had, to date, been stalling the full launch of the Saudi solar industry, the government restructuring in May placed all three administrative functions related to the industry—energy, industry, and electricity—under the newly created M.O.E.I.M.R. In addition, its minister now chairs the board of directors of both K.A.C.A.R.E. and K.A.C.S.T.⁴⁴ The restructuring has paved the way for the government’s control of the development of solar power and industry, which is likely to be exercised through this unified “Ministry of Yellow Oil” and P.I.F.

Nevertheless, how the regulatory framework for the industry will fully develop from here remains to be seen, especially concerning the design of the planned public–private partnership. While Vision 2030 provides for the transformation of Saudi Aramco into a multi-sectoral industrial powerhouse, private solar start-ups, with

growing expectations about the market, have already begun springing up throughout the kingdom.⁴⁵

Some local private solar entrepreneurs have already expressed their concern over the possibility that the Saudi solar industry may end up becoming another field dominated by protected oligopolistic players and have been calling for the state to play a transparent institutional role to ensure efficiency in the industry.⁴⁶

Another concern is the pace of localization of the industry. While the local content requirements will protect infant local production of solar modules from cheap imports, especially those from China, some analysts believe they may pose a barrier to the development of the industry and its cost-effectiveness.⁴⁷ The U.A.E.'s Masdar has shelved its plan to produce solar modules after seeing the build-up of an excessive production capacity in the global P.V. industry and the oversupply in the market that it has caused.⁴⁸

Likewise, Saudi Arabia's quota-based labor nationalization program may impose a glass ceiling on production, given the insufficient pool of qualified local technical workers, which has resulted from the long-unsolved, wide skills gap between education and industry. Less than 10 percent of technical jobs in the country's private

sector have been localized so far because of Saudi workers' preference for administrative jobs—and for wearing the thawb (a traditional white robe)—and unpreparedness for technical professions.⁴⁹

In order to overcome this problem, the National Transformation Program set an ambitious target of increasing the number of students in technical and vocational training from the current 104,432 to 950,000 by 2020.⁵⁰ Given the unpopularity of technical and vocational training among young Saudis, how the Saudi government can implement such a change - and if a leap in

“Saudi Arabia’s quota-based labor nationalization program may impose a glass ceiling on production.”

quantity will be matched by that in quality - remains to be seen. In addition, the development of effective communication mechanisms between the emerging industries and human capital development institutions in order to narrow the skills gap is likely to be highlighted as a critical agenda in the coming years.⁵¹

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