

**Clean Energy Business Council  
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**Saudi Arabia's Vision 2030  
What Role Will Renewables Play in the Post-Oil Economic Transformation Plan?**

**VIP Keynote Address – H.E. Dr Abdulrahman M. Al-Ibrahim**  
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Ladies and gentlemen, Your Excellencies, distinguished guests.

It is my very great honour to have been invited here by the Clean Energy Business Council, and to be allowed to address you all in this, the 6th MENA Clean Energy Summit.

And ladies and gentlemen, it gives me immense pleasure to be in the United Arab Emirates once again, a country, like my own country of Saudi Arabia, that has embarked on a visionary path, with ambitious goals, in a drive to modernise and diversify its economy away from reliance on fossil fuels.

And a key part of that, ladies and gentlemen, and the reason we are here, is the transition to a renewable energy economy, and the investment and business opportunities that it provides.

And what a great timing for the summit to take place just after the world celebrated the 80<sup>th</sup> birthday of the first Saudi Arabian oil discovery on March 3<sup>rd</sup> 1938!

We are truly blessed in this part of the world. Deep beneath our feet we have been blessed with such an abundance of energy in the form of fossil fuels that it transformed the lives of our forefathers, from lives of sustainable frugal hardship to lives of unsustainable profligate ease based on non-renewable resources. And above our heads we are blessed with such an abundance of energy in the form of solar and wind energy that it has the potential to transform the lives of our descendants, from lives of unsustainable profligate ease, to lives of sustainable sufficiency based on clean and renewable resources.

Whether this happens and how it happens is down to us; to our generation of decision makers, business leaders, entrepreneurs, scientists and engineers.

We've made a good start. This morning we heard Dr. Nasser Saidi, Paddy Padmanathan and others, speaking about futuristic clean projects like Dubai's Mohammed bin Rashid Al Maktoum Solar Park, and its planned capacity of 5,000 MW by 2030.

Apparently, when it's finished, it will be huge. 214 square kilometres. That's bigger than many towns and even cities. And although it's genuinely very impressive, it's not enough, not nearly enough, but

it is a fantastic achievement, and I especially like its name, “Solar Park”. It sounds like somewhere to take your children for a picnic or an ice-cream while they ride their bikes.

Actually, it reminded me of a story from the very start of Saudi Arabia’s venture into renewable energy. As some of you might know it all started at King Abdulaziz City for Science and Technology, or “KACST” as it’s usually known. We had a 350 kW concentrated PV tracking system in our renewable research center, a place called the Solar Village, about 50 km north of Riyadh, and yes, families did sometimes arrive at the gate thinking they could picnic there and ride their bikes.

Anyway, at the time of this story, it was the largest PV system of its kind in the world, and it provided energy to two local villages, Al-Jubaila and Al-Uyaina. The experience of providing power to the villagers was exceptionally interesting, because of the speed in which they became addicted to a continuous supply of electricity in their homes and workshops.

Now, this is not the famous story about the group of angry villagers who came to the Solar Village one cloudy day, armed to the teeth, demanding that the power was turned back on, but the story about how the same villagers, on a matter of highest principle, adamantly refused to pay for the electricity.

You see, at that time the national grid hadn’t quite reached the two villages, and the Saudi Electric Company didn’t want the Solar Village to provide free electricity in case it caused problems when the grid eventually reached them and they had to pay. The tariff wasn’t much in those days anyway, only about 5 halalah per kWh. So, the Solar Village complied. They provided the electricity, billed the villagers, and then the villagers refused to pay. Absolutely refused. Not one halalah. They weren’t interested in the incredibly expensive photovoltaics and its tracking system, or the transmission lines from the Solar Village to their homes and farms, or the cost of operations and maintenance. All they understood is that the energy came from Allah at no cost! As far as they were concerned, the sun and its energy belonged to Allah, and like the rain from the clouds and the air that we breathe, it was free. End of discussion.

In those days, Saudi Arabia was a world leader in renewable energy, participating in ground-breaking research across a whole spectrum of technologies, and had pilot installations in off-grid locations across the country; like the first freezing solar desalination plant at Yanbu in 1985, or the solar PV-RO desalination plant at Sadus village in 1995 that remained in operation serving its community until very recently.

Saudi Arabia has huge potential for exploiting solar energy due to its geographical location, vast unused desert lands and year-round clear skies. But high oil prices, and high renewable energy costs in the intervening years, meant that our national focus was more on strengthening and transforming other areas, such as basic infrastructure and housing, conventional thermal electricity generation and water desalination, and providing first-class medical care and education from kindergarten to university for all citizens.

But renewable energy wasn’t entirely forgotten, it just simmered away quietly in the background on a smaller scale, waiting for its moment. Research continued. Technology transfer continued. Training

continued. We conducted hugely successful international cooperation programs, such as the joint Saudi-German program for solar hydrogen production, the joint Saudi-US program on solar energy, and the joint Saudi-Japan program on renewable energy, to mention just a few.

The historical reality everywhere, is that interest and commitment to renewable energy and its applications has always been dependent on oil prices. The higher the oil price, the higher the interest in renewable energy. The lower the oil price, the lower the interest in renewable energy. A completely unsustainable see-saw relationship that has hindered renewable energy establishing itself as a major player in the energy mix, not just in Saudi Arabia, but across the world.

But that's all in the past. The last decade has ushered in a renaissance of interest and resolve, and has offered up incredible opportunities, which of course, is why we are all gathered here today.

So, what has changed ladies and gentlemen?

What are these opportunities?

What has made it all possible?

The first, is that years of teaching and training, both at home and overseas, has seen the emergence of a critical mass of skilled and talented engineers and technicians, with a drive to solve problems, a passion for innovation, and a zest for clean and futuristic technologies.

The second, is the evolution and adoption of robust renewable energy policies, and the expansion and establishment of supporting and enabling organizations, such as the world-class applied research institutes and centers of excellence at KACST and KAUST, influential think-tanks such as the King Abdullah Petroleum Studies and Research Center "KAPSARC", regulatory development at the Cogeneration and Regulatory Authority "ECRA", and policy development at the King Abdullah City for Atomic and Renewable Energy "KA-CARE" along with its National Renewable Energy Data Center that provides extensive wind and solar resource measurement, modelling and forecasting capabilities through its Renewable Resource Atlas.

And thirdly, the cost of renewable energy has fallen dramatically. When we started all those years ago, photovoltaics was over 90 cents per kWh, just five years ago it was about 20 cents per kWh. In the recent bidding for the Sakaka solar PV plant, 7 out of 8 bids were under 3 cents per kWh, which means PV has now reached economic parity with conventional thermal generation technologies. The story with onshore wind energy is the same; unit costs have fallen from over 15 cents per kWh to less than 6 cents per kWh over the last 10 years.

But while an eager and skilled workforce, a reformed organizational infrastructure, and long awaited economic parity, are all necessary, they are not in themselves sufficient for a renewable energy resurgence.

The essential missing ingredient, while all these preparations were going on in the background, was political foresight and determination.

All that changed with Saudi Vision 2030, and more specifically as far as we are concerned, with the establishment of Saudi Arabia's National Renewable Energy Program, or "NREP" as we call it.

NREP describes itself as a "long term, multifaceted renewable energy program designed to balance the domestic power mix, whilst working towards carbon reduction commitments."

The program is managed and executed by the Ministry of Energy, Industry, and Mineral Resources, and an office within the Ministry, the Renewable Energy Project Development Office, or REPDO, is responsible for the delivery of NREP.

In a nutshell, NREP's task is to create a renewable energy industry in Saudi Arabia.

NREP has to review legal and regulatory frameworks, and encourage Public-Private Partnerships (PPP) so that the private sector is able to own and invest in renewable energy using an Independent Power Producer (IPP) model with long-term Power Purchase Agreements (PPA). The energy generated at the sites will be sold to limited liability companies, financially guaranteed by the electricity utility company.

The initial goal of NREP is to increase the capacity of renewable energy in the Saudi Arabian energy mix to 3.45 GW by 2020 and 9.5 GW by 2023. That is equivalent to 4% of the Kingdom's total energy mix by 2020 and 10% by 2023. The remainder will be made up of 29% from steam turbines, 29% from combined cycle, and 32% from gas turbines plants.

An excellent start has already been made. In Round 1 of NTP 2020, 300 MW of solar PV capacity at Sakaka was recently awarded, and 400 MW of wind capacity at Dumat al Jandal is expected to be awarded within a few months. Sakaka is expected to come on line in late 2019, and Dumat al Jandal should be operational late the following year.

The remainder of NTP 2020 comes in Rounds 2 and 3, and totals 2.75 GW. This will include a rich portfolio of Solar PV Plants, Solar CSP Plants, Waste to Electricity Plants, and Wind Plants.

It could be argued that, in the past, renewable energy targets have been announced before and then quietly dropped or ignored. So, what makes this one different ladies and gentlemen?

Partly, it is because all the strategic institutional enablers are now in place.

Partly, because the whole process is openly competitive, but totally transparent.

Partly, because it has increased credibility through adherence to targets and schedules.

But perhaps most importantly of all, we simply have no choice.

The days of believing we could pump oil and gas indiscriminately are over. Leaving aside for now renewable energy's potential to combat climate change, the simple fact is that population growth, combined with increasing per capita energy consumption, means that by 2030, Saudi Arabia's power capacity is expected to exceed 120 GW, and desalinated water demand to exceed 7 million cubic meters per day.

It means that over the next 12 years we have to fill a 60 GW gap in power capacity, and a 3 million cubic meters per day gap in desalinated water production.

Vision 2030 is our strategic roadmap for that task, NREP the mechanism, and REPDO the oversight.

In every bid, NREP will be looking for localization solutions. Crucially, at least 30% of a bid's renewable energy value-chains and clusters must include local content. This could be from R&D, manufacturing or other sections of the value chain, as long as it results in job creation and technology transfer objectives, and acts as a viable tool allowing renewable energy to be a key player in the national GDP.

Bidding is open to both local and international companies with experience in the electricity sector, and PPAs are awarded to the lowest cost bids meeting the criteria.

Now, this could be a barrier to small and medium sized companies hoping to participate in these opportunities, but there are other agencies and organizations, such as the Saudi Chamber of Commerce, whose task is to ensure that smaller companies are able to participate and reap the benefits of the renewable energy revolution in Saudi Arabia.

This part is actually very important to me, as one of the hats I wear, or ghutras to be more accurate, is Chairman of the Renewable Energy Committee for the Riyadh Chamber of Commerce and Industry.

The Riyadh Chamber is particularly concerned about the ability of small and medium size enterprises "SMEs" to gain a foothold in this new renewable energy market. It is vitally important that robust localization tools, supportive policies, and regulatory frameworks specifically focussed on SMEs are developed and put in place.

Among the approaches that I am presently floating, is a suggestion that there should be mitigation measures to support local SMEs. Another is that the renewable giants should be required to invest in R&D collaborations with local SMEs, or that at least part of their bids should utilize high-end technologies instead of relying on proven, but aging technologies. Perhaps we could use the "Park" concept to incubate futuristic technologies, and help foster the emergence of more SMEs in our quest for success.

It has become clear that the economics are not favourable for SMEs. ECRA has formulated market and regulatory conditions to stimulate a growing distributed PV industry in Saudi Arabia. They published regulations for net metering PV capacities of up to 2 MW in the distribution grid. This is encouraging, but raising capital for the small-scale solar PV market is challenging as banks are reluctant to lend to small projects with long payback periods and no off-take guarantees.

Ladies and gentlemen, one thing we have all come to realize is that just as global climate change can affect local weather patterns, often disrupting life for the worse, so too can global advances in

renewable energy technologies affect local energy policies, often disrupting previous plans, but usually for the better.

Renewable energy may well be location dependent in its implementation and results, but although we need to act locally, we need to think globally. There is no one rule that fits all. We need to learn from the rich experience available internationally, and then act according to our local needs.

In announcing the Saudi Transformation Program 2020 and the Saudi Vision for 2030, His Royal Highness Deputy Crown Prince Mohammed bin Salman has set the Kingdom of Saudi Arabia on its first steps towards a post-oil economy, something that a decade or so ago, many would have considered impossible.

Our strategy, ladies and gentlemen, is to seek out and learn from the best international practices and experiences, and adapt them to our needs, and all the while, to stay flexible and open to new ideas and technologies.

We need to live the future we are shaping today. A future perhaps, where fossil fuels are no longer simply burnt for fuel, but are utilized to maximum effect in value-added production chains. We need to shape a future where energy sources are clean, sustainable, affordable, abundant, and secure. We've taken the first steps. May Allah guide us on the remainder of the path.

Most importantly, our endeavors towards implementing clean energy in Saudi Arabia and the GCC should be sustainable.

Ladies and gentlemen, I would like to close by thanking the organizers, the Clean Energy Business Council, for making this 6th MENA Clean Energy Summit possible, and I would also like to thank all the delegates and attendees for being here, and making this summit such a success.

Thank you.