

The Abdullah Bin Hamad Al-Attiyah International Foundation for Energy & Sustainable Development

~ CEO Roundtable Series ~ WHITE PAPER, MAY 2017 FOSSIL FUELS AND RENEWABLES IN THE 21st CENTURY: Friends not Foes





FOSSIL FUELS AND RENEWABLES IN THE 21st CENTURY:

Friends not Foes

Stretching over a century, the Middle East's oil industry has successfully crested many a turbulent wave; oil price shocks, challenging and maturing oil fields and security issues, to name a few. Now the global transformation towards low carbon growth sees the region – home to a third of the world's oil producers – entering an entirely new chapter.

renewable projects, energy efficiency program and subsidy cuts being implemented across the Gulf and the wider Middle East. The age-old debate between environmentalists and the head honchos in the oil world that 'going green' is not financially savvy is dying.

An 'energy basket' that leverages both fossil fuels primarily oil and gas - and renewables is the best answer to meeting the 49% increase in energy consumption in the Middle East that BP's latest Energy Outlook expects by 2035. The mix also increases the chance that Gulf countries will be able to meet the demand of their growing populations and uphold their promises to meet the requirements of the Paris Agreement, the world's most comprehensive climate change deal.

In the Gulf alone, Qatar's population could climb by 23% to 3.2 million by 2030 and the UAE's by 18% from today's 9.4 million residents to 11.05 mil-

The green revolution is well underway with [lion by 2030, according to the United Nation's latest report on global population growth. Kuwait's population is expected to grow by 17% to 4.8 million, Saudi Arabia's growth is anticipated at 20% to 39.4 million and Oman could report 26% growth to 5.8 million.

The growth in the Middle East's energy consumption by 2035.

23%

The growth in

Qatar's population

anticipated by 2030,

to 3.2 million.

70

The number of

residents officially

registered in the UAE in 1950, compared to

9.4 million today. The

figure is expected to

rise to 11.05 by 2030.

22%

Solar-panel efficiency

on a commercial

basis worldwide has

climbed from 15% to

22% in the last five

years.

49%

While the vast and long-awaited commercial potential of renewables - primarily solar and wind dominate energy headlines, growth in every energy market is welcomed and needed. BP's Energy Outlook anticipates that oil and gas, together with coal, will remain the main source of energy powering the world economy, accounting for more than 75% of total energy supply in 2035, compared with 86% in 2015. An 11% decline in just under two decades hardly casts hydrocarbons to the side as a 'sunset industry' that is fading in importance, slipping below the global energy horizon. LNG is expected to grow twice as fast as international gas trade and to account for half of all globally traded gas by 2035, up from today's 32%, the report details.

FIRST MOVERS: MERGING TWO WORLDS

Gulf governments' petrodollars are already being funnelled into supporting green projects, which in turn enhance oil and gas production - a win-win for the Gulf's oil-centric economies. Al Reyadah - a joint venture between ADNOC and Masdar - inaugurated the Mussafah facility last November. Al Reyadah is the first commercial-scale carbon capture, utilisation and storage (CCUS) facility in the Middle East and will capture up to 800,000 tons of carbon emitted from Emirates Steel and pipe it to ADCOs' Bab and Rumaitha fields for enhanced oil recovery (EOR). To the east, Oman's Miraah solar thermal plant will generate 6,000 tons of steam per day via 36 glasshouses to support state-owned and Shell-led Petroleum Development Oman's (PDO) existing thermal EOR technology at the Amal field when the project comes online later this year. The \$600 billion project has the potential to make an 80% saving of natural gas at the field. Data sets for both projects - and those similar - are vital to signposting cost-effective strategies to commercially scale up the methods across the Gulf. Business leaders' understanding of the lingo and mission at hand is key; they are either the money makers, or linked closely to the money makers. A continual flow of funds to sustain the current momentum behind talent training and projects goes hand-in-hand with integrating environmental awareness into the Gulf's DNA.



"The age-old debate between environmentalists and the head honchos in the oil world that 'going green' is not financially savvy is dying."

Meanwhile, solar-panel efficiency on a commercial SHIFTING MINDSETS basis worldwide climbed from 15% to 22% in the past five years, according to the World Economic Forum (WEF). The US state of Texas illustrates how both worlds can co-exist; the state is home to both the country's largest oil production and largest wind-power generation capacity. Collaboration and knowledge sharing between the two worlds - fossil fuels and renewables – is key to plugging any holes in the global energy basket. Leaks in the basket will help few and any wastage will incur unwanted expenses, especially at a time when oil-producing economies are grappling with low oil prices.

An occasional and aggravated political undertone that suggested support for renewables by nonoil producing countries was an attempt to quell OPEC's influence in global energy markets has been countered by many OPEC members' openness to low carbon growth. In support of OPEC member Oatar's National Vision 2030, the construction of the country's largest solar power project will begin this year as part of a joint venture between Qatar Electricity and Water Company and Qatar Petroleum (QP). The 200 megawatt (MW)

2020 The year that Qatar' largest solar power project, at 200 MW, will be operational. Capacity can be expanded to 500 MW.







"An 'energy basket' that leverages both fossil fuels and renewables is the best answer to meeting the Middle East's 49% increase in energy consumption by 2035. Elbowing one another out of the way will not work - all resources are needed to support growing populations and the environmental checklist."

2030

solar power project, which can be expanded to 500 MW, is expected to be fully operational by 2020. Environmental protection is an important theme in Qatar's vision, as illustrated by the country's second largest LNG producer, Rasgas, repairing any coral damage incurred by the laying of new pipeline. Plus, the world's biggest oil producer and OPEC linchpin Saudi Arabia is seeking bidders for the first stage of its \$50 billion renewables spend to develop almost 10 gigawatt (GW) of renewable energy by 2023 and the UAE launched its Energy Plan 2050 in January, with the aim of increasing clean energy to 50% of the total energy mix and improving energy efficiency by 40%.

Digitalization will be key in uniting all the resources of the global energy basket by enabling operators to have a clear viewfinder into supply-demand balances within their own market and cross-collaborating with other markets. There are multiple examples, including a refined product pipeline of 2 million b/d moving from Houston all the way to New York City, which is 100% digitized and managed by just six employees based in Atlanta.* In the renewables market, GE have launched a digital wind farm built on the Predix platform, which enables operators to collect, visualize and analyse their unit. Data can then be used to create a predictive model that transforms into actionable insights. Operators must be cautious, however, for a new villain emerges

Environmental development is one of the four key pillars in Qatar's National Vision 2030, along with economic, social and human development.

\$348.5bn

The volume of global spending on clean energy in 2015 - a record high.

from this accelerated efficiency – cybercrime. It is the new mafia with a global reach and the power to strike immediately and often without warning. Significant attacks can cripple operations and revenue margins.

Accordingly, a new breed of leadership, one synonymous with Silicon Valley characters, is also vital to hedging against such risk - Chief Digital Officers (CDO). CDOs in the energy world can be tasked with understanding how traditional and disruptive commercial energy sources - fossil fuels and renewables - can be complementary instead of dominating. A CDO and his team must cost-effectively manage a digital transformation so that legacy IT and infrastructure - especially in the case of hydrocarbons - is leveraged instead of wasted and the threat of cybercrime is kept to a minimum.





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PWC's Strategy+ division's 2017 study of CDOs among the world's 2,500 largest public companies revealed that 19% of these companies have designated such an executive to lead their digital agenda - versus 6% in 2015. Over a third (38%) of companies in Europe, the Middle East and Africa (EMEA) have appointed a CDO. Yet, in terms of customer-facing industries appointing CDOs, oil and gas only accounts for 3%. Insurance, media-entertainment-communications and banking take the top three spots, at 35%, 28% and 27%, respectively. CDOs are just the tip of the iceberg in terms of needing to inject a pioneering attitude across all energy sectors. Investing in the R&D of talent and technologies increases the chances of cutting costs and boosting operational efficiency – each is gold dust in

18% Global spending or clean energy fell by nearly a fifth in 2016 as decades of R&D efforts paid off and investors finally got more value for less cash.



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"Collaboration and knowledge sharing between the two worlds – fossil fuels and renewables – is key to plugging any holes in the global energy basket. Leaks in the basket are expensive and waste precious time."

Silicon Valley graduates like Microsoft co-founder Bill Gates and Apple co-founder Steve Jobs, for example, adopted a steely commercial approach of just-do-it-and-see-how-it-goes as opposed to the energy industry's typical have-an-idea-but-wait-40 years-to-act. The latter is certainly applicable to the commercial energy industry's approach to renewables, with solar technologies taking four decades to gain ground.

The more collaboration between those working in fossil fuels and renewables, the more confident investors will be, the more funds for R&D will be available and the greater the speed of each market's growth and profitability. Elbowing one another out of the way in attempts to take pole position on the global energy stage will not work.

*According to an esteemed participant at the roundtable.

GREEN ECONOMICS

The economic veil hiding the potential of renewables has only recently been lifted thanks to decades of R&D. The rate of global spending on clean energy hit a record high of \$348.5 billion in 2015, before falling by 18% to \$287.5 billion last year, according to Bloomberg New Energy Finance (BNEF). But this is not the negative for environmentalists – and indeed global health – that it initially seems. Instead, the decline is because investors are getting more bang for their buck due to technological advancements and efficiency. But while solar projects broke the price barrier three times in the last two years, the variability of weather and embryonic storage solutions means solar is not yet reliable enough to be used for baseload consumption. As the market for renewables grows, an education process to ensure general understanding of what low-carbon growth and all the associated lingo means would benefit the public and corporate awareness process. Renewables are energy resources and sources of power that can quickly be replenished and used endlessly, such as solar, wind and hydro power. Wood and biomass – organic matter used as fuel – can be considered renewable if the trees and organic matter are replanted and restored. The rate of regeneration must be near parity with the rate of use to ensure neither expires.

3% Oil and gas companies worldwide account for just 3% of the customer-facing industries that have appointed chief digital officers (CDO).

\$600bn

The cost of the Miraah, meaning 'mirror' in Arabic, solar thermal plant in Oman. Up to 6,000 tons of steam will be generated daily to support operations at the Amal oil field.



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