ABDULLAH BIN HAMAD AL-ATTIYAH INTERNATIONAL FOUNDATION
FOR ENERGY AND SUSTAINABLE DEVELOPMENT

Issue 03: November 2018

Al-Attiyah Foundation Monthly Sustainability Digest

Expert sustainability opinion and insight

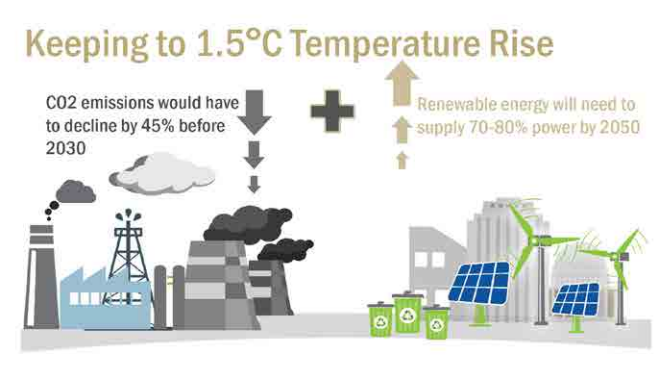
Spotlight on Energy, Natural Gas, and Climate Change: Views and Insights from Leading World Experts

The Abdullah bin Hamad Al-Attiyah International Foundation for Energy and Sustainable Development hosted a series of events during Qatar Green Buildings Council's (QGBC) Sustainabltiy Week, following an MoU signed between the Foundation and QGBC last year. The week's activities were in line with the vision of the Foundation's Chairman HE Abdullah Bin Hamad Al-Attiyah, to make a significant contribution to society by convening global experts from academia, industry and government to find potential solutions to the challenges faced by every sector. World leading experts from the Center on Global Energy Policy, Columbia University, New York and Shell, shared their opinions and scenario planning on principal energy topics with stakeholders in Qatar: ***"The Geopolitics of Climate Change "*** and the ***"Role of Natural Gas"*** in meeting the goals of the United Nations Framework Convention on Climate Change (UNFCCC), Paris Agreement provided the focus for the discussions.

مؤتمر قطر للمباني الخضراء ٢٠١٨ - التأثير
Qatar Green Building Conference 2018 - The Impact
COLUMBIA SIPA School of International and Public Affairs
QATAR 2018 SUSTAINABILITY WEEK
اسبوع قطر للاستدامة ٢٠١٨

Meeting the Goals of the Paris Agreement

The direct correlation between anthropogenic emissions of greenhouse gases and economic development had shaped the discourse on climate change, long before the advent of the UNFCCC. The notion that the climate change challenge needs to be addressed in a way that does not constrain development, places enormous responsibility on governments, policy makers, civil society and the private sector. The week's events explored how the energy industry can and should transform in order to strengthen the global response to the threat of climate change.



Context of the IPCC Report

The release of the Intergovernmental Panel on Climate Change (IPCC) report on the 8th of October, provided perfect timing and an appropriate context for the discussions.

The IPCC identified that limiting global warming to 1.5°C would require rapid, far-reaching and unprecedented changes in all aspects of society. The "Special Report on Global Warming of 1.5°C", was prepared in response to an invitation from the UNFCCC when it adopted the Paris Agreement in 2015. It will be a key scientific input into the Katowice Climate Change Conference in Poland in December, when governments review the Paris Agreement.

The report also highlights a number of climate change impacts that could be avoided by limiting global warming to 1.5°C compared to 2°C, or more. For instance, by 2100, global sea level rise would be 10 cm lower; the likelihood of an Arctic Ocean free of sea ice in summer would be once every 100 years compared with at least once every 10 years with 2°C temperature rise.

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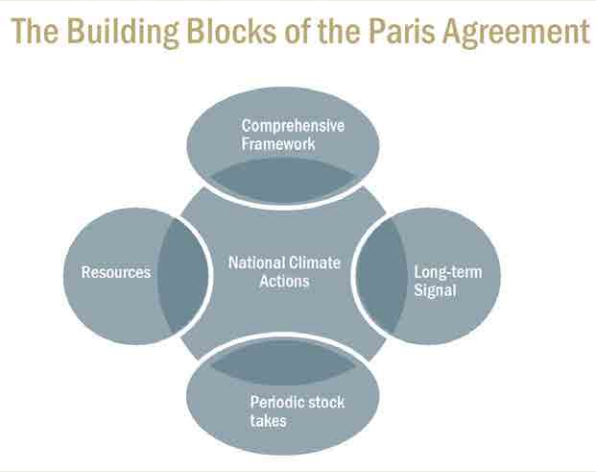
In addition, it is predicted that coral reefs would decline by 70 to 90 percent with global warming of 1.5°C, whereas virtually all (> 99 percent) would be lost with 2°C.



The report also examines pathways available to limit warming to 1.5°C, what it would take to achieve them, and the potential consequences. The findings demonstrate that limiting global warming to 1.5°C would require "rapid and far-reaching" transitions in land, energy, industry, buildings, transport, and cities. Global net human-caused emissions of carbon dioxide CO_2 would need to fall by about 45 percent from 2010 levels by 2030, reaching 'net zero' around 2050. This means that any remaining emissions would need to be balanced by removing CO_2 from the air.

In addition, the IPCC special report focussed on the radical changes required in the world energy system:

- Renewables to supply 70% to 85% of power by 2050.
- Energy-intensive industries to cut their CO_2 emissions by 75% to 90% by 2050 compared to 2010 to meet the 1.5°C goal. This compares to reducing their CO_2 by 50% to 80% for a 2°C limit. This is achievable with new and existing technologies that are technically proven, but deployment on a large scale is required.
- Buildings and transport will need to shift heavily towards green electricity.

The Role of Energy Sector in Responding to Climate Change

On Day 2 of the (QGBC) Conference, the Foundation hosted two panel sessions on the role of the energy sector. During his welcome, H.E Dr. Ibrahim Ibrahim, Vice Chairman of the Board of Directors at the Al-Attiyah Foundation, set the tone for lively discussions focusing mainly on the potential implications of the Paris Agreement for the energy industry, with some key messages on: the foundational contours of the Paris Agreement; carbon pricing; challenges for the energy sector; electrification of road transport and implication for natural gas demand; and the impact of recent (IMO) standard on natural gas demand in the shipping sector. H.E Dr. Ibrahim highlighted current efforts from the government of Qatar as well as initiatives by the private sector towards Qatar National Vision 2030 (QNV 2030).

The (QNV) 2030, with its four pillars (human development, social development, economic development and environmental development), is aimed at changing the face of life in Qatar. It has formed the cornerstone of the implementation by the State of Qatar, of the 2030 Agenda and the subsequent UN Sustainable Development Goals.

After 10 years of implementation, with regular submission of National Voluntary Review (NVR) reports to the United Nations, it is an opportune time to reassess Qatar's efforts to build a modern state with sustainable, integrated economic, social and environmental development that leverage the available human and material resources to ensure a better future for all the citizens and residents of Qatar.

In pursuit of its sustainable development efforts, the government of Qatar provides a supportive environment to enable the private sector to launch initiatives that help to promote long term sustainable growth. Companies, particularly energy companies, are responding well to the efforts of the government, in this regard.

Overview of the Paris Agreement – Foundational Contours

The Paris agreement recommends a comprehensive and holistic response to climate change, including: acknowledgement of the sustainable development context; facilitating action in both mitigation and adaptation; providing support to the poorest and most vulnerable.

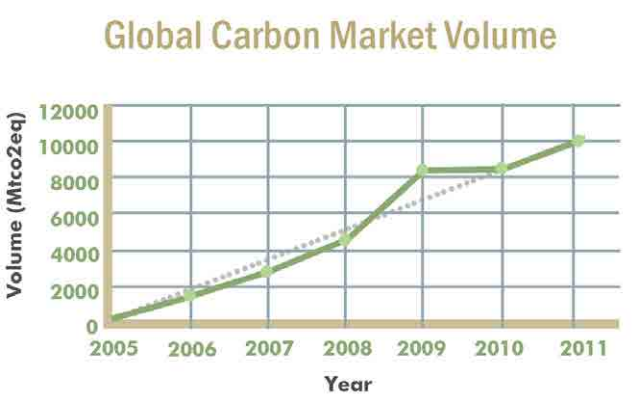
The Paris Agreement, for the first time, brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so. As such, it charts a new course in the global effort.

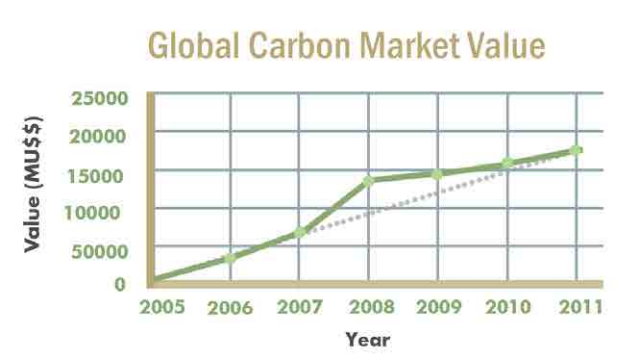
Paris sets a long-term signal for action that provides all actors with certainty of the direction of travel. Development and submission of nationally determined contributions (NDCs) are the cornerstone of commitments under the Paris Agreement. However, the experts on the panel session, from the Centre on Global Energy Policy at Columbia University, noted that current commitments do not bring us to the target of 2°C set in the Paris Agreement.

The Paris Agreement provides a comprehensive framework for setting policy measures and implementation of climate actions at national, regional, and sectoral levels.

Role of Carbon Pricing

A price on carbon helps shift the burden for the damage back to those who are responsible for it, and who can reduce it. Instead of dictating who should reduce emissions where and how, a carbon price gives an economic signal so polluters decide for themselves whether to discontinue their polluting activity, reduce emissions, or continue polluting and pay for it. In this way, the overall environmental goal is achieved in the most flexible and least-cost way to society. The carbon price also stimulates clean technology and market innovation, encouraging new, low-carbon drivers of economic growth.





Challenges for the Energy Sector

The energy industry is both a major contributor to climate change and a sector that climate change will disrupt. Over the coming decades, the energy sector will be affected, on multiple levels, by policy responses to climate change. The stakes are high: without mitigation policies, the global average temperature is likely to rise by 2.6–4.8°C by 2100 from pre-industrial levels. In addition, economic growth and the rising global population will continue to drive energy demand upwards, leading to a further rise in GHG emissions. Climate change itself may also increase energy use due to greater demand for cooling.

Most forecasts project that many factors, including a global population growth of nearly 2 billion, a doubling of worldwide economic output and a rapid expansion of the middle class in emerging economies, will raise global energy demand by an amount equivalent to the total energy used today in the entire western hemisphere. This growing demand creates a dual challenge: providing more energy to meet the growing population while managing the risks of climate change.

Electrification of Road Transport and Implication for Natural Gas Demand

Reducing Green House Gas (GHG) emissions, the need to improve urban air quality, improve energy security by reducing oil demand and improving the balance of trade, are some of the main reasons' governments are promoting electric vehicles.

A reduction in battery costs is driving Electric Vehicle (EV) penetration, although at the current battery pack cost of over $200/kWh, EVs are still not competitive with Internal Combustion Engines (ICE). Thus, they will continue to require government mandates and subsidies at least until they reach a cost of about $100/kWh. Many analysts believe the $100/kWh cost will be reached in the mid-2020s but it is uncertain, in part because of rising battery material costs such as lithium and cobalt.

The international experts from Columbia University noted that very little research has been done on the impact of vehicle electrification on natural gas demand. The central question is whether the 30% average increase in global electricity consumption due to (EVs) will be supplied by natural gas, renewables or other fuels. Optimistically, if natural gas captured a major share in power generation, as the sector moves to decarbonise, it would increase current global natural gas demand.

IMO Standards and Impact on Natural Gas Demand in the Shipping Sector

The International Maritime Organisation (IMO) in 2008 issued rules to curtail sulphur pollutions. The regulations to reduce sulphur oxide emissions introduced a global limit for sulphur content of ships' fuel oil, with tighter restrictions in designated emission control areas. Currently, ships are allowed to emit 3.5% sulphur dioxide which will be reduced to 2.5%. Shipping companies will need to look at cleaner fuel options, with the possibility to move to LNG. However, enforcement of these rules is a high challenge and some companies may choose to ignore the new limits. There is a view by some in the sector, that there could be short-term disadvantage to comply sooner rather than later.

Ships can meet the new requirement by using low-sulphur compliant fuel oil or by using approved equivalent methods, such as exhaust gas cleaning systems or "scrubbers", which "clean" the emissions before they are released into the atmosphere. An increasing number of ships are now using gas as a fuel, because it leads to negligible sulphur oxide emissions when ignited. Another alternative fuel is methanol which is being used on some short sea services.

Views from Captains of Industry

The Al-Attiyah Foundation's third CEO Roundtable for 2018 took centre stage on the third day of the Sustainability Week. The quarterly meeting brings CEOs of member companies and partners together to discuss and share insights on themes and topics pertaining to Energy and Sustainable Development. As an intimate group, the CEOs from Qatar's energy and business sectors share their own views and company's response to the event theme. Discussions for this Roundtable meeting focused on "***The Geopolitics of Energy and Climate Change***" capitalising on the attendance of the special guest speakers from the Centre on Global Energy Policy at Columbia University SIPA, who provided expert insights on the topic.

The summary of discussions at the quarterly CEO Roundtable, held under "Chatham House Rule", is compiled into a non-attributed quarterly 'White Paper' that is disseminated widely to policy makers, members, partners and participants.

The key views and recommendations:

- Fossil fuels and renewables complement one another: Abandoning the former to wholly adopt the latter is not practically possible nor sensible. Learning how to leverage the value of both to create a new and mixed energy basket is best.
- The energy mix by 2040 will be the most diversified in history.
- Renewable energy is the fastest growing energy source, accounting for 40% of the increase in energy up to 2040, according to BP Outlook 2018.
- And natural gas grows much faster than either oil or coal. But this does not mean investments into fossil fuels can falter.
- With the contribution of non-fossil fuels only increasing from 1% today to 8% in 2040 in the Middle East, the sustainable growth of the fossil fuel market, with the exception of coal, remains highly valuable. Energy security needs both sides of this 'energy transition' coin to succeed.
- Research and development (R&D) is often the unsung champion of positive growth in energy markets and technologies.
- The total public energy research, development and demonstration (RD&D) budget neared $18 billion last year among member governments of the IEA. After four years of decline since 2012, the budget rose significantly to reach 2014 levels – climbing by 7% between 2016 and 2017.
- Spending in low-carbon energy technologies reached $17.3 billion last year, noted the IEA. However, global investments of $2.4 trillion are needed in clean energy every year up to 2035, as well as cutting the use of coal-fired power to almost nothing by 2050, to mitigate the very worst of climate change. This sobering warning by the UN's Intergovernmental Panel on Climate Change (IPCC) equates to 2.5% of global GDP.

A Dialogue Among Senior Managers

On the final day of Sustainability Week 2018, The Al-Attiyah Foundation hosted a Senior **Managers Energy Dialogue**. This dialogue provided more senior employees from member companies and the wider energy and sustainability industry with the opportunity to benefit from insights and interact further with the international experts hosted by the Al-Attiyah Foundation. The format of the event allowed for a deeper dive into the same topic as the CEO Roundtable. The Senior Managers Energy Dialogues are intended to become a regular feature that compliments future quarterly CEO Roundtables.

Building on the discussions at the CEO Roundtable, participants at the Senior Managers Energy Dialogue considered the following:

The Potential Role of Natural Gas in the Future Energy Mix

Looking at the challenge from Qatar's perspective, as a world leading supplier of natural gas, the international experts strongly suggested that more needs to be done to promote natural gas globally as a cleaner fossil fuel. In particular, the global gas industry should promote the use of gas for power generation, highlighting its value in reducing carbon emissions.

A transition to a low-carbon global economy based on renewables alone would be very costly, particularly in developing nations whose growing populations have a legitimate claim to economic growth. The complementarity between renewables and natural gas needs to be fully assessed and harnessed.

Advantages of Natural Gas

To compliment the efforts to increase the use of renewables, it is pertinent to sustainably and cost-efficiently improve the carbon footprint of conventional energy sources. Natural gas is the ideal fossil fuel for doing so: natural gas is best-suited to facilitate climate protection quickly and affordably, for in terms of carbon content, it delivers more energy than the other fossil fuels and when burned, emits about 50 percent less CO_2 per kilowatt hour (kWh) than coal and lignite.

Renewable energy sources like wind and solar also benefit from natural gas and its affordable cost. Gas could provide a clean solution to the intermittency problems commonly faced by wind and solar. The capital cost of implementing a backup gas powered power plant is significantly lower than coal. This means that the cost of fall-back during intermittency is low, making renewable energy more competitive in the marketplace.

Barriers and Challenges to the Use of Natural Gas

While natural gas could be considered valuable in reducing (GHG) emissions in the power sector, most scenarios do not project natural gas to win as a fuel of choice in this sector. In both Shell Sky scenario and the International Energy Agency 2017 World Energy Outlook, natural gas-fired power market share in power generation is projected to decline from 2016 to 2040.

Post 2030, only zero carbon power generation sources are projected to be used to move on to the two-degree trajectory. Thus, most scenarios observed that there is some reluctance to build new gas-fired capacity. There is also uncertainty and concern about the level of fugitive methane emissions in the natural gas supply chain, although gas is clearly still less GHG intensive than coal. A presentation of the Shell Sky Scenarios was a major highlight of the Senior Managers Energy Dialogue.

What is Needed to Harness the Inherent Advantages of Natural Gas?

To ensure natural gas has a role in a low carbon world, producers need to minimize methane emissions from their operations, invest in carbon capture from natural gas, educate policy makers on the benefits of gas as a fast and low cost means of decarbonization, invest in new gas supplies to avoid cyclic volatility, and invest in downstream gas infrastructure so it can be more readily utilized in developing countries.

Shell's Sky Scenario

As part of the Senior Managers Energy Dialogue, Mr. David Hone, Chief Climate Change Adviser from Shell, provided attendees with a detailed look at the Shell Sky Scenarios. The presentation introduces a scenario that aims to hold the global average temperature increase to well below 2°C through a combination of "***mutually reinforcing drivers being rapidly accelerated by society, markets and governments***."

The scenario recognizes that extending current efforts, such as efficiency mandates, carbon taxes or renewable energy support, is insufficient. It argues that concurrent climate policy actions, and the deployment of disruptive new technologies within government policy environments to incentivize investment and innovation, will be required.

In 2013, Shell published its New Lens Scenarios, which for the first time, featured the modelling of the energy-system to 2100, enabling the viewing of long-term transitions in their entirety. These scenarios showed that the application of CO_2-targeted policy frameworks would lead to net-zero emissions in the energy system by the end of the century.

However, because these fall short of the goal set by the Paris Agreement on climate change, the more recently produced Sky Scenario looks at a possible decarbonization pathway of achieving net-zero emissions from energy use by 2070.

The Sky scenario begins with the current structure of economic sectors and government policies, and assumes "***very aggressive, but plausible***," ratcheting up of policy commitments through the first two global stocktakes (GSTs) under the Paris Agreement. It notes that, following the GSTs, greater uncertainties regarding policy implementation and technology development exist, which is why the scenario aims to be both ambitious and realistic by adopting an approach grounded in the energy system's current reality combined with the long-term temperature goal.

In the Sky scenario, oil consumption would rise through 2025 before beginning to decline, drop in the 2030s and fall below current levels after 2040. Liquid hydrocarbon fuel consumption would decrease by 50% between 2020 and 2050, and fall by 90% by 2070. The scenario also includes sector transformations in transport, buildings, industry, electricity and energy.

The Sky Scenario is based on the following assumptions from now to 2070:

- a change in consumer mindset where people preferentially choose low-carbon, high-efficiency options to meet their energy service needs;
- a step-change in energy efficiency;
- carbon-pricing mechanisms adopted during the 2020s, leading to a CO_2 cost embedded in consumer goods and services;
- the electrification rate of final energy more than triples, with global electricity generation nearly five times the current level;
- new energy sources grow by a multiple of fifty, with primary energy from renewables surpassing fossil fuels in the 2050s;
- 10,000 large carbon capture and storage (CCS) facilities are built, compared to fewer than 50 in operation in 2020; and
- net-zero deforestation is achieved, and an area the size of Brazil is reforested offering the possibility of limiting warming to 1.5°C.

Conclusion

Meeting the targets of UNFCCC, Paris Agreement, remains a hot topic and focus for most countries. Despite the US's announced withdrawal, goals are likely to be toughened at each five-year interval. Every individual, organization and government has a role to play in meeting the targets, however, it is apparent that current progress is still limited, with emissions continuing to rise and most countries' pledges insufficient. In order to reach the aspiration of limiting temperature increases to no more than 1.5°C, sharp drops in coal, oil and gas combustion are required by 2030, with different scenarios yielding widely-varying trajectories. It is obvious, that major oil and gas exporters need to adopt a number of strategies by cutting emissions at home; building diplomatic coalitions; and developing and deploying low-carbon fossil fuel technologies.

The discussions of the week and subsequent outputs and connections made, demonstrated how think tanks, such as the Al-Attiyah Foundation, can make a significant contribution by convening global experts from academia, industry and government to find potential solutions to the challenges faced by every sector and country as they strive to meet the goals of the Paris agreement.

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