Lloyd's Register

Low Carbon & Politics: The Merging of Two Worlds

Middle East Executive Briefing

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Lloyds Register hosted an industry roundtable discussion on the sidelines of the Abu Dhabi International Petroleum Exhibition and Conference (ADIPEC) on the 8th November, inviting a cross-section of senior stakeholders from national and international oil companies, environmental companies, financial consultancies and academia and research. Participants debated the challenge that regional economies face in establishing a cost-efficient low carbon future while not jeopardizing their energy economics and security. Key points are detailed in this White Paper.

Simple economics are revolutionizing the accessibility of renewable and energy efficient technologies, as greater affordability has triggered an unprecedented step-change in the world's ethos of low carbon. The growth of renewable energy technologies – from solar, wind, hydro and nuclear – heralds the birth of the world's fourth industrial revolution and galvanized the political and industrial appetite required to establish the Paris Agreement.

Participants at the roundtable unanimously agreed that the Paris Agreement spells a new chapter in the historically fragmented narrative of international climate policy. The success is best illustrated by the US and China's agreement in September to formally ratify the Agreement – the world's two largest economies who are responsible for 40% of global carbon emissions are now on board.

The US and China have pursued their own energy efficiency policies, including voluntary emission reduction schemes and renewable energy projects, especially solar and wind. China plans to launch an Emissions Trading Scheme (ETS) in late-2017, while an abundance of natural gas has enabled the US to reach its lowest level of emissions in twenty years. But, the Paris Agreement is the first time that the two countries have committed to operate under a global umbrella that holds them accountable for their emissions.

The countries' cooperation is in part fortuitous timing due to US President Obama's conviction that low carbon growth is a multi-generational issue, which has propelled the country's domestic and international engagement. Unsupportive comments by President elect Donald Trump on the campaign trail could threaten the bullish sentiment when he resides in the White House from January 2017.

The reason for China's increasing cooperation is more straight forward – pollution. China's economic boom over the last three decades due largely to its manufacturing prowess has come at a high cost; breathing the air in Beijing can be the equivalent to smoking forty cigarettes a day, according to US-based nonprofit group Berkeley Earth.

The growth of renewable and energy efficient technologies is integral to meeting the 48% increase in global energy consumption that has been forecast by the US' Energy Information Administration (EIA) between 2012 and 2040, with the world's population expected to swell by 31% from today's 7.4 billion to 9.7 billion by 2050. The environmental incentives underpinning political appetite for renewable energy policies and technologies are also stronger than ever. The 2015 annual report from the UN's World Meteorological Organization (WMO) said that greenhouse gas (GHG) levels reached a record high for the thirtieth consecutive year in 2014, with a WMO report in October warning that 2016 could be the hottest year on record.

40%
The US and China account for roughly 40% of global emissions.

48%
The US' EIA expects the world's energy consumption to climb by 48% between 2012 and 2040.

9.7
The world's population is forecast to swell by 31% from today's 7.4 billion to 9.7 billion by 2050.

What is the Paris Agreement?

A global climate agreement, which was borne at the UN's Framework Convention on Climate Change (UNFCCC) in the French capital in December 2015. The Agreement aims to limit warming to well below 2°C and to pursue efforts to limit it to 1.5°C. The Agreement also sets a target for net zero global emissions in the second half of this century. The Agreement came into force on the 4th November 2016 and has been signed by 193 countries as of the 11th November 2016, with 109 of those countries ratifying the Agreement. Another eight countries have pledged to ratify the Agreement by the end of 2016, which would bring the number of ratified countries to 117 – commitments that account for 79.9% of global emissions, according to Berlin-based Climate Analytics. Countries' individual emission reduction targets are not legally binding, but the mechanism to ensure the targets continually increase is. Legally enforcing the Agreement would be highly complicated, but the political and financial will associated with a low carbon outlook is sufficient to ensure countries' endeavor to meet their targets. The establishment of the Kyoto Protocol in 1997 – which the US did not sign – has provided a vital political and scientific stepping stone to the Agreement, which is the world's most comprehensive deal on climate change.

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The Evolution of Green Innovation

The US and China's support of the Agreement strengthens a vital ingredient in investors' environmental playbooks: confidence. The countries' involvement gives a stamp of credibility on an equation with global reach: the more human and financial resources invested today, the steeper the downward trajectory of costs for renewable energy technologies will be.

Comments made by oil companies at the discussion that time is short gained traction with all attendees, as did the sentiment that the race is on for countries to enhance their low carbon know how to near the UN's zero-emissions goal towards the end of this century.

The global volume of cash invested in renewable power and fuels hit a record high of $286 billion in 2015 – 4.7% higher on 2014 levels. Approximately $73 billion was invested in 2005, according to the Renewables 2016 Global Status Report. Solar energy accounted for 56% of the 2015 investments, with wind power accounting for 38%. The volume of cash spent on renewables was more than double that spent on coal and gas-fired power generation in 2015. This sets an ambitious tone for 2017.

The higher cost of renewable energy technologies has long deterred the majority of political and business energy stakeholders, but the fruits of ambitious research and development (R&D) efforts by some are being realized and hugely reducing costs. One example is a record low price for solar power set by a project in Dubai in May, which participants from environmental companies described as 'earth shattering'. What is perhaps most remarkable is that Dubai's laudable record was surpassed by a project in Chile in August, which translates into two records in three months.

The nuclear power market is also rapidly growing, following investors' reflection after the 2011 nuclear accident in Japan, which was caused by one of the strongest ever earthquakes on record with an 8.9 reading on the Richter scale. The global use of nuclear energy is expected to increase between 23% and 100% by 2030, according to the International Atomic Energy Agency's 2016 report. There are currently 473 reactors in operation, with 67 reactors under construction.

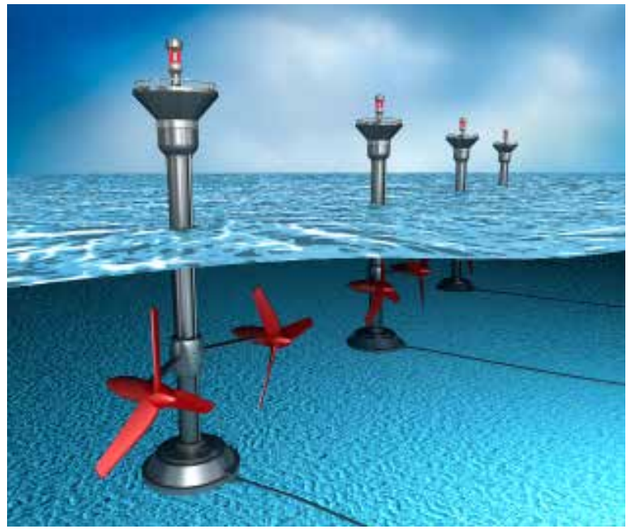
In 2015, the UAE became the first country in nearly three decades to break ground on its first nuclear energy facility. Construction on the $24.4 billion Barakah One plant started in 2012 and is scheduled for completion in 2020, when it will deliver up to 25% of the country's electricity demand and save up to 12 million tonnes of emissions per year.

Innovations that promote the flexibility of nuclear power are emerging. Small reactors that can be mobilized quickly with the option to add modular sections are gaining traction in commercial markets, along with floating nuclear reactors that can be moved to locations to meet heightened demand.

International oil companies said that putting a price on carbon – be it through trading, a tax, or carbon capture and storage (CCS) regulation, for example – is inevitable. Pricing carbon has the potential to generate much-needed funding for renewable energy R&D and technologies, but only around 40 countries and approximately 20 cities, states and regions have put a price on carbon so far, according to 2016 data from the World Bank.

There must be a greater focus on the creation of agile renewable energy technologies, as different tools will be required to meet different climates, terrain and socio-economic demographics. As highlighted by the challenges faced by Japan in 2011, renewable energy and energy efficiency technologies must also be moveable, or braced to thrive in regions prone to natural disasters, such as earthquakes, flooding and hurricanes.

Embracing the digitalization of information, such as big data and the Internet of Things (IoT), will be key to creating historical data and improving the management of data analytics. Each is a key feature to strengthening the R&D ecosystem that drives the falling cost of renewables and energy efficiency technologies, thereby further whetting governments and financiers' appetites.



"The volume of cash spent on renewables was more than double that spent on coal and gas-fired power generation in 2015. This sets an ambitious tone for 2017."

Industry Engagement Gains Momentum

The positive political sentiment is clearly reflected in industries' commitments, which should propel the next wave of 'green' technological innovations. Ten of the world's biggest oil companies announced the establishment of a $1 billion fund in November to ease the climate change impact of oil and gas, with measures

286
Global investments in renewable power and fuels reached $286 billion in 2015.

56%
Of the global investments, 56% was for solar power and 38% for wind power.

473
The number of nuclear energy operators operating worldwide.

1
Oil and gas companies established a $1 billion fund in November to ease the negative impact of climate change.

including the reduction of burning coal and R&D in CCS.

At sea, refineries and ship owners are reviewing low carbon technologies following the UN agency International Maritime Organization's (IMO) announcement in October to reduce the existing 3.5% mass/mass (m/m) Sulphur cap on marine fuels for ships to 0.5% from January 2020, instead of 2025. National oil company stakeholders agreed that the cap is a reality that all stakeholders have little choice but to adapt to.

Also in October, the UN agency International Civil Aviation Organization (ICAO) announced the first global emissions reduction scheme for aviation, which will apply to cargo and passenger flights that will collectively generate more than 10,000 tonnes of annual GHG. Around 2% of the industry's annual revenues will be redirected to carbon-cutting initiatives and reduced emissions from deforestation and forest degradation (REDD). Again, political and industrial cooperation is supporting the R&D of low carbon technologies.

Innovative uses of existing technologies are also being developed in the hope of raising awareness of efficient energy use amongst consumers, along with unprecedented subsidy cuts that have started being implemented in the Gulf since January 2015. For example, Dubai's Emirates National Oil Company (ENOC) is using radio frequency identification (RFID) at their retail stations to help motorists manage their fuel budgets.

Squeezed budgets from low oil prices since mid-2014 and rising energy demand – BP anticipates energy consumption in the Middle East to climb by 60% by 2035 – means the region will significantly benefit from exploring renewable and energy efficiency technologies further.

Most participants were of the view that the growth of the low carbon market is not a threat to the prominence of hydrocarbons, which will be a primary source of energy for at least five decades. Instead, renewables open a gateway for hydrocarbon producers, and wider industry, to expand the scope of their R&D to cut costs and enhance operational efficiency.

This is a particularly timely issue, considering the International Energy Agency (IEA) recorded a 25% reduction in field investments in 2015 to $583 billion and said in September this year that oil prices could stay within today's $50 a barrel range until mid-2017. The unnerving outlook for oil-centered economies in the Gulf, such as Saudi Arabia, Qatar, Kuwait and the UAE, can be increasingly offset by low carbon solutions.

For example, Oman's Miraah solar thermal plant will generate 6,000 tonnes of steam per day to support state-owned and Shell-led Petroleum Development Oman's (PDO) existing thermal enhanced oil recovery (EOR) technology at the Amal field. In Abu Dhabi, the world's first commercial steel CCS project has been developed for Emirates Steel by Al Reyadah, which is a joint venture between Abu Dhabi National Oil Company (ADNOC) and Masdar. The emissions savings generated by the two projects are equivalent to taking 63,000 cars and 170,000 cars, respectively, off the road.

Attendees from the research sector said government,

2%
The percentage of global emissions attributed to aviation.

60%
The rate of energy consumption in the Middle East will climb by 60% up to 2035, according to BP.

6,000
Oman's Miraah solar thermal plant generates 6,000 tonnes of steam a day to support an EOR project at the Amal oil field.

academia and non-profit organizations must tread carefully when requesting that companies improve their carbon disclosure, which means companies reveal their rate of emissions and potentially take steps to offset their carbon footprint. Against a sensitive economic backdrop of low oil prices, a push for carbon disclosure could be interpreted as a threat to companies' financial stability and potentially jeopardize much-needed investments in both the renewable and hydrocarbon markets.

Carving Out a Clear Roadmap

The timetable for industry to shift towards low carbon operations is tight, but viable. Oil companies at the discussion pointed to how Shell has steered its portfolio from a focus on oil to gas operations over the last decade and how BP illustrated the value of a rigorous emissions reduction scheme when the company announced in 1998 that it would lower emissions from its operations by 10% on 1990 levels by 2010. Savings incurred through energy efficiency meant that BP incurred no net costs and met the target in 2001 – nine years early.

Governments and financial institutions in the Middle East and beyond must enhance existing frameworks that encourage exploratory projects, as successful R&D and the resulting renewable energy technologies rely heavily on a well-measured trial and error approach. All energy stakeholders need easy access to funding for R&D, which includes laboratories, testing sites and specialist human resources, as well as the means to share intellectual property (IP) and register patents that reach international standards. Siloed efforts are unlikely to succeed.

Participants from companies focusing on research highlighted how the commercial viability of renewable and energy efficiency technologies is paramount. If you cannot sell a product, then it will have no real-time impact on industry and government's low carbon goals and the related R&D funding feed will dry up. This is particularly important to support the growth of the small and medium-sized enterprises (SMEs) sector in the Gulf, which typically have smaller budgets and are a vital portion of countries' workforce. SMEs account for up to 94% of businesses in the UAE, for example.

There are already many success stories in the Gulf, such as Abu Dhabi's Masdar. The company was established in 2006 at a time when the risk-reward ratio of low carbon R&D appeared unbalanced, particularly as renewable technologies were not as high on the region's governmental agenda. But over the last decade, Masdar has emerged as a hub of ground breaking knowledge and testing for the Middle East with its projects ranging from fuel efficiency, water conservation and electric cars to a power-generating wind tower that is a modern interpretation of ancient Arab technology.

Participants from energy entities said high quality education and an ability to think outside of the box lie at the heart of successful low carbon R&D, so governments and academia in the Middle East and beyond must continually bolster students' learning of science, technology, engineering and mathematics (STEM). This would nurture the talent of the world's future thermodynamic specialists, electrical engineers and low carbon economists, for example. Such skills, along with an equally vital capacity to think critically and creatively, will create a holistic R&D workforce to spearhead the much-needed innovation that participants from wider industry explained is vital for the next generation.

The economic and social intricacies – such as energy security – of low carbon policies means it has long challenged the world's politicians, business people and environmentalists who have tried to pin down the parameters of a global deal. The creation of the Paris Agreement, with the support of the world's two heavyweights, is no doubt a major milestone that will spur investments into renewable energy technologies. But, all stakeholders cannot afford to shy away from the hardest part yet – transforming theoretical blueprints into tangible projects. ■

"The Middle East would benefit from an integrated energy policy, which would provide signposts to guide all the stakeholders towards a low carbon future. There is a considerable level of multilateral cooperation and collaboration already happening here – this has created a strong and united movement to see positive change. The adoption of new technologies to help define a low carbon future with widespread and cost effective implementation is the next step in helping the region realize this vision."

Alasdair Buchanan, Group Energy Director, Lloyd's Register

25%
The spending at oil and gas fields fell by 25% to $583 billion, according to the IEA. Another 24% reduction is anticipated in 2016.

170,000
Emirates Steel's new CCS programme is the equivalent of taking 170,000 cars off the road.

94%
SMEs account for up to 94% of businesses in the UAE.

9
The number of years that BP met its emissions reduction target early in 2001.

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