“Clean Energy Market in MENA: Finance, Mobility, Hydrogen, Energy Efficiency”, Keynote presentation at the CEBC-Enterprise Ireland event, 5 Oct 2021

Dr. Nasser Saidi, in his capacity as the Chairman of the Clean Energy Business Council, gave a keynote address at the CEBC-Enterprise Ireland High-Level Seminar & Networking Event held at the Capital Club in Dubai on the 5th of October 2021.

Titled “Clean Energy Market in MENA: Finance, Mobility, Hydrogen, Energy Efficiency“, the presentation discussed:

(a) Clean Energy Ecosystem in the MENA region

(b) New investment in renewable energy, by region & sector

(c) Climate Finance in MENA

(d) E-mobility in MENA

(e) Hydrogen in MENA: an infant, but rapidly developing market

(f) Energy Efficiency in MENA

(g) Green post-Covid19 transformation presents a major diversification opportunity for MENA; How can MENA grow & develop its Clean Energy market?

"Climate goals: a priority for business growth", article for DWTC, Mar 2021

The article titled "Climate goals: a priority for business growth" was written for the Dubai World Trade Centre, and published on 7th March 2021.

Climate goals: a priority for business growth

Reducing carbon emissions presents significant commercial opportunities for businesses across the Middle East. Dr Nasser H Saidi, chair of the MENA Clean Energy Business Council explores the future wins for companies ready to go green

Last year, atmospheric carbon dioxide hit record levels, according to data from the National Oceanic and Atmospheric Administration (NOAA) and Scripps Institution of Oceanography in the US. Even with a global lockdown and drop in emissions, 2020 was still the second-hottest year on record, just 0.02°C behind record 2016 temperatures and 0.98°C above the 20th-century average. The World Meteorological Organization (WMO) also revealed 2011-2020 to be the warmest decade on record.

It is clear that we are heading towards further temperature increases. As a result, the amount of methane is rising rapidly, exacerbated by melting polar ice caps, with Arctic sea ice alone declining at a rate of almost 13 per cent per decade, as estimated by the World Wildlife Fund. A consequence of this is rising sea levels, and in the MENA region this presents a challenge for many coastal cities.

Almost 90 per cent of our water is imported and, according to NASA, the region has been subject to an almost continuous drought since 1998. Here, in the GCC, we've also been rapidly depleting aquifer water which was historically used to

establish agricultural self-sufficiency. Saudi Arabia, for example, has exhausted 40 per cent of aquifer water that had been accumulated over millennia, in just 15 years.

Challenges offset by opportunity

There are several positives, however, as green economies and green technology also bring significant opportunity, especially for the region's business community. The impact of Covid-19 caused many companies to pause sustainability efforts, but with global policymakers pushing for a more sustainable post-pandemic economic recovery, it's time to get back on track.

In essence, we need to move away from 50 years of highly energy intensive and fossil fuel-dependent activity and transition to renewable energy and associated technologies, led by the private sector in partnership with the public sector and local communities.

There are numerous ways that MENA-based companies can achieve this and increase profitability through emission reduction initiatives, beginning with greater energy efficiency. By analysing energy use, companies can determine how best to reduce energy consumption, which in turn means a reduction in operating costs.

The next step is to invest in renewable energy, whether it's solar, wind or another geothermal solution, with the longer-term benefit being lower maintenance costs throughout the equipment lifecycle. There's also a third benefit: lower health costs, with the replacement of fossil fuels reducing pollution.

From a technology perspective, over time the adoption of new technologies presents an opportunity to enter the green economy and gain a foothold through the development of new products and business streams. If we consider water shortages and regional reliance on desalination, for example, renewable energy has a vital role to play. An electricity-generating solar plant can also be used for desalination, so the MENA countries are well placed to become global leaders in desalination technology, which could then be exported

globally.

Driving profitability through local production

Another regional advantage – and opportunity – is in the monetisation of our high levels of solar irradiation. Solar-generated electricity could be line exported through Egypt, or other countries, to Europe; and you could also establish power lines into India and Pakistan. As well as a commercial opportunity, this would also have a positive impact on pollution levels and companies would actively reduce their carbon footprint. Companies that develop a comparative advantage in renewable energy could take it a step further, by establishing a global export business for locally produced solar technologies.

The UAE and Saudi Arabia are at the forefront of renewable technology, with a number of companies already developing and installing solar technology, and the establishment of solar plants including Noor Abu Dhabi and the Mohammad bin Rashid Al Maktoum Solar Park, which give us access to the cheapest solar power in the world.

There is a need to accelerate investment and, in addition to the removal of fossil fuel subsidies to put prices on a global par, in my opinion the best way to do this would be to impose a carbon tax. If the carbon tax was set somewhere between US$50-70 per ton[1], this would effectively raise more funds than currently yielded from VAT in Saudi and the UAE. If we then channelled carbon tax income and fossil fuel subsidies savings into renewable energy investment in the green economy, this could also help the private sector to make the switch, adopt clean technologies and transform transportation, the built environment and many other areas.

In time, this will also become part of foreign policy. The UAE, for example, is recognised for its foreign aid contribution; and part of that contribution could be renewable energy and technology based, targeted at poorer countries. So, instead of financial support, aid would be in the form of UAE-produced renewable energy and clean technology installations.

Unlocking capital through climate goal commitment

Sustainable finance is one area to watch as central banks, financial institutions and capital markets increasingly look to move away from financing and investing in fossil fuel assets. Norway's sovereign wealth fund is divesting away from fossil fuel assets and is an excellent example of this developing trend. The trend will only accelerate as central banks, followed by financial institutions and capital markets, also introduce climate risk in asset and loan pricing. The upshot is that the cost of finance and capital will become more expensive for heavily energy or fossil fuel intensive companies.

Companies already pursuing sustainable operations will have a lower cost of credit plus easier and less costly access to capital markets. This means that the cost of credit and cost of capital through equity markets, or bond and sukuk markets, will decrease over time and encourage sustainable investment and climate risk mitigation technologies.

The green sukuk market is set to grow rapidly in the next few years with a recent S&P Global Ratings report noting that US$65 billion in sukuk bonds are set to mature this year, part of which is expected to be refinanced on the sukuk market. S&P estimates that total sukuk issuance will tally between US$140-155 billion in 2021, up from US$139.8 billion in 2020. In January 2021, First Abu Dhabi Bank, which is the country's largest lender, raised just over US$292 million through its sixth green bond issuance. The Saudi Electricity Company (SEC) similarly raised US$1.3 billion in the region's first dual-tranche green sukuk in 2020.

It's here that governments are key. As they start to issue more green bonds and sukuk they set a benchmark for the private sector to do the same. So, to tie all the financing elements together, first, governments issue the bonds and, second, the capital markets set standards for green debt and equity, with the added responsibility (along with regulatory authorities) of monitoring potential green washing.

Plan of action

The opportunities are clearly there, but companies need a focused plan of action to take the sustainability agenda forward. First, they need to make sustainability part of company culture. They need to evaluate their operations, review their energy efficiency, analyse their carbon footprint and consider their role in pollution and environmental management. Then, they can integrate it into company culture.

In addition to sustainability awareness, this approach can also impact sustainable product development. For example, a company producing hugely polluting air conditioners could look into how it can reduce the amount of electricity its products require per unit of output.

Second, companies should consider R&D investments. What are they investing in to improve their products and business? And, third, companies should look at their engagement with the public sector. What does a particular country have in place in terms of a climate action plan? What role does a company's industry sector play? What is the company's role in that? For example, if a company is in the transport sector, it has a major part to play in the transition to electric vehicles and developing the transportation infrastructure for e-mobility.

Actions can hit roadblocks around the issue of incentives. A major short-term disincentive is a company's quarterly or annual profitability goals, when the benefits of addressing climate change comes with a medium to long-term outlook and risk profile.

We have to remember that when I, as an individual or a company, pollute, I don't pay the cost, everybody pays the cost. There is an externality to my actions which I do not pay for. So, the question is, how do you internalise those costs? This is where the issue of carbon pricing and the carbon tax is so important, because until we have these actions in place, businesses have zero incentive to address their own climate risk profile.

This goes hand in hand with the need to achieve greater energy efficiency across the board. The GCC countries use twice as

much energy per unit of GDP, on average, as the OECD countries. Thankfully, Dubai Electricity & Water Authority and Abu Dhabi Water & Electricity Authority now provide detailed individual usage reports. We can use this type of digital information to increase awareness and price accordingly.
For the business community to meet strategic or mandated climate change goals it all starts with regional government and a national climate action plan with a clear strategy and rollout. Once this is in place then you know where you fit in as a business or individual and what you can do to drive profitability and support climate change goals. The bottom line is that we must act collectively and in a concerted manner to address and mitigate the existential threat of climate change.

[1] *A carbon tax of $40 per ton would add about 36 cents to the price of a gallon of gasoline for example.*

Interview with Energy & Utilities on the impact of Covid19 on renewable energy, 9 Jul 2020

Dr. Nasser Saidi, Chairman of the Clean Energy Business Council speaks to Middle East Energy's "Energy & Utilities" about the impact of COVID-19 and low oil prices on the renewable energy programmes.

"Clean Energy in MENA: Industry & Workforce Readiness", CEBC report launch, 23 Apr 2019

The Clean Energy Business Council (CEBC) launched a survey-based report titled "Clean Energy in MENA: Industry & Workforce Readiness" on 23rd Apr, 2019, at the Capital Club in Dubai.
To download the report, please access the CEBC webpage – here
To download the presentation, which discusses the climate change-related challenges facing the MENA region as well as the results of the CEBC survey, please click here.

The future of energy: innovation, technology and geopolitics, Panel discussion at Aspen Institute Italia, 3 Jul 2018

Dr. Nasser Saidi participated as a panelist at the Aspen Institute Italia event titled "Il futuro dell'energia: innovazione, tecnologia, geopolitica" (The future of energy: innovation, technology and geopolitics) on 3rd July 2018.
Innovation in the field of energy takes place at various levels simultaneously, resulting in a truly "disruptive"

combination: new digital technologies (with the growing role of artificial intelligence and blockchains); "smart grids" that permit an improved and increasingly steady coordination between supply and demand; greater storage capacity (batteries of varying sizes) that will make it possible to overcome the problem of discontinuity among renewable fonts; the availability of low-cost abundant, clean energy (low environmental impact) for people and businesses. With the push toward digital technology generating more rapid transformations, it is not easy to accurately predict the timeframes and means of future efforts; but the direction is quite clear, as is its influence on the daily life of anyone who is going to be using electrical power – i.e. an unprecedented number of persons.
More: http://www.aspeninstitute.it/en/programs/future-energy-innovation-technology-and-geopolitics

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Exploring the impact of blockchain in the energy industry, 30 Jan 2018

This presentation titled "Exploring the impact of blockchain in the energy industry" was delivered as part of a webinar organised by ATA Insights and the Clean Energy Business Council (CEBC), which explored the capabilities of blockchain, its disruptive potential and future applications.
In his presentation, Dr. Nasser Saidi, explores the concept of Blockchain and its applications before focusing on how the technology can be applied in energy systems. Identifying the legal and regulatory issues, Dr. Saidi also highlights existing blockchain regulations across the globe. Blockchain

adoption in its infancy in MENA, but UAE stands at forefront. View the video below for more insights:

Comments on the Abu Dhabi Sustainability Week event in the Arab Weekly, 4 Feb 2018

The below article titled "**Abu Dhabi Sustainability Week: Gulf region eyes future in green economy**" was published in the Arab Weekly on 4th Feb 2018, and can be directly accessed here. Comments are highlighted in the article posted below.

Abu Dhabi Sustainability Week: Gulf region eyes future in green economy

In what is likely to be a blueprint for desert regions across the globe, Abu Dhabi unveiled the world's largest man-made desalinated water reserve in the desert at Abu Dhabi Sustainability Week.

The event brought the world's sustainability community together to learn about the major social, economic and environmental trends shaping global development. It took place with the overarching theme of "Driving the Global Energy Transformation." Three core topics were the focus of discussions: climate change and resource scarcity, sustainable cities and urbanisation and technology disruption and digitisation.

The United Arab Emirates was seen as vigorously pursuing the objectives of its Vision 2021, placing a sharp focus on

improving the country's environmental performance and promoting sustainable initiatives as part of the transition to a low-carbon economy. Among the projects is a reserve of high-quality desalinated water, which is contained in a network of 315 recovery wells below the Liwa Desert. The system has an infiltration and recovery system sitting atop a natural fresh water underground aquifer. The desalinated water is piped from the coast to create the secure reserve system.

Saudi Arabia also announced it was pushing ahead with renewable energy projects, which will include wind, solar and geothermal projects. It plans to invest up to $50 billion in the efforts over the next five years.

Saeed al-Abbar, chairman of Dubai-based Emirates Green Building Council (EmiratesGBC), stressed the industry's "clear shift of focus to a growing market of renewables and energy and water retrofits."

"The various stakeholders displayed new and innovative business approaches to encourage the adoption of renewable and energy efficient technologies, which ultimately provides financial benefits as well as furthers the sustainability agenda," al-Abbar said.

"It was also very encouraging to witness the launch of new pavilions, such as the 'Water and Energy Storage and Batteries,' which demonstrate a more holistic approach to sustainability. This is an indicator that the industry has matured and is better equipped for a fast-changing future in energy conservation," he added.

Al-Abbar said the 2018 World Future Energy Summit is evidence that the market is increasingly aware of the available technologies and the importance of establishing them as a standard in various sectors. "The next step would be to develop strong frameworks and policies to accelerate their implementation," al-Abbar said.

On the Gulf and the rest of the Middle East preparing for a decarbonised future economy, al-Abbar said: "On a strategic level, the region needs to act fast – energy consumption is high, and our natural resources are being depleted. We need to

focus on decarbonising the built environment, a major source of emissions in the region. In this regard, EmiratesGBC has set a key objective for 2018 of creating a Centre of Excellence for net-zero energy buildings."

"This year we see emphasis given to sustainability in buildings and the growing market of ESCOs (energy service companies) in the GCC region," said Nasser Saidi, chairman of the Clean Energy Business Council. "Buildings consume around 60% of the electrical generation in the [Gulf Cooperation Council] GCC and represent a growing demand in residential and commercial areas and it's a topic of strong interest from utilities and municipalities alike."

He noted that another new area of focus this year was electrical vehicles with manufacturers exhibiting current production models as well as future ones.

"We also saw announcements made by regulators and government officials through their country pavilions, which provided timely and insightful information to developers and the private sector on the status of solar markets across the GCC," Saidi said.

He said the Middle East, as well as GCC countries, are developing their strategies and mandates around combating climate change and reducing their carbon footprint across the primary energy usage sectors such as power generation and transportation.

Saidi said it was encouraging to see initiatives to address climate change in the GCC. He pointed to Abu Dhabi-based Masdar presentation at Paris climate change conference for reducing the carbon footprint of the growing sector of seawater desalination.

"I think the GCC is playing a role which is expected to take on more momentum and energy in the next couple of years. It is assuming a leadership role in large-scale solar PV [photovoltaic] utility power plants, which has achieved a [gigawatt] scale and ground-breaking tariffs, enabling a significant growth of clean energy in the power-generation mix of utilities across the GCC," Saidi said.

Given the severe risks of climate change in the Middle East, particularly in desert areas, it is important that GCC countries deal with the effects of changing environmental conditions.
"Climate change risk must be part of the analytical and policy assessment of all infrastructure and development projects. The UAE can be the champion of this innovation," Saidi said.

Making it "clean": a rapidly changing global mix, article in Aspenia Issue n. 76, May 2017

The article titled "Making it clean: a rapidly changing global mix" was published in Aspenia Issue n. 76, May 2017, which can be accessed here.

The world is in for an energy revolution. Technological innovation and fear of climate change are sparking investment in clean energy solutions. A massive shift is taking place, away from fossil fuels to renewable sources, yet more still needs to be done to curb **global warming.**

Over the next few decades, the world will witness an energy transformation and revolution. New energy investment will be largely directed at renewables (solar, wind, hydro, and geothermal), where between 2017 and 2040 some 7.8 trillion dollars are forecast to be invested, compared to just 3.2 trillion in fossil fuels and nuclear. This will represent a massive shift, as nearly 60% of the world's power will be created through zero-emission methods. Nevertheless, if there

is to be any hope to keep global warming below a 3°C trajectory, another 5.3 trillion dollars will still need to be invested in energy efficiency, to help cut carbon emissions and transfer power sources over to renewable systems.[1]

Two driving forces – technological innovation and the fear of climate change – are leading the shift to renewables. Since 2009, the cost[2] of wind power has declined by 66%, while the cost of utility-scale solar power has declined by 85%, with a further 36% reduction expected by 2020. Along with even greater falls in the cost of energy storage, renewable energy is increasingly cost-competitive with conventional generation technologies. Onshore wind and solar will be the cheapest ways of producing electricity during the 2020s and, in most of the world, in the 2030s too. Other global disruptive technologies are also encouraging a move to renewable energy, including oil to gas switching. Electric vehicles will represent 35% of new light-duty vehicle sales by 2040, some 90 times the 2015 figure. The fourth industrial revolution – including robotics, nanotech, 3D and 4D printing – will radically reduce the energy-to-GDP ratio, increasing energy efficiency across all human activities and energy uses.

The second factor favouring renewables is the ongoing Anthropocene age and the deadly threat of climate change to our only habitat. We face the potential extinction of humans and other animals. The COP21 and COP22 summits underscored the shared global consensus on the environmental, political, social and economic dangers posed by global warming. However, these government policy commitments and strategies require international, regional and national cooperation between governments, business, civil society, non-profit and non-governmental organizations, and households. While Donald Trump's stance on climate change and his eviscerating "vision" for the American Environmental Protection Agency is likely to make the path towards clean energy more difficult, it also offers emerging giants like China and India the opportunity to

take the lead in showcasing their commitments towards clean energy and decarbonization. The launch, last year, of a one billion dollar clean energy investment fund – Breakthrough Energy Ventures, by Bill Gates, Jack Ma, Ambani and others as investors – promises the implementation of innovative alternative energy technologies through support of research and development.

THE MENA REGION'S TRANSFORMATION. The Middle East and North Africa (MENA) region is highly vulnerable to the risks of climate change due to water scarcity, growing desertification, concentration of economic activities in coastal areas and a reliance on climate- sensitive agriculture. The region is also facing a demographic challenge. Currently home to close to 390 million people, the MENA population is expected to rise to approximately 500 million by 2100. The young (60% under thirty) and fast-growing population, rapid urbanization (about 3% per annum), and economic growth are all putting pressure on existing infrastructure and leading to rapidly growing domestic energy demand. Besides being rich in natural resources,[3] the MENA region is also "renewable energy rich", with some of the highest solar irradiation on earth. More solar power falls on the world's deserts in six hours than is consumed in energy everywhere in a year. The region has a natural comparative advantage here.

Planned MENA investments in the energy sector are an estimated 622 billion dollars over the next five years. Given current pricing policies, MENA power capacity alone will need to expand at an average annual pace of 8% between 2016 and 2020. This corresponds to an additional capacity of 147GW and accounts for the largest share of investments (207 billion), while projects under study represent by far the largest portion of planned investments (282 billion).

The Gulf Cooperation Council (GCC) will require 85 billion dollars to add 69GW of generating capacity by 2020. The GCC has already committed 174 billion in investments, more than

50% of the MENA total. By increasing the share of renewables in power production, oil producers can free crude oil and natural gas for export markets. Increasing the use of renewable energy would also help reduce the GCC countries' large carbon footprint: per capita emissions and ambient air pollution there are among the highest globally.

The United Arab Emirates (UAE), for example, holds around 6% of global crude reserves, and plans to spend 164 billion dollars on renewable energy by the middle of the century. Dubai has launched a solar PV project at 2.91c/kwh and announced the completion of a 200MW power plant (that will produce enough electricity for 50,000 homes) one month ahead of schedule, as part of a plan to build the world's largest solar energy park by 2030.

SUPPLYING THE PEOPLE. MENA countries aim to rapidly adopt renewable energy (wind and solar) over the coming decades.[4] The cases of the lower-income, densely-populated countries of Egypt and Morocco are particularly notable.

The growth of distributed renewable energy has implications for economic development and access to energy. An estimated 21.3 million people in the MENA region still lack electricity, and close to 8 million people rely on traditional biomass for all of their energy needs. The rise of distributed, off-national grid, renewable power means remote and rural areas can have access to energy.

The introduction and diffusion of renewable energy systems would increase productivity, stimulate economic development and improve quality of life by modernizing rural electrification and networks. It would also free women from the back-breaking, time-consuming job of getting water and fuel for the household. Local renewable energy systems free up time for education and skill acquisition as well as enabling access to the internet and the digital economy. They improve access to services, including health and financial services.

In addition, the operation, management, and maintenance of renewable installations can create sustainable, local jobs. The bottom line is that renewable energy can be a major contributor to economic development and poverty reduction.

THE FOUR PILLARS OF DECARBONIZATION. According to IRENA, the GCC region can cut its annual water use by 16%, save 400 million barrels of oil, create close to 210,000 jobs and reduce its per capita carbon footprint by 8% in 2030 – all by achieving the renewable energy targets that national and sub-national governments have already announced. The decarbonization strategies and objectives require deep partnership with the private sector, and should be built on four pillars.

Pillar one concerns removing fossil fuel, water, electricity and related subsidies,[5] so that the pricing of such resources and services reflects true economic costs and accounts for externalities. This would remove a major burden from government budgets, improve energy efficiency in all sectors and generate substantial environmental and health benefits.

Pillar two of decarbonization strategies regards the legal and regulatory frameworks to support the implementation of measures to alleviate the consequences of climate change. Institutional frameworks are important because they imply broad political commitment and support policies and investments. None of the GCC countries have yet drafted climate change framework legislation to serve as a comprehensive, unifying basis for climate change policy.[6] However, the UAE recently established Climate Change and Environment Ministries, which is a significant pioneering step in the right direction.

Pillar three is the imposition of carbon taxes based on emissions generated from burning fuels, rather than emissions trading schemes, which have failed to achieve their stated

objectives. Businesses and households respond to price as well as non-price incentives and “nudges”. Introducing carbon taxes would shift the energy mix towards renewables, reduce fuel consumption, increase fuel efficiency and sharply reduce the carbon emissions that are driving global warming. For the GCC countries, which are energy wasteful, the institution of a carbon tax would also generate substantial revenues for governments, increase energy efficiency and drive decarbonization strategies. Carbon taxes could raise multiple times the revenue projected from the proposed introduction of VAT and other tax proposals in 2018.

The fourth pillar is decarbonization finance. COP21 and COP22 commitments can unleash more than 16 trillion dollars of investments in renewable energies and clean technologies. Governments need to set up climate funds – which can be self-financing, thanks to the proceeds of carbon taxes – for investment in renewables and clean technology infrastructure; they also need to facilitate the financing of renewables r&d and investment through financial markets. For businesses and entrepreneurs, the green and clean economy presents an unprecedented opportunity for innovation and productivity growth enhancing investments, all while reducing energy costs. The important policy lesson is that there is no trade-off between the objectives of economic growth and decarbonized economies.

OPPORTUNITIES FOR AND LINKS WITH EUROPE. The MENA region’s renewable energy transformation presents a unique opportunity for business partnerships with Europe, apart from official cooperation. In Morocco, for example, a partnership between the government and the private sector is building what will be the largest solar plant in the world. Located in the desert outside Ouarzazate, the 3.9 billion dollar plant will produce enough electricity to power more than a million homes when it is completed in 2018. In Jordan, private firms have already

built twelve solar plants and are in the process of building at least seven more, the largest collection of privately-owned power plants in the region. In 2016, a number of large-scale PV projects commenced in Saudi Arabia, Kuwait, Jordan and the UAE, all of which are open to private sector participation. The region currently has 885MW of solar power capacity in operation, 3,610MW under construction and 1,300MW under tender. Key announcements last year included Saudi Arabia's 30-50 billion dollar Renewable Energy Program, that started tendering 700MW of solar and wind energy projects in February.

Growing energy demand and the renewable energy transformation potential of North Africa and the GCC represent a major business opportunity for European energy companies. The scope for partnership can and should encompass renewable energy joint ventures and public-private partnerships, joint research and development projects in solar technologies and investment in a North Africa-Europe energy corridor linking Morocco, Algeria and eventually Libya and Tunisia to Europe through Spain, France and Italy.

The electricity grid of Europe should be linked to North Africa and an integrated electricity market developed. This strategic vision is a feasible project and would diversify Europe's sources, thereby reducing its dependence on Russian gas. The International Energy Agency has estimated that the potential from concentrated solar power technology alone could amount to 100 times the electricity demand of North Africa, the Middle East and Europe combined.[7]

The renewable energy transformation of the MENA region presents a historical window of opportunity based on technological change and comparative advantage, requiring bilateral and multilateral agreements between the EU and the North African countries. Unlike previous efforts at economic integration (including the Barcelona Process), energy supply integration has a solid economic and financial case based on the power of technological change and comparative advantage.

The clean energy revolution can transform the economies of many struggling regions and can save us all from the dire consequences of climate change.

Endnotes

[1] "2017 Market Outlook," Bloomberg New Energy Finance.

[2] Refers to unsubsidized, levelized *cost of energy. See Lazard's Levelised Cost of Energy, version 10, 2016.*

[3] MENA contains 47.7% of the world's proven oil reserves, 42.7% of natural gas and other minerals.

[4] Selected MENA renewable energy targets: Saudi Arabia plans to install 3.5GW of renewables by 2020 (as part of Vision 2030); the UAE plans to derive 24% of its power from clean sources by 2021 and plans to increase its target for power generation from clean energy to 30% by 2030; Jordan's national strategy aims at raising the share of renewables in the energy mix to 10% by 2020, equivalent to a generating capacity of some 1500MW; Morocco has a renewable energy target of 52% by 2030; Egypt intends to supply 20% of generated electricity from renewable sources by 2022.

[5] The average estimated implicit cost of low energy prices for the GCC, based on 2016 prices, ranges from 0.8% of GDP for the UAE to over 7% for Kuwait. See the IMF Regional Economic Outlook from October 2016.

[6] See the LSE Global Climate Legislation Study, Grantham Institute, 2015.

[7] See the renewable energy blog at www.worldbank.org.

‘Solar energy will be as ubiquitous as a smartphone’: Interview for Vision.ae, Feb 2017

The article below first appeared on Vision.ae and can be accessed here.

The Chairman of the Clean Energy Business Council discusses the innovations that will enable UAE to achieve ambitious clean energy targets by 2050

Clean energy – often derided by cynical, short-termist politicians as an expensive luxury – deserves a bold visionary to trumpet how its natural resources such as sunlight, wind, water, biofuel and geothermal heat can stall climate change and save the world.

Dr. Nasser Saidi, the Chairman of the Clean Energy Business Council (CEBC) has plenty of plausible, expansive ideas that reject the usual hyperbolic rhetoric, and favours a far more pragmatic approach. Solar energy has the potential to be as fundamental as smartphones, he says. On-demand energy distribution could someday replace the outmoded grid model.

“Consider the rapid technological developments in the space of energy, especially renewables such as solar hydro, wind, for example,” says Dr. Saidi. “These advances have yielded major cost-saving implications, making clean energy an increasingly competitive alternative to fossil fuels. The day will come when solar energy is as ubiquitous as a smartphone.”

Of course, affordability is the key to unlocking mass-market support, and the former Chief Economist of the Dubai international Financial Centre (DIFC) believes it is price and not conscience that will be the motivating factor. “Consumer education campaigns have their merit, but at best they only

nudge people along. First and foremost, cost is a fundamental influencer of consumer behaviour", he says. "When the UAE government started reducing the petrol price subsidy, it automatically had a trickle effect on people's commuting and vehicle purchase decisions – price incentives for the population is the only sure-fire way to effect change. "The day will soon come when we adopt an on-demand energy distribution model. You won't need a grid anymore. The grid system is both expensive and laborious to design and maintain and involves some loss of energy in the course of distribution."

The UAE is determined to save every last precious drop of energy, and the numbers indicate how serious His Highness Sheikh Mohammed Bin Rashid Al Maktoum, the Vice President and Prime Minister of the UAE and Ruler of Dubai, is in launching the Dubai Clean Energy Strategy 2050. AED100bn for its Green Fund, AED50bn for phase two operations of the Mohammed bin Rashid Al Maktoum Solar Park – the largest single-site solar park in the world, and the DEWA Innovation Centre, which houses a group of research and development laboratories in the clean-energy arena, has also been awarded AED50bn for its forward-thinking work.

Sheikh Mohammed was unequivocal that the 2050 strategy will "provide 75 per cent of the emirate's energy through clean energy sources by 2050, reflecting our commitment to establish a sustainable model in energy conservation, which can be exported to the whole world, and support economic growth without damaging the environment and natural resources." His goal? "To become the city with the smallest carbon footprint in the world by 2050", he says.

The Minister of Energy Suhail Al Mazroui is certainly confident the plan is still on track, reiterating at the World Future Energy Summit (WFES) in Abu Dhabi in January that by 2050, 44 per cent of the country's installed power capacity will come from renewable energy, 6 per cent from nuclear energy, 38 per cent from green gas and 12 per cent from clean coal.

“It comes down to one thing”, says Dr. Saidi. “Leadership. The leaders of the UAE have shown great wisdom and foresight, thinking beyond mere electoral cycles and individual legacies and looking to build a nation that will sustain generations to come 50 years down the road”, he says.

Saidi, who held ministerial and leadership roles in his home country of Lebanon, has in recent years lent his expertise to game changing businesses poised to reshape entire sectors, including acting as Deputy Chairman to the Dubai-based Eureeca, a global equity crowd funding platform.

The CEBC, founded by Dr. Saidi during his tenure at DIFC, has played a pivotal role in forging a public-private partnership, together with institutional members such as Dow Chemical and GE, to shape and implement a new clean energy mandate. This approach has also most recently been mirrored by an UN-backed, Dubai organisation, the World Green Economy Organisation, to help private sector firms in the UAE go green, and emphasised by Al Mazroui’s comments at the WFES that all future investments for both renewable and conventional power plants will require about US190bn of investment from private investors.

This collective approach, says Dr. Saidi, is imperative if the UAE is to move towards not only 100 per cent clean energy adoption but to reduce net energy consumption overall. “We need a new legislative and urban framework to enable the private production of energy. Individual households should be able to easily and cheaply manufacture clean energy on-demand and also sell off unused energy units, a common practice in some countries in the West.”

Interview with Dubai TV (Arabic) on Renewable Energy, 9 January 2017

The Dubai TV interview discusses the move towards renewable energy, and what it means for the Middle East. What are the incentives, what are the barriers, what is the outlook for renewable energy are some of the discussion points in the interview

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Carbon tax can fund clean energy transition: Gulf News Oped, 4 Jan 2017

The original article, titled "Carbon tax can fund clean energy transition", was published in Gulf News on 4th January 2017, and can be accessed here.

Carbon tax can fund clean energy transition

Removing fossil fuel, water, electricity and related subsidies will improve energy efficiency and generate

substantial environmental and health benefits

Climate change is a deadly threat to our habitat, animals and people. Current annual emissions of greenhouse gases are about 50 billion tonnes of carbon-dioxide-equivalent, compared with about 41 billion tonnes in 2005. An Intergovernmental Panel on Climate Change report has warned that the world is on a path that could, if left unchecked, deliver a global average temperature rise of four degrees Celsius or more by the end of the century – a condition that has not existed on Earth for millions of years! We are in the Anthropocene Age.

COP21 was quickly ratified, in 11 months, versus eight years of the Kyoto protocol, underscoring the shared global consensus on the social and economic dangers posed by global warming. However, the COP21 government commitments and strategies require international, regional and national cooperation between governments, businesses, civil society, organisations and households. While United States President-elect Donald Trump's stance on climate change (and his nominee for the Environmental Protection Agency) is likely to make the path towards clean energy more difficult, it also offers emerging giants like China and India the opportunity to take the lead in showcasing their commitments towards green energy and lower carbon emissions.

The recent launch of a $1 billion (Dh3.67 billion) clean energy investment fund – Breakthrough Energy Ventures – with Bill Gates of Microsoft; Jack Ma, founder of the Alibaba Group; Mukesh Ambani, chairman and managing director of Reliance Industries; and others as investors, promises implementation of innovative technologies through the support of research and development. This should challenge and inspire investors, governments and entrepreneurs based in the Gulf Cooperation Council (GCC).

The GCC and other countries from the region have committed to renewable energy initiatives – be they the UAE's target to

generate 24 per cent of its electricity from clean energy sources by 2021, or Morocco's renewable energy target of 52 per cent by 2030. These ambitious objectives need implementation through decarbonisation strategies and objectives that require deep partnership with the private sector. I will bring the perspective of the Clean Energy Business Council on these strategies at the Abu Dhabi Sustainability Week (ADSW).

Pillar one starts with removing fossil fuel, water, electricity and related subsidies, so that the pricing of such resources and services reflects true economic costs and account for externalities. This would improve energy efficiency in all sectors and generate substantial environmental and health benefits.

Pillar two is the imposition of carbon taxes, rather than emissions trading schemes. Businesses and households respond to price as well as non-price incentives and 'nudges'. Carbon taxes are taxes based on emissions generated from burning fuels. Introducing carbon taxes would shift the energy mix towards renewables, reduce fuel consumption, increase fuel efficiency and sharply reduce the carbon emissions that are driving global warming. A carbon tax creates incentives for energy consumers (both businesses and households) to use cleaner fuels and adopt new clean technologies, thereby reducing the amount they pay in carbon tax. For businesses, investors, entrepreneurs and researchers, carbon taxes would encourage investment and research and development in renewables and clean-tech.

For the GCC, the institution of a carbon tax would also generate substantial revenues for governments, increase energy efficiency and drive decarbonisation strategies. Revenues could range from as low as US$11 billion in Kuwait to as high as $80 billion (Dh294.24 billion) in Saudi Arabia (depending on the tax, consumption, demand elasticity and current price of gasoline). In essence, carbon taxes could raise

substantially more revenue than current value added tax proposals.

Pillar three of decarbonisation strategies is overarching climate change legal and regulatory frameworks to support implementation. Institutional frameworks are important because they imply wide-based political commitment and support of climate change policies and investments. None of the countries of our region have established such legislation. The GCC can lead by enacting Climate Change Framework Legislation (laws or regulations with equivalent status) serving as a comprehensive, unifying basis for climate change policy. In this regard, the establishment of Climate Change Ministries (e.g. in the UAE) is a step in the right direction.

The fourth pillar is decarbonisation finance. COP21 commitments will unleash more than $16 trillion of investments in renewable energies and clean technologies. Governments need to set up climate funds – using the proceeds of carbon taxes – for renewables and clean-tech infrastructure and facilitate the financing of renewables R&D and investment through financial markets. For businesses and entrepreneurs, the green and clean economy presents an unprecedented opportunity for innovation, productivity-growth-enhancing investments, along with lower energy costs impacting all activities. There is no trade-off between economic growth and decarbonised economies.

Young people drive MENA's

transition towards clean energy future, today!: Interview with Solar PV.TV, Dec 2016

In this video interview, Dr. Saidi shares with SolarPV.TV his opinion that young people drive MENA's transition towards clean energy future, today! He also introduces the Clean Energy Business Council's major achievements to date and their plans in short & long term perspective.

The Role of Solar in Combating Climate Change & How to Deploy this in MENA, Opening keynote at CEBC 5th Annual MENA Forum, 14 Dec 2016

The presentation titled "The Role of Solar in Combating Climate Change & How to Deploy this in MENA", was delivered at the Clean Energy Business Council's (CEBC) 5th Annual MENA Forum, held in Dubai on Dec 14, 2016.
Next year will be critical to the long-term success of the energy diversification strategies across the Middle East, as

we close in on the 2020 milestone. What we see from markets such as Saudi Arabia in particular during the early part of 2017 will be a key indicator of renewed momentum – beyond 2017 – leading a major shift in the regional dynamic for renewables for the next decade and beyond.
The presentation discussed results from the COP21 and COP22, while also highlighting how MENA continues to rank poorly in the Climate Change Performance Index. Renewable energy commitments in the MENA were outlined, and the increasing momentum for solar and wind were underscored. Solar is MENA's road to decarbonisation; but, implementation of a carbon tax could generate substantial revenue, increase energy efficiency and drive decarbonisation strategies.

Panel Discussion on Renewable Energy at UNEP FI Global Roundtable, 26 Oct 2016

The panel discussion was one of the sessions at the UNEP FI Global Roundtable held in Dubai towards end-Oct, 2016. The session titled Innovative Tools for Sustainable Finance: Renewable Energy focuses on innovation – what is new and relevant to financial institutions, what are the new market and investment opportunities? What are new financing models?

TV Interview with Sky News Arabia on Clean Energy, 5 July 2016

The Sky News Arabia TV interview with Dr. Saidi was aired on 5th July 2016 as part of the program Alam Al Taqa. It can be viewed here (begins 13 minutes into the video), and covers a wide range of topics related to clean energy: associated investments, technology costs, legal and regulatory framework, as well as the challenges and opportunities in the MENA region.

UAE can own the clean energy finance space: Interview with SolarPV.TV

In this video interview, Dr. Saidi shares with SolarPV.TV his opinion that the UAE can "own the Clean Energy finance space". He also introduces the Clean Energy Business Council's major achievements to date and their plans in short & long term perspective.

GCC Clean Energy: Challenges & Way Forward, Presentation at the EU GCC Clean Energy Network II

The presentation titled "GCC Clean Energy: Challenges & Way Forward", was delivered at the 1st consultation workshop held by the EU GCC Clean Energy Network II (CENII) in Dubai on 24th May 2016.
It covers the three major clean energy challenges faced by the GCC – water,energy efficiency and subsidies, before delving into the reforms needed for GCC's path towards decarbonsiation. Elaborating also on the EU-GCC cooperation, the presentation concludes with an overview of the Clean Energy Business Council (CEBC) and its activities.

New Oil Normal and the Impact on Renewables: Global Lessons Learned, CEBC Conference, May 2016

The presentation titled "New Oil Normal and the Impact on Renewables: Global Lessons Learned" was delivered at the Clean Energy Business Council's "Project Financing Renewables & Clean Energy MENA 2016" event, held in Dubai on May 3, 2016.

Gulf region needs to go full tilt at renewables: Gulf News op-ed, 15 Dec 2015

This article was published in the print edition of Gulf News dated 15 Dec 2015 and is available online here.

Gulf region needs to go full tilt at renewables

Even as governments seize on its importance, the private sector needs to make a move

This has been a year of agony and ecstasy for the energy industry. The global oil glut has captured most of the headlines, but oil's economic gloom has been driving a future energy investment dialogue that promises to shape new energy markets and regional economies.

In many ways it has been a tipping point for the future of renewables in the Middle East and North Africa, and a catalyst for accelerated clean energy development. The oil market adjustments have been jarring, and may well be prolonged.

The new supply driven oil market has sent oil's value into a free-fall that is predicted to result in a $287 billion (Dh1.05 trillion) loss in oil exports or about 21 per cent of the combined GDP for GCC suppliers. The turmoil has sparked discussions over fiscal reform, aimed at aligning the real cost of energy production with the price paid for energy usage – removing subsidies and lowering the burden on state budgets while identifying new sources of energy supply such as renewables.

What policy reforms also do (such as UAE's deregulation of

fuel prices) is positively impact consumption habits and therefore the environment. At a time when climate is high on the political and social agenda, policies that modify wasteful domestic habits cannot be overlooked.

The UAE has been steadfast in its commitment to the climate. In October, it submitted its Intended Nationally Determined Contribution (INDC) to the UN that set a target of increasing clean energy contribution to the total energy mix from 0.2 per cent in 2014, to 24 per cent by 2021. This was against the backdrop of a recent study by the Massachusetts Institute of Technology that warned of regional catastrophe and 'heatwaves beyond the limit of human survival' in the GCC by 2070 should global warming continue unabated.

It was another shot in the arm for the clean energy industry, but its importance to the long term stability of the environment has never been in question. Now, renewable energy is more than just the answer to climate change. What has changed over the last 12 months is that the economics of new energy in many parts of the region represent a cost competitive source of new power supply.

And that has been the true driver of action among the investment and business communities in the region.

So much so, the declining cost of solar technology is making the region's enduring resource – sunshine – a commercially viable commodity, and a cost-efficient source of new power generation. Solar PV will be at grid parity in 80 per cent of countries in the next two years and it is already the cheapest form of new power generation in UAE according to IRENA.

The opportunity must be grasped while the momentum exists in the knowledge that there is no trade-off between decarbonisation and economic growth.

This year started with a deal that saw Acwa Power and TSK secure a contract to develop a 100 Megawatt (Mw) solar project at the Al Maktoum Solar Park, at a record low cost of $5.98 per MWh, the cheapest solar in the world. That deal changed the perceived view of solar energy as an expensive socially responsible activity, to now being the smart long-term

economic decision for governments in desperate need to secure energy supply as demand grows while liberating hydrocarbons for global markets and reducing emissions.

What has followed has been a year of investment pledges and technology commitments. In February ADNOC confirmed its groundbreaking Carbon Capture, Usage and Storage project remained on track. Later that month, the UAE made a commitment to invest $35 billion to diversify its energy sources and reduce its dependence on natural gas imports for power generation.

More recently the Dubai leadership pledged Dh100 billion ($27.2 billion) to a Green Fund that will provide easy loans for investors in the field and ignite a wave of new investment activity. At the same time, the Dewa Innovation Centre was inaugurated, designed to incubate laboratories in the field of clean energy with a total investment of Dh500 million ($130.7 million).

Another way for the GCC to transform energy investment while reducing fuel consumption and diversify revenue is to introduce a carbon tax. It is usually defined as a tax based on GHG emissions generated from burning fuels; this would increase fuel efficiency and sharply reduce the carbon emissions that are driving global warming.

A carbon tax creates incentives for energy consumers to use cleaner fuels and adopt new clean technologies, thereby reducing the amount they pay in carbon tax.

All are promising developments, but what has been missing are the necessary policy reforms that would support a greater share of participation from the private sector in the GCC, a region with pledged renewable energy targets of more than 100GW by 2030. Morocco and Egypt are both firmly on the global hotlist for renewable energy activity among the private sector, thanks to attractive regulatory policy changes that have sparked a flurry of new projects. The Gulf countries must follow that lead to positively move the dial on grid-connected renewables in the next five years.

It is connecting those parallel worlds of regional policy,

finance and business that our recent Clean Energy Forum debate in Dubai facilitated. Now, more than ever the economic and political communities must join the dots to successfully scale up the pace of renewable energy deployment.
The environment has been counting on it for some time. Now, our economies need it too.

Opening address at CEBC's Annual Event, 8 Dec 2015

The below speech was delivered as the opening address at the Clean Energy Business Council's annual event held in Dubai on 8th Dec 2015.

Good Morning, ladies and gentlemen, or Alsalamu aleikoum as we say in this part of the world. Welcome to the CEBC's 2015 Annual Event.

We are meeting at a historic moment in time. Global leaders have gathered in Paris to address the imminent threat climate change poses and attempt to finalize an international agreement to limit global warming and adapt to its impacts. Managing climate change is the central challenge facing humanity. But will we take action now or procrastinate as is characteristic of human nature?

Climate change is causing a dramatic shift in the earth's ecosystems and food supply chains. Droughts are escalating, oceans are warming and acidifying, temperatures are increasing and ice-sheets are melting at alarming and unparalleled rates. We have entered the 'Anthropocene age' where humans are systematically destroying their environment, their livelihood, their home and their planet. What is unknown is the extent of

destruction and damage that will impact the planet if this is left unchecked.

The recent Intergovernmental Panel on Climate Change Report predicts a global average temperature rise of 4° C or more by the end of this century. Temperature increases of this magnitude have not been seen for tens of millions of years. Too much or too little water has the potential of causing severe and sustained conflict that could result in the migration of hundreds of millions of people, and decimation of animal, plant life and habitat.

Much of the developed world have already made some commitment to reduce their carbon emissions. The EU aims to lower emissions from a 1990 baseline by at least 40% by 2030. The US has pledged a reduction in its GHG emissions by 26-28% below its 2005 levels. China, a leader in renewable energy investment has set a target of reducing its CO2 emissions per unit of GDP by 60-65% on 2005 levels by 2030. But to achieve these targets robust policy and regulation needs to be developed, and implemented locally.

Closer to home, the UAE announced plans to increase its low-carbon energy contribution to the overall energy mix from 0.2% in 2014 to 24% in 2021 by implementing energy efficiency measures, feed-in tariff reforms and demand-side management initiatives. Last month, the government unveiled the *Dubai Clean Energy Strategy 2050* which will see 7% of the emirate's energy come from clean energy sources by 2020, increasing to 25% by 2030, with a target of 75% by 2050. Plans also include the establishment of a Dh100 billion Dubai Green Fund as well as the DEWA Innovation Centre, which will house research and development laboratories in the field of clean energy with an estimated investment of 500 million dirhams.

Many other Middle East and North African countries are following suit with ambitious renewable energy programs underway including Morocco, Egypt, Kuwait, Jordan, Qatar,

Saudi Arabia, Oman, Turkey, Bahrain, Iran and others.

Recent innovation and technological change imply that there is no trade-off between decarbonisation and economic growth. The transition to the *new climate economy* presents significant opportunities for growth inducing investment, job creation, new innovations, productivity growth and entrepreneurship, and the development of clean and renewable energy financing such as Green Bonds and Sukuk that will create a new asset class. The appetite is definitely there: green bond issues to pay for low carbon energy projects reached $36.6bn in 2014, more than triple the previous year.

We at the CEBC have been working closely with the Dubai Supreme Council of Energy to implement a Green Sukuk. The UAE's open and developed international financial sector has the potential to become a global hub for renewable and clean energy financing.

The CEBC is incredibly excited about the future of clean energy in the MENA region as we see a major shift towards the adoption of renewables and clean-tech solutions, along with the necessary regulatory frameworks.

Job creation and human resources will play a key role in the new energy economy and its successful deployment. It is our view that the industry needs access to a wider pool of talented individuals. **CEBC's Women in Clean Energy** program, which will be launched later in the morning, aims to help address this gap and will provide practical steps to encourage more women into jobs in the renewable and clean energy sectors.

It is my great pleasure to be joined today by distinguished guests and regional government representatives who will share the latest developments and insights into their country's current activities, future plans and lessons learned. On behalf of the CEBC Board of Directors I would like to thank

all of our guest speakers and share our deep appreciation for our international guests towards their valuable contributions to today's discussions.

I would also like to thank our sponsors ENGIE, Adenium Energy Capital, Latham & Watkins, Unidaan, Concentrating Systems, and Fleishman Hillard for their generosity and support. As a not-for-profit organization, it is through sponsorship and funding from our members that we are able to deliver events such as this.

Let me end by quoting Christiana Figueres head of the UN Framework Convention on Climate Change, "never before has a responsibility been in the hands of so few". You are pioneers of a new age. I would like to encourage you to get more involved in CEBC's activities and networks. Please feel free to speak with any of our team during the day – we would be pleased to assist in any way.

Thank You.

Paris COP21, climate change and decarbonisation: Opinion piece in Gulf Business, Dec 2015

This article appeared in the print edition of Gulf Business, December 2015 and is also available at http://www.gulfbusiness.com/articles/world/paris-cop21-climate-change-and-decarbonisation/. Click here to download the print version.

We have entered the ‘Anthropocene age’ where humans are systematically destroying their environment, their livelihood, their home and their planet.

Past geological epochs were the result of external forces of nature or cosmic events. This time it is human action that is leading to calamitous climate change. An Intergovernmental Panel on Climate Change report has warned that the world is on a path that could, if left unchecked, deliver a global average temperature rise of 4°C or more by the end of the century.

A temperature increase of 4 or 5°C or more has not been seen for tens of millions of years (homo sapiens have been around for 250,000 years) and is likely to be enormously destructive. Too much or too little water has the potential to cause severe and sustained conflict and the migration of hundreds of millions. Not to mention, the decimation of animal and plant – life and habitat. Managing climate change is today the central challenge facing humanity. But will we take action now or procrastinate?

Some 200 global leaders are sched- uled to meet for the Paris Conference of the Parties 21, in an attempt to finalise an international agreement to limit global warming and adapt to its impacts. The proposed deal calls on countries to transparently report on greenhouse gas emissions and commit to ramp up climate action over the next few decades. Any agreement is unlikely to be legally binding. However, the ‘intended nationally determined contributions’ are what sets the Paris talks apart from past attempts at a global climate agreement in Kyoto in 1997 and the failed Copenhagen summit in 2009

The World Resources Institute states that the clean energy plans of Brazil, China, the European Union, India, Indonesia, Japan, Mexico and the United States – which together account for more than 65 per cent of the world’s primary energy demand – would more than double their annual clean energy supply by

2030. Yet commitments should include not just targets but also policies and measures, and local institutions, to implement them. Paris COP21 is a chance to build understanding not only of threats and risks but of the opportunities that lie in the transition to the low-carbon economy.

Where do the Gulf Cooperation Council nations stand on these issues?

GCC pollution levels and commitment to INDC

The GCC has some of the world's highest per capita consumption rates of fossil fuel energy and electricity. As a result, it has some of the highest CO2 emissions in per capita terms. Vehicular emissions are one of the main sources of air pollution in the GCC. It may not be well known but the United Arab Emirates tops the world for exposure to tiny air pollutants, accord- ing to the World Bank. The UAE's PM 2.5 level (which measures tiny airborne pollutants smaller than 2.5 microns) stood at 80 micrograms per cubic metre in a report this year. Much higher even than countries such as China (73 micrograms) and India (32 micrograms). Qatar stands second among the GCC nations, with its level at 69 micrograms and Saudi Arabia quite close at 62.

Earlier in November, Saudi Arabia submitted its intended nationally determined contribution, revealing its aim to slash its emissions by up to 130 million tonnes by 2030. Shy on details, the document does not mention the current levels of green house gas emissions. It underscores the fact that its plan is dependent on 'robust' oil export revenues over the coming decades and the country 'reserves the right' to update its plan.

The UAE, in October, announced its target to increase low-carbon energy contribution to the overall energy mix from 0.2 per cent in 2014 to 24 per cent in 2021. To achieve this target, the UAE will implement energy efficiency measures,

feed-in tariff reforms and demand-side management initiatives. Such measures would include dissemination of information to consumers about their power consumption patterns, implementation of electric appliance entry efficiency standards and setting water and energy consumption standards for buildings.

It is the economics that matter

The New Climate Economy report by The Global Commission on the Economy and Climate identifies 10 key areas of opportunity for stronger climate action. These could bring significant economic benefits. There is the potential to achieve at least 59 per cent and as much as 96 per cent of the emissions reductions needed by 2030, to keep global warming under 2°C. The report has four main points. One, moving to a low carbon infrastructure is not a 'climate cost' but a 'climate investment'. Two, emissions need to stabilise at a lower level than previously thought. Three, clean energy is keeping a lid on the cost of a low carbon transition. We should invest at least $1 trillion a year in clean energy, compared to current levels of $260bn. Four, any Paris agreement needs to include a 'ratchet mechanism' – a facility for a regular review and revision of targets, given the falling costs and rising awareness of countries.

There is no trade-off between investments required for a low-carbon economy and economic growth. 'Climate' must be integrated into economic decision-making processes at the levels of government, society and businesses. This requires a major shift by policymakers and business leaders in their strategic outlook. It is also urgently required in the Middle East and North Africa region where oil producers are at the crux of energy market developments.

Moving the GCC to decarbonise

Energy consumption patterns in the GCC region are

unsustainable. Due to high and growing air pollution levels and carbon footprints, the region faces high risks from climate change. What should they do to decarbonise?

(a) Phase out fuel subsidies

In addition to imposing large fiscal costs, energy subsidies distort consumption and production patterns, and encourage energy intensive activities. A recent Inter- national Monetary Fund report found that post-tax subsidies, accounting for environ- mental and other damages resulting from subsidies, are projected to reach $5.3 trillion in 2015. This is equivalent to 6.5 per cent of global gross domestic product and a staggering 13 to 18 per cent of regional GDP in the Middle East and North Africa plus Pakistan region. Eliminating energy subsidies by raising energy prices to inter- national levels would improve energy efficiency in all sectors and generate sub- stantial environmental and health benefits.

(b) Impose a carbon tax

A carbon tax is usually defined as a tax based on emissions generated from burning fuels. This will transform energy investment, reduce fuel consumption, increase fuel efficiency and sharply reduce the carbon emissions that are driving global warming. A carbon tax creates incentives for energy consumers to use cleaner fuels and adopt new clean technologies, thereby reducing the amount they pay in carbon tax. For the GCC nations, a carbon tax would also be a way of diversifying revenue.

(c) Invest in intelligent, clean infrastructure

If current policies are unchanged, over 170 GW of additional capacity will be required in the GCC region alone by 2020. The GCC should aim to receive over 50 per cent of its generation capacity from solar power. Prices for solar photovoltaic modules have fallen over 80 per cent since 2008 and will be at grid parity in 80 per cent of countries in the next two years.

The cost of energy storage is also rapidly falling.

(e) Develop renewable energy financing

Green financing, including green bonds and Sukuk, is attracting new investors as part of sustainable finance. The UAE, which is hosting the International Renewable Energy Agency, has an open and developed international financial sector proficient at financing hydrocarbons. It can become the first global hub for renewable energy finance, tapping the Gulf region's enormous financial resources.

Be Unreasonable About the New Climate Economy, Op-ed, Huffington Post, Dec 2014

This article, titled "Be Unreasonable About the New Climate Economy", and co-authored with Loukia Papadopoulos, originally appeared here.

A Global Energy Landscape in Turmoil

Two important energy developments mark 2014: the precipitous, near 50% fall in oil prices since June 2014 accompanied by energy market turmoil and uncertainty. The other is the China-US agreement (together accounting for over one-third of global greenhouse gas emissions) which would cut US net greenhouse gas emissions 26-28% below 2005 levels by 2025, while China – the global leader in renewable energy investment – announced targets to peak CO2 emissions and increase the non-fossil fuel share of all energy to around 20% by 2030. December saw the Lima Accord, the first time that both rich and poor countries agreed to submit blueprints outlining how they intend to cut carbon emissions. While this is a breakthrough in a nearly

two-decade effort to implement a global agreement to combat climate change, it is a voluntary accord, not legally binding and there is no enforcement mechanism. In conjunction, the Intergovernmental Panel on Climate Change released an urgent warning last month demanding action including a global switch to renewables by 2050 and the elimination of fossil fuels by 2100.

On a sustained basis, lower conventional fossil fuel prices in the $60-$70 range undermine the economics of substitute, competing energy sources including tight oil and renewables. On the other hand, the China-US agreement and Lima Accord could herald a global agreement and impetus to the United Nations Framework Convention on Climate Change. In turn, consensus could lead to an upward, sustained shift in global investments into clean technology (CT) and renewable energy (RE), transforming the economics of energy.

Financing Renewable Energy

On the finance side, this year proved promising for green financing. “Green Bond” issuances surged with some $32.6bn raised by October 2014, while Bloomberg New Energy Finance projected the total volume of green bonds issued to reach $40b in 2014 (triple the US$14b issued in 2013). This year also saw the largest offshore wind financing to date come to fruition: the US$3.8b financial close of the 600MW Gemini wind project off the coast of the Netherlands. This and other projects proved that banks are willing to take construction risks for well-structured projects and that new investors are exhibiting increased interest in the renewable energy sector. Militating against this is lower fossil fuel prices and growing regulatory pressure, including Basel III, which penalises bank-finance of renewable energy projects and investments due to their long-tenor and untested risk. We will need to develop new climate economy finance frameworks.

Long-Term Drivers of Change

While the revival of RE investment and finance in the aftermath of the onset of the Great Financial Crisis is encouraging, much needs to be done. This is well demonstrated

by the Global Commission on the Economy and Climate in its flagship report, The New Climate Economy , which highlighted three drivers of change:

Raising energy resource efficiency. Fossil fuel subsidies run at $600bn -of which nearly half are in the Middle East and North Africa (MENA) region- generate energy inefficiency and waste, while clean energy subsidies are at $100bn globally, and have been declining.

Investment in Low-carbon forms of infrastructure is essential to reduce current emissions trajectories. We need to substantially reduce capital costs for low-carbon infrastructure investments. This also means removing regulatory and other barriers to RE finance.

Stimulating innovation in new technologies, business models and social practices that can drive both economic growth and emissions reduction.

No Trade-off between Low-carbon Economy Investments & Economic Growth

The main point of recent expert research is that there is no trade-off between investments required for a low-carbon economy and economic growth. Indeed, investments required for the new climate economy could stimulate economic growth, innovation, technological change, productivity growth and entrepreneurship. But this will not happen unless 'climate' is integrated into economic decision making processes at the levels of government and businesses. The New Climate Economy requires systematic changes to policy and project assessment tools, performance indicators and risk models. This requires a major shift by policy makers and business leaders in their strategy outlook, in their Weltanschauung. Nowhere is this strategic shift in outlook more urgently required than in the region whose oil producers are at the crux of energy market developments.

MENA Policy Reforms & Initiatives: a Transformation is required

The MENA region which is the world's main source of hydrocarbon energy, needs to focus on three policy reforms and

initiatives to drive change:

• *Gradual removal and targeting of carbon subsidies*, while providing incentives for renewable energy and clean technology. Fossil fuel and electricity subsidies are consuming some 22% of MENA government budgets at the expense of much needed investment in education, health, environment and development projects. More damning, the main beneficiaries of the subsidies are the wealthy and upper quintile of the income distribution, not the intended poor. Governments should provide transition financing to enable a gradual phasing out of subsidies; this would have a greater chance of success and face less opposition from entrenched interests.

• *Provide incentives and implement programmes for energy efficiency*. Energy usage (amount of energy used per unit of GDP) in the Gulf Cooperation Council (GCC) and the wider MENA region is twice as high as in the OECD countries. MENA is an energy inefficient and profligate region. The GCC countries consume as much primary energy as the African continent, with one-twentieth of the population! Saudi Arabia alone uses as much oil as Germany though it has a quarter of the population and produces one-tenths of the output. Cheap subsidised energy is distorting consumption and production towards high energy intensity technology choices and activities, such as aluminum production. Cheap energy encourages wasteful use.

• *Develop renewable and clean energy financing*. This is starting in major GCC countries that are strategically engaged on the RE path. Dubai recently shattered global solar price records when ACWA Power bid an unsubsidised US 5.98 cents fixed tariff, over a 25-year period under a Build-Own-Operate (BOO) model for a 1,000 MW solar plant. Saudi Arabia was listed 35th in the EY RE attractiveness index, while Qatar has unveiled a solar factory in Doha with 300MW capacity, with the potential to be expanded to 2.5GW. More generally, Green financing is increasingly attracting new investors as part of sustainable finance. The UAE which is hosting IRENA, and also has an open and developed international financial sector proficient at financing hydrocarbons, can become the first

global hub for RE and CE finance, tapping the Gulf region's enormous financial resources.

MENA Transformations: We need to become unreasonable about the new climate economy

The current energy landscape is dynamic, subject to both short term market forces and structural changes driven by new technology and new discoveries. Radically increasing energy efficiency, phasing out generalised fuel subsidies and the distortions they create for consumption and production decisions, and re-orienting the budgetary savings to increased spending on education, health, productivity, investing in low-carbon infrastructure, social capital and climate-resilient knowledge and capacity building would be nothing less than transformational to the societies and economies of the MENA region. The GCC should take the lead. The time to act is now: building the New Climate Economy must be done proactively, in partnership with the private sector, opening new sectors for economic diversification and innovation.

The MENA region has timidly begun on a path to making its societies climate-ready and its energy policies climate-friendly. Given its resources, it can play a central role in moving to the new climate economy. And yet despite progress, there is still a long way to go. Completing this journey may seem daunting, overwhelming, and unreasonable even. But as George Bernard Shaw once said: "The reasonable man adapts himself to the world: the unreasonable one persists in trying to adapt the world to himself. Therefore all progress depends on the unreasonable man." The GCC countries need to show that they can be unreasonable enough to help build the climate-resilient low carbon societies that are now so desperately needed.

Solving The GCC's Water Crisis – Opinion piece in Gulf Business, Oct 2013

[This article appeared in the Gulf Business Oct edition (print) and is also available online here]

Water scarcity is this century's imminent greatest problem, a clear and present danger: no surprise considering 85 per cent of the world's population lives in the driest half of the planet. The United Nations estimates that, already, six to eight million people die annually from the consequences of disasters and water-related diseases, with a child dying from a water-related illness every 21 seconds.

In developing countries, unsafe water causes 80 per cent of all illness and disease, and kills more people every year than all forms of violence, including war. Things are set to get worse. Water availability is expected to decrease in most regions while, future global agricultural water consumption alone – needed to feed a global population expected to increase by three billion – is estimated to increase by 19 per cent by 2050. The challenge, simply and starkly, is the sustainability and continuance of the life of animals and humans.

NOT A DROP

Water availability and scarcity is also a growing economic challenge and a major source of risk to businesses. The World Bank estimates that the cost of adapting to the impacts of a 2°C rise in global average temperature could range from a conservative $70 to $100 billion per year between 2020 and 2050 and that between $13.7 billion and $19.2 billion of that amount would be related exclusively to water scarcity issues.

Businesses ranging from manufacturing to utilities to agri-business and food production face direct risk exposure to water scarcity and need to develop tools to manage their business risk. GCC corporates will have to measure and manage their water footprint as well as their carbon footprint.

The MENA region is one of the most water-scarce regions in the world. Although home to 6.3 per cent of the world's population (and growing), the region has access to only 1.4 per cent of the world's renewable fresh water (and declining). To make matters worse, the region currently exploits over 75 per cent of its available renewable water resources due to its burgeoning population, increased urbanisation, mispricing of water and rapid economic growth.

Saudi Arabia in an ill-fated drive to increase food production has – over a 15-year period – largely depleted its water aquifer that had taken millions of years to accumulate. It will be forced to stop its wheat production by 2016. Yemen is already a hydrological basket case and Gaza is an ecological disaster.

WATER WARS

In the oil-rich but arid GCC region, a major policy issue is that the bulk of the region's water is misdirected into agriculture, a sector that provides less than five per cent of GDP.

Artificially cheap water has enabled the development of water-intensive crops in a region that has no natural advantage in producing these, but where governments provide generous subsidies to ensure future food supplies under the aegis of 'food security'. Global warming will only compound the severity of water scarcity.

Competition for water resources is becoming more intense, threatening to develop into 'water wars'. Better ecosystem and

water management systems, improved water use efficiency and pricing, and investment in water infrastructure are all part of the answer. Water is a shared resource and must be managed on a local, basin and national basis.

In the richer Gulf countries, water scarcity is mostly dealt with through desalination plants – a critical component of the solution for those countries that have access to sea water. GCC countries account for more than 40 per cent of the world's water desalination capacity, and much of that capacity is fossil-fuel energy intensive. Desalination capacity is estimated to grow from 9.5 billion m3 per year to near double, reaching 18 billion m3 per year by 2016 – with the annual rate of increase expected to be maintained over the next decade.

ENERGY CONCERNS

However, current desalination solutions are costly, energy intensive and lead to environmental degradation. This is in large part due to the technology's reliance on fossil fuels. In some GCC countries, co-generation power desalting plants (CPDPs) consume more than 50 per cent of total energy consumption with the cost of energy equal to almost 87 per cent of the running cost! This will only get worse with time as energy costs rise with competition for limited fossil fuel reserves and as hydrocarbons are likely in the future to be charged the additional costs of mandatory CO2 sequestration. There is an imperative requirement to develop less polluting and more energy efficient desalination plants.

The answer is to wed renewable energy and desalination. Saudi Arabia has taken the lead with its announcement to develop and use solar- powered desalination plants with the aim that all desalination of sea water in the country would be done completely by solar energy by 2020. This is a wise strategic choice. Efforts are under way to link the GCC with a water pipeline at a cost of $1 billion, similar to the under construction electricity grid. The GCC has announced plans to

invest $300 billion in water projects by 2022 to meet the needs of their growing domestic and expatriate populations.

GREEN DESALINATION

The World Bank's 'Renewable Energy Desalination: An Emerging Solution to Close MENA's Water Gap' report correctly proposes that coupling renewable energy sources with desalination could provide a win-win solution to the region's water woes. Switching to renewables for electricity production yields multiple benefits. The adoption of concentrating solar power (CSP) desalination would bring considerable environmental advantages. An increased share of CSP-RO desalination allied with the more efficient CSP thermal desalination would reduce annual brine production by nearly half (from 240 km3 to 140 km3) as well as greatly reduce CO2 emissions. Increasing renewable energy could cut MENA's annual CO2 emissions to 265 million tonnes as opposed to the 1,500 million tonnes by 2050 estimated to be produced with continued use of fossil fuels.

Renewables-based desalination along with more rational pricing of water utilisation should become a clear policy priority for addressing water scarcity in the GCC region. The GCC should aim to create an energy ecosystem that is resource efficient, does not contribute to climate change, while addressing not only the region's severe water scarcity but the related complications associated with polluting energy technologies. 'You never miss the water till the well runs dry' is an old idiom that is becoming a harsh reality for the MENA region that has already exhausted its wells.

Interview with The Business Year on Clean Energy

Clean & Green Interview : The Business Year

Harnessing Green Sukuk for Sustainable Development in MENA

To Download as PDF: Harnessing Green Sukuk for Sustainable Development

***The recent United Nations Conference on Sustainable Development (Rio+20) in Rio de Janeiro, Brazil, which* gathered some 100 heads of state and government, along with thousands of representatives from NGOs, the private sector and civil society, agreed on one thing: The global community must quickly and effectively address the issue of sustainable development; otherwise recurring economic and environmental crises may overwhelm our planet.**

Indeed, rising average temperatures and the increasing incidence of extreme weather events herald that our planetary ecological dynamics may be reaching an irreversible tipping point.

Some 220 documented and concrete commitments were registered at the conference in a 53-page outcome document entitled '*The Future We Want'* and agreed on by member states after negotiations. The document calls for a wide range of actions, including the establishment of sustainable development goals,

and details how a green economy can be used as a tool to achieve sustainable development.

The http://cloudofcommitments.com/ website is tracking these commitments, 57% of which are energy related, 18% water, 10% cities while our dying oceans only receive 5% of commitments, reflecting that protecting the commons was only nominally on the agenda.

Avoiding a planetary tipping point as a result of climate change requires that announced commitments be translated into strategies, policies and actions. In turn, policies and actions will require massive financing. The money needed to combat climate change exceeds USD 10 trillion over the next two decades, according to the International Energy Agency, with growing calls for using longer-dated 'green-themed' debt instruments for financing.

Investments in clean energy, a key climate change solution, have already begun to grow at an impressive rate. According to Bloomberg New Energy Finance, global investment in clean energy reached USD 211 billion in 2012 and USD 260 billion in 2011. According to the Pew Charitable Trust, investment in clean power assets alone could reach USD 2.3 trillion during the 2010-20 decade.

Nowhere are the climate change and sustainability issues more acute than in the Middle East and North Africa (MENA) countries. The MENA region is particularly vulnerable to climate change. We live in some of the most fragile ecologies on earth. We are one of the most vulnerable regions to warming, reduced precipitation and rise in sea levels.

Water supply sources in the Arab world, two-thirds of which originate outside the region, are being stretched to their limits. The level of water scarcity is the highest in the world and is rapidly growing, threatening to lead to confrontation, to 'water wars'.

A recent report by the Arab Forum for Environment and Development stated that the Arab world will face severe water shortages as early as 2015, as the annual per capita share will be less than 500 cubic meters. This is less than 10% of

the world’s average. Yemen is expected to be the first country to run out of water. The same report warned that without fundamental changes in policies and practices, the situation will get worse, with drastic social, political and economic ramifications.

The growing threat of severe economic and social consequences of climate change along with the growing budgetary burdens of fossil fuel subsidies (the MENA countries are one of the highest absolute and per capita fuel subsidy providers) are leading to policy change. MENA countries have high carbon footprints – notably the GCC countries – but also have enormous potential for low-carbon solutions through clean energy.

The region is currently seeing an explosion of clean power projects in planning and implementation, along with significant planned investments in energy efficiency and carbon reduction projects, with a focus on solar energy utilising projects. How will these projects be financed? Given the risks involved and the long gestation horizon of clean energy projects it is efficient to use debt financing.

In particular, I would like to make a case for financing clean energy and clean tech investments in the MENA region through sukuk and Shariah-compliant capital market financing instruments to be dubbed “Green Sukuk”.

High oil and gas prices have generated an extraordinary level of international assets and liquidity in the hydrocarbon exporting countries of the MENA region, with gross foreign assets forecast to reach some USD 2.3 trillion by end-2012. Research also suggests that there is a growing demand in the Middle and Far East for Shariah-compliant or Islamic sukuk, but a shortage of such products.

A major reason is that oil-exporting governments, which would be the main issuers of debt and sukuk, have been running high budget surpluses over the past decade and as a result have not had to resort to debt finance. For related reasons, corporates in the Gulf countries have also been cash rich and therefore not reliant on market financing.

However, the global financial crisis, the contagion effects of the Eurozone's continuing crisis and retrenchment of EU banks, along with growing financial sophistication of both the public sector and Gulf private businesses, is changing financing strategies.

The GCC countries are keen to lead in innovative finance as they develop financial centers and diversify their economies. Additionally, government and government-related entities responsible for the clean energy build out in the Middle East are becoming regular issuers of bonds and sukuk, given the long gestation and life cycle of energy projects. In this context, a Shariah-compliant "Green Sukuk" would be an ideal investment instrument for the MENA region as it would meet the investment requirements of Shariah-compliant investors from the GCC, Asia and global institutional investors increasingly cognizant of the benefits of environment, CSR and corporate governance compliant investments.

It is estimated by Barclays Capital and Accenture that 25% to 40% of institutional investors' assets under management are dedicated to fixed-income debt, including asset-backed securities. The sukuk market is well-suited to channel the growing global pool of Shariah-compliant capital to fund clean and renewable energy and climate change projects.

A Green Sukuk market would also extend beyond MENA. Less developed Muslim and non-Muslim countries in Asia and Africa have significant potential for clean/renewable energy for sustainable development along with significant requirements for investment to protect themselves from the impacts of climate change.

In light of the above, the Clean Energy Business Council of the Middle East and North Africa (CEBC), the Climate Bonds Initiative and the Gulf Bond and Sukuk Association have launched a Green Sukuk Working Group (GSWG). The group aims to channel market expertise to develop best practices and promote the issuance of sukuk for climate change solutions investments, such as renewable energy and clean tech projects.

Green Sukuk are Shariah securities and investments that use

criteria for climate solutions developed by the International Climate Bond Standards scheme. This scheme is also backed by a group of institutional investors and leading environmental non-government organizations including theCalifornia State Teachers' Retirement System (CalSTRS); the Natural Resources Defense Council; theCalifornia State Treasurers' Office; the Investor Group on Climate Change (IGCC); the Carbon Disclosure Project; and the Ceres Investor Network on Climate Risk (INCR).

The scheme also has an industry working group that provides input into the formulation of eligibility criteria, with participation from organizations such as the International Finance Corporation (IFC),Standard & Poor's, Aviva Investors and KPMG.

With Saudi Arabia planning investment of at least USD 100 billion into clean energy resources over the next decade, and the UAE and many other MENA countries following suit, there are substantial and viable projects in the region that are ideally suited to sukuk investors. The CEBC will help investors more easily identify Shariah-compliant opportunities while assisting in providing the debt capital for clean energy and other climate-friendly projects in the region.

This initiative is an important step toward creating the foundations of a strong future green economy and the basis for effective sustainable development of the MENA region.

Dr. Nasser H. Saidi is the Chief Economist of the Dubai International Financial Center and executive director of the Hawkamah-Institute for Corporate Governance. He is a member of the IMF's Regional Advisory Group for MENA and Co-Chair of the Organization of Economic Cooperation and Development's (OECD) MENA Corporate Governance Working Group.