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International Foundation for
Energy & Sustainable Development



~ Whitepaper ~

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***Energy Efficiency:
Oil and Gas Production in the Gulf
Rewriting the Rule Book***

Energy Efficiency: Oil and Gas Production in the Gulf

The following Whitepaper was harvested from a CEO Roundtable of 15 leaders in the Gulf's energy industry. The closed door event was held in Doha, Qatar on February 27th.

Rewriting the Rule Book

What will be the life blood of Gulf energy companies' competitive strategies in the 21st century? Energy efficiency. Swelling populations, rising demand, a thickening environmental rulebook and lower commodity prices are creating a pressure cooker – finetuning efficiency is one of the vital release valves. Those promoting proactive strategies to reshape the status quo of energy production, transport and consumption will climb the global league table of thought leaders. As automotive entrepreneur Henry Ford said: "If you always do what you did, you'll always get what you got." The tide of change is upon us.

Global investments in energy efficiency rose by 9% to \$231 billion in 2016 on the previous year, according to the International Energy Agency (IEA). And unsurprisingly. The 'lower for longer' oil price – now heading into a fourth year – has brightened the global spotlight on the need to streamline costs while bolstering output and slashing emissions. Reduced payrolls, unprecedented subsidy reforms, the nurturing of intellectual champions of an innovative future and soaring corporate appetite for digital tools as part of the 4th Industrial Revolution are some of the methods accelerating energy efficiency.

Efforts are paying off. The world would have used 12% more energy in 2016 had it not been for energy efficiency improvements since 2000 – the equivalent of another European Union (EU) on the global energy map, detailed the IEA. Global energy intensity, the amount of primary energy demand needed to produce one unit of GDP, fell by 1.8% in 2016. It has declined at an average rate of 2.1% since 2010

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Quick action in Qatar to bolster regulations for energy efficiency would help Doha emerge as the region's leading voice on a challenge that has global applications. Proactivity would send a powerful message about the country's transformation into a knowledge-based economy.”

– a major increase from 1.3% between 1970 and 2010. This means the world can produce more GDP for each unit of energy consumed. Percentage points can translate into vast sums. The estimated savings incurred through energy efficiency totaled \$2.2 trillion in 2016 – twice the size of Australia's economy.

Up, up...
and up?

9%

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2000

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\$50bn

Efficiency improvements since 2000 created \$50 billion in additional spending on energy imports in IEA member countries in 2016.

20%

In Japan, oil imports would have been 20% higher in 2016 and gas imports 23% higher had those efficiency gains not occurred.

CONSTRUCTION: ABANDONING BAD HABITS

Construction is one of the world's biggest potential sweet spots for improving energy efficiency; up to 50% of consumption is expended in buildings. Brainstorms over blueprints mark the crossroads for the economic and environmental efficiency of a building; an impact that lasts for as long as the building stands, potentially centuries. In Qatar, up to 70% of energy consumption in buildings is consumed via air conditioning. There is no need to continue wasting gas reserves by hypothetically banging 'our heads against the same brick wall'. One roundtable participant said a shift in mindset is critical: "There is no great mystery to building physics, as we know exactly how to deal with

these issues. It is simply a case of zooming in our focus to make these changes as early on as possible." This includes leadership spurring regulatory change so that energy efficiency is woven into the rule book as a necessity, alongside the importance of fire alarms and structural safety.

The other – and larger – part of the challenge is the existing building stock. The turnover in rebuilding tends to be far too long. It could take over 1,000 years in the UK, for example. Instead, Qatar and others in the Gulf can focus on retrofitting. Therein lies the opportunity for the oil and gas sector to upgrade its portfolio; headquarters,

staff quarters, control rooms at refineries, ports and major oil fields and many other structures. "Forty years ago, I was a student and drove around the UK with my van," another roundtable participant shared. "I doubt I could compare that vehicle with the car I now drive, which is infinitely more efficient, faster and safer. This is exactly the narrative that needs to evolve in the construction arm of the oil and gas industry. Speed and investment are key to ensure planned construction projects follow a more sustainable path. Backtracking is too expensive, especially for eagle-eyed accountants already grappling with today's lower commodity prices and rising demand."



But the pace must keep accelerating, as pressure points in Qatar and beyond intensify. The UN expects Qatar's population alone to rise by 23% to 3.2 million by 2030 from today's 2.6 million – a trajectory that is generally mirrored across the region. BP Outlook estimates the Middle East's energy consumption to rise by 54% through to 2040 and Saudi Arabia-based Apicorp said power capacity in the Middle East and North Africa (MENA) must expand by 7.4% each year between 2017 and 2021 to meet demand. The World Energy Council said Gulf states will need to earmark \$50 billion in new power generating capacity over the next decade.

Qatar has taken note; the volume of the country's mantra for greater energy efficiency is getting louder. The pace of

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Can a change in consumption attitudes within the oil and gas industry be accelerated by very clear, transparent and honest objectives and communication from countries' leadership? Yes. Are all those factors currently on the table for the oil and gas industry? No.”

change sends a powerful message about the country's future as a knowledge-based economy, as per its National Vision 2030. Major changes so far include subsidy cuts, increased tariffs for some utilities (water and electricity) and pricing domestic fuel in line with international prices.

Paris Agreement: A Green Future

2°C

Improved energy efficiency will play a vital role in meeting the Paris Agreement's long-term goal of keeping the increase in the global average temperature to well below 2°C above pre-industrial levels.

2016

The level of CO₂ emissions in the world's biggest emitting nations either fell or were static in 2016 in large part due to energy efficiency, according to the Netherlands Environmental Assessment Agency (NEAA).

28%

The global population will rise to 9.7 billion from today's 7.6 billion – a 28% climb. This will make cost-effectively satisfying energy demand while hitting low-carbon targets even tougher. Clear regulations are essential.

0.5%

Owners of refiners, ships and ports must meet the International Maritime Organization's (IMO) ruling to reduce sulphur in bunkering fuel from today's 3.5% to 0.5% by 2020. LNG bunkering is currently a popular choice to meet the ruling, which aims to reduce marine and air pollution.

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Plus, in January, Qatar Petroleum announced the official start of operations of the new Qatargas following the successful completion of the integration with RasGas. The move will save QR2 billion (\$550m) in annual operating costs. This offers a timely boost to the world's biggest LNG exporter, as it proactively ringfences its coveted market share against escalating competition from the US and Australia. Qatar also lifted a 12-year self-imposed ban last April on development of the world's biggest natural gas field, the country's North Field, which it shares with Iran. The development of the southern section of the vast offshore field will bring production up to 100 million tons per year – a 30% rise on current volumes. Energy efficiency will prove more imperative than ever as Doha pursues this ambitious target to safeguard its world-leading role.

HYDROCARBON HELPERS?

Many Gulf energy companies' efficiency standards were calculated when oil prices were considerably higher. Cheap energy meant wastage did not pinch the balance sheet quite as keenly as it does today. Consequently, efficiency savings in recently developed renewable technologies (solar, wind and hydro, predominately) can reach 60% versus 20% in the oil and gas industry. Seizing opportunities to raise the percentage in the latter camp is particularly important as BP Outlook expects the Middle East to remain the largest oil producer and the second largest gas producer up to 2040, accounting for over 34% of global liquids production and 20% of gas production. Identifying greater efficiencies today will mushroom into

AVIATION: AMBITIONS GAIN HEIGHT

As a global crossroads with rapidly rising passenger numbers, energy efficiency in aviation is essential for Qatar and the wider Gulf. Improved management of Qatar Airways' fuel continues, with the airline becoming 2.5% more carbon efficient in 2017 on the previous year. Not bad for an airline with a fleet of 196 passenger and cargo aircraft, plus 11 luxury private jets. Qatar is also a member of the Carbon Offset and Reduction Scheme for International Aviation, or CORSIA. In October 2016,

191-member states of the United Nations International Civil Aviation Organization (ICAO) adopted CORSIA, a global CO₂ offsetting scheme. CORSIA aims to reduce any annual increase in total CO₂ emissions above 2020 levels, including those generated through the inefficient use of fuel, with a voluntary period between 2021–2026. Compliance will be mandatory from 2027 – just under a decade for airlines to overhaul their status quo for a greener future. Each ton of carbon emitted by airlines above

the 2020 baseline will require airlines to invest in UN-approved carbon offsets via a market-based mechanism (MBM). Significant progress is already being made, with the new Airbus A380, Boeing 787, ATR-600, Embraer E2 and Bombardier CSeries aircraft using less than 3 liters of jet fuel per 100 passenger kilometers. This matches the efficiency of most modern compact cars, according to Air Transport Action Group (ATAG). Still, this pace must accelerate and be standardized across the global fleet to reach CORSIA's target.



more fluid balance sheets and low-carbon growth during the 2020s. Delays will soften competitive edges. Government and energy leaders in Qatar and the wider Gulf must provide a clear regulatory rulebook and openly report their own progress. This positive beacon of changed behavior from the top-down will help bring energy efficiency to the forefront of consumption habits. This can include penalties for failing to turn off lights, water efficiency initiatives, offsetting air miles by buying carbon credits, temperature limits on air conditioning units (23°C was popular amongst roundtable participants) and car-sharing for local employees to reduce pollution. Smart meters and sensors to identify leakages and a digital grid would also incur noteworthy savings. Such tools are easily available on the commercial market; passing pieces of paper between departments should be considered an archaic practice, rather than a daily reality. Education is also key in raising awareness. Qatar's General Electricity and Water Corporation (Kahramaa) sends monthly bills to help consumers curb their overuse, for example. Applying taxes is an effective, if unpopular, method. "Unless you have to pay for things, the outlook will not change.

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Let's assume that the cost of a unit of power is QR18. If you just introduce a QR10 tax for consumers to pay per unit, I assure you that their consumption would fall by more than 40%. And that is only charging 55% of the total cost!" one roundtable participant said. Holistic efforts are vital; encompassing multiple industries along the value chain will bring greater economic and environmental dividends (see boxes 'Construction: Abandoning Bad Habits' and 'Aviation: Ambitions Gain Height' on pages 2 and 4, respectively).



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I have gathered data on the energy efficiency of my 30-year old house for 17 years and found that I can save 20% on my electricity bill if I upgrade to a modern-day air conditioning unit. How can this simple data gathering and analysis methods be broadened to identify energy efficiency in the oil and gas industry? This must be a big focus point, as we know that even just one percentage saving can equate to millions of US dollars and saved CO₂.”



Research and development (R&D) that culminate in innovations that leverage energy efficiency in other sectors illustrate how the oil and gas industry is still just skimming the vast potential. GE achieved a Guinness World Record title in April 2016 for powering the world's most efficient combined-cycle power plant; the 9HA gas turbine achieved a 62.22% efficiency rating. The technology can ramp up or down at 65MW/minute while still meeting emissions requirements and gets to full power in under thirty minutes – less time than it takes to drink a coffee. The turbines commissioned in 2016 alone will reduce carbon dioxide emissions by 7 million m/t by 2020 compared to existing gas-fired power plants. This should serve as a reminder that every year without meaningful progress means the hill to sustainability is a much steeper climb later.

Mastering transparent and easy-to-use data management systems should also be at the top of energy companies' agendas in 2018. Nearly half (45%) of respondents to a Schneider Electric and GreenBiz Research survey (see below: 'An Evolving Marriage: Perception and Action') said organizational data is highly decentralized, handled at local or regional levels. This can create expensive black holes in

companies' knowledge base. "I have gathered data on the energy efficiency of my 30-year old house for 17 years. I could save 20% on my electricity bill if I upgrade to a new modern-day air conditioning unit," one roundtable participant shared. "How can this data gathering and analysis be broadened to pinpoint savings in the oil and gas sector? Remember, even just 1% of savings can equate to millions of US dollars."

Regulatory guidance would also act as a springboard for small and medium-sized enterprises (SME) to identify roadmaps that are both economically and environmentally sound – a delicate tightrope to master. MENA Research Partners (MRP) forecasts that the number of SMEs in the GCC will rise by 156% in the next five years, with the sector worth \$920 billion. How can this huge potential of financial and human capital – a core part of Qatar's burgeoning workforce – be most effectively channeled?

Achieving energy efficiency is not a case of ticking off a checklist – it must be a permanent overhaul of operating norms and mentalities. Energy needs will only rise and environmental legislation will only become stricter. Those spearheading change today will breathe sighs of relief in the 2020s.

AN EVOLVING MARRIAGE: PERCEPTION AND ACTION

Despite bullish attitudes, the energy industry has yet to fully embrace energy efficiency. This includes the integration of proactive strategies, open dialogue and easy access to centralized systems in daily operations. The results from a Schneider Electric and GreenBiz Research survey in January 2018 of energy and sustainability professionals from almost 240 large companies illustrates how companies must marry their aims with actions.

- 23% have demand response strategies or plan to in the near term.
- 81% have made energy efficiency upgrades or plan to within the next two years.
- 61% said energy and sustainability decisions are not well coordinated across relevant teams and departments.
- 30% have implemented or are actively planning to use energy storage, microgrids or combined heat and power, or a mix of technologies.

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