



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



Sustainable
Development Goals
and Energy Nexus

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Foreword

Energy and Sustainable Development are two cornerstones of the work of the Abdullah Bin Hamad Al-Attiah International Foundation for Energy and Sustainable Development. While some may consider the use of Energy and Sustainable Development together in the name of the Foundation as an oxymoron, my passion and vast experience throughout my career encompass both areas and illustrate the synergies and interconnectedness between them.

I was privileged to serve as both the Chairman of the United Nations Commission on Sustainable Development (2006) and the President of the 18th Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC-COP 18), in 2012. This underscored a career that is characterized by a strong passion for issues relating to sustainable access to energy, security of supply, climate change, socio-economic development, transparency and accountability.

There is an ongoing discourse on the global energy mix, particularly in relation to environmental challenges facing the oil and gas sector. As an interesting perspective, this publication looks at the role of the energy industry in the global pursuit of

sustainable development through the lens of the United Nations Sustainable Development Goals (SDGs). We examine each of the seventeen SDGs and provide some insights on how the contribution from the energy sector can be strengthened.

The main objective of the booklet is to serve as a concise reference tool for policy makers, industry practitioners, academia, and anyone with an interest in the global sustainability agenda, particularly within the energy industry. In addition, the publication will be a good educational and public awareness tool.

The Al-Attiah Foundation was founded in 2015 to provide robust and practical knowledge and insights on global energy and sustainable development topics and communicate these for the benefit of its members and the community. This publication is a demonstration of the commitment of the Al-Attiah Foundation to its vision and mission. As the Founder of the Abdullah Bin Hamad Al-Attiah International Foundation for Energy and Sustainable Development, I hope you find it to be very informative.

H.E. Abdullah Bin Hamad Al-Attiah

Chairman of the Abdullah Bin Hamad Al-Attiah
International Foundation for Energy and Sustainable Development
Former Prime Minister & Minister for Energy and Industry

Introduction

Sustainable development is undoubtedly one of the biggest challenges the world continues to face today. We live in a world where more than 800 million people still live in extreme poverty; one out of nine people are starving; 2.5 billion without access to clean water; and 1.3 billion people have no access to modern electricity.

It is against this backdrop that the world leaders in September 2015 adopted the 2030 Agenda for Sustainable Development, enshrining the 17 UN Sustainable Development Goals (SDGs). The SDGs, which officially came into force in January 2016, are a new universal set of goals, targets and indicators that all UN member states are expected to use for framing their sustainable development agendas and policies for 15 years, until 2030. The 17 SDGs (see list in the Appendix) follow and expand on the millennium development goals (MDGs), that were agreed by governments in 2001 and expired at the end of 2015.

It is important to understand the scale of ambition, transformation and fundamental common human values that the 2030 agenda embodies, as reflected in its opening paragraph:

OPENING PARAGRAPH OF THE UN 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

This Agenda is a plan of action for people, planet and prosperity. It also seeks to strengthen universal peace in larger freedom. We recognise that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development. All countries and all stakeholders, acting in collaborative partnership, will implement this plan. We are resolved to free the human race from the tyranny of poverty and want and to heal and secure our planet. We are determined to take the bold and transformative steps which are urgently needed to shift the world onto a sustainable and resilient path.

As we embark on this collective journey, we pledge that no one will be left behind. The 17 Sustainable Development Goals and 169 targets which we are announcing today demonstrate the scale and ambition of this new universal Agenda. They seek to build on the Millennium Development Goals and complete what these did not achieve. They seek to realize the human rights of all and to achieve gender equality and the empowerment of all women and girls. They are integrated and indivisible and balance the three dimensions of sustainable development: the economic, social and environmental.

As the focus of the global community shifts towards the development and implementation of sustainable development agendas, it is an opportune moment to consider the contributions from major sectors to the realization of the SDGs. The energy sector, especially oil and gas, has played a crucial role in industrialization since the beginning of the last century. Developing countries, in particular, will continue to rely on oil and gas to power growth in many areas, such as in transportation, electrification and industrialization. Nevertheless, the sector

faces immense challenges, ranging from climate change and air pollution, to concerns about energy availability and affordability for millions of people.

As the world continues to grapple with ways to provide enough dependable, affordable and sustainable energy to meet rising global demand, including for those 1.3 billion people still without access to electricity, the ongoing environmental challenges facing the oil and gas sector are expected to continue. This publication, entitled Sustainable Development Goals

and Energy Nexus, is expected to be a valuable and timely contribution by the Al-Attayah Foundation to the efforts of the energy sector to meet its environmental and sustainability challenges. While only a few of the SDGs are often seen as directly linked to energy, this publication examines the connectivity between energy and each of the 17 SDGs.





The global community has witnessed an unprecedented rise in interest in sustainable development over the past few decades. During this time, there has also been an increased awareness of the environmental impacts of industrial activities, particularly in the energy sector. In response to temperature rises and the visible impacts of climate change already witnessed across the globe, there is increasing focus on the impact of emissions on the climate.

At the same time, the use of hydrocarbon products in modern society has become increasingly pervasive, and hydrocarbon derivatives are bound to continue to play an important role for many years to come, even in a future where energy systems are shifting to low-carbon models. The future prosperity of many nations and the of their population are dependent on oil and gas resources being used wisely without causing harm to people or the environment. Countries that are well endowed with abundant natural resources are realizing that environmentally acceptable exploitation of these resources, particularly hydrocarbon reserves, is contributing to national wealth and serving as a springboard and cornerstone of sustainable development and social stability.

This publication presents some basic facts on the status of the 17 UN Sustainable Development Goals, highlights what has been achieved in the last 15 years, examines the challenge ahead towards the 2030 development agenda, and discusses the energy sector's contribution. It seeks to set out, under five main themes, some of the more important considerations relating to the energy industry in the broader sustainability agenda of today's world.

Many energy companies are measuring, managing, reducing and reporting their negative impacts on society and the ecosystem. Environmental management options are being continuously explored through research and development of new technologies. Human rights, transparency and social development are receiving greater attention too. Several industry guidelines and voluntary standards have emerged through participatory processes involving key players in industry and civil society. The energy sector, particularly oil and gas, is engaging actively in international debates and multilateral processes. The key question is how all these advances can be harnessed to make a significant contribution to concerted global efforts to achieve the bold sustainable development agenda by 2030.

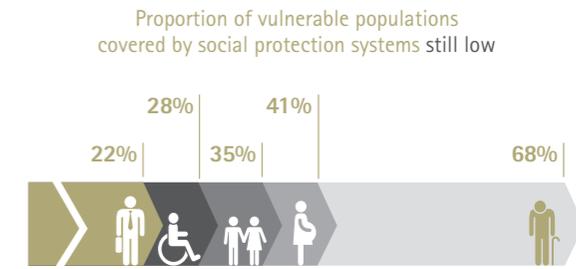
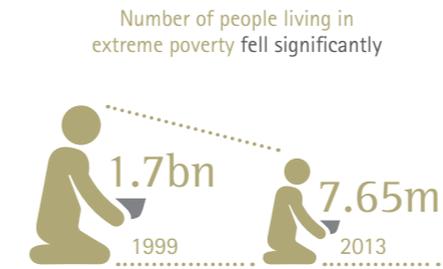
The sustainable development goals in context

The 17 UN Sustainable Development Goals are set with great expectations to help transform our world. The benchmark on the current status, as highlighted by a few facts on each of the 17 SDGs, shows the progress made in the last 15 years and the remaining daunting task of transforming to a sustainable world by 2030.



NO POVERTY

The number of people living in extreme poverty globally, has declined by more than half from 1.9 billion in 1990. Nevertheless, more than 800 million people still live in extreme poverty. About one in five people in developing regions lives on less than US\$1.25 per day.

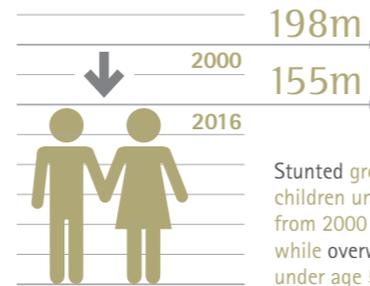
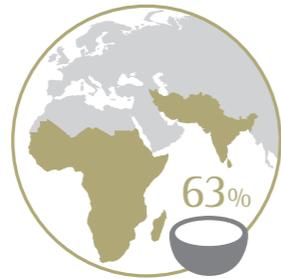




NO HUNGER

The proportion of undernourished people in developing regions has fallen by almost half since 1990; from 23.3% in 1990-1992 to 12.9% in 2014-2016. However, one in nine people in the world (about 800 million) are still undernourished.

Almost two thirds suffering from hunger live in sub-Saharan Africa and Southern Asia

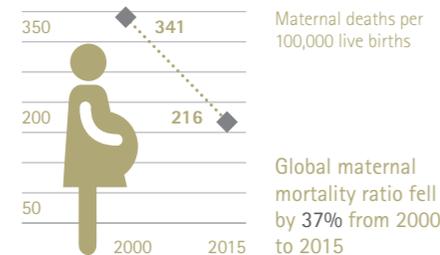


Stunted growth in children under 5 fell from 2000 to 2016, while overweight children under age 5 increased



GOOD HEALTH

17,000 fewer children die each day than in 1990, but more than six million children still die before their fifth birthday each year. Despite global progress, an increasing proportion of child deaths are in sub-Saharan Africa and Southern Asia. Four out of every five deaths of children under age five occur in these regions. In Eastern Asia, Northern Africa and Southern Asia, maternal mortality has declined by around two-thirds. But, the maternal mortality ratio – the proportion of mothers that do not survive childbirth compared to those who do – in developing regions is still 14 times higher than in the developed regions. Only half of women in developing regions receive the recommended amount of health care. At the end of 2013, there were an estimated 35 million people living with HIV. By 2014, there were 13.6 million people accessing antiretroviral therapy, an increase from just 800,000 in 2003.



Maternal deaths per 100,000 live births

Global maternal mortality ratio fell by 37% from 2000 to 2015

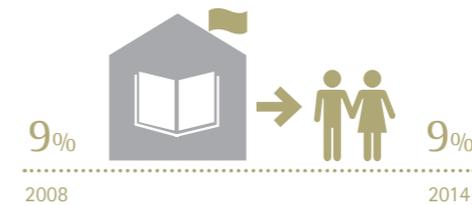
Risk of dying between the ages of 30 and 70 from one of these four Non-communicable Diseases (NCDs) fell between 2000 and 2015



QUALITY EDUCATION

Enrolment in primary education in developing countries has reached 91%, but 57 million children still remain out of school. The world has achieved equality in primary education between girls and boys, but few countries have achieved that target at all levels of education.

Proportion of primary school age children out of school has stagnated at about 9% since 2008



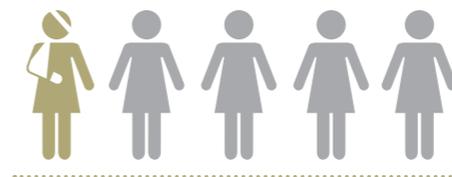
In 2011 only around one quarter of schools in sub-Saharan Africa had electricity and less than half had access to basic drinking water



GENDER EQUALITY

Women in Northern Africa hold less than one in five paid jobs in the non-agricultural sector. In sub-Saharan Africa, Oceania and Western Asia, girls still face barriers to entering both primary and secondary school. Only in 46 countries do women now hold more than 30% of seats in national parliament in at least one chamber.

1 in 5 ever-partnered women and girls were subjected to physical and/or sexual violence by an intimate partner



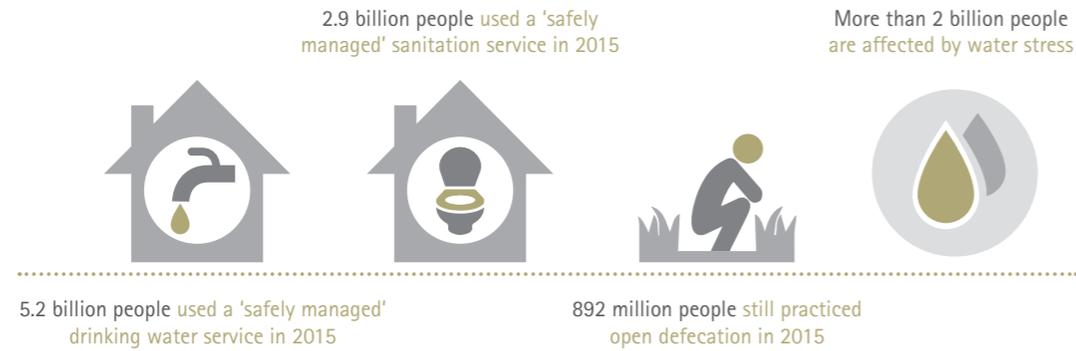
Fewer than 1 in 3 senior and middle-management positions were held by women in the majority of 67 countries





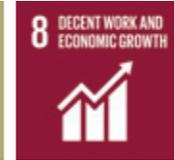
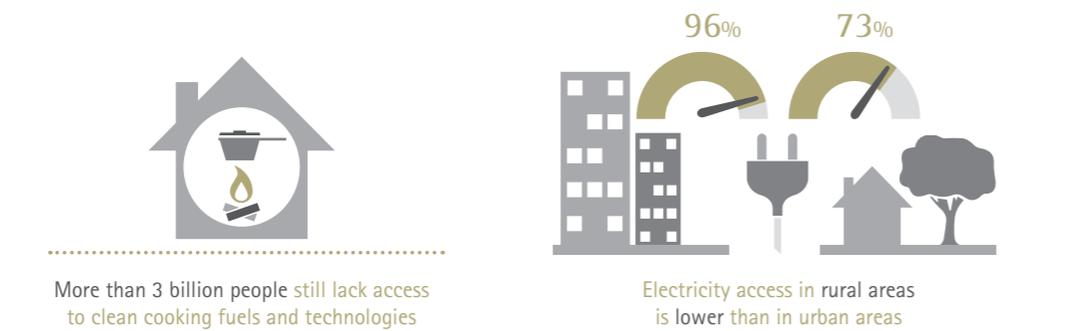
CLEAN WATER AND SANITATION

In 2015, 91% of the global population had access to a clean drinking water source, compared to 76% in 1990. However, 2.5 billion people still lack access to basic sanitation services, such as toilets or latrines.



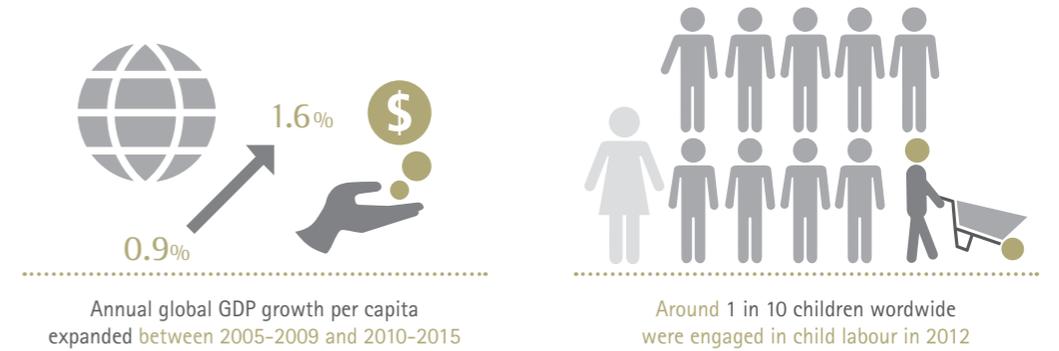
ACCESS TO MODERN ENERGY

1.3 billion people – one in five globally – still lack access to modern electricity. Three billion people rely on wood, coal, charcoal or animal waste for cooking and heating. Renewable energy currently constitutes 15% of the global energy mix.



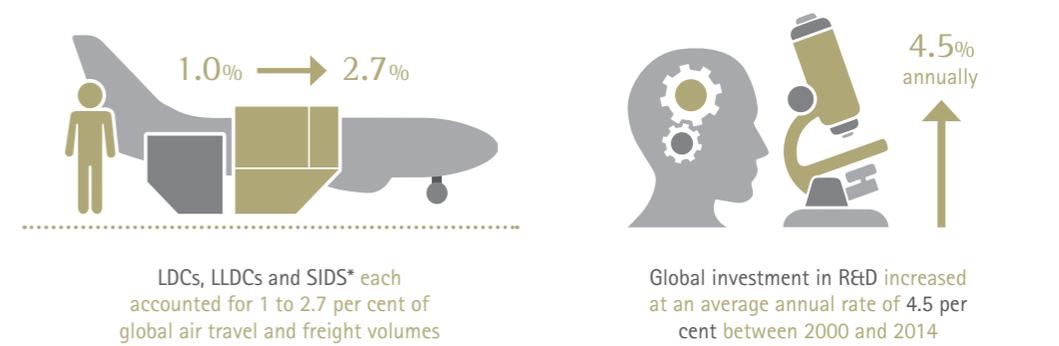
GOOD JOBS AND ECONOMIC GROWTH

Global unemployment increased from 170 million in 2007 to nearly 202 million in 2012, of which about 75 million are young women and men. 470 million jobs are needed globally for new entrants to the labour market between 2016 and 2030.



INNOVATION AND INFRASTRUCTURE

For many African countries, particularly the lower-income countries, infrastructure constraints affect company productivity by around 40%.



* LDCs - Least Developed Countries; LLDCs - Landlocked Developing Countries; SIDS - Small Island Developing States

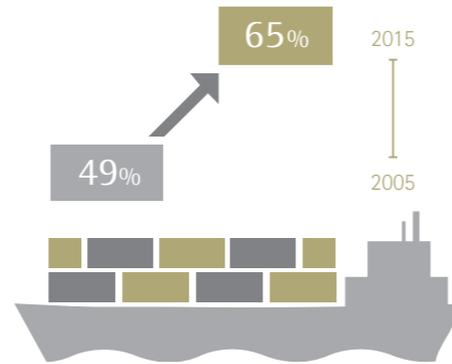


REDUCED INEQUALITIES

A significant majority of households in developing countries (more than 75%) are living today in societies where income is more unequally distributed than it was in the 1990s.



Global cost of sending remittances averaged above 7 per cent

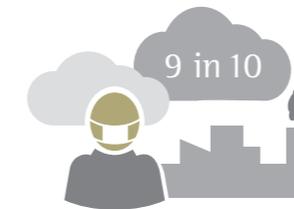


Proportion of tariff lines for exports from LDCs with zero tariffs increased from 2005 to 2015



SUSTAINABLE CITIES AND COMMUNITIES

Half of humanity (about 3.5 billion people) live in cities today. By 2030, almost 60% of the world's population will live in urban areas. More than 800 million people live in slums today and the number keeps rising. The world's cities occupy just 2% of the Earth's land, but account for 60–80% of energy consumption. Cities have the potential to either waste energy through ineffective distribution or optimise their efficiency by reducing energy consumption and adopting green energy systems.



9 in 10 living in urban areas breathed air that did not meet WHO air quality guidelines in 2014



Coverage of municipal waste collection was 65 per cent in cities in 101 countries

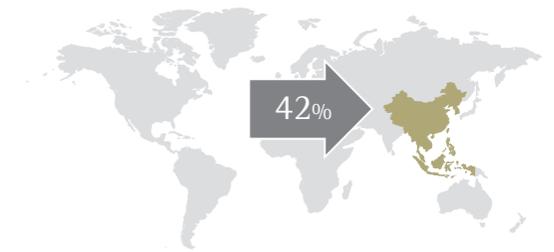


RESPONSIBLE CONSUMPTION

Should the global population, as predicted, reach 9.6 billion by 2050, the equivalent of almost three planets would be required to provide the natural resources needed to uphold current lifestyles in a sustainable manner. 1.3 billion tons of food are wasted every year. If people worldwide switched to energy-efficient lightbulbs, the world would save \$120 billion annually.



Global material footprint increased from 2000 to 2010

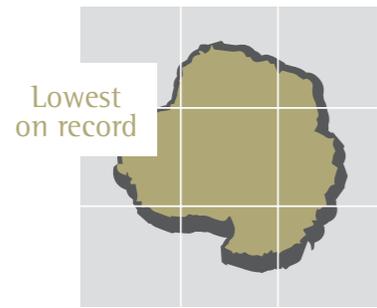


Eastern and South-Eastern Asia accounted for 42 per cent of global domestic material consumption (DMC) in 2010

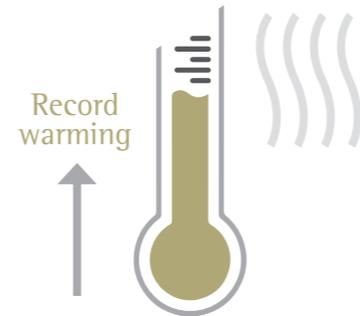


CLIMATE ACTION

Global emissions of carbon dioxide have increased by almost 50% since 1990. The ocean has absorbed about 30% of the emitted anthropogenic carbon dioxide, causing ocean acidification. Over the next few decades there are multiple mitigation pathways to achieve sufficient emissions reductions to limit the warming to 2°C – the goal set by governments – with a greater than 66% chance. There is increasing top-down action by governments, especially after the landmark Paris Climate Change Agreement. This is complemented by bottom-up action by the private sector and civil society. More than 500 climate change laws have been enacted in 60% of countries, covering 80% of global emissions. Large institutional investors are diversifying into climate smart investments, and the green bond market is growing exponentially, along with understanding of climate-related risk.



Global sea ice fell in 2016 to its second lowest extent on record

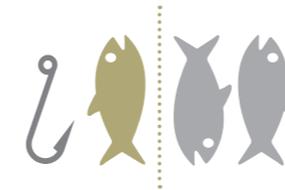


Record was set in 2016 for warming at 1.1 degrees Celsius above pre-industrial period

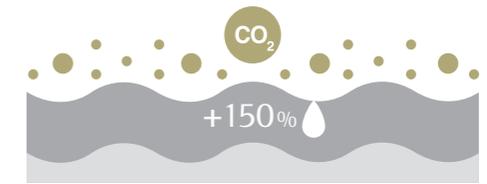


LIFE BELOW WATER

Oceans cover three-quarters of the Earth's surface, contain 97% of the Earth's water, and represent 99% of the living space on the planet by volume. Oceans serve as the world's largest source of protein, with more than 3 billion people depending on the oceans as their primary source. Marine fisheries directly or indirectly employ over 200 million people. Globally, the market value of marine and coastal resources and industries is estimated at \$3 trillion per year or about 5% of global GDP. As much as 40% of world oceans are heavily affected by human activities, including pollution, depleted fisheries, and loss of coastal habitats.



31 per cent of marine fish stocks were overfished in 2013

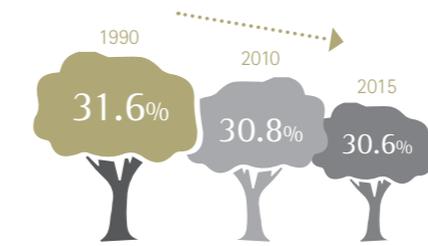


As atmospheric CO₂ levels increase, estimates indicate that oceans could be nearly 150 per cent more acidic by 2100

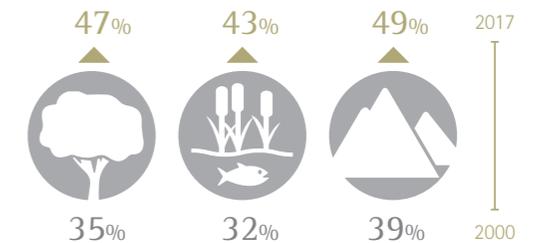


LIFE ON LAND

Thirteen million hectares of forests are being lost every year. Around 1.6 billion people depend on forests for their livelihood. About 2.6 billion people depend directly on agriculture, but 52% of the land used for agriculture is moderately or severely affected by soil degradation. Due to drought and desertification, 12 million hectares are lost each year (23 hectares per minute), enough to grow 20 million tons of grain.



Annual net loss of forest area globally between 2010 and 2015 was less than half that of the 1990s



Average worldwide coverages of terrestrial, freshwater and mountain KBAs (Key Biodiversity Areas) have increased

The role of Energy in perspective

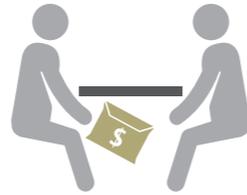


PEACE AND JUSTICE

Corruption, bribery, theft and tax evasion cost developing countries some US\$1.26 trillion per year. The rate of children leaving primary school prematurely in conflict-affected countries reached 50% of in 2011, which amounts to 28.5 million children. The number of refugees of concern to the United Nations High Commissioner for Refugees (UNHCR) stood at 13 million in mid-2014.



Almost 1 in 3 people were held in detention without being tried or sentenced for a crime in 2013-2015



Over 18 per cent of firms worldwide reported receiving at least one bribery payment request



Over 70 per cent of victims of trafficking were women and girls in 2014



PARTNERSHIPS FOR THE GOALS

A successful sustainable development agenda requires partnerships between governments, the private sector and civil society. Official development assistance (ODA) stood at approximately \$135 billion in 2014. In 2014, 79% of imports from developing countries entered developed countries duty-free. Internet penetration has grown from just over 6% of the world's population in 2000 to 43% in 2015. The number of internet users in Africa almost doubled in the past four years. About 68% of the global population today have access to a mobile phone.



ODA rose by 8.9 per cent from 2015 to 2016, reaching a new peak



Proportion of the population with Internet access was lowest in LDCs in 2016

The 17 UN SDGs represent a comprehensive coverage of elements of human development, incorporating all aspects relating to environmental, social and economic activities. While the 17 goals are interlinked and interconnected, they can be categorized into four broad clusters, in addition to a fifth cluster with the last standalone goal on partnership:

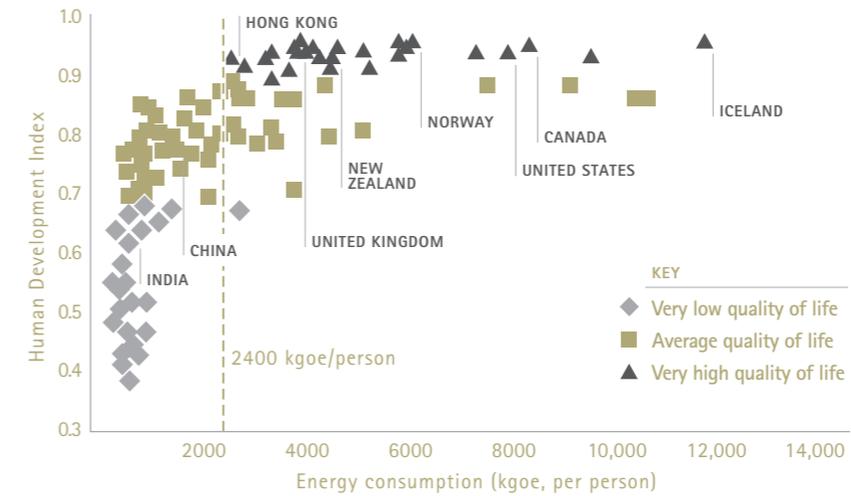
- 1 Goals addressing immediate human needs: Poverty reduction, ending hunger, good health, quality education, and access to clean water & sanitation;
- 2 Goals addressing fundamental environmental issues: Climate change, life below water, and life on land;
- 3 Goals relating to social-economic development: Access to energy (including renewables), economic growth and decent work, industry & infrastructure, sustainable cities, and responsible consumption and production;
- 4 Goals embodying significant UN principles: Gender equality, reduced inequalities, peace and justice; and
- 5 The standalone Goal 17 on global partnership for sustainable development.

The connectivity between energy and sustainable development and the central role of energy in our today's world, is reviewed under five themes that relate to the above categorization of the SDGs. We have carefully selected these themes, to provide a concise coverage of all the seventeen Sustainable Development Goals. The goals represented within each theme are presented in the box below the respective theme.

The role of Energy in perspective

THEME ONE ENERGY AND HUMAN WELFARE

- GOAL 1 End poverty in all its forms everywhere.
- GOAL 2 End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
- GOAL 3 Ensure healthy lives and promote well-being for all at all ages.
- GOAL 4 Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
- GOAL 6 Ensure availability and sustainable management of water and sanitation for all.



First and foremost, all households require a minimum amount of energy to meet their basic subsistence needs, such as cooking, lighting and heating. For poor households living in rural communities, the only sources for meeting these basic energy needs are firewood, straw, dung, other biomass, oil lamps, candles, and dry-cell batteries.

Once the basic needs are met, household income levels increase and members progress up the social ladder, and the need for energy increases, particularly for welfare-enhancing amenities.

WELFARE-ENHANCING AMENITIES

- ◆ Modern commercial cooking fuels that reduce the time and health risks associated with use of traditional biomass fuels;
- ◆ Improved electric lighting at the household and community levels;
- ◆ Appliances such as fans or refrigerators;
- ◆ Potable water supply and sewerage systems;
- ◆ Household communication and entertainment appliances, such as radios and televisions;
- ◆ Health care and maternity clinics; and
- ◆ Transportation services.

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THE ROLE OF ENERGY IN PERSPECTIVE | T1: ENERGY AND HUMAN WELFARE

Proportion of undernourished people, 2000 -2002 and 2014-2016 (percentage)

Region	2000-2002 (%)	2014-2016 (%)
Sub-Saharan Africa	30	23
Central and Southern Asia	18	15
Oceania	16.5	14
Eastern and South-Eastern Asia	16.8	9
Latin America and the Caribbean	11.4	6
Northern Africa and Western Asia	7	6
Least developed countries	37	27
Landlocked developing countries	34	22.7
Small island developing States	22.5	18
World	15	11

Note: In Australia and New Zealand and Europe and Northern America, the prevalence of hunger is less than 5 per cent.

Proportion of countries with insufficient health care professionals, 2005 -2015 (latest available) (percentage)

Region	2005-2015 (%)	2015 (%)
Sub-Saharan Africa	100	95
Central and Southern Asia	71	36
Oceania	46	54
Eastern and South-Eastern Asia	40	53
Latin America and the Caribbean	35	72
Northern Africa and Western Asia	22	48
Least developed countries	95	61
Landlocked developing countries	95	64
Small island developing States	63	43
World	49	43

Note: A country with less than 1 physician and fewer than 3 nurses or midwives per 1,000 people is considered to have an insufficient number of health care professionals. All countries with data in the Europe and Northern America, and Australia and New Zealand regions have at least 1 physician and at least 3 nurses or midwives per 1,000 people.

All the above services and amenities, essential for improved welfare and quality of life, require modern commercial energy. They are also complementary and synergistic to each other: the availability of one service reinforces and increases the benefits of another. For example, when women no longer have to gather fuel-wood, their health can be expected to benefit from the reduction in physical labor, and they can convert the time saved into more productive activities that lead to increased income or greater educational benefits. Energy that provides lighting and potable water can help achieve lower rates of illness and improved literacy, which in turn support growth and productivity.

The exploitation and prudent management of natural resources such as oil and gas can provide a significant revenue source for government, and can offer opportunities for poverty reduction. The development of local resources can generate substantial fiscal revenues that can be used for public spending in support of poverty reduction. For some emerging market economies, the scale of these potential revenues is extremely large relative to the size of the local economy, thereby forming a significant boost to development.

Unfortunately, we do not always see these benefits. Some substantial oil exporters, for example, despite many years of oil and gas development, still have a greater incidence of poverty than before their first oil production. In many resource-rich countries, economic growth, led by development of natural resources, has created substantial increases in income inequalities, both between different economic groups and between the resource-rich and resource-poor regions of the countries.

The impact on poverty alleviation, positive or negative, of the development of oil and gas resources depends primarily on government policy. Appropriate macroeconomic and social policies are essential prerequisites for any country endowed with abundant natural resources to be able to profitably use such resources for successful poverty eradication programs.

Proportion of the population with primary reliance on clean cooking fuels and technologies, 2000 and 2014 (percentage)

Region	2000 (%)	2014 (%)
Sub-Saharan Africa	11	12
Oceania	16	30
Central and Southern Asia	28	37
Eastern and South-Eastern Asia	44	59
Latin America and the Caribbean	78	86
Northern Africa and Western Asia	80	89
Europe and Northern America	97	99
Australia and New Zealand	100	100
World	50	57

Proportion of the population with access to electricity, by residence and total, 2000-2014 (percentage)

Year	Urban (%)	Rural (%)	Total (%)
2000	94.7	77.6	63.1
2005	95.4	80.2	66.1
2010	96.2	83.6	70.2
2014	96.3	85.3	73.0

KEY INSIGHT

Energy companies should continue to ensure that their contributions to the development of the countries where they operate are tangible and complementary to the efforts of the respective governments. Energy companies therefore need to ensure that their interests are aligned and consistent with the priorities set by the countries, in their 2030 development agendas (referred to as Vision 2030 by several countries).

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The role of Energy in perspective

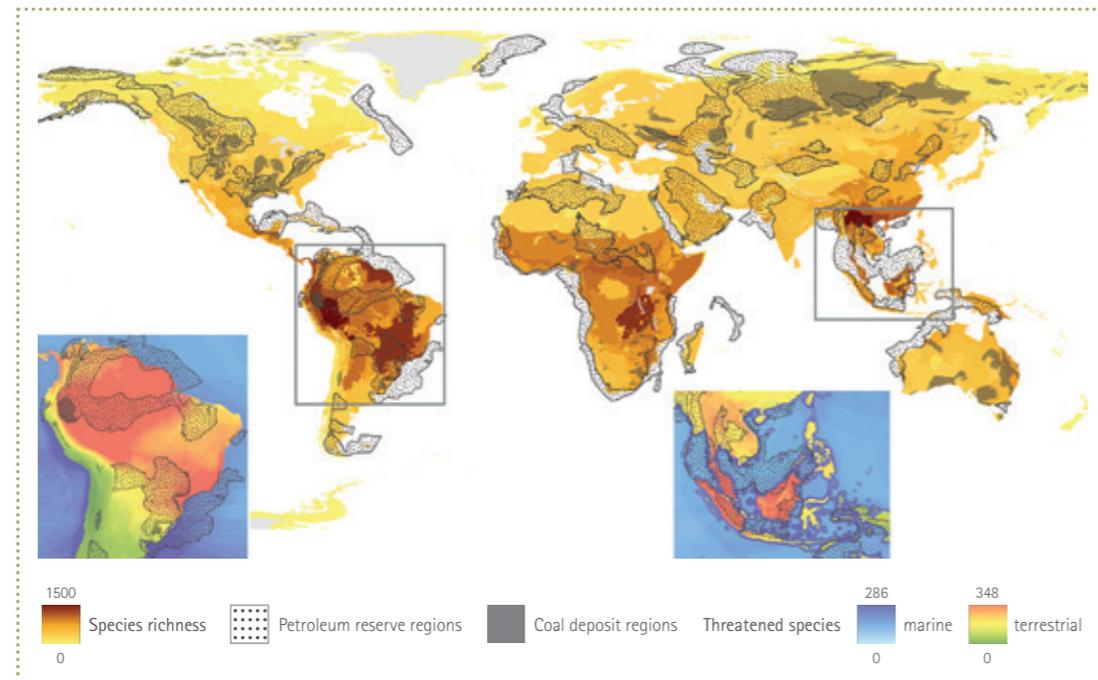
THEME TWO ENERGY AND ENVIRONMENTAL CONCERNS

GOAL 13 Take urgent action to combat climate change and its impacts.

GOAL 14 Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

GOAL 15 Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss.

Overlaying regions of threatened species and natural resource extraction



The negative impacts of energy development, production and utilization on air, land and human health constitute the major drawback to the energy industry's contribution to sustainable development. These impacts on biodiversity and the ecosystem, coupled with the finite nature of non-renewable natural resources, provide credence to those who argue that the extractive industry should only get a license to operate if they are applying best practice to protect the environment. There is also increasing advocacy that other interests, such as, protection of sensitive environments, national parks or indigenous people, should have priority over natural resource extraction. However, the extractive industry has made significant progress in recent years, in good operational practices and advances in responsible environmental management. This is receiving some recognition and basis for acceptance of the contribution the sector can make to sustainable development.

The extraction of finite, non-renewable natural resources, such as oil and gas, has profound contribution to make to sustainable development, adding value across the strata of global socio-economic development and offering the opportunity for many advances in knowledge and technology.

The broader focus of sustainable development that emphasizes the human condition and quality of life issues, as well as ecological and environmental aspects, sets the key premise for sustainable development in the extractive industry: the ability of the sector to convert natural resources capital into new forms of capital, such as economic, social and human capital, all of which are essential requirements for attaining the UN SDGs.

The energy industry, in particular oil and gas, has to overcome many challenges to operating responsibly, more than most other industries, because of the high visibility and potentially far reaching consequences of the environmental impacts associated with the sector. It is in the best interest of the energy industry to do whatever necessary to prevent disastrous accidents that tend to earn the sector a bad name.

Some landmark UN Agreements and International Treaties provide the framework for developing appropriate industry strategies for addressing the ecological impacts of energy development and production from non-renewable natural resources.



2

THE ROLE OF ENERGY IN PERSPECTIVE | T2: ENERGY AND ENVIRONMENTAL CONCERNS

CLIMATE CHANGE

We do not need to look too far into the future to realize that responding to climate change is one of the greatest challenges facing the global energy industry. When 196 countries that are Parties to the United Nations Framework Convention on Climate Change (UNFCCC) adopted the Paris Agreement in December 2015, it represented a major breakthrough. After more than 20 years of negotiations, the world agreed on a blueprint on how to keep global climate change well below 2 degrees Celsius. The agreement is seen by many world leaders who gathered in Paris in December 2015 as the last hope for humanity to preserve the foundations for a healthy planet. Under the Paris Agreement, each country must set out a climate action plan (a Nationally Determined Contribution – NDC), which describes the targets of the country, and the means for reaching the targets. These NDCs are now front and center of the attention of any sector, company and organization that wishes to understand what role they can play in, and how they will be impacted by, the new climate policies.

The Paris Agreement recognizes the need for the widest possible cooperation by all countries and sectors of society, including the different tiers of government. The Paris Agreement is indeed a game changing outcome, as it represents a paradigm shift from the era where industry, particularly the energy industry, was largely seen as culprits to a new era where the energy industry could become part of the solution. The Paris Agreement signals that real transformation of the energy sector is the will and undertaking of all world's governments. Nobody understands what it would take to transform the energy sector better than the players within the sector, and it is promising to see the energy industry stepping up to be counted among the leading actors, as exemplified by the Oil and Gas Climate Initiative.



OIL AND GAS CLIMATE INITIATIVE

Led by the CEOs of 10 oil and gas companies



Objective:
DRIVE practical action on climate change through collaboration

Source: OGCI

REDUCING GREENHOUSE GAS EMISSIONS – POSSIBLE ACTIONS

Increasing oil and gas industry influence over emissions ↑	Reducing oil & gas industry operational emissions	<ul style="list-style-type: none"> Operational efficiency Reducing flaring 	<ul style="list-style-type: none"> Reducing methane emissions 	
	Influencing emissions from energy use	<ul style="list-style-type: none"> Efficient fuels and lubricants 	<ul style="list-style-type: none"> Switching from coal to gas industry, buildings and power 	<ul style="list-style-type: none"> Carbon capture use and storage
	Supplying low greenhouse gas alternatives	<ul style="list-style-type: none"> Natural gas in transport Offshore wind power Wave and tidal power Geothermal power 	<ul style="list-style-type: none"> Biofuels in transport Electricity & hydrogen in transport Biomass power Concentrated solar power 	<ul style="list-style-type: none"> Onshore wind power Solar PV power Nuclear power
	Engaging with others on mitigation efforts	<ul style="list-style-type: none"> Bioenergy with carbon capture* Agriculture & forestry* 		<ul style="list-style-type: none"> Buildings efficiency Transport efficiency Industry efficiency
		Low (c0.5GtCO ₂ e/yr)	Medium (0.5-1.5GtCO ₂ e/yr)	High (>1.5GtCO ₂ e/yr)

Potential contribution to greenhouse gas reduction in 2040 →

Source: OGCI

- Focus areas for collective investment by OGCI, in addition to individual company action
- Existing focus areas for OGCI member
- Other potential areas

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2

THE ROLE OF ENERGY IN PERSPECTIVE | T2: ENERGY AND ENVIRONMENTAL CONCERNS

OCEANS, SEAS AND MARINE RESOURCES

The primary instrument governing the protection of seas is the United Nations Convention on the Law of the Sea (UNCLOS). UNCLOS was adopted at the 1982 UN Conference on the Law of the Sea and came into force, after protracted negotiations, in 1994. It is the "constitution for the seas". The most comprehensive international treaty ever concluded, it establishes rules for all types of use: navigation, fishing, oil and gas extraction, seabed mining, marine conservation and marine scientific research.

While marine mining is still a vision for the future, offshore oil production, on the other hand, is a long-established industry which generates billions in profits every year. The oil industry's environmental and safety standards have been developed over a long period, generally in response to accidents or larger oil pollution incidents. In compliance with UNCLOS, most countries now have environmental legislation and regulations for offshore oil production. However, accidents and spills still occur and there is a growing concern that the number of major oil spills could

increase in future because of the trend towards drilling at ever greater depths. These incidents could become more and more challenging to control.

The relevant government authorities and the management of the companies concerned usually conduct extensive investigations to determine the causes of the incidents and lessons learned. The reports of such investigations always contain specific recommendations on corrective measures necessary to prevent future occurrence.

Merged nutrient risk indicator of large marine ecosystems projected to 2050

Legend: Lowest, Low, Medium, High, Highest, No data

Note: The global map is for illustrative purposes only and does not imply the expression of any opinion whatsoever concerning legal status of any country or territory, or concerning the delimitation of its frontiers or boundaries.

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TERRESTRIAL ECOSYSTEM, FORESTS, AND LAND

There are several UN Treaties that contain provisions to address the cluster of issues and aspects of Goal 15 of the SDGs. Table 1 lists some of the multilateral conventions that relate to forests and land.

Table 1: List of Conventions relevant to Forests and Land

Convention	Adoption (dd/mm/year)	Coming into force	Number of parties	Website
Climate change convention	09/05/1992	21/03/1994	186 (01/05/01)	www.unfccc.org
Convention on Biological Diversity	05/06/1992	29/12/1993	180 (21/06/01)	www.biodiv.org
Desertification	17/06/1994	26/12/1996	174 (15/06/01)	www.unccd.int
Ramsar Convention on Wetlands	02/02/1971	21/12/1975	124 (12/08/01)	www.ramsar.org
World Heritage Convention	16/11/1972	17/12/1975	164 (15/05/01)	www.unesco.org/whc
Ozone Layer Convention	22/03/1985	22/09/1988	177 (15/06/01)	www.unep.org/ozone
World Trade Organization	15/04/1994	01/01/1995	141 (31/05/01)	www.wto.org

International efforts to negotiate a treaty for the conservation and sustainable development of the world's forests, have failed to produce a global legal instrument in which all environmental, social and economic aspects of forest ecosystems are included. Instead, aspects of the several treaties listed in Table 1 relate to forests, with the top three on the list containing most comprehensive provisions on forests.

THE UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION (UNCCD)

The international framework set up to address the problem of desertification, is the sole legally binding international agreement linking environment and development to sustainable land management. The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found. In 2007, Parties to the Convention adopted a 10-year (2008-2018) strategy that sets out the goals:

“
to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas in order to support poverty reduction and environmental sustainability”.

The Convention is based on the principles of participation, partnership and decentralization – the backbone of good governance and sustainable development. National Action Programmes (NAP) are one of the key instruments in the implementation of the Convention. They are developed in the framework of a participative approach involving the local communities and they spell out the practical steps and measures to be taken to combat desertification in specific ecosystems.

The Convention provides opportunities for energy companies to collaborate with its 195 parties and local communities, and work together to improve the living conditions for people in drylands, to maintain and restore land and soil productivity, and to mitigate the effects of drought.



THE CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

Is an international legally binding treaty with three main goals: conservation of biodiversity; sustainable use of biodiversity; fair and equitable sharing of the benefits arising from the use of genetic resources. Its overall objective is to encourage actions which will lead to a sustainable future.

However, despite the international efforts through the CBD, biodiversity continues to disappear at an alarming rate. While oil and gas exploration and production is often not the biggest threat to biodiversity in an area, it can have a wide range of negative impacts on ecosystems, including soil, air and water

contamination, habitat fragmentation and conversion, deforestation, erosion and sedimentation of waterways. These are areas that receive increasing attention in impact assessments, regulatory compliance and corporate social responsibility initiatives.

KEY INSIGHT

Several UN treaties highlight the key aspects and impacts that energy companies need to pay attention to, as well as providing a useful framework for forging strong private/public partnerships. These partnerships create bridges between national policies, establish a normative base for cooperation and cohesion, and provide necessary infrastructure for collective rule-based approaches. Energy companies should continue to be actively engaged in the multilateral processes at domestic and international levels, to ensure that they are proactive in making that which is necessary possible. Also, there is need for extractive industry to continuously deploy and advance best practices to protect and contribute to the conservation of the environment, so as to continue to improve on the public image of the sector and earn a de facto CSR license to operate.

The role of Energy in perspective

THEME THREE ENERGY AND SOCIO-ECONOMIC DEVELOPMENT

- GOAL 7 Ensure access to affordable, reliable, sustainable and modern energy for all.
- GOAL 8 Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
- GOAL 9 Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.
- GOAL 11 Make cities and human settlements inclusive, safe, resilient and sustainable.
- GOAL 12 Ensure sustainable consumption and production patterns.

Despite several attempts to decouple economic growth and energy consumption, the two seem to be linked in a feedback loop: increased energy access fosters income growth, while energy use tends to increase with income. In developing countries with low levels of access to modern energy services, energy is regarded as a resource to fuel economic growth. The influence of energy access on GDP and income growth in developing countries is well documented.

The World Health Organization estimates that, over a ten-year period, if half of the global households that still use traditional fuels and stoves switched to cleaner cooking sources, there would be an aggregate saving for families of \$34bn per year and an economic return of \$105bn per year.

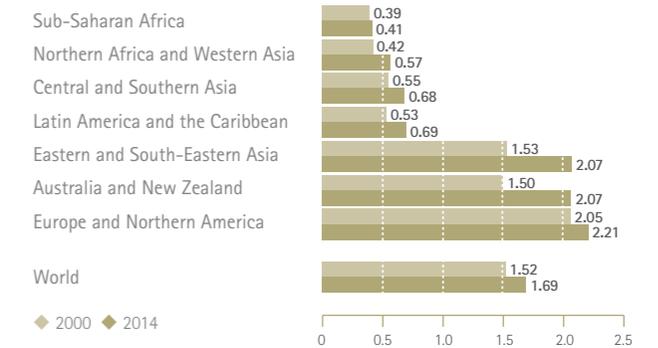
The economic effects of energy development include higher government revenues and job creation, contributing broader regional prosperity. Industry clusters can help diversify the local industrial base and spur innovation. Through cluster-based development, economically successful regions have knitted together companies, teaching and research institutions and different levels of government to create uniquely competitive industries.

RESEARCH AND DEVELOPMENT (R&D)

It is estimated that global energy sector research and development spending was over \$65 billion in 2015, with China overtaking Japan as the world's top spender on energy R&D as a share of GDP.



Research and development expenditure as a proportion of GDP, 2000 and 2014 (percentage)



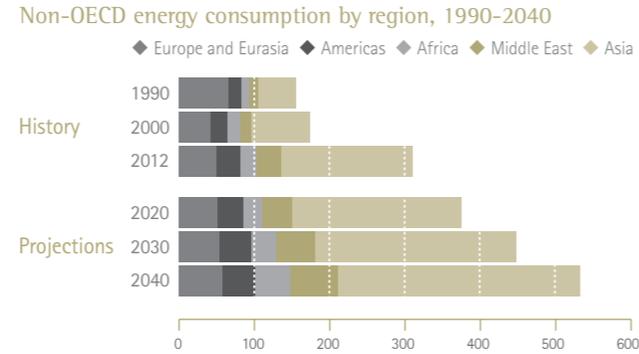
JOB CREATION

Employment in oil and natural gas production extends far downstream into other manufacturing processes. In addition to jobs created through direct employment, more jobs are created by indirect employment through a long supply chain, as well as induced job creation through greater spending of natural resource revenues by governments. Also, those that are directly and indirectly employed by the sector spend their salaries on locally produced goods and services, contributing further to job creation. On average, the oil and gas industry typically demonstrates an employment multiplier greater than three, meaning that for every direct job created in the oil, natural gas and related industries, three or more indirect and induced jobs are also created across the economy.

This however, should be seen in the context of the transformation of the energy services that is now taking place in several countries, particularly in the OECD. Coal is on its way out in the USA thanks to shale gas. More people are now employed in renewable energy than in coal. Many European countries have decided to completely decarbonize their energy systems before 2050. Diesel vehicles are banned from an increasing number of cities in Europe and the sale of fossil fuel vehicles are planned to be banned from 2030 in Germany with other countries following suit. Vehicle manufacturers are already considering a shift in their production models. There is no doubt that this energy revolution will present challenges but also many opportunities for the energy sector. Old jobs and systems may disappear but new ones will surely emerge.

SUSTAINABLE CITIES

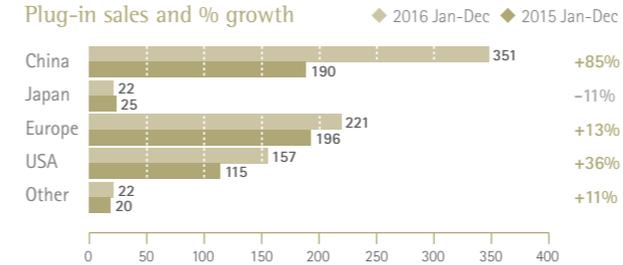
We see rising prosperity and increased urbanization creating sprawling cities, with increasing demand for more residential and commercial buildings, and of course these new buildings will require energy. Commercial energy demand is estimated to increase by 40 percent by 2040. Most of this growth will occur in non-OECD countries, where commercial energy demand is expected to double, including an increase in electricity demand of more than 150 percent. The introduction of compact fluorescent lights – and, more recently, LED lights – is helping to reduce growth in demand associated with lighting.



TRANSPORT SECTOR

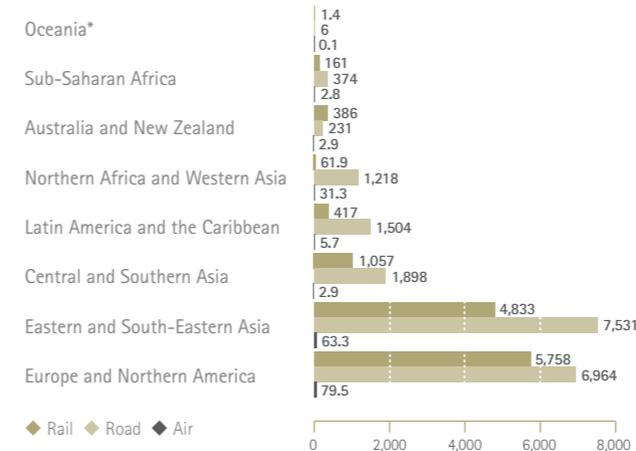
Sustainable transport is an integral part of the development agenda of many countries. Since transport is responsible for 23% of global energy related greenhouse gas emissions, it is recognized that promoting sustainable transport is a necessary part of addressing the impact of climate change. We are seeing a

rise in the use of electric vehicles (EVs), with some countries and manufacturers already setting ambitious targets for the proportion of EVs in the production and sales of new motor vehicles.



Volumes of plug-ins – electric cars that can be recharged from an external source – have more than tripled since 2013, and if the trend of last year's growth rate of 42% continues, 8 out of 10 cars sold by 2030 could be plug-ins. It appears that what is inconceivable today is not impossible in the near future. While the global picture still shows just a current 0.85% market share, in some markets, the share of EVs has risen significantly. Norway had a 24% plug-in share in 2016, Netherlands 5% and Sweden 3.2%.

Freight transport by rail, road and air, 2015 (billions of freight tonnes-kilometres)



FUELLING INDUSTRIALIZATION

By 2040, industrial energy usage is projected to rise by about 30 percent above the 2014 level. Most of this growth is expected to come predominantly from two subsectors – heavy industry and chemicals. Energy demand in the chemical sector alone is expected to rise by about 50 percent, with most of the increase occurring in China, India and other key emerging countries. The United States is also likely to see demand growth as its chemical industry expands to capture the benefit of rising shale gas and tight oil production. The growth impact on demand in the chemical sector is twofold, since chemical producers use oil and natural gas, both as fuel and as feedstock.

In keeping with energy-efficiency trends in homes and cars, industries are striving to "make more with less" through new technologies and processes. For example, the World Steel Association estimates it takes about 60 percent less energy to produce a ton of crude steel today than it did in 1960. According to the International Energy Agency (IEA), the energy intensity of producing cement will improve by 0.5 percent per year as optimization and modified production processes continue to be more widely adopted. Industrial efficiency has improved in all regions. But the most dramatic change has been in China, where energy intensity of the industrial sector has improved markedly over the past 20 years.

ENERGY DEMAND IN THE HEALTH SECTOR

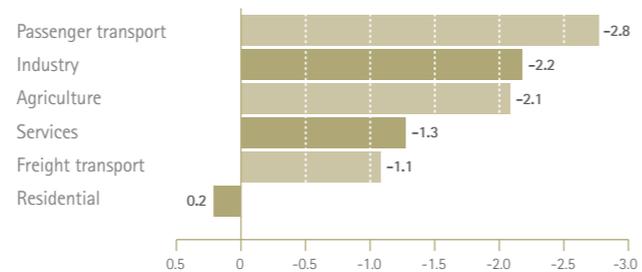
Square meter by square meter, hospitals use twice as much energy as office buildings. In the United States, healthcare is the second most energy-intensive industry, after food service and sales, with energy costs estimated to be as high as \$6.5 billion a year. This number continues to rise, with an increasing need for medical services as the country's 78 million baby boomers age.

Epidemiological studies indicate that the steady effects of a warming climate will lead to an increase in infectious and chronic conditions, such as allergies and respiratory disease, resulting in further upward trend in energy demand in the

health sector. In order to mitigate the growing energy demand, the health sector is relying more and more on alternative energy sources, with predictions suggesting that hospitals in the US, for example, could shift up to 30% of their energy requirements to renewables, like wind and solar, without sacrificing quality of care. Furthermore, the manufacture of pharmaceutical precursors from synthetic sources other than petroleum puts a little damper on growth in energy demand in the health sector.



Compound annual growth rate of final energy intensity in end-use sectors, 2012-2014 (percentage)



KEY INSIGHT

Energy, particularly the hydrocarbons, has played a crucial role in industrialization since the beginning of the last century. This trend will continue well into the future. However, the sector will need to adapt rapidly to a changing business climate and continue to innovate and diversify. As we continue to move towards a world of collective green growth based on the appropriate energy mix for each country, developing countries as well as the very large energy consumers like the USA, China, Japan and others need to have all sources available to them as part of their sustainable development strategies. This needs to be enhanced by technological developments and innovative approaches to address environmental and operational challenges.

The role of Energy in perspective

THEME FOUR ENERGY AND ETHICAL ISSUES & PRINCIPLES

GOAL 5 Achieve gender equality and empower all women and girls.

GOAL 10 Reduce inequality within and among countries.

GOAL 16 Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.



By 2015 the world had overcome some of what seemed, 25 years ago, to be its most daunting challenges. Yet even with this commendable progress, the world still faces many complex development challenges, such as lingering deprivations and deepening inequalities.

Basic human deprivations are common among various groups. Women and girls, ethnic minorities, indigenous peoples, persons with disabilities, migrants – all experience deprivations in the basic dimensions of human development.

An analysis of LinkedIn recently showed that women make up only 26.7% of all oil and gas industry profiles on the professional networking site. This was the lowest percentage of any of the dozen industries examined. Healthcare had the largest percentage, at about 59.8%, and technology companies came in the middle of the pack, at 30.6%.

The situation with the representation of women at the board level is even bleaker. About 14% percent of the boards of the 200 top global utilities include women, and only 5% in the US, according to a recent report from Ernst and Young. Companies are now paying increasing attention to diversity, spurred in part by a looming talent crunch. The business case for diversity is also clear. The return on equity – a measure of company profitability – of the 20 most diverse utilities was 8.5%, compared to 7% for the lower 20, says Alison Kay, Global P&T Leader at Ernst and Young.

The energy industry recognizes that globally women remain significantly under-represented in the sector, especially in leadership roles. There are several initiatives by energy companies to address gender inequalities. For example, the Women's Oil Council initiative was established to provide a forum to promote female leadership. It is also a forum to discuss issues affecting women in the industry and provide networking and accelerated career development opportunities at a senior level. Partners in the Council include leading oil and gas companies such as Shell, BP and Tullow. Some companies also have internal programmes focused on the career advancement of women, such as Occidental Petroleum's Women of Oxy Network, which provides networking opportunities and professional development to more than 300 women.

KEY INSIGHT

Energy companies should strive to remain in the forefront of promoting responsible and ethically sound business approaches. With an increasing spotlight on the impacts of resource explorations on communities, it is important that energy companies continually demonstrate their ability to transform. Addressing gender inequality provides an opportunity for scaling up the existing initiatives into an industry-wide global programme that scouts for promising young female students and brings them on a fast track with a guaranteed employment in energy companies at the end of their academic studies.

The role of Energy in perspective

THEME FIVE PARTNERSHIP FOR DEVELOPMENT

GOAL 17 Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development.

The High-level Political Forum on Sustainable Development (HLPF) is the United Nations' central platform for follow-up and review of the 2030 Agenda for Sustainable Development, including the Sustainable Development Goals (SDGs).

Voluntary National Reviews (VNRs) are an integral aspect of the High-level Political Forum. They provide a broad platform for partnerships, enabling the participation of major groups and other relevant stakeholders and the exchange of experiences – including successes, challenges, and lessons learned – with the objective of accelerating implementation of the 2030 Agenda.

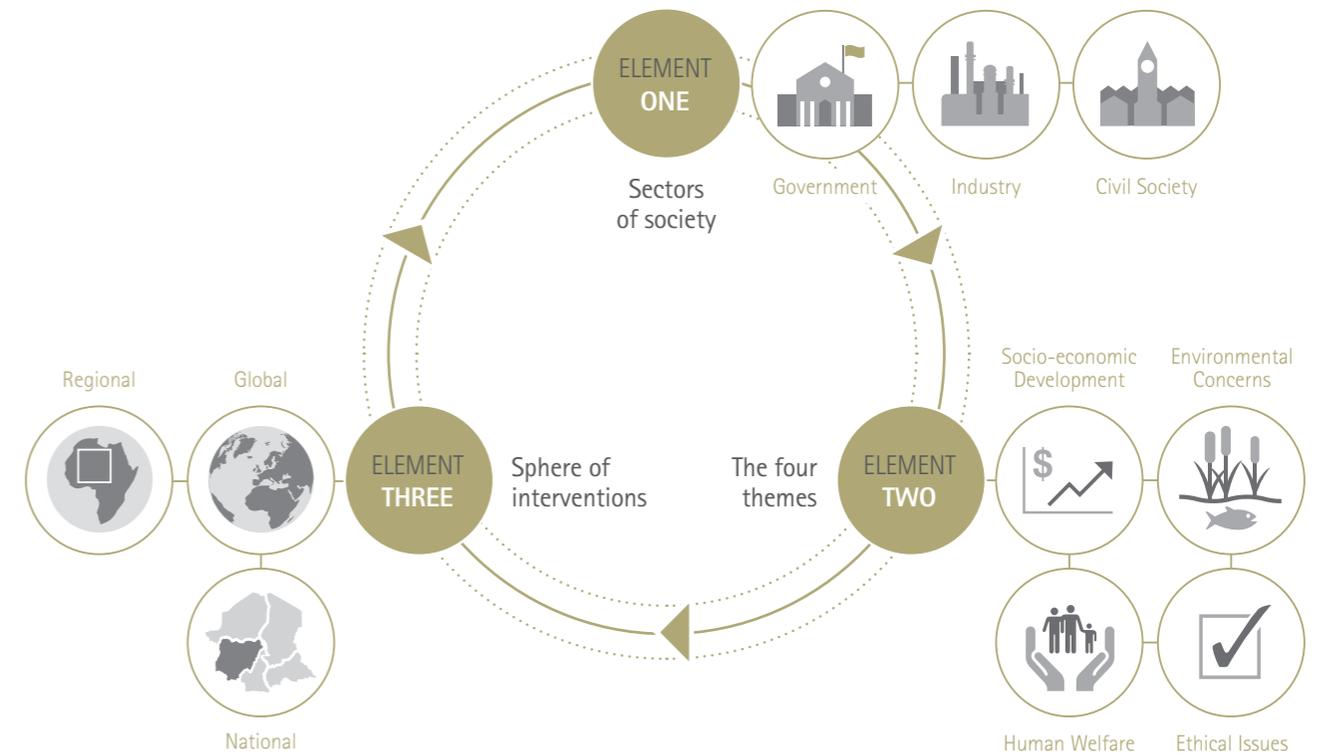
The 2030 Agenda for sustainable development requires efforts in several fronts and from all sectors of society. Moving towards universal human development requires governments, private sector and civil society working together to address the dimensions of the Sustainable Development Goals (SDGs), at national, regional and global levels.



“

The 2030 Agenda for sustainable development requires efforts in several fronts and from all sectors of society.”

PARTNERSHIP FRAMEWORK



The energy industry, particularly the oil and gas sector, is involved in several partnership initiatives as shown in Table 2 below.

Table 2: Partnership initiatives involving the energy industry

Name	Description
The Energy and Biodiversity Initiative (EBI)	The Energy and Biodiversity Initiative has developed a guidance tool for integrating biodiversity conservation into upstream oil and gas development that is broadly accepted by industry and the NGO community.
The IMO/IPIECA Global Initiative (GI)	The IMO/IPIECA Global Initiative is an umbrella program under which the partners bring together relevant national/regional actors from both government and industry to develop and implement sustainable oil spill contingency plans and promote the ratification of oil spill-related international conventions.
Partnership for Clean Fuels and Vehicles (PCFV)	In 2001 the PCFV brought together partners from governments, automotive industry and the oil and gas sectors to jointly set a goal to phase out lead. In December 2005, the PCFV celebrated the phasing out of lead in sub-Saharan Africa.
Carbon Capture Project (CCP)	The CCP partnership enables industry experts to work with government agencies to develop technologies to reduce costs and improve efficiencies of CO2 capture, and to demonstrate that storage can be safe and secure.
Global Gas Flaring Reduction (GGFR)	Since its inception in 2002, the GGFR partnership has developed a global voluntary flaring and venting standard that has gained broad global acceptance. The partnership, involving governments, oil and gas companies and the World Bank as a 'neutral broker', also assists countries to implement this and other global programs at a national level.
The Extractive Industries Transparency Initiative (EITI)	This collaborative effort among oil and gas companies, NGOs and governments has succeeded in bringing wide acceptance that knowing what governments receive in revenues, verified by what companies pay, is a critical first step towards holding decision makers accountable for the use of those revenues.
The Voluntary Principles on Security and Human Rights (VPSHR)	The Voluntary Principles on Security and Human Rights partnership has enabled government, industry and NGO partners, sometimes in opposition to one another, to identify common interests and work together constructively to address security and human rights concerns at a global level.

Source: IPIECA

The global level partnerships are complimented by a plethora of partnership initiatives in many countries. Through such partnerships, the oil and gas sector has been able to gain the trust and buy-in of governments and civil society, in several industry best-practice guidelines and voluntary standards.

The partnerships have enhanced the involvement of civil society in the identification and implementation of well-targeted corporate social responsibility programmes, as well as the contribution and participation of the oil and gas sector in international fora.

Conclusion

We are living in a globalized world where human development outcomes are determined not only by actions at the national level, but also by the structures, events and work at the global level. Over the past quarter-century there has been impressive progress on many fronts in human development, with people living longer, more people rising out of extreme poverty and fewer people being malnourished. Human development has enriched human lives, but unfortunately not equally, and even worse, not every life. It is not by chance but by choice that world leaders in 2015 committed to a development journey that is all encompassing, based on the premise of the 2030 Agenda. The world has fewer than 15 years to achieve its bold and all-inclusive agenda to close the human development gap.

spontaneous settlement, agricultural activities and infrastructure development. The challenge to society in the coming years will be to ensure continued development to help the billions of people now in poverty, while at the same time managing the necessary oil and gas activities in order to mitigate the negative impact on the environment and valuable ecosystems on which all people depend.

Energy companies are now finding that, in addition to legal and regulatory incentives to operate in an environmentally responsible manner, there are also strategic, operational, reputational and financial reasons as well. For many companies, especially those that operate internationally, environmental and social issues have as much potential to harm their bottom line as financial issues. The challenge for energy

The Abdullah Bin Hamad Al-Attiyah International Foundation for Energy and Sustainable Development undertook to publish this publication to emphasize how the energy industry is contributing, and can continue to contribute, to global efforts to attain sustainable development for all by 2030. In pursuit of its vision and mission, this is one of the important areas in which the Foundation is committed to working, in partnership with like-minded organizations, to ensure sustainable extraction and utilization of natural resources, in an environmentally responsible manner.

It is not surprising to see that there have been numerous published reports on human development since the era of the Millennium Development Goals (MDGs), which were the precursor of the SDGs. However, most of these reports present discussions of major development issues at a general level. In this publication, a specific spotlight has been focused on energy, particularly on the oil and gas sector.

Oil and gas exploration and production are often pioneer economic activities in relatively undeveloped areas, and can lead to further economic and social activities, including migration,

companies is to balance the public demand for abundant, low-cost oil and gas products, with society's expectation for corporate social and environmental protection.

Appendix

References

The UN Sustainable Development Goals

- GOAL **1** End poverty in all its forms everywhere
- GOAL **2** End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- GOAL **3** Ensure healthy lives and promote well-being for all at all ages
- GOAL **4** Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- GOAL **5** Achieve gender equality and empower all women and girls
- GOAL **6** Ensure availability and sustainable management of water and sanitation for all
- GOAL **7** Ensure access to affordable, reliable, sustainable and modern energy for all
- GOAL **8** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- GOAL **9** Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- GOAL **10** Reduce inequality within and among countries
- GOAL **11** Make cities and human settlements inclusive, safe, resilient and sustainable
- GOAL **12** Ensure sustainable consumption and production patterns
- GOAL **13** Take urgent action to combat climate change and its impacts
- GOAL **14** Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- GOAL **15** Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- GOAL **16** Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- GOAL **17** Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

- 1** BP, 2017. Energy Outlook
- 2** ExxonMobil Corporation, 2017. Outlook for Energy: A view to 2040. Texas, ExxonMobil.
- 3** United Nations Development Programme (UNDP), 2016. Human Development Report 2016 – Human Development for Everyone. New York, UNDP.
- 4** World Health Organization (WHO), 2015. World Health Statistics 2015.
- 5** World Bank Group, 2016. Global Monitoring Report 2015/2016 – Development Goals in an Era of Demographic Change. Washington DC, World Bank Group.

For more information, visit the following websites:

<http://www.energymix.co.nz/our-consumption/>

<http://www.un.org/en/index.html>

<https://ourworldindata.org/>

<http://www.oilandgasclimateinitiative.com/>

<http://www.sdgindex.org/assets/files/2017/2017-SDG-Index-and-Dashboards-Report--full.pdf>



An aerial photograph of a coastline, showing a sandy beach on the left and a rocky shore with white surf on the right. The water is a deep green. A dotted white geometric pattern, consisting of various polygons, is overlaid on the entire image. A small figure of a person is visible on the beach.

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