Sustainable Energy for All:
Opportunities for the
Oil and Gas Industry
Acknowledgements

The findings presented here are the result of research, interviews, and focus groups conducted in support of the development of the Sustainable Energy for All initiative by the UN Global Compact and Accenture. More than 70 companies across 19 industries—primarily UN Global Compact LEAD companies and Caring for Climate Signatories—contributed to these findings. Specific to the oil and gas industry, the following companies and organizations provided valuable input and contributions: Aequitas Resources Holdings, Eni, IPIECA, Royal Dutch Shell, Statoil and Total.

Contents

Preface 3
Summary 4
The Importance of Sustainable Energy for the Oil and Gas Industry 6
Priority Actions for the Oil and Gas Industry 10
Preface

In support of the United Nations Secretary General’s Sustainable Energy for All initiative, the United Nations Global Compact and Accenture have partnered to identify the most important actions the private sector can take across nineteen different industries to advance the primary objectives of the initiative while simultaneously driving business value.

This body of work includes an introductory report that discusses the relationship between the initiative and the private sector in a broad sense, as well as 19 individual “Industry Opportunity” documents. In total, the objective is to provide guidance and to inspire companies across all industries to take action in pursuit of sustainable energy and benefits for their own companies.

This document provides an analysis of the opportunities Sustainable Energy for All presents to the oil and gas industry. It identifies specific priority actions oil and gas companies can take to advance the three objectives of the initiative—energy access, energy efficiency, and renewable energy—while also driving increased business value.

The priority actions identified for each industry are aligned to the vision and objectives of the Sustainable Energy for All initiative. They span multiple modes of engagement—operations, products and services, social investment and philanthropy, and advocacy and public policy engagement—and represent four different ways that businesses can create value: revenue growth, cost reduction, brand enhancement, and risk management.

As United Nations Secretary General Ban Ki-Moon wrote prior to the 2012 World Future Energy Summit, “Energy transforms lives, businesses and economies.... To succeed, we need everyone at the table—governments, the private sector, and civil society—all working together to accomplish what none can do alone.... The obstacles are not so much technical as human. We need to raise sustainable energy to the top of the global agenda and focus our attention, ingenuity, resources, and investments to make it a reality.”

Addressing the world’s energy needs is a way to advance society and also to advance sustainable value creation for the oil and gas industry – while balancing positive economic, environmental, and social gains across the globe.

About the Oil and Gas Industry

The oil and gas industry is a complex industry with a supply chain that often cuts across multiple geographies. It is one of the world’s largest and most capital-intensive industries and produces end products such as fuel oil, natural gas and gasoline but also the raw material for many chemical products. In addition, business ownership models in the industry range from small and medium independents to large major integrated oil and gas companies to national (or government owned) oil and gas companies. The industry has three major segments: exploration and production of oil and natural gas (upstream); transportation, storage, and trading of crude oil, refined products, and natural gas (midstream); and refining and marketing of crude oil (downstream).
Summary

The ambitious goals of the United Nations Sustainable Energy for All initiative will require commitment and vigorous action from the private sector to drive investment, increase innovation in products and services, and increase operational efficiencies. The oil and gas industry has opportunities both to contribute to the broader social goals of the initiative and to realize enhanced business value in the areas of revenue growth, cost reduction, brand enhancement, and risk management.

The oil and gas industry sits directly at the heart of the production and consumption of energy. About half of all energy supplied to the world is provided by oil and gas and energy demand is expected to continue to grow. Although recent economic turmoil has reduced energy consumption the past few years, 2010 saw a strong rebound with consumption growing 5.6%, the highest rate since 1973 across all forms of energy and all regions but 2011 was more in line with historical average growth of 2.5%.

The oil and gas industry is energy intensive and requires significant amounts of energy to extract resources from the ground, process them, and transport them to the end-user. Although fossil fuels will continue to dominate global energy use for the foreseeable future, the oil and gas industry can still affect change along the supply chain by promoting national energy plans, investing in new renewable fuels, and increasing efficiency in their own operations.

For oil and gas companies to advance their business opportunities related to access to energy, energy efficiency, and renewable energy, the industry should focus on five priority actions—mapped to the business value levers, objectives and engagement modalities of Sustainable Energy for All:

<table>
<thead>
<tr>
<th>Priority Industry Actions</th>
<th>Business Value Levers</th>
<th>Objectives</th>
<th>Engagement Modalities</th>
</tr>
</thead>
</table>
| Use more renewable energy sources and emphasize energy efficiency throughout the entire fuels supply chain. | • Cost Reduction  
• Risk Management | • Energy Efficiency  
• Renewable Energy | • Core Business: Operations |
| Reduce the flaring of gas from operations and identify opportunities to reuse captured gas on-site or provide energy to local communities. | • Revenue Growth  
• Cost Reduction  
• Risk Management | • Energy Access  
• Energy Efficiency | • Core Business: Operations  
• Social Investment and Philanthropy |
| Invest in research and development and utilize core competencies to bridge the gap from fundamental research to commercialization of liquid renewable transportation fuels and renewable generation technologies. | • Revenue Growth  
• Risk Management | • Renewable Energy | • Core Business: Products and Services |
| Promote international trade in sustainable energy products. | • Revenue Growth  
• Risk Management | • Energy Access  
• Energy Efficiency  
• Renewable Energy | • Advocacy & Public Policy Engagement |
| Use innovative business models and create new products and services to improve energy affordability and to enable access to clean cooking and heating solutions. | • Cost Reduction  
• Risk Management | • Energy Access | • Core Business: Products and Services  
• Social Investment and Philanthropy |
What Is Sustainable Energy for All?

Under the leadership of Secretary-General Ban Ki-moon, the United Nations is mobilizing key constituencies from the private sector, public sector, and civil society in a major global initiative, Sustainable Energy for All. The goal of the initiative is to catalyze action around three clear objectives to be achieved by 2030:

• Energy access: Ensuring universal access to modern energy services.

• Energy efficiency: Doubling the global rate of improvement in energy efficiency.

• Renewable Energy: Doubling the share of renewable energy in the global energy mix.

The Sustainable Energy for All initiative strives to mobilize bold actions and large-scale investments by fostering the enabling conditions for success, supporting cooperation and coordination across sectors, and tapping into a broad array of businesses and financiers. The initiative has the capacity to leverage a rapidly expanding knowledge network, disseminate ideas, and monitor progress toward the initiative's objectives. It can "change the terms of engagement" by introducing new public-private partnerships based on synergies across relevant sectors of the economy and engendering constructive dialogue on policy, investment, and market development by governments, businesses, and civil society.

Sustainable Energy for All provides a clearly articulated global vision for sustainable energy and brings together the unparalleled global convening power and reach of the United Nations, which will help build consensus, drive a common agenda, and coordinate the actions of multiple entities at both the global level and the national levels, helping all entities work toward shared and mutually beneficial goals. Sustainable Energy for All brings together all relevant stakeholders in the sustainable energy area—the public sector, private sector, and civil society—on a common and open platform for communication and collaboration.

For more comprehensive information about Sustainable Energy for All, please go to: http://www.sustainableenergyforall.org/
The Importance of Sustainable Energy for the Oil and Gas Industry

The Oil and Gas Industry: Highly Energy Intensive

The oil and gas industry is at the heart of the global energy market as one of two industries (the other being utilities) that produce and supply the majority of energy used by society.

Demand for energy is growing, and this growth is expected to continue due to population growth and global higher standards of living. Although recent economic turmoil has reduced energy consumption during the past few years, 2010 saw a strong rebound with consumption growing 5.6 percent, the highest rate since 1973 across all forms of energy and across all regions but 2011 was more in line with historical average growth of 2.5%. The transport sector, which is the primary consumer of fuels produced by oil and gas companies, is the main contributor to growth in demand, with car markets expanding substantially in non-OECD economies. Transportation accounts for approximately one quarter of global energy use. This is projected to increase by nearly 50 percent by 2030 and by more than 80 percent by 2050 in the absence of new regulations.

A key component of the oil and gas business model is the ability to evaluate investments and development activities over a very long time horizon. It is in a position to use this expertise to help governments develop new or optimize existing energy plans. To assist national governments in developing effective, multi-stakeholder energy strategies, the oil and gas industry can be an important partner when it comes to investment and financing, capability and capacity development, and long-term strategic planning – in addition to program implementation and execution.

Innovation in the Oil and Gas Industry

Based on the position of the oil and gas industry in the energy value chain, it has the potential to affect significant change related to sustainable energy. Three particular areas of importance are: cooperation with policy makers and regulators to develop national energy plans, increasing operational energy efficiency, and investing in new renewable fuels and renewable energy generation.

The oil and gas industry is committed to investing in new technologies to meet energy demand and the challenges of sustainability. The industry is investing heavily in the research and development of new technologies to improve efficiencies in operations. The industry is also at the forefront of creating the next-generation of advanced biofuels and large-scale offshore wind; developing and advancing renewable technologies from pilot project to scale.

There are several innovation trends taking shape in the oil and gas industry to address sustainable energy opportunities and market development:

- The creation of the "new, fully optimized" digital oil field with more sophisticated information technology - using distributed sensors, high speed communication and data mining techniques to use real-time data to make better decisions and to get more barrels out of each asset.
- Energy efficient technologies to access and process hard to reach, lower quality, and new types of oil and gas.
- Development of alternative and advanced fuels and renewable energy generation technologies.

These innovations can be combined to create high performing, efficient companies and help to expand the use of renewable and clean liquid transportation fuels and renewable energy generation.
When it comes to improving energy efficiency, the oil and gas industry has achieved some success over the last few decades. "According to data from the International Energy Agency, the energy intensity of oil refining has fallen by 13 percent since 1980 in OECD countries (where reliable data is more readily available), due to improvements in processing efficiency."\(^5\) Even with this increase in efficiency, the oil and gas industry is very energy intensive—requiring significant amounts of energy for extraction, processing, and transportation. According to one study the energy consumed by the oil and gas industry amounts to approximately 10 percent of gross oil and gas production.\(^6\)

While the energy intensity of refining has fallen since 1980, the energy intensity of oil and gas extraction has been increasing—by approximately one-third since 1980 in OECD countries—despite heavy investments to improve efficiency (based on 2004 Survey Data from the International Association of Oil and Gas Producers).\(^7\) This trend is expected to continue, as many of the new unconventional resources (shale gas, oil sands, etc.) being identified and developed will require more energy than traditional resources to be commercialized and brought to market. In addition, conventional oil is also increasingly harder to find and extraction from mature fields is requiring more energy.

From a renewable energy perspective, new sources and supplies of renewable energy continue to grow rapidly. In 2010, global biofuels production increased by 13.8 percent, constituting one of the largest sources of liquids production growth in the world.\(^8\) The oil and gas industry is a key component of this growth as it looks to diversify. Many oil and gas companies consider themselves energy companies, and are positioning to bring a varied and diverse set of products that create energy to market – regardless of their origin. Oil and gas companies are also using their core capabilities and current business positions to create profitable positions in renewable energy generation such as geothermal and offshore wind.

Oil and gas companies can also play a more active role in producing low-carbon fuels such as natural gas which can contribute significantly to the Sustainable Energy for All objective of providing universal energy access, and leading the development of new technologies to reduce carbon in their operations, methods such as carbon capture and storage.
The Business Opportunity Presented by Sustainable Energy for All

In taking actions to advance the three objectives of Sustainable Energy for All, the extent of this unprecedented, rapid change will provide companies with new opportunities to drive sustainable business value in a manner that aligns to their core strategies. To seize these opportunities, there are four engagement modalities companies can address as they implement the identified priority actions:

1. Core Business - Operations: Businesses can transform their operations through increased energy efficiency and the use of renewable energy alternatives.

2. Core Business - Products and Services: Businesses can innovate and modify their core products and services to meet the new and developing market demands for more energy efficient products, sustainable energy, and the infrastructure needed to extend energy access around the world.

3. Social Investment and Philanthropy: Businesses can identify ways to establish a strategic link between social investments and their core strategies to increase the likelihood that such activities will be sustained and able to reach scale.

4. Advocacy and Public Policy Engagement: Businesses can seek to engage governments (national, regional, or local) on relevant issues that protect competitiveness and drive opportunities, while working toward the objectives of Sustainable Energy for All.

Sustainable Energy for All provides a platform to address global financial, social, and environmental concerns associated with energy. Ultimately, in working toward the achievement of the three objectives of the initiative—energy access, energy efficiency, and increased use of renewables—businesses also have significant opportunities to drive sustainable value. Especially important are four value levers related to revenue growth, cost reduction, brand enhancement, and risk management.

Which Actions Will your Company Take to Drive Value?

The particular actions a company chooses to drive business value depend on a range of factors: its unique attributes and energy characteristics; its business model, corporate strategy and consumer base; and external factors such as level of regulation and economic context. Each of the priority actions in this document is aligned to one or more of the four business value levers described here.

### Business Value Levers

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<thead>
<tr>
<th>Revenue Growth</th>
<th>Brand Enhancement</th>
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<tr>
<td>• Creating new business models</td>
<td>• Showcasing innovation</td>
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<td>• Collaborating to develop new markets</td>
<td>• Collaborating to increase transparency</td>
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<tr>
<td>• Developing new products and services</td>
<td>• Improving community involvement</td>
</tr>
<tr>
<td>• Moving from products to services</td>
<td>• Engaging stakeholders</td>
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<tr>
<th>Cost Reduction</th>
<th>Risk Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Improving energy efficiency</td>
<td>• Contributing to policy agendas</td>
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<tr>
<td>• Streamlining supply chain and logistics</td>
<td>• Protecting “License to Operate”</td>
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<td>• Reducing raw material consumption</td>
<td>• Integrating risk management activities</td>
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<tr>
<td>• Changing operations to reuse waste</td>
<td>• Diversifying business model and operations</td>
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Sustainable Energy as a Value Driver for the Oil and Gas Industry

The oil and gas industry uses energy in operations to make products, but is also the main supplier of energy to end-consumers; for transport, electricity and heating. Consumer demand for energy, driven by the emerging economies, is expected to increase by 35 percent by 2035 according to the International Energy Agency, an increase likely to be met predominantly by fossil fuels. Over the next 25 years, 90% of the projected growth in global energy demand comes from non-OECD economies. In particular, the transport sector, with car markets expanding substantially in Non-OECD economies will be the key new energy demand driver. "Non-OECD car sales will exceed those in the OECD by 2020, and the global passenger car fleet is set to double, reaching almost 1.7 billion by 2035, driving up oil consumption despite impressive gains in vehicle fuel economy, increased supplies of biofuels, and deployment of electric vehicles." Yet despite the growth in demand, the oil and gas industry still faces financial pressures and must innovate in order to be competitive. In a commodity market, the oil and gas industry has been highly cyclical driven by movements in the world price of crude oil and geopolitical tensions. It has become increasingly difficult for International Oil Companies to generate growth as government control over the majority of the world’s oil reserves has made accessing new upstream resources challenging. So called, "easy oil" has been depleted and refining margins have become squeezed as more processing is necessary to treat heavy crude and produce the low-sulphur products regulations are demanding. Although there have been recent technological advancements in drilling and fracturing processes which have given a boost to the unconventional oil industry, these processes also require increased energy use.

In order to compete in these new markets, oil and gas companies will have to reduce operating costs through efficiencies and innovative technologies and diversify its product base through new renewable energy technologies.

Oil and gas companies have significant opportunities to improve the efficiency of core operations through new process designs and process economising techniques, driving business value through cost reductions based on sustainable energy initiatives. The global oil and gas industry has already made significant improvements in the efficiency of its energy use. One key area for efficiency is reduction in gas flaring. Between 2005 and 2010, flaring of gas associated with oil production has decreased worldwide by 22 percent from 172 billion cubic meters (bcm) to 134 bcm, according to the Global Gas Flaring Reduction partnership, but there is still ways to decrease these values even more.

The oil and gas industry also has an important role to play in the global sustainable energy transformation, and these sustainable energy markets represent a new and expanding business opportunity for oil and gas companies to create new revenue streams. Oil and gas companies will be leaders in advanced biofuels development as a means of diversifying, and oil and gas companies are also entering non-transportation renewable markets such as wind and solar. Oil and gas companies have already shown financial commitment in these areas: BP made a commitment in 2005 to invest $8 billion over 10 years on alternative energy but are investing at a faster pace than this, and at the end of 2011 had already invested around $7 billion, in 2010 Shell invested $12 billion to form a biofuel joint venture with Cosan S.A. and Statoil has constructed the world’s first floating wind turbine, dubbed the Hywind project, and has invested over $1 billion in offshore wind development.

Finally, oil and gas companies can help increase access to electricity for the 1.3 billion people without access by supplying society with energy such as natural gas captured from the redirection of current gas flaring streams and investing in activities that provide cleaner and more efficient cooking options for the 2.7 billion people that rely on wood, coal, charcoal or animal waste for cooking and heating. These actions not only provide for societal improvements, but they also help build brand awareness, strength, and equity. In addition, these are ways to spur and enter into local energy markets. As companies face increased geopolitical pressures in the remote areas they operate in, any opportunity to increase community development and goodwill in a country could potentially lead to improved government relations and increased access. In addition, although local markets may not be profitable in the short run, greater business opportunities will come as the energy demand grows.
Priority Actions for the Oil and Gas Industry

The following section provides detail on five priority actions the oil and gas industry can take to become more energy efficient, increase the use of renewable energy and advance their business opportunities in the sustainable energy market:

1. Use more renewable energy sources and emphasize energy efficiency throughout the entire fuels supply chain.

2. Reduce the flaring of gas from operations and identify opportunities to reuse captured gas on-site or provide energy to local communities.

3. Invest in research and development and utilize core competencies to bridge the gap from fundamental research to commercialization of liquid renewable transportation fuels and renewable generation technologies.

4. Promote international trade in sustainable energy products.

5. Use innovative business models and create new products and services to improve energy affordability and to enable access to clean cooking and heating solutions.


The oil and gas industry is committed to increasing energy efficiency in its operations and working with end-users to improve efficiency in the use of its products. Finding ways to use energy more efficiently can make a major contribution to moving the world onto a more sustainable energy path. Oil and gas companies also have a strong financial incentive to save energy, because of the large share of energy in the overall cost of operating their facilities.

The process of producing and transporting oil and gas across the fuels supply chain is very energy intensive, and significant opportunities exist to increase energy efficiency and to incorporate more renewable fuels. In 2010, according to the International Association of Oil and Gas Producers, reporting companies consumed 1.5 GigaJoules for every tonne of hydrocarbon produced with onshore being more energy intense than offshore production. Although the industry has already implemented many energy efficiency actions and in fact, the industry manages to keep energy consumption from production and supply of a standard gasoline or diesel product to less than 18% of that consumed throughout its life, there are several factors that have reduced the net impact of energy efficiency improvements and the industry can continue to be more efficient. For example, “easy oil” is no longer available and exploration and production teams need to use more energy to remove the hydrocarbons from the ground. In addition, crude has to be further processed in refineries to treat heavy crude and meet low-sulphur regulations, requiring more energy. Finally, new environmental mitigation technologies such as carbon capture and storage, although reducing carbon emissions, may also increase energy use.

Case Study: Total Ecosolutions: Designing Energy Efficient Solutions to Meet Customer Expectations

Introduced in 2009 in Europe, Total Ecosolutions is a flagship program to promote smarter, more sustainable energy consumption. It offers customers innovative solutions that perform above market environmental standards, by curbing natural resource use and/or environmental impact while providing the same level of service. Products awarded the Total Ecosolutions label comply with the principles of the ISO 14020 and 14021 standards. As of December 2011, Total Ecosolutions encompass 32 labeled products and services, including plastics, resins, adhesives, lubricants, engine fuel, heating solutions and smart meters. Products such as Fuel Economy Lubricants, the result of years of joint research with automobile makers (mainly long-time partners Renault and PSA), recently earned the Total Ecosolutions label.

According to Total’s estimates, based on a comparison with reference products and services in the European market offering an equivalent outcome for the customer, the use of Total Ecosolutions products and services avoided nearly 749,000 metric tons of carbon equivalent in 2010 (estimate based on sales in 2010). That is the equivalent amount emitted by 75,000 European Union residents in one year. Energy savings range from 5 to 33%, compared with the market standard products and services.
To make improvements in this area, oil and gas companies will need to continue to reduce waste and optimize efficiency and logistics across its entire supply chain as well as consider opportunities to use renewable energy. There are many waste streams associated with oil and gas production, only some of which are currently managed through reclamation or recovery as operational fuel. By reusing waste streams to generate energy on-site, companies can significantly lower operational costs associated with energy. There are several process or technology improvements oil and gas companies can implement across the supply chain to become more energy efficient including:

**Upstream**
Utilizing more efficient gas turbines on platforms could significantly improve efficiencies in exploration and production operations. Using electricity from the land-based grid for offshore platforms rather than gas turbines could provide opportunity to utilize grid based renewable energy, reduce CO2 emissions, and improve energy efficiency. This technology is currently being deployed in the North Sea and on the Norwegian Continental Shelf. Solar energy is also being piloted for steam generation to augment steam produced from natural gas for oil recovery. Companies are also starting to install comprehensive plant instrumentation to enable energy efficiency to be managed and improved.

**Case Study: Statoil – Improving Operational Energy Efficiency**

External benchmarks document Statoil as one of the most efficient upstream producers in the conventional oil and gas industry. Statoil has a strong focus on energy efficiency, through upgrading older facilities and field-specific energy management plans. In 2010 alone, the energy management process identified strategic energy modifications to reduce energy demand by approximately 10 MW.

Measures to improve operational efficiency include:

- advances in seismic surveying and analysis, and drilling techniques to improve drilling success rates;
- improved process operations and equipment, such as increased use of flare gas recovery systems (installed on most new platforms on the Norwegian Continental Shelf), more efficient pumps and compressor turbines and use of high-pressure pipelines to reduce energy input per unit of oil or gas transported per kilometer;
- combined heat and power to increase energy efficiency, such as the combined heat and power plant at the Mongstad refinery in Norway which started regular production of electricity in December 2010. The project increases energy efficiency of the refinery through closure of old inefficient boilers and furnaces and improved integration of process heat and increases refinery fuel gas volumes. Previously, there was no use for surplus refinery fuel gas but now the project has enabled full electrification of the Gjøa platform (in operation from 2010) via a direct power cable from the Mongstad gas power plant.
- subsea installations on the seabed such as the compression of gas on the seabed of the Åsgard field (to be completed in 2015) in the Norwegian Sea. The project is a significant and un-precedent technology advance and it improves energy efficiency and lowers costs compared with carrying out compression on platforms or on land. The closer the compression is to the well, the higher the efficiency and production rates.

Since the early 1990s, Statoil has implemented energy-efficiency measures that have helped to reduce carbon dioxide emissions by approximately 40 million tons on the Norwegian continental shelf compared with a business-as-usual scenario. These measures have been influenced by a strict regulatory regime in Norway – especially a CO2 tax introduced in the 1990s.

**Midstream / Transport**
The oil and gas transportation system is a complex network of pipelines designed to transport petroleum products from producing regions to end-use markets with considerable opportunity for energy losses. Although natural gas pipelines are more efficient than electric lines, with only 2 to 3 percent losses versus 6 to 7 percent losses, there are still areas for improvements. Key technologies for energy efficiency in midstream include controls, enterprise software, instrumentation, low-voltage products, high pressure pipelines, and efficient compressors, pumps, drives and motors.
Software and analytics could also optimize downstream distribution logistics and reduce energy consumption.

**Downstream Refining**

Petroleum refining requires tremendous amounts of energy. In the United States, for example, refining consumes more energy than any other sector of manufacturing. Some studies estimate that refineries spend 50 percent of operating costs on energy purchases. For this reason, setting achievable targets for improving energy efficiency should be a top priority for most refinery managers.

The need to reduce operating costs intensifies as refining margins decrease. Any solution that improves the conservation, recovery and use of heat will increase the refinery's efficiency; techniques such as enhanced heat integration, increased automation, energy management systems, and the use of modern catalysts can improve the energy efficiency of a refinery. Cogeneration plants, also known as combined heat and power, generate electricity almost twice as efficiently as the average power supplied by a local utility company and are key energy efficiency technologies in refineries. Even basic solutions such as improved, planned maintenance can enable equipment to operate with better energy efficiency.

**End consumer**

In many cases, consumers have perceptions about energy efficiency and about the oil and gas industry in general. Oil and gas companies, similar to automobile companies, have the opportunity to engage with end consumers to educate them on what efficient operational practices they are implementing as a company and what steps the end consumer can take to be more sustainable and energy efficient. In addition, oil and gas companies can provide energy saving products to its consumers such as lubricants and gasoline with fuel additives.

2. **Reduce the Flaring of Gas from Operations and Identify Opportunities to Reuse Captured Gas On-Site or Provide Energy to Local Communities.**

Considerable energy waste occurs in the operations of oil and gas companies. One of these sources is gas flaring associated with the production of oil. According to a World Bank report, about 150 billion cubic meters (or 5.3 trillion cubic feet) of natural gas are being flared and vented annually around the world. That is equivalent to 30 percent of the European Union’s gas consumption or 25 percent of consumption in the United States. The annual 35 billion cubic meters of gas flared in Sub-Saharan Africa alone could generate half of that continent’s power consumption. Efforts to reduce gas flaring in oil production is one example of a win-win measure to increase energy efficiency, reduce carbon emissions, and potentially increase energy access for more people.

Gas from crude oil production is flared for several reasons: if there is no gas pipeline network to bring the gas to the market; if there is no option to liquefy the gas and transport it to the market by ship, truck or rail; if the gas cannot be injected into a reservoir for pressure support or disposal; and if regulations are not in place to prevent flaring. Flaring of this gas wastes a valuable clean energy resource that can be used to reduce inefficiencies and increase energy access in many developing countries where much of the oil is produced.

Technologies exist to capture the flared gas, but gas utilization needs to be improved, as does the distribution infrastructure so that producers can unlock the value of currently wasted natural gas. As described by the World Bank Global Gas Flaring Reduction Partnership, oil and gas companies should focus on four areas of gas flaring reduction to improve energy
efficiency, expand access to energy, and contribute to climate change mitigation:

- Commercialization of associated gas requires infrastructure, pipeline networks, liquefaction facilities, and small-scale gas-to-liquid technologies for economically viable utilization on-site, and for distribution to local markets.

- Working with governments to put effective regulations in place for associated gas, and to create incentives such as Carbon Finance Funds or Clean Development Mechanisms.

- Implementation of a global flaring and venting reduction standard.

- Capacity building to obtain carbon credits for flaring and venting reduction projects.

Many partnership opportunities exist that can help oil and gas companies achieve success in this action area. For example, companies can partner with other in-region oil companies to develop infrastructure; they can partner with governments to develop regulations and standards; and they can collaborate with organizations such as the World Bank to build capacity and a framework for oil companies to collaborate on these issues globally. Many major oil companies are already partners of the World Bank Global Gas Flaring Reduction Partnership (GGFR) such as Eni, Shell, Statoil, Total and others. Although flaring is a global action area, several key geographies include Russia, Nigeria, Iran and Iraq.30

Statoil, a founding partner in the GGFR partnership, recently set a flaring intensity target for 2020 of only 2 tons per produced 1000 tons of hydrocarbons, and encourages other companies and countries to do the same. One way Statoil has supported their flaring reduction efforts is a collaborative project they formed with Pemex to reduce gas flaring on the Tres Hermanos oilfield in Mexico. This project was registered under the United Nations Framework Convention for Climate Change's Clean Development Mechanism in 2010. This was the first gas flaring reduction project to be registered as a Clean Development Mechanism by the United Nations and opens up interesting funding opportunities for similar projects globally.31

Case Study: Eni – Flaring to Power in the Republic of Congo22

Eni has a flaring down strategic plan that seeks to address the dual challenge of fighting energy poverty while tackling climate change. Between 2007 and 2011, Eni has reduced flaring by over 42%, and is investing in new energy infrastructure to bring this figure up to 80% by 2015. When fully implemented, the program will recover around 5 billion cubic meters of gas per year. Where the associated gas is used to supply the local market and produce electricity, the population gains access to a continuous supply of reliable and safe energy. This, in turn, acts as a catalyst for social and economic development. (These projects occur predominantly in Africa.)

In 2007 Eni signed an agreement with the Republic of Congo and presented a four-year plan to the Congolese authorities, setting out its commitment to produce electricity for the country from two electric power stations and phase out flaring. Gas flaring can be eliminated both by re-using the gas to produce electricity and re-injecting the gas into the hydrocarbon deposit.

The gas, which comes from the M’Boundi onshore field, is collected and transported along the 55-kilometer gas pipeline to the Djeno area, where it contributes to fueling the 50 MW Centrale Electrique Djeno (CED) and the new 300MW Centrale Electrique du Congo (CEC). CEC is not operated directly by Eni, which holds a 20% stake in the power station, while the remaining 80% is held by the Congolese government. The two power stations currently account for 60% of the country’s installed capacity, and it is distributed in the Pointe-Noire area, which has a population of approximately 700,000 people. While average electricity per capita consumption in Congo is around 157 Kwh per year, the average figure in the Pointe-Noire area in 2009 rose to 350 KWh and 462 KWh in 2010. Eni has also contributed to strengthening the national electricity network by revamping the high voltage line (220 KV) from Pointe-Noire to Brazzaville (550 km) as well as 8 electricity substations in 2011. This infrastructure will ensure that electricity will be supplied not just to the main Congolese cities, but also to numerous smaller towns. In addition, in 2010, Eni undertook the extension of Pointe-Noire’s electricity distribution network: the work is planned to be completed by 2013.

Because local workforce capacity building is critical for supporting the success of access to energy initiatives, Enipower, Eni’s power company, is offering technicians and engineers from the Congolese national power company the opportunity to work in Italy for two years to acquire skills to manage projects independently. Enipower is also advising the Congolese Government on enhancing the Network Code, which are the technical regulations governing the country’s electricity infrastructure.
**3. Invest in Research and Development and Utilize core Competencies to Bridge the Gap from Fundamental Research to Commercialization of Liquid Renewable Transportation Fuels and Renewable Generation Technologies.**

Demand for renewable fuels, particularly in the transportation sector, is currently limited. In the United States, for example, the transportation sector is predominantly a gasoline market consuming roughly 129 billion gallons of gasoline, 44 billion gallons of diesel, 11 billion gallons of ethanol, and just under 700 million gallons of biodiesel per year. However, many regions are introducing regulations to mandate a percent of renewable fuels in the transportation sector. Regulations such as the European Union’s Renewable Energy Directive and the US Renewable Fuels Standard are helping to provide certainty around percentages of renewable fuels required in the transportation fuel mix. The second US Renewable Fuels Standard (RFS2) provided dates and targets in a step-function increase, which has guaranteed a set market but has also allowed companies to ramp-up investment and production and provide check points on the maturity of the industry. Similar regulations could also promote a stable market in Asia and South America.

Although biofuels disrupt the traditional product of oil and gas companies, at a time when “easy oil” has disappeared and refining margins are shrinking, oil companies are starting to look to diversify. Oil and gas companies’ unique capabilities in refining, transporting, and marketing liquid fuels as well as access to financial resources, position them to lead the liquid renewable fuel market by bridging the gap from fundamental research to the marketplace. Oil and gas companies have made significant financial investment in this market with Brazil’s Petrobras, through its wholly-owned subsidiary Petrobras Biocombustivel, investing USD $2.5 billion, part of $4.1 billion earmarked for the biofuels business, in increasing biodiesel and ethanol production between 2011 and 2015 including ethanol logistics and research. In addition, in 2011 Shell and Cosan closed on one of the largest biofuels investments with the USD $12 billion joint venture to create the sugar cane ethanol company Raizen.

Oil and gas companies have also established several strategic partnerships outside their industry to deliver next generation biofuels. For example, Butamax Advanced Biofuels is a joint venture created by BP and DuPont. It combines BP’s expertise in fuels technology, development and infrastructure with DuPont’s leading capabilities in biotechnology. Or Chevron’s partnership with Weyerhaeuser, Catchlight Energy, which unites Weyerhaeuser’s expertise in innovative land stewardship, resource management and capacity to deliver sustainable cellulose-based feedstocks at scale with Chevron’s technology capabilities in molecular conversion, product engineering, advanced fuel manufacturing and fuels distribution.

In another example of using core competencies to advance renewable energy, oil and gas companies are utilizing their experience in offshore oil production to grow the offshore wind market. Statoil is working to reduce offshore wind costs through using their oil production offshore expertise in marine operations and logistics, procurement and offshore maintenance. Statoil has taken significant offshore wind positions over the last few years and believes their oil experience will give them a competitive edge. These positions include a 1 billion USD, investment in the Sheringham Shoal offshore wind farm in the UK that is scheduled to start operations in 2012, and securing options in the big Dogger Bank license in the UK. Statoil has also developed Hywind, the world’s first floating wind turbine.

In addition, Eni has developed a strong partnership with the Massachusetts Institute of Technology (MIT) to investigate technologies for large-scale exploitation of solar energy. The partnership gave life to the “Solar Frontiers Center” (SFC) with headquarters at MIT in Boston, a centre entirely dedicated to research and development activities on solar energy with common spaces and labs. The collaboration with MIT has originated some records, such as the realization of the first solar cell printed on paper, the ultra-flexible solar cell, as well as the development of solar cells prototypes that imitate the photosynthesis process.

Finally, through increased exploration and production of natural gas; oil and gas companies are helping to advance the integration of renewable energy into the electricity grid. Many renewables (e.g. solar, wind) are intermittent and not necessarily available when energy consumers demand them. Thus, regional electric grids with variable renewable input need quick-start electricity generation to guarantee supply to customers. Natural gas-fired turbines are used in this way because they offer the greatest generation flexibility with ramp rates of 8% per minute, something that coal and nuclear power are not well suited for.

In addition, new natural gas combined-cycle (NGCC) plants continue to improve their capabilities for responding to the intermittency of large-scale renewable generation in the system.

Renewable energy still has a high relative price compared to conventional fossil fuel energy and many policies have been created to encourage further deployment and development of these technologies such as renewable portfolio standards or incentives such as tax credits to reduce investment and production-related costs or to increase consumer demand. Yet these policies tend to have the opposite effect of scaling these technologies globally, with much of the energy generated from renewable resources being largely consumed in the nation where it is produced. Other types of protectionism such as tariffs or local content production requirements also create barriers to trading renewable energy feedstocks, end products and technologies across borders. Creating a global market for renewable energy feedstocks, end products and technologies would increase demand and encourage essential investment and research into renewable energy sources. Lowering barriers to trading renewable energy would also have a strong positive impact on access to sustainable energy.

Looking at four basic clean energy technologies, namely wind, solar, clean coal and efficient lighting, in 18 top greenhouse gas emitting developing countries, the World Bank estimated that the removal of both tariffs and non-tariff barriers, such as local content requirements and harmonization of standards, could boost trade by as much as 13 percent. A Global Agenda Council formed by the World Economic Forum in 2010 proposed a Sustainable Energy Free Trade Area aimed at removing all subsidies on fossil fuels, and eliminating tariffs and taxes on clean energy products. Although there may not currently be a global agreement in place, the United States, Canada, the European Union and Australia have been in discussion regarding eliminating tariffs on green technologies such as solar and wind power to spur their use. Similar discussions on improving environmental goods and services market access are also underway within APEC and the Group of 20 (G-20).

One sustainable market that has overcome trade barriers is the Clean Development Mechanism, overseen by the United Nations Framework Convention on Climate Change, which produces Certified Emission Reduction credits that can be traded and sold. While this market is not as tangible as biofuels or solar panels it does represent a significant exchange of sustainable energy financing across borders, even if the exchange only takes place in the form of offsets. Clean Development Mechanism offsets, although focused on reducing carbon emissions, are often produced via renewable energy projects and often provide increased energy access to underserved communities. As of spring 2012, there are now over 4,000 Clean Development Mechanism projects registered in some 74 countries worldwide, ranging from projects that reduce emissions by replacing inefficient wood stoves, to wind power projects that displace fossil fuels, to large industrial projects that avoid extremely potent greenhouse gases. Oil and gas companies can continue to support Clean Development Mechanism applicable projects such as gas flaring reduction, low emission vehicles and fuels, and clean cookstoves to increase sustainable energy trading, energy efficiency and access to energy and generate additional revenue streams.

Expanding international trade in renewable energy sources will require significant investments of economic and political capital. The impacts of removing a tariff on ethanol imports in one country would be complex and cannot be separated from the impact of ethanol-related subsidies and mandates in other countries around the world. But removing tariffs would clarify price signals to producers and would support sustainable energy production in both developed and emerging economies.
5. Use Innovative Business Models and Create New Products and Services to Improve Energy Affordability and to Enable Access to Clean Cooking and Heating Solutions.

Providing access to energy and clean cooking and heating solutions to low income populations may not always be just about new and innovative large-scale technological or infrastructure solutions, but about using a company’s core competencies, eliminating waste, adapting the industry’s traditional business model and designing products to meet the low income population needs in developed and developing economies. These actions should not be seen just as social philanthropy but as ways to expand local energy markets and potentially gain greater access to local resources through improved government relations. Although local markets may not be profitable in the short run, greater business opportunities will come as the energy demand grows and economic situations improve.

Activities across the entire supply chain; upstream and downstream, can capture and use waste streams to provide energy to local communities, in the event the surrounding community does not have energy or is under-served. Access to energy also means giving economic access to services. Low income populations (living in both urban and rural areas) sometimes cannot afford the costs of energy consumption provided to their homes. Abating the cost of bills through creative financing is a way to help low income customers pay their consumption and at the same time guarantee them an effective service.

Case Study: Royal Dutch Shell – Global Alliance for Clean Cookstoves

The Global Alliance for Clean Cookstoves, founded in 2010 by the United Nations Foundation and a coalition of public-private partners, is a public-private partnership to save lives, improve livelihoods, empower women, and combat climate change by creating a thriving global market for clean and efficient household cooking solutions. The Alliance’s 100 by 2020 goal calls for 100 million homes to adopt clean and efficient stoves and fuels by 2020. The Alliance is working with public, private, and non-profit partners to help overcome the market barriers that currently impede the production, deployment, and use of clean cookstoves in the developing world.

In November 2011 the Alliance released Igniting Change: A Strategy for Universal Adoption of Clean Cookstoves and Fuels, a comprehensive vision for the cookstove sector to achieve universal adoption of clean cookstoves and fuels. The strategy charts three critical pillars of activity – enhancing demand, strengthening supply and fostering an enabling environment as key components of a thriving market for clean cookstoves and fuels.

Shell is a founding partner and has financed market assessments in six countries: Brazil, Indonesia, Timor Leste, Ethiopia, South Africa and Nigeria to analyze macro environments, demand, supply, distribution and financial sustainability of existing and potential cookstove programs. Shell is also helping to support the Alliance’s work to develop international standards for clean, safe and efficient cookstoves, as well as rigorous testing protocols and strengthened local testing centers. The absence of internationally-recognized clean cookstove standards and limited in-country testing capabilities has hampered efforts to scale up adoption rates and led to health and efficiency claims by some manufacturers that often overstate their products’ benefits to the consumer.

Shell views its engagement as an opportunity to make a positive impact on global energy-related health and environmental challenges. Providing innovative energy solutions is Shell’s core business and is equally reflected in its social investment theme of energy access. Energy is an area in which Shell can offer its knowledge, experience, global networks and technical expertise through advocacy, mapping, standards and testing, and carbon finance. As the first energy company involved in the Alliance, Shell views its participation as a differentiator and expects to leverage partners to build effective and sustainable programs in the communities they operate in.
One example of providing access to energy in an innovative manner is the Bonny Utility Company (BUC), a mini-utility operating on Bonny Island in Nigeria, which is a CSR initiative that is transitioning into a financially sustainable operation. Taking advantage of a government decree allowing private power generation and distribution, Nigeria Liquefied Natural Gas (NLNG) and The Shell Petroleum Development Company of Nigeria (SPDC) signed a memorandum of understanding with the local community and negotiated a contractual agreement to supply power on the island. In the same spirit, the business is run under an inclusive governance structure bringing together the oil industry, local leaders and representatives, and government officials. BUC offers customers a progressive tariff schedule comprising six levels; there is a free basic allowance followed by increasing energy charges as a function of consumption. As a result, customers—who range from low-income households to larger service sector businesses—receive an indirect subsidy from zero to 70 percent depending on their needs.45

Clean cooking and heating solutions is also an energy access need for the 2.7 billion people who rely on wood, coal, charcoal or animal waste for these activities,46 in both rural and urban areas. A significant amount of the world's wood supply is used as fuel, yet most biomass cookstoves are extremely inefficient. For example, a kilogram of wood generates only a tenth of the useful heat for cooking as delivered by a kilogram of liquid petroleum gas.47 They are also dangerous: each year, nearly 2 million people worldwide die as a result of prolonged exposure to smoke from traditional cookstoves.48 Improving clean cookstove standards and supporting local clean cookstove businesses are vitally important for these communities. The International Energy Agency 2011 Outlook "Energy for All" Case estimated that $74 billion of additional investment is required to provide universal access to clean cooking facilities by 2030.49

Providing innovative energy solutions is part of an oil and gas company’s core business. In addition, oil and gas companies already work in many regions of the world where cookstoves and open fires are most frequently used for cooking and heating. With that reach and leverage, energy access is a strategic area where this industry could benefit society through new innovative solutions and additional investments. Oil and gas companies can offer cultural knowledge, business experience, global networks, social investment funding and technical expertise to help build a cleaner-burning cookstove and fuel industry. International Oil Companies must partner with local communities, entrepreneurs, investors, governments, humanitarian agencies and nongovernmental organizations for this action area to achieve success, focusing on addressing local needs and the innovations and investments that can drive the most positive impact.

Accompanying the installation of these products and services, a best practice should be the provision of capacity building or local training of people in order to guarantee the long-term use of the products. This training should also include the empowerment of women. In many situations women have a critical role in the deployment, management, and maintenance of the energy solutions. Oil and gas companies should also consider hosting and participating in forums to convene key stakeholders including universities, NGOs, local and national governments, and other International Oil Companies to help advance public policy and awareness, and to mobilize action on improving access to energy.
Conclusion

The priority actions identified in this document are meant to provide guidance and inspire oil and gas companies to take action and collaborate to advance the three objectives of the Sustainable Energy for All initiative while simultaneously maximizing their realized business value. It is vital that the private sector be fully engaged and committed to successfully achieve the initiative’s ambitious objectives. With the right level of support, coordination, and action the power of industry can be unleashed to ensure universal energy access, dramatically improve the energy efficiency of business operations, increase the use of renewable energy, and develop more sustainable products and services. Actions focused on achieving the desired outcomes of Sustainable Energy for All will drive significant positive societal change in addition to economic growth and opportunity.

The oil and gas industry sits directly at the heart of the production and consumption of energy. The oil and gas industry is energy intensive and requires significant amounts of energy to extract resources from the ground, process them, and transport them to the end-user. Although fossil fuels will continue to dominate global energy use for the foreseeable future, the oil and gas industry can still affect change along the supply chain by promoting national energy plans, investing in new renewable fuels, and increasing efficiency in their own operations.

Although companies within this industry will share certain perspectives and emphases, each company’s contribution to the initiative’s three objectives will be different based on attributes specific to that company - both internal factors such as business model, corporate strategy, consumer base as well as external factors such as extent of regulation and economic context in the regions the company operates. The oil and gas industry needs to play a leadership role as innovators, solution designers, and drivers of investment for sustainable energy. Although companies may already be implementing these (and other) actions to advance sustainable energy, the industry should utilize the Sustainable Energy for All platform to help accelerate the achievement at scale.

For oil and gas companies to advance their business opportunities related to energy efficiency and renewable energy, the industry should focus on the five priority actions detailed in this document. By focusing on these actions, the oil and gas industry will be able to maximize its contribution to Sustainable Energy for All, increase business value, and ensure a sustainable future based on a balanced approach to improving social, environmental, and economic benefits for all.
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About the United Nations Global Compact
The United Nations Global Compact is a call to companies everywhere to: (1) voluntarily align their operations and strategies with ten universally accepted principles in the areas of human rights, labor, environment and anticorruption and (2) take actions in support of UN goals, including the Millennium Development Goals. By doing so, business can help ensure that markets advance in ways that benefit economies and societies everywhere. Endorsed by chief executives, the UN Global Compact is a leadership platform for the development, implementation, and disclosure of responsible corporate policies and practices. Launched in 2000, it is the largest corporate responsibility initiative in the world—with over 7,000 signatories based in more than 135 countries, and Local Networks existing or emerging in 90 countries. More information: www.unglobalcompact.org.

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