أرامكو السعودية
saudi aramco

the many layers of **opportunity**

Saudi Aramco annual review 2016

DEC 2016
NOV 2016
OCT 2016
SEP 2016
AUG 2016
JUL 2016
JUN 2016
MAY 2016
APR 2016
MAR 2016
FEB 2016
JAN 2016

the
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opportunity

Saudi Aramco annual review 2016

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All statements, other than statements of historical fact, included in this Annual Review are forward-looking statements. In some cases, you can identify forward-looking statements by terminology such as "will," "anticipate," "expect," "plan," "believe," "intend," and "should" or the negative of these terms or other comparable terminology. These statements relating to future events, or Saudi Aramco's future performance, reflect management's current beliefs and expectations and involve known and unknown risks, uncertainties, and other factors that may cause Saudi Aramco's actual results, performance, or achievements to be materially different.

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King Salman ibn ‘Abd Al-‘Aziz Al Sa‘ud

The Custodian of the Two Holy Mosques

His Royal Highness Prince Mohammed ibn Salman ibn ‘Abd Al-‘Aziz Al Sa‘ud

Crown Prince, Deputy Premier, Minister of Defense, and President of the Supreme Council of the Saudi Arabian Oil Company (Saudi Aramco)

HE Khalid A. Al-Falih

Minister of Energy, Industry and Mineral Resources, and Chairman of the Board of Directors of the Saudi Arabian Oil Company

HE Dr. Ibrahim A. Al-Assaf

Minister of State for Saudi Arabia

HE Dr. Majid Al-Moneef

Advisor to the Royal Court

HE Yasir O. Al-Rumayyan

Managing Director and Member of the Board, Public Investment Fund (Saudi Arabia)

Mr. Andrew F.J. Gould

Former Chairman of BG Group plc, and former Chairman and CEO of Schlumberger Ltd.

Amin H. Nasser

President and CEO of Saudi Aramco

HE Dr. Khaled S. Al-Sultan

Rector of King Fahd University of Petroleum and Minerals

Sir Mark Moody-Stuart

Former Chairman of Royal Dutch Shell and Anglo American plc

Mr. Peter L. Woicke

Former Managing Director of the World Bank and former Vice President of the International Finance Corporation

board of directors

Governance

Our behavior is what defines us—as a company, as employees, and as people. Everything we do is anchored by our Corporate Values: Excellence, Safety, Accountability, Integrity, and Citizenship. We hold ourselves to the highest business and ethical standards, and are dedicated to building and maintaining trusted relationships.

Our corporate governance structure defines our strategic direction and ensures our industry leadership. It also shapes who we are and how we are seen by the world—including our customers, suppliers, and new and existing business partners. Our Board of Directors (the "Board"), which encompasses a wealth of diverse experience and a future-oriented mindset, models standards for integrity and ethical behavior.

The Board oversees our regular reporting and independent auditing practices. The audit process, endorsed and monitored by the Board, is intended to ensure an independent, confidential, and robust review of company operations and provide a clear and transparent reporting channel from the auditors to the Board and the Supreme Council of the Saudi Arabian Oil Company (Saudi Aramco).

chairman's message

For the global oil and gas industry, 2016 was a challenging year. Yet, challenges often are the prelude for new opportunities and greater value ahead.

I believe that history — and indeed, the near future — will prove that despite the discouraging business climate, 2016 was a turning point for both Saudi Aramco and the Kingdom, as well as for the global oil and gas industry.

This past year, Saudi Aramco leveraged its capabilities, talent, innovation, and fiscal discipline to ensure resilience and realize landmark achievements, including record high rates of crude oil production, raw gas processing, and sales gas production, along with stronger integration within the entire petroleum value chain. All of this was achieved against the backdrop of persistently low oil prices and a weak global economy.

To help ensure reliable supplies of petroleum energy to meet future demand, Saudi Aramco completed its second expansion of the Shaybah crude oil facility and commissioned the giant Wasit Gas Plant, boosting its overall crude oil production and gas processing capabilities. Sadara, the world's largest petrochemical complex ever built at one time, commenced commissioning activities as well.

These mega-projects, and others currently under construction, will help meet growing domestic demand for energy, substantially increase production of gas as an efficient, cleaner energy for utilities and industry, and supply feedstocks to the manufacturing base. Keeping its vision focused on the long-term horizon, Saudi Aramco sustained its investments in research and development, seeking new ways of making petroleum more accessible, useful, sustainable, and competitive.

Equally impressive, these accomplishments come at a time when Saudi Aramco is growing in new directions, including building a stronger downstream portfolio with international refining, chemicals, and marketing opportunities.

By seeking new prospects, realizing potential, and building new capacities, the company created greater value for itself, its customers and stakeholders, proving again that at Saudi Aramco, energy is opportunity.

During the year, the Kingdom of Saudi Arabia launched its landmark Vision 2030, an ambitious economic and social transformation program. The Vision, which aims to diversify the national economy beyond oil and build a thriving private sector, will enable Saudi Aramco to expand its global presence. Concurrently with the Vision, the company will enlarge its supply chain and improve business reliability through a local network of suppliers and manufacturers while increasing the competitiveness of Saudi Arabia's energy sector — and in the process, generate sustainable growth and quality jobs for Saudis.

For Saudi Aramco, the most notable feature of the Kingdom's transformation will be the future offering of part of the company's shares in local and international stock markets. This move drives further diversification and growth of the national economy, while elevating the international visibility of the company's decision making and governance, and building confidence in its long-term strategy.

Internationally, 2016 was a turning point for the oil market as the downturn, which started in 2014, reached bottom, and markets started to balance. The agreement reached between producers late in the year, coupled with improving fundamentals, has set the stage for an improved business environment in 2017.

The Paris Agreement, ratified by Saudi Arabia in 2016, builds on the United Nations Framework Convention on Climate Change and is steering the world toward a new energy era. However, we believe that the transition will be gradual, and the role of oil and gas in the global energy mix will remain significant for decades to come.

Saudi Aramco's success would not have been possible without the support imparted by the Custodian of the Two Holy Mosques King Salman ibn 'Abd Al-'Aziz Al Sa'ud, and Crown Prince HRH Mohammed ibn Salman ibn 'Abd Al-'Aziz Al Sa'ud.

The company was honored by the presence of King Salman in December, when he visited Dhahran and inaugurated five oil and gas projects, the King Abdulaziz Center for World Culture, and the Sadara joint venture in Jubail. These are initiatives that deliver on the Kingdom's promise for a better tomorrow through new energy capabilities and new value creation opportunities. In summary, 2016 was not just a successful year, but I believe it is a bridge to a better tomorrow.

On behalf of the Board of Directors, I thank the men and women of Saudi Aramco who delivered superior performance despite challenging conditions, and I also thank our customers, partners, and the communities in which we operate for their contributions to our shared success.

Khalid A. Al-Falih
Minister of Energy,
Industry and Mineral Resources
Chairman of the Board of Directors

president's foreword

Since its earliest beginnings, Saudi Aramco has sought to be the world's most reliable producer of petroleum energy. Our long-term approach to managing the Kingdom's hydrocarbon resources has consistently delivered superior performance and growth.

More recently, our vision has been to become the world's leading integrated energy and chemicals company, reinforcing our focus on the long-term. While our strategic direction remains unchanged, three major developments are worth highlighting for their impact on our business in 2016.

First, the oil market remained challenging, causing project deferments or cancelations across the industry. We responded to this challenge by intensifying our focus on excellence and on lowering costs, addressing every aspect of our business. We strengthened our Operational Excellence and Capital Efficiency programs, while enhancing our robust leadership and performance management systems.

Second, the National Transformation Program, designed to build the institutional capacity and capabilities needed to achieve the ambitious goals of Saudi Arabia's Vision 2030, reaffirms Saudi Aramco's role as an important driver of the Kingdom's growth and enables the expansion of our commercial ecosystem. We have made encouraging progress with our In Kingdom Total Value Add (IKTVA) localization program, with its emphasis on developing reliable local supply, exports, and job creation. The value of our direct material procurement from local manufacturers increased by $800 million to reach $2.9 billion in 2016, representing 43.5% of our material procurement spending and is the highest level of local content in the company's history.

We marked a significant milestone in our efforts to support the Kingdom's development with the inauguration of the King Salman International Complex for Maritime Industries and Services in Ras Al-Khair. The complex is envisioned to become the largest maritime industries complex in Saudi Arabia and a hub for regional maritime engineering, construction, and related expertise.

Third, the Paris Agreement underscored our view that shaping the future energy landscape in a greenhouse gas constrained world requires an industry led, technology-driven, collaborative approach. We are proud to be part of the $1 billion investment in innovative low emission technologies by the Oil and Gas Climate Initiative. Once commercialized, these technologies have the potential to reduce greenhouse gas emissions on a global scale.

Taken together, the prevailing and emerging challenges have reinforced our determination to create additional value for the company and enable the continued growth of the Kingdom's economy. In turn, this determination has helped us to sharpen our priorities.

We envision pursuing ultra-clean, sustainable oil, doubling gas supplies, establishing a leading position in renewables, and becoming a global powerhouse in refining, chemicals, and marketing—all enabled by the finest technologies and most talented employees in the world.

I want to thank our people for the many significant contributions they made in 2016. Their inspiration and dedication have once again shown that, despite short-term strains, we remain dedicated to turning potential into opportunity and generating more value from the Kingdom's resource base.

Amin H. Nasser
President and Chief Executive Officer

global and domestic operations

- Saudi Aramco headquarters
- Saudi Aramco refinery (4)
- terminal (9)
- bulk plant (24)
- joint venture refinery
- Saudi Aramco Base Oil Company (LUBEREF)
- Power and Water Utility Company for Jubail and Yanbu' (MARAFIQ)
- R&D center/technology office
- global office
- international joint ventures and majority held subsidiaries

Houston
Motiva Enterprises LLC

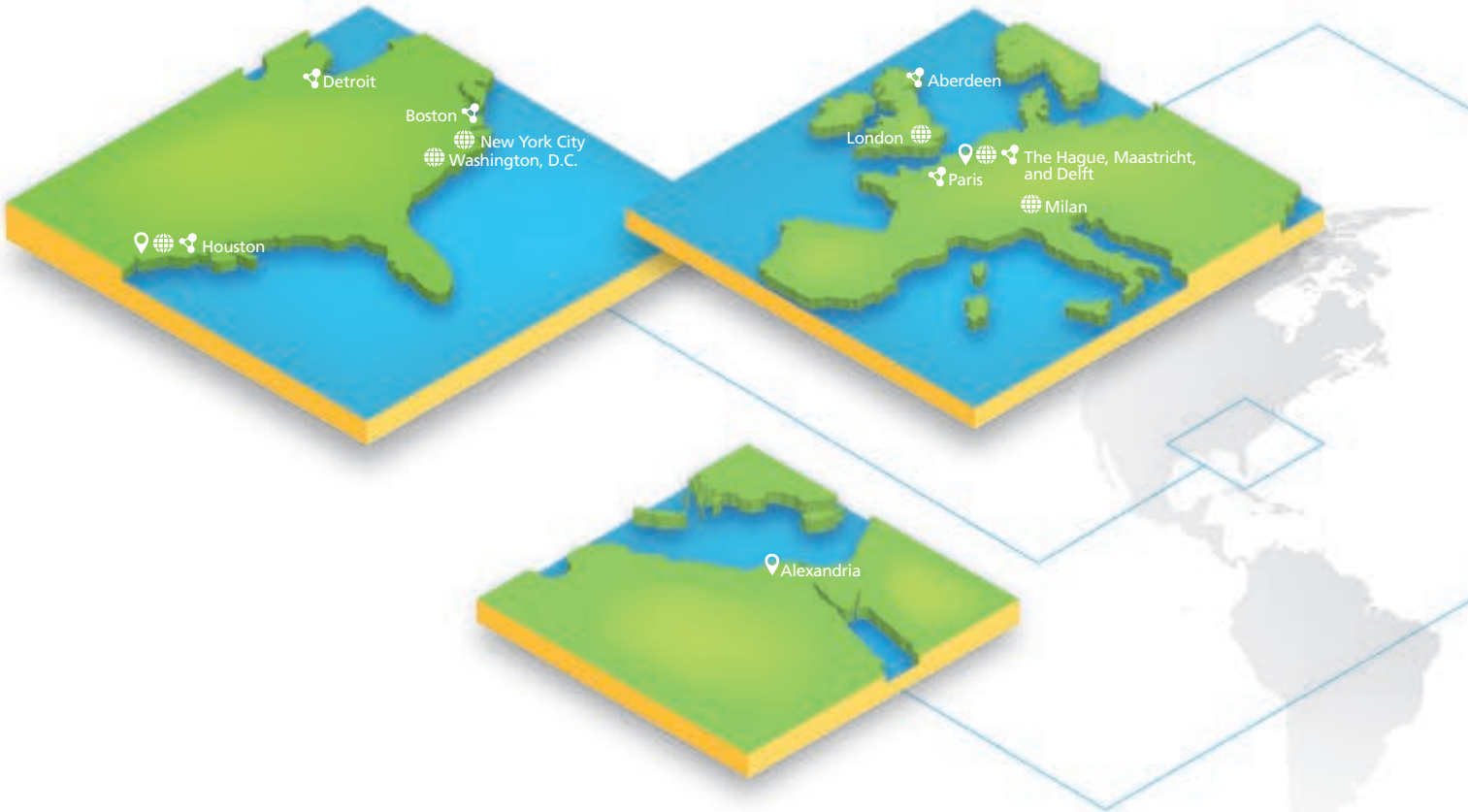
Maastricht
Arlanxeo Holding BV

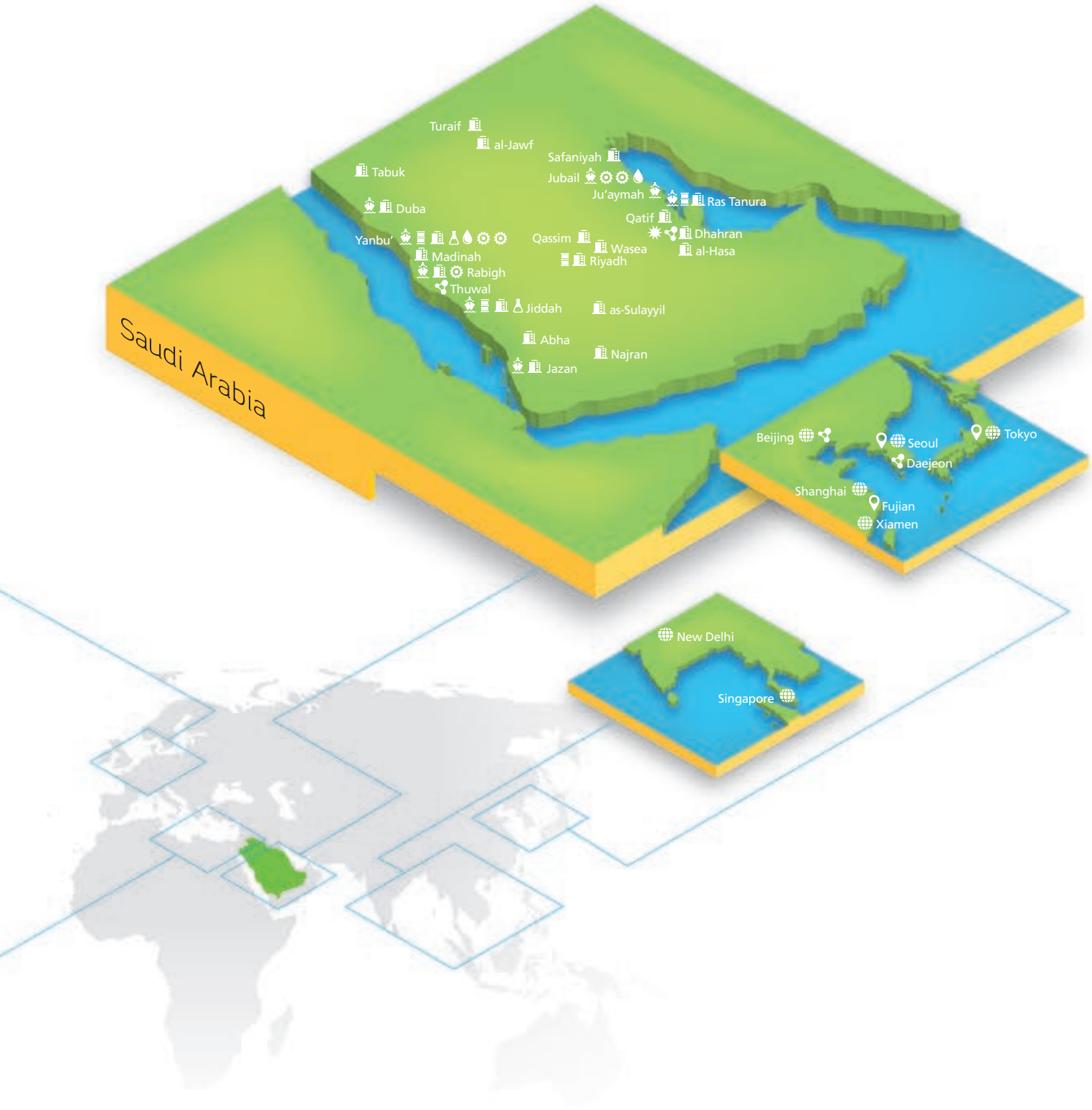
Alexandria
The Arab Petroleum Pipeline Co. (SUMED)

Fujian
Fujian Refining and Petrochemical Company Ltd.
Sinopec SenMei Petroleum Company Ltd.

Seoul
S-Oil Corporation

Tokyo
Showa Shell Sekiyu KK




Saudi Arabia
Turaif
al-Jawf
Tabuk
Safaniyah
Jubail
Ju'aymah
Ras Tanura
Duba
Qatif
Dhahran
Yanbu'
Qassim
Wasea
al-Hasa
Madinah
Riyadh
Rabigh
Thuwal
Jiddah
as-Sulayyil
Abha
Najran
Jazan
Beijing
Seoul
Tokyo
Daejeon
Shanghai
Fujian
Xiamen
New Delhi
Singapore

key figures

total hydrocarbon production*

13.5

million boepd

crude oil produced

10.5

million bpd

crude oil and condensate reserves

260.8

billion barrels

total raw gas processed

12.0

billion scfd

gas reserves

298.7

trillion scf

sales gas produced

8.3

billion scfd

ethane produced

920

million scfd

worldwide refining capacity

5.4

million bpd

NGL produced

1.4

million bpd

Saudi Aramco share of refining capacity

3.1

million bpd

boepd = barrels of oil equivalent per day
scf = standard cubic feet
bpd = barrels per day
scfd = standard cubic feet per day
NGL = natural gas liquids
**crude oil, sales gas, ethane, NGL, and condensate*

Tapping the Kingdom's vast hydrocarbon resources requires best-in-class technology, such as this drilling rig designed in-house. New onshore and offshore drilling joint ventures will ensure we have the tools and the people to transform the potential energy of petroleum into greater opportunity—for Saudi workers, our business, and energy consumers around the globe.

upstream: transforming potential into opportunity

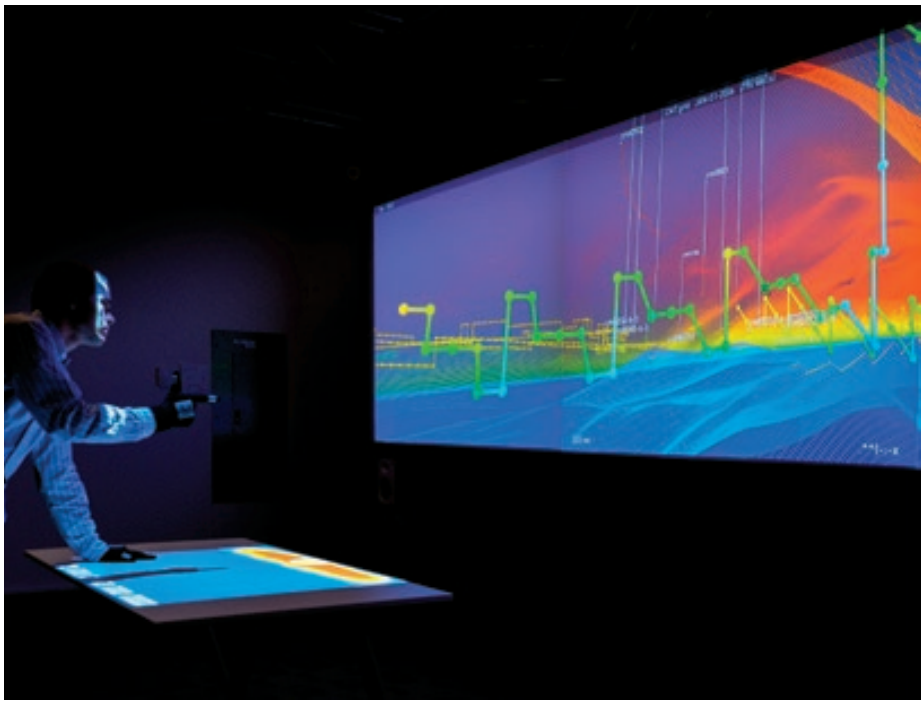
We create maximum value from the Kingdom's resources by reinforcing our preeminent position in exploration and production, replacing produced oil, increasing gas reserves, and growing oil and gas production while optimizing costs.

In 2016, we achieved a new record for crude oil production, averaging 10.5 million barrels per day (bpd). We also produced a record level of sales gas, averaging 8.3 billion standard cubic feet per day (scfd).

On their own, the Kingdom's hydrocarbon reserves represent potential energy. The transformation of potential into opportunity requires the best people, practices, and technology—attributes that underlie our aim to become the world's leading integrated energy and chemicals company. For more than eight decades, we have prudently managed Saudi Arabia's oil and gas reserves to maximize their long-term value, and to enable the growth of economies around the world.

Petroleum is the original wellspring of Saudi Arabia's prosperity, and the foundation of its continued growth. Our drive to create more value from the resource base is powered by the expertise and ingenuity of our people, our relentless focus on best-in-class practices, operational efficiency, the use of innovative technologies, and research into the sustainable use of hydrocarbons. Together, these capabilities further diversify the economy and launch new business opportunities for oil field service providers, suppliers, manufacturers, and technology developers.

Sophisticated reservoir modeling enables us to optimize the development of oil fields and played a key role in doubling the original oil production capacity of our Shaybah facility, raising it to 1 million bpd.



Exploration: adding to our resource base

At year-end 2016, our recoverable crude oil and condensate reserves stood at 260.8 billion barrels. Gas reserves grew to 298.7 trillion standard cubic feet (scf).

In 2016, we discovered two new oil fields, Jubah, 300 kilometers (km) north of Dammam, and Sahaban, 280 km south of Dammam, and one new gas field, Hadidah, 470 km south of Dammam. At year-end, our total number of fields was regrouped to 130 fields. This number reflects the grouping of some areas as subdivisions of larger fields, where these areas are parts of continuous geological structures.

We continued progress in our unconventional gas program. We completed wells in northern Saudi Arabia to help meet our commitment to deliver 55 million scfd of gas by year-end 2017 to industrial and electrical power facilities in the Wa'ad Al Shamal industrial city project. In addition, we completed wells in South Ghawar and the Jafurah Basin.

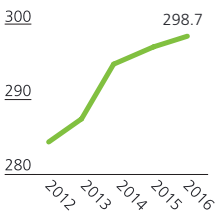
Our ongoing success in adding gas reserves—especially nonassociated gas—provides the domestic economy with additional and cleaner potential energy, and supplies of fuel and feedstock that can be harnessed for greater opportunity.

Our proficiency in finding new oil and gas reserves enables our sustainable growth as a company. We secure this growth by enhancing the expertise of our people, developing and deploying the latest technologies, and continuously improving the efficiency of our operations to sustain our best-in-class performance.

To learn more about our research in upstream technology, see pg. 34

Gas reserves growth

(trillion scf)



Oil production: investing in capacity

Our investments in upstream, from exploration to production and processing, are designed to maintain our supply flexibility and world leading production capacity, enabling our role in stabilizing oil supplies in the future. We maintained our spare oil production capacity by optimizing the mix of crude oil grades from a balanced portfolio of mature and young reservoirs.

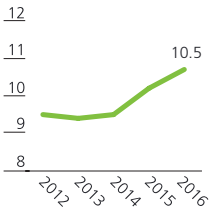
In 2016, we successfully executed a demanding drilling and workover schedule and made significant progress on the following major projects:

- Our second 250,000 bpd expansion project at **Shaybah**, located in the Rub' al-Khali or Empty Quarter, came onstream in 2016, raising its overall production capacity to 1 million bpd of Arabian Extra Light crude oil—double the facility's original capacity.
- We continued drilling wells to increase the production capacity of our **Khurais** field, located 150 km southeast of Riyadh, by 300,000 bpd to raise current capacity from 1.2 million bpd to 1.5 million bpd by mid-2018.

We continuously optimize our crude oil mix, guided by our outlook and assessment of future performance. To maximize long-term value, optimize costs, and advance recovery rates, we completed technical assessments for producing fields, integrating subsurface computational models with surface facility networks to identify and exploit beneficial synergies. We also drilled new water injection wells to provide reservoir pressure support and installed electrical submersible pumps to increase well production rates and reduce the costs associated with surface facilities.

Crude oil production

(million bpd)



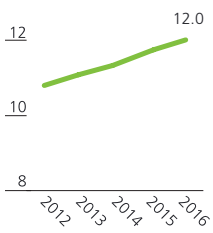
Gas processing: powering growth

More than 40% of our nonassociated gas now comes from offshore fields such as Hasbah, which feeds our new Wasit Gas Plant. In 2016, we reached an all-time high for raw gas processing, helping reduce domestic reliance on liquid fuels for power generation, freeing up more oil for export and for value-added products.

Growing supplies of cleaner burning natural gas helps reduce domestic reliance on liquid fuels for power generation, enabling increased liquids exports, and provides feedstock to petrochemical industries, spurring regional development, job creation, and demand. In 2016, we achieved an all-time high for total raw gas processing of 12 billion scfd. Other highlights from 2016 include:

Raw gas processed

(billion scfd)

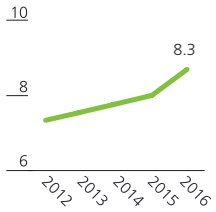


- We started up a second NGL processing train at **Shaybah**.
- Our **Wasit Gas Plant**, located north of Jubail Industrial City, reached its full operational feed capacity of 2.5 billion scfd.
- To feed Wasit, we brought gas production onstream from the big bore nonassociated gas wells in our offshore **Arabiyah** and **Hasbah** fields, situated approximately 150 km northeast of Jubail Industrial City in the Arabian Gulf. The Hasbah field features some of the world's most prolific gas production platforms. With the startup of production from these two fields, more than 40% of our nonassociated gas now comes from offshore fields.
- The facilities for our grassroots **Midyan Gas Plant** in the Tabuk region of northwestern Saudi Arabia reached 97% completion. The plant will supply nonassociated gas and condensate to the Saudi Electricity Company's new power plant in Duba in the Kingdom's northwest, generating opportunities for economic growth in the region.

We remain committed to increasing gas production.

Sales gas produced

(billion scfd)



- We commenced construction of our grassroots **Fadhili Gas Plant**, located 30 km west of Jubail Industrial City, in late 2016. The facility is emblematic of our broader impact on not only increasing supplies of gas, but also driving economic growth, developing the Saudi workforce, and reducing emissions.
  - » Designed to process 2.5 billion scfd and deliver 1.7 billion scfd of sales gas to the Master Gas System, Fadhili will be our first plant to treat nonassociated gas from both onshore and offshore fields.
  - » It will be the first to have the capability to use low Btu gas to fuel an independent power plant, yet switch to sales gas as needed. This flexibility enables us to generate electricity from lower value gas and maximize supplies into the Master Gas System.
  - » In another first, the plant was designed from inception to use the Tail Gas Treatment process to reach the maximum sulfur recovery rate of 99.9%, helping protect air quality.
  - » The project's value extends well beyond the resources it will process: The development of Fadhili will add billions of dollars to the local economy, with an expectation that 40% of the plant's materials and services to be sourced and manufactured in Saudi Arabia.

Our significant investments in new gas processing capacity help meet Saudi Arabia's demand for energy, reduce the use of liquids for electricity generation, and enable opportunities in energy consuming industries such as steel, aluminum, and other downstream value-added sectors.

Optimizing performance

In 2016, we remained focused on maximizing long-term value creation from the Kingdom's hydrocarbon resources while making tactical adjustments to meet the challenges of the market downturn, aiming to lower costs, improve performance, and enhance efficiency. For example, we made substantial achievements in **drilling** through a number of programs and initiatives:

- Our cost optimization initiatives included negotiating lower costs for rigs, materials, and services. We introduced a program to recondition equipment and materials, resulting in significant savings, and we deployed an offshore floating hub to supply tools and materials. These efforts enabled a reduction in overall well costs compared to 2015.
- Measures to improve performance included introducing new drilling bits and driving mechanisms, and applying optimum drilling parameters to achieve an increased drilling rate of penetration and lower cost per foot. Contractors' nonproductive time was also reduced compared to previous years.
- Initiatives to boost efficiency included enhanced well design and the introduction of technologies that reduced drilling and completion time and improved well delivery. We also set world records in pipe recovery operations, sidetracking, and wireline tractor use — all of which enable faster and more efficient operations.

In 2016, we drilled more wells and produced record levels of oil and sales gas while optimizing expenditures and manpower levels.

Our efforts to boost efficiency in upstream operations were bolstered by corporate programs, such as Operational Excellence and Total Plant Reliability Management.

Reliable energy to the Kingdom and the world

Our sustained investments and efforts to contain costs help secure our preeminent position as the world's most reliable producer of crude oil. Equally important, our concerted efforts to increase the availability and utilization of natural gas diversify the energy mix and grow the economy, multiplying the value of our hydrocarbon base many times over.

To learn more about our upstream training center, see pg. 60

In addition to boosting oil production capacity at Shaybah, we also started up a second NGL processing train. The new volumes of NGL will serve as feedstock for industrial cities and help meet growing demand.


GAS INJECTION

Our refining and chemicals facilities in Saudi Arabia—some wholly owned, some ventures with global companies—increase opportunities for domestic conversion industries, manufacturers, and service providers, adding value to the Kingdom's resource base.

downstream: adding value through integration

With a diversified, integrated, and robust business portfolio, our supply, trading, and marketing model will mitigate oil price volatility, generate additional revenues, and expand opportunities for conversion industries, local manufacturers, and service providers—all of which drive job growth and value creation.

Continuing our journey to become the world's leading integrated energy and chemicals company, in 2016 we created additional value from our resource base by progressing a suite of major downstream projects.

In refining, we made steady progress on our wholly owned Jazan Refinery, which includes an integrated aromatics complex, in the Kingdom's southwest. In chemicals, we started up the mixed feed steam cracker with the capacity to crack 85 million scfd of ethane at Sadara, our joint venture with The Dow Chemical Company in Jubail Industrial City. With our partner Sumitomo of Japan, we neared completion of an expansion at Petro Rabigh, our integrated refining and chemicals complex on the Red Sea coast. And we launched Arlanxeo, a specialty chemicals joint venture headquartered in the Netherlands.

Unlocking the greater potential value inherent in hydrocarbon resources lies at the heart of our downstream strategy. We plan to capture synergies by integrating at both the operational and geographical level—connecting oil and gas supply, refining, chemicals, and base oils in regions of high growth potential. Our integrated business model enables us to attain higher value from every hydrocarbon molecule that we produce and grow our global market share.

In-Kingdom downstream: stimulating growth

Saudi Arabia's endowment of oil and gas, our expanding network of refining and chemicals facilities integrated with industrial parks, and geographic proximity to major markets in Europe and Asia all combine to create favorable conditions for investment, growth, and even greater demand.

In 2016, we safely and reliably supplied the country's transportation sector with the refined products and fuels needed to keep the Kingdom moving, provided fuel and feedstock to the Kingdom's power sector, made significant progress on our integrated refining and chemicals projects, and advanced the development of a base oils business. We also continued to explore enhanced integration opportunities within our refining network while focusing on our performance to boost operating efficiency.

We are committed to raising our global refining capacity.

Construction of our 400,000 bpd **Jazan Refinery** reached 55% completion. The overall project includes a marine terminal and an integrated gasification combined cycle power plant with the capacity to generate 3.7 gigawatts of electricity. Pre-commissioning activities for the Jazan complex are scheduled to begin in mid-2018, following completion of the marine terminal.

Sadara: unlocking value

Worldwide, the chemicals industry is a $4 trillion business, but the Gulf Cooperation Council's (GCC) share of the global market for specialty chemicals, for example, is less than 2%. We therefore see significant opportunities to grow our downstream products portfolio, creating sustainable value for our partners, our customers, and the Kingdom.

Our Sadara joint venture, with the capacity to produce 3 million tons of performance plastics and high-value chemicals per year, was conceived to meet growing demand in the region and in Asia.

To learn more about our research in downstream technology, see pg. 38

In 2016, Sadara marked a historic landmark with the startup of its mixed feed steam cracker, making it the first chemicals facility in the GCC countries to crack naphtha. The cracker, which breaks ethane and naphtha to form new molecules, including ethylene and propylene, enables the production of a diversified range of plastics and chemical products designed to meet the rigorous standards of sectors such as advanced packaging, construction, electronics, furniture, and the automobile industry.

PlasChem and PlusTech Parks: multiplying value

The potential to grow our in-Kingdom employment is especially strong in the chemicals sector. Currently, the regional chemicals industry accounts for less than 1% of the global number of jobs in the sector and related industries. Our expansion into the industry will raise that percentage. For example, adjacent to Sadara is the **PlasChem Value Park**. Expected to create 1,500 direct jobs and generate opportunities for thousands more indirect jobs, the park has attracted some of the world's largest chemical and oil services investors. Our support includes investing in an ethylene oxide and propylene oxide pipeline, and coordinating our efforts with the PlasChem Value Park team and the Royal Commission for Jubail and Yanbu' to attract investors and future customers.

The **Petro Rabigh PlusTech Park**, integrated with Petro Rabigh, is expected to generate more than 2,000 jobs and attract private sector investment of over $1 billion. Given the park's potential to attract new customers, we contributed 50% of the park's development costs and currently own a 50% stake in its infrastructure and assets. Our main role is to promote and market PlusTech Park to attract downstream conversion industries that will consume our fuel and feedstocks. So far, 30 local and international plastics converters have signed agreements to operate in the park, 14 of which have commenced production.

We also neared completion of the **Petro Rabigh Phase II** project to expand its cracking facility to crack an additional 30 million scfd of ethane and add an aromatics complex to produce new differentiated products. The full operation of the cracking facility was achieved in 2016, and the remaining assets are scheduled to start up in mid-2017.

Khalid Al-Faifi grew up in the mountains of Jazan and now works as a mechanical engineer at our Jazan Refinery, under construction in the Kingdom's southwest. Al-Faifi, and thousands more like him, are helping transform the area into a magnet for opportunity and investment.

By partnering with global energy companies in ventures such as SATORP in Jubail, S-Oil in the Republic of Korea, and YASREF in Yanbu', we maximize the value of the Kingdom's hydrocarbon resources while producing critical feedstock for industry and essential fuels that meet the needs of consumers around the world.


Saudi Aramco Total Refining & Petrochemical Company


S-Oil Corporation


Yanbu Aramco Sinopec Refining Company Ltd.

Global downstream: expanding horizons

Our partnerships in refining and marketing ventures in China, Japan, South Korea, and the United States enable us to traverse the length of the value chain from wellhead to consumer, adding value to our resources at every step. In 2016, we continued to pursue and evaluate international opportunities to expand our refining and chemicals capability for greater downstream integration to propel additional value creation.

- In **South Korea**, we hold a majority equity interest in **S-Oil**, one of the country's leading refiners. Two projects are underway to enhance its refinery's competitiveness, create a more diversified portfolio, and improve profitability. The first project involves upgrading low-value residue to high-value olefin and gasoline products. The second project involves new facilities to produce polypropylene and propylene oxide, and recover ethylene.
- In **Indonesia**, we have been selected as the strategic partner for the Refinery Development Master Plan Project of Pertamina, the national oil company. In 2016, we signed a nonbinding Joint Venture Development Agreement to enable further progress for the joint ownership, upgrade, and operation of Pertamina's Cilacap Refinery in Central Java. Under the agreement, the refinery's capacity will be expanded to 400,000 bpd and designed to process Arabian crude oil to produce refined products that meet Euro V specifications, basic petrochemicals, and Group II base oil for lubricants. Saudi Aramco will own a 45% interest of the venture. Basic engineering design work was completed in early 2017.

In addition to expansion in Asia, we also progressed integration in the United States and Europe:

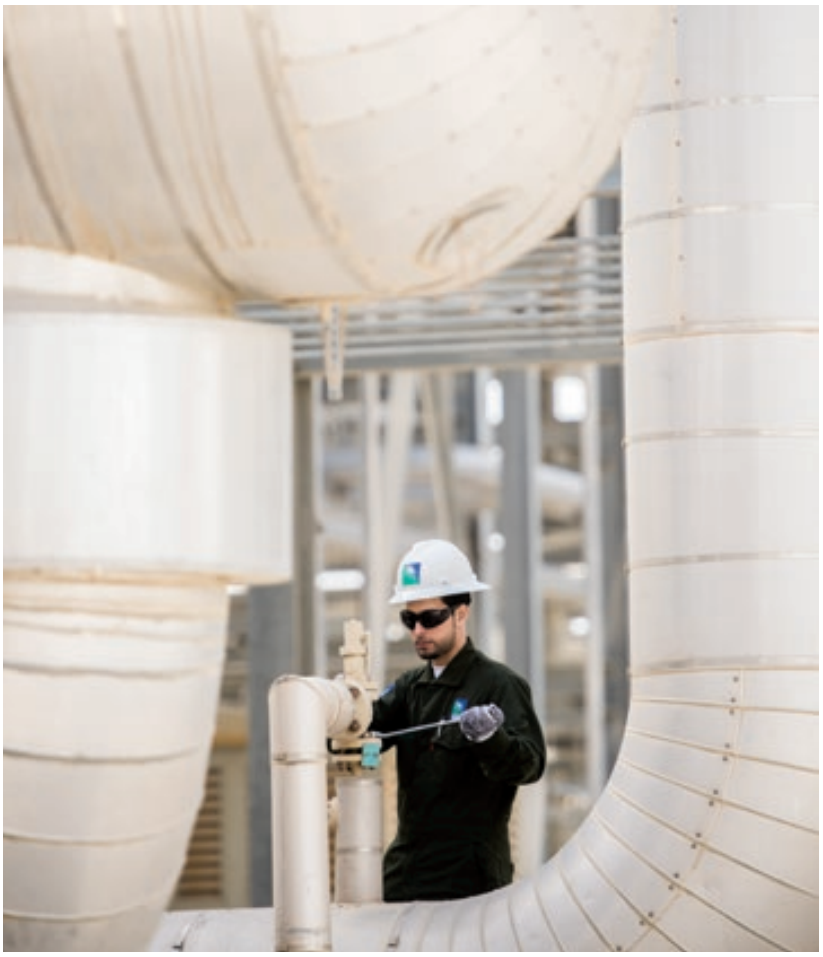
- In the **United States**, a nonbinding Letter of Intent was signed by our Houston-based indirect subsidiary, Saudi Refining Inc., and an affiliate of Shell Oil to end the **Motiva Enterprises LLC** refining and marketing joint venture formed by the parties in 1998 ("Motiva"), and to divide the assets of Motiva between them. Subject to the completion of definitive agreements and the receipt of regulatory approvals of the definitive agreements, Saudi Refining Inc. and its affiliate, Aramco Financial Services Company, will own 100% of Motiva and the assets retained by Motiva, including full ownership of the Motiva Refinery in Port Arthur, Texas and certain distribution terminals. The definitive agreements also include an exclusive license to use the Shell brand to sell certain products across much of Texas and the Southeast.
- In the **Netherlands**, we officially launched **Arlanxeo**, our joint venture with German specialty chemicals company LANXESS, a milestone on our journey to increase our participation in the chemicals sector. Arlanxeo is a world leader in the development, production, marketing, sale, and distribution of synthetic rubber and elastomers used in the global tire industry, auto parts manufacturing, construction, and oil and gas industries. The joint venture helps unlock the full economic potential of the Kingdom's hydrocarbon resources, and potentially enables opportunities for further economic diversification and job creation.

Growing sales and marketing

Expanded sales and marketing activities are key components of our strategy to strengthen integration across our downstream business and create additional value while diversifying risk. Guided by this approach, we registered eight new customers in 2016 and explored sales opportunities in the Baltics, Africa, Australia, and New Zealand. We also renewed our agreement for the Okinawa storage facility to support supply and distribution in Asia and are working to expand storage capacity by 2 million barrels, to 8.3 million barrels, by mid-2017.

In 2016, we signed key business principles with the Jadwa Industrial Investment Group and LUBEREF, our affiliate that operates two base oil refineries in Jiddah and Yanbu' on the Kingdom's Red Sea coast, for the right to lift and market the base oil produced at LUBEREF. Base oils are used to create lubricants for automotive, industrial, and marine applications.

New gas plants such as Wasit are key components of the expansion of the Master Gas System. Growing the capacity of the Master Gas System to deliver more gas safely and reliably enables new opportunities.



We plan to integrate **base oil** producing affiliates and establish global base oil product slates under the Saudi Aramco brand for Groups I, II, and III, with the capacity to produce 4.7 million tons per year, representing 14% of global base oil demand. In late 2016, our sales and marketing subsidiary, Aramco Trading Company (ATC), began volume exports of Group I base oil under the new brand name **aramcoDURA®**.

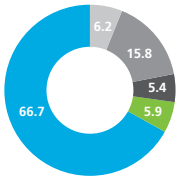
In addition to commencing exports of aramcoDURA®, ATC celebrated five years of successful operations and remained focused on creating more value from trading operations and maintaining reliability and profitability from our refined products portfolio. ATC pursued efficiency gains by optimizing freight contracts, hiring a new lead logistics provider, and increasing the number of local and international hubs to offer greater storage options and shipping flexibility.

Meeting our customers' needs in the Kingdom

By optimizing our supply chain and balancing the utilization of our assets, we seek to meet our in-Kingdom customers' needs safely, efficiently, and reliably. In pursuit of these goals, in 2016 we continued work to upgrade our distribution system.

To enhance supply reliability, we completed a project to increase the capacity of the Riyadh-Qassim pipeline from 125,000 to 160,000 bpd, boosting the reliability of refined product supply to this central region.

Our project to re-commission the Yanbu' South Terminal and integrate it with the Yanbu' Crude Oil Terminal progressed in 2016, with construction reaching 64% completion. Integrating the two terminals creates greater operational agility and



2016 exports by region: crude oil

- Asia
- NW Europe
- Mediterranean
- U.S.
- Other

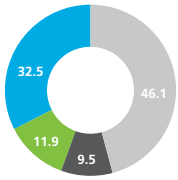
bolsters our downstream network integrity to meet demand in Saudi Arabia. The South Terminal will facilitate crude oil deliveries to our Jiddah and Jazan refineries and to our YASREF joint venture refinery while maintaining crude oil export capability.

By expanding our Master Gas System, we are enabling the growth of the high-demand utility and industrial sectors in the Kingdom's Central and Western regions.

The first phase of the project to expand our **Master Gas System** is designed to increase capacity from 8.6 to 9.6 billion scfd and deliver gas to King Abdullah Economic City — a grassroots industrial and commercial city 120 km north of Jiddah — and the Rabigh area. Construction of the first phase was 72% complete at year-end, and engineering and procurement for the second phase, which will raise capacity to 12.5 billion scfd, were 73% and 38% complete, respectively. The additional volumes of fuel and feedstock will help our customers diversify and create jobs.

Primed for growth

Driven by our strategy to integrate across the value chain, our achievements in the downstream sector continued to build strength and resilience into our business model — positioning us for greater growth.



2016 exports by region: refined products

- Asia
- NW Europe
- Mediterranean
- Other

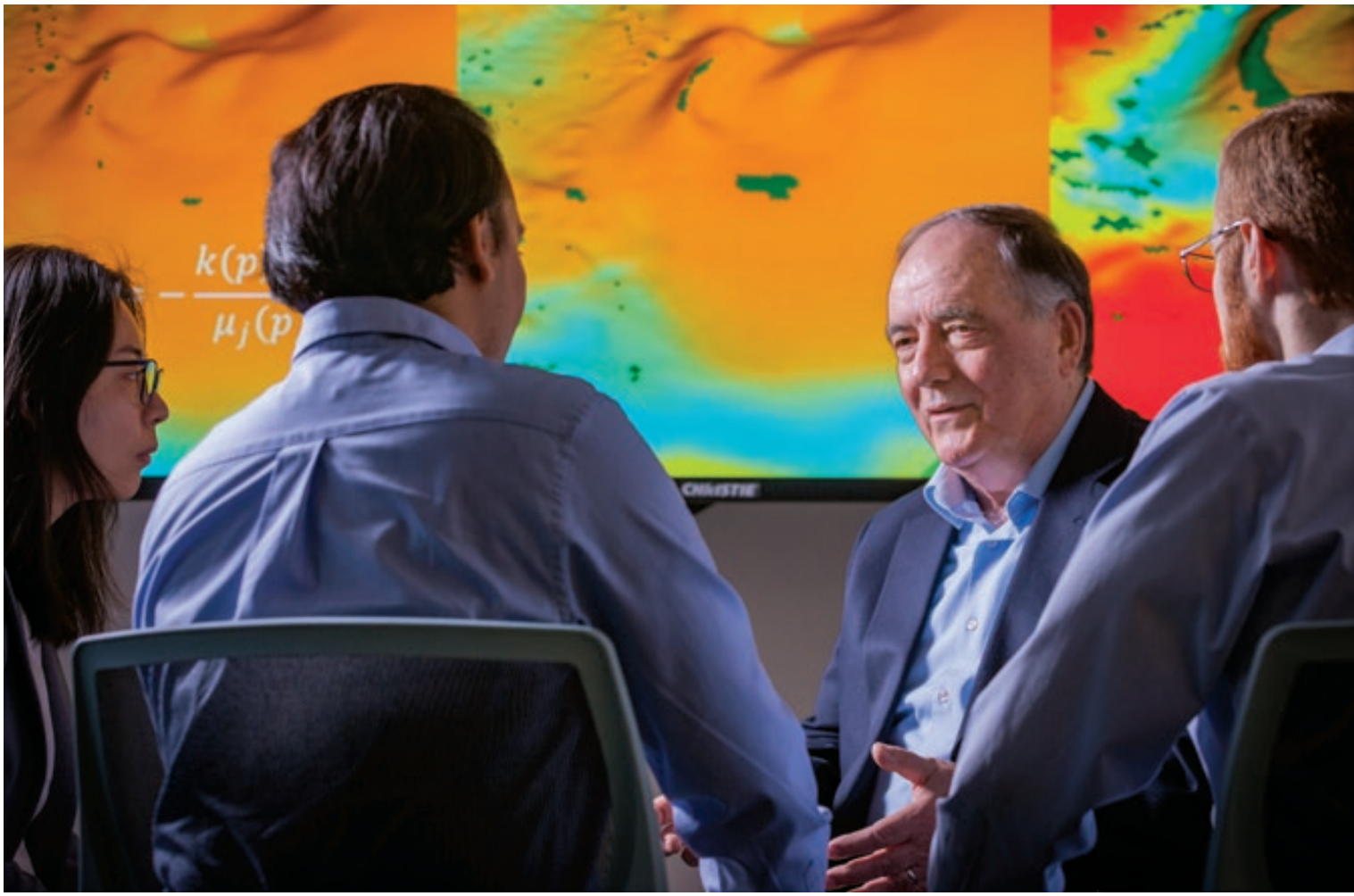
Personnel at our Houston R&D Center investigate new sealants that can repair broken oil well cement downhole and bring production back from damaged wells. The Houston facility is part of our Global Research Network, which is dedicated to achieving breakthrough innovations to meet energy challenges.

technology: powering innovation

We originate impactful, innovative solutions to make our resources more dependable, sustainable, and valuable—for the benefit of our business, Saudi Arabia, and energy consumers around the world.

Technology and innovation are key drivers of our strategy to maximize the inherent value of the resource base, enable a more diversified and globally competitive domestic market for our products, and create a Saudi workforce with a world-class knowledge base. We realize these goals by developing and commercializing new technologies, evolving strategic alliances with industry partners, forging relationships with world leading research and academic institutions, and pursuing strategic acquisitions and investments to generate additional value.

Our research and development (R&D) efforts focus on the **upstream, downstream**, and **sustainability** domains—specifically on high-impact technologies that have the potential to create significant competitive advantage for our operations and help grow new businesses. In 2016, we progressed initiatives across the hydrocarbon value chain, from underwater robotic seismic acquisition and faster reservoir modeling to improved refinery yields and new fuel formulations.



Resource stewardship

In our more than 80 years of managing the Kingdom's oil and gas resources, continuous technological innovation has been the driving force behind our upstream operations and remains fundamental to our future success. Our technological advances have made exploration more effective and economical, opened new sources of supply, and enhanced our ability to recover more oil and gas to secure sustainable growth.

Enhancing resource discovery

In 2016, we achieved the industry's first trillion-cell simulation and hydrocarbon migration algorithm, run on the latest evolution of our POWERS (parallel oil and water enhanced reservoir simulator) technology. We developed POWERS in-house, and at the time of its first deployment in 2000, it was capable of million-cell models. In 2010, we unveiled GigaPOWERS, which ran billion-cell models. Now, the development of **TeraPOWERS** will make it possible to model the physics of hydrocarbon reservoirs from their original generation to their final production, from microscopic rock pore scale all the way to giant field and even basin scale.

The breakthrough model was made possible through collaboration with the King Abdullah University of Science and Technology (KAUST), located north of Jiddah on the Red Sea. TeraPOWERS will help prioritize prospects, reduce exploration risks and costs, and enable us to sustainably manage the Kingdom's oil and gas resources for future generations.

Led by Dr. Ali Dogru, in photo at left, our TeraPOWERS team ran the industry's first trillion-cell simulation and hydrocarbon migration algorithm. The insights generated by TeraPOWERS, combined with data gleaned from core samples, allows for more precise drilling—enabling sustainable management of the Kingdom's petroleum resources for future generations.

We continued to explore **geochemical techniques** developed in-house, including correlating geotracers—natural compounds found in crude oil—to help evaluate the distribution, migration, and accumulation of subsurface fluids. The knowledge gained from the data generated by these techniques lowers the risks associated with new prospects and opens new opportunities for exploration.

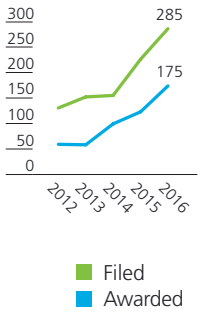
We also built and tested **two autonomous underwater vehicles** designed to acquire seismic data in shallow offshore environments. These innovative subsea vehicles could reduce data acquisition costs by 30% and speed up data acquisition by 50%, providing high-quality data more cost effectively.

Boosting oil recovery

During 2016, we continued to develop and test a range of improved and enhanced oil recovery technologies to maintain our capability to help meet growing energy demand.

Our **SmartWater Flood** research program continued to show potential to improve oil recovery rates from carbonate reservoirs by an additional 4% to 8%. The results of our in-house research program and single-well field trials have shown that injected seawater, whose ionic composition has been optimized, outperforms traditional seawater injection. In 2016, we completed detailed engineering design for the main surface facilities for a

New patents filed and awarded



Working with local industries in al-Hasa, date palm waste is crushed into powder and added to drilling fluids to prevent the loss of circulation. This novel approach, under investigation by our R&D Center in Dhahran, could reduce costs and generate new business opportunities.

multi-well demonstration project at 'Uthmaniyah, and advanced the design of another demonstration project at Khurais.

With a goal to reduce CO_2 emissions while also efficiently increasing oil recovery, we continued to monitor the performance of our **CO_2 enhanced oil recovery** demonstration project—the largest such project in the Middle East. Since the initial injection of CO_2 in north 'Uthmaniyah in 2015, the response from the test wells has been positive, with oil production rates increasing three to four times.

We maintained progress on several in-house studies of **chemical enhanced oil recovery**, including better characterization of the pre-selected chemical formulation in different rock types, and evaluation of potential synergies with our SmartWater Flood technology. We plan to conduct a single-well tracer test in 2017 to demonstrate the effectiveness of the chemical formulations in the field.

Surfactants are chemicals that reduce the surface tension of liquids, and can be used to help loosen oil from rock. We have conceived and developed sustained release **surfactant nanoparticles** in-house as a potentially efficient means of enhancing oil recovery. In 2016, we completed new formulations and conducted characterization and stability tests in support of a single-well test planned for 2017.

We completed **integrated reservoir studies** for 31 fields and reservoirs, incorporating static data (geology and petrophysics), and dynamic data (well testing and production), to create detailed 3-D models. Applying best-in-class reservoir development and depletion strategies, including advanced well architecture and completion technologies, enables us to analyze the oil recovery performance of reservoirs and manage them for the long term.

Underbalanced coiled tubing drilling allows us to optimize drilling performance and maximize recovery rates from gas wells to help meet growing demand. In 2016, this technology helped mitigate formation damage to achieve a production rate of 60 million scfd from a gas well. We plan on assigning additional wells to the technology project in 2017 to enable the drilling of areas with low reservoir pressure, without damaging the reservoir.

Improving efficiency and performance

We continued to investigate **cable deployed electric submersible pump (ESP) systems** that can be deployed and retrieved in one day using the pump's power cable, thereby eliminating the need to use a workover rig and significantly reducing costs while boosting oil recovery. Major milestones achieved in 2016 included the testing of ESPs in our Khurais and Abu Hadriyah fields.

Other highlights of our research programs include:

- **High-temperature fracturing fluid** system using untreated seawater and designed to conserve freshwater and treated seawater. A field trial is scheduled for 2017.
- **Waterless fracturing fluids** based on CO_2. This technology uses supercritical CO_2 (carbon dioxide in a fluid state) to keep hydraulic fractures open. We synthesized nearly 100 polymers and co-polymers and expect to test them under supercritical CO_2 conditions in 2017.
- We conducted a successful implementation of using resin-enhanced **local sand** to fracture a gas well in 2016, with further trials to follow in 2017. This initiative offers the potential to lower gas production costs as well as promote economic development using local resources. We are also identifying locally produced drilling and stimulation chemicals to replace imported versions.
- In a novel approach to address the challenge of losing drilling fluids and mud in drilling operations, we are exploring the potential of local **date tree seeds and fibers as loss circulation materials**. In 2016, we filed patents for three loss circulation materials and conducted field trials of the seed-based solution. The new products, designed to replace expensive imported loss circulation material, could significantly reduce drilling costs while creating jobs in local communities.

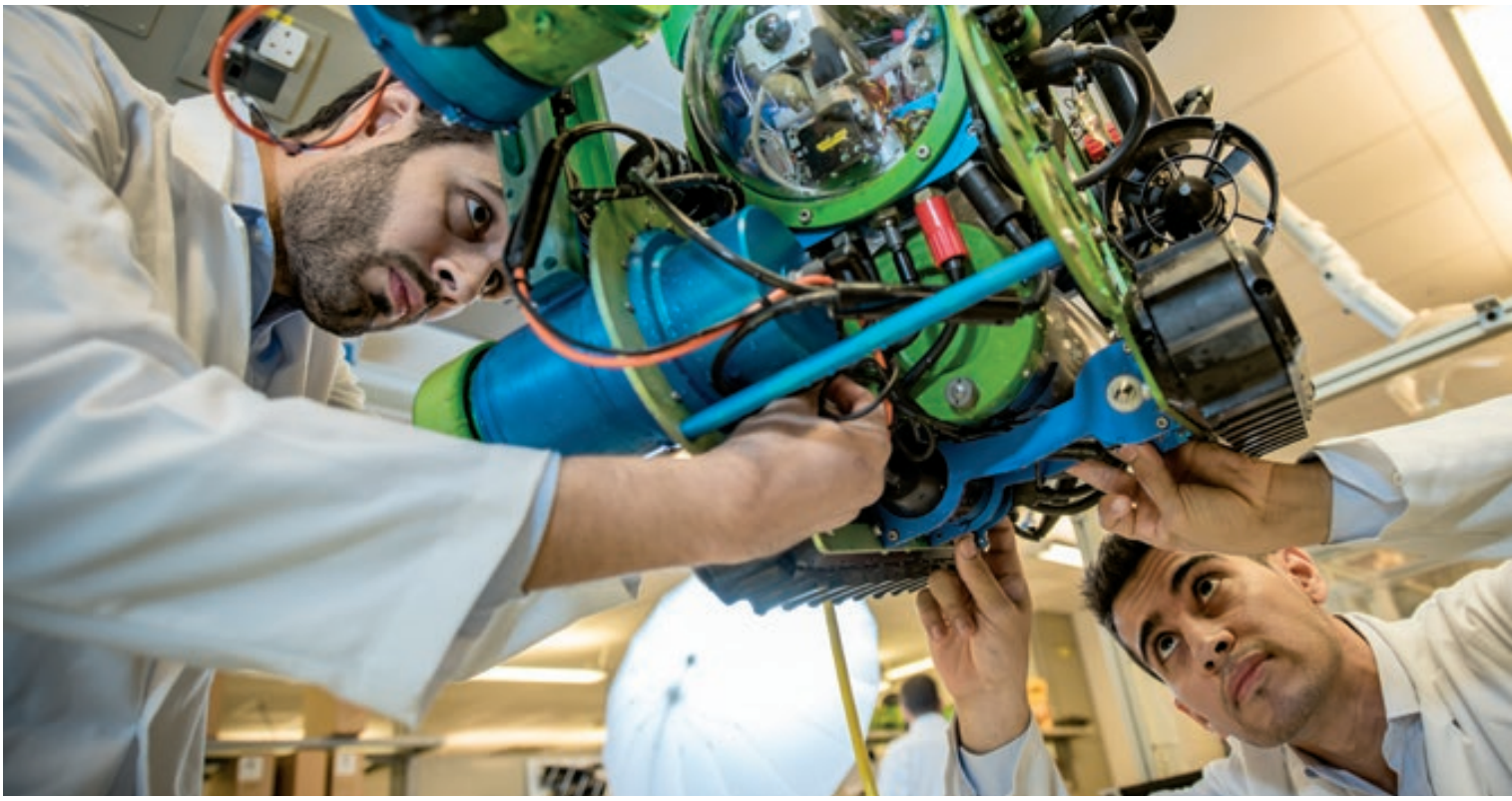
More broadly, we also evaluated a slate of local materials and chemicals for their suitability to replace more expensive imported products and spur the development of a strong and reliable in-Kingdom supplier base.

Leveraging technology to add value

Our research efforts are aligned with our downstream strategy to integrate our refining and chemical facilities—a synergy that generates a powerful value multiplier effect.

In 2016, our R&D teams progressed an array of initiatives to capture additional value through new technologies. These included:

- **Crude oil to chemicals.** We optimized the conditioning step of pyrolytic cracking of crude oil, employing a novel catalyst system. Work is ongoing to confirm the process, with initial results delivering higher chemical yields than originally estimated, suggesting greater potential to capture additional value.
- **Transforming lower value streams** to higher value chemicals. We investigated and successfully demonstrated four processes and catalyst options to upgrade the quality of the reformate stream (heavy naphtha processed from crude oil) to produce benzene, toluene, and xylene.
- **Developing new catalyst products** to increase production of value-added products such as diesel and propylene. We deployed a new hydrocracking catalyst at our Riyadh Refinery in 2014, increasing mid-distillates by 2 volume percent. The next step will be to deploy the catalyst in our Ras Tanura Refinery. We also developed a new catalyst for fluid catalytic cracking (FCC). The product, capable of producing an additional 4% to 7% of propylene relative to commercially available catalysts, has cleared the demonstration stage in an integrated FCC pilot plant.



Preserving value through network integrity

Our ability to reliably and safely deliver our products to customers across the Kingdom and to our export terminals depends upon infrastructure maintained to the highest standards—an approach that also improves operational efficiency. In 2016, we continued to enhance our maintenance capabilities with innovative technology:

- Our proprietary **Saudi Aramco Inspection Robot** (SAIR) is a unique wireless robotic technology capable of conducting visual inspection, ultrasonic thickness gauging, and gas sensing on hard-to-reach steel surfaces. We enabled the creation of a new startup company by licensing SAIR to the Arabian Robotics Company, reflecting our commitment to support new technology-based businesses in the Kingdom. We anticipate SAIR will begin inspecting company assets in mid-2017.
- Our **Shallow Water Inspection and Monitoring Robot** (SWIM-R™) is a remotely operated vehicle designed to perform underwater inspection tasks. In shallow water environments, diving support vessels encounter accessibility and positioning challenges, making the inspection of pipelines in shallow water difficult. In contrast, the SWIM-R vehicle can be deployed from shore or by using a low-cost inflatable vessel, reducing inspection time and costs, and can complete inspection tasks four times faster than divers. We demonstrated the SWIM-R in the Red Sea and the Arabian Gulf, and the technology is protected by seven filed patents.

Designed, developed, and tested in less than two years, our Shallow Water Inspection and Monitoring Robot (SWIM-R™) enhances pipeline inspection speed, efficiency, and safety. The creation of innovative solutions across our operations underpins our strategy to create greater value.

Our state-of-the-art Detroit Research Center enables researchers to collaborate with engine designers and major automakers to explore new fuels technology in engines and whole vehicle systems—ideas with the potential to become scalable technologies that can reduce emissions and improve fuel economy.

Securing energy for the long term

Throughout 2016, we continued to explore technologies that will increase the efficiency and environmental performance of fuels derived from oil to ensure future generations can enjoy the economic benefits of accessible, reliable, and sustainable supplies of petroleum while also protecting the natural environment.

We are working with auto manufacturers on the advanced integrated engine fuel systems of the future.

Throughout 2016, we continued to advance our efforts to develop new fuel and engine combinations. We plan to create automotive technologies that, in combination with innovative new fuels, can make a substantial impact on reducing emissions and improving efficiency, all while maintaining vehicle performance.

Our technology developments in this area are tested extensively in state-of-the-art research facilities around the world and in the labs of our collaborators—major automakers, engine designers, R&D organizations, and consortiums. At our **Detroit Research Center**, five engine test laboratories and our first vehicle chassis dynamometer are now operational. Equipped with this lab, the Detroit team is able to demonstrate new fuels technology in both engines and whole vehicle systems.

Additional highlights from our research into fuel engine systems include:

- Working collaboratively with European and U.S. automakers, we demonstrated significant fuel efficiency and pollutant emissions improvements using Gasoline Compression Ignition (GCI) technology. This was done on several light-duty and heavy-duty platforms using market and blend stock gasoline fuels (like naphtha) instead of diesel.

- In collaboration with IFP Energies nouvelles (IFPEN), we demonstrated the feasibility of octane on demand in a light-duty vehicle. This approach utilizes two fuels to supply the necessary anti-knock quality based on engine requirements while improving fuel efficiency.
- In collaboration with the KAUST Clean Combustion Research Center, we released two new fuel formulation tools in the public domain. First, AramcoMech 2.0 allows researchers to investigate the combustion behavior of different fuels under different conditions at a molecular level. This model has been cited in more than 380 international research institution publications and adopted by leading transportation companies for product development and research. Second, the Fuel Design Tool complements AramcoMech and can be used to develop surrogate fuels that match most of the physical and chemical properties of real fuels. This tool is web-based and supports the broader combustion research community.

Addressing energy challenges with our Global Research Network

Utilizing our "open innovation" model, our continued investment in R&D is designed to maintain our competitive advantage and generate long-term value. Our **Global Research Network**, comprising three in-Kingdom research centers and eight satellite research centers and technology offices, continued to accelerate technology development to address global energy challenges and contribute to the development of a vibrant technology ecosystem in Saudi Arabia.

In 2016, we expanded the collaboration between our Aramco Research Centers in Detroit, Houston, and Boston with the **Massachusetts Institute of Technology's Energy Initiative (MITEI)** to support research by two Low-Carbon Energy Centers designed to address climate change challenges. The centers bring together researchers from multiple disciplines at MIT to engage with companies, governmental

agencies, and other stakeholders to further research and promote clean energy technologies to mitigate climate change.

At our headquarters in Dhahran, a key development in 2016 was commencing the expansion of the **Exploration and Petroleum Engineering Center – Advanced Research Center (EXPEC ARC)**. The project includes construction of a new research building and laboratory for enabling integrated research on sustainability technologies. When complete, the new facilities will house 850 professionals and support staff.

We also broke ground on a **new research center at KAUST**, integrated with the research staff and facilities at the university and positioned to capitalize on the international network of academic institutions affiliated with KAUST. The center, expected to open in 2019, will include labs and offices to support research in the areas of chemicals, intelligent systems, solar energy, reservoir engineering, computational modeling, and environmental protection.

Expanding knowledge through collaboration

Collaborating with technology leaders in academia and industry enhances our competitiveness and expands our global technology footprint. We undertook a wide range of activities in 2016 to transform ideas into sustainable solutions, including signing a Heads of Agreement with Saudi Arabian Basic Industries Corporation (SABIC), a leading Saudi petrochemicals manufacturer, to conduct a feasibility study on the development of a fully integrated **crude oil-to-chemicals complex** to be located in Saudi Arabia.

To learn more about Converge®, see pg. 52

The project aims to maximize chemical yields, transform and recycle byproducts, drive efficiencies of scale, optimize resources, and diversify the mix of petrochemical feedstock to enable new economic opportunities and to develop a world-class labor force. Phase I of the joint study was completed in 2016.

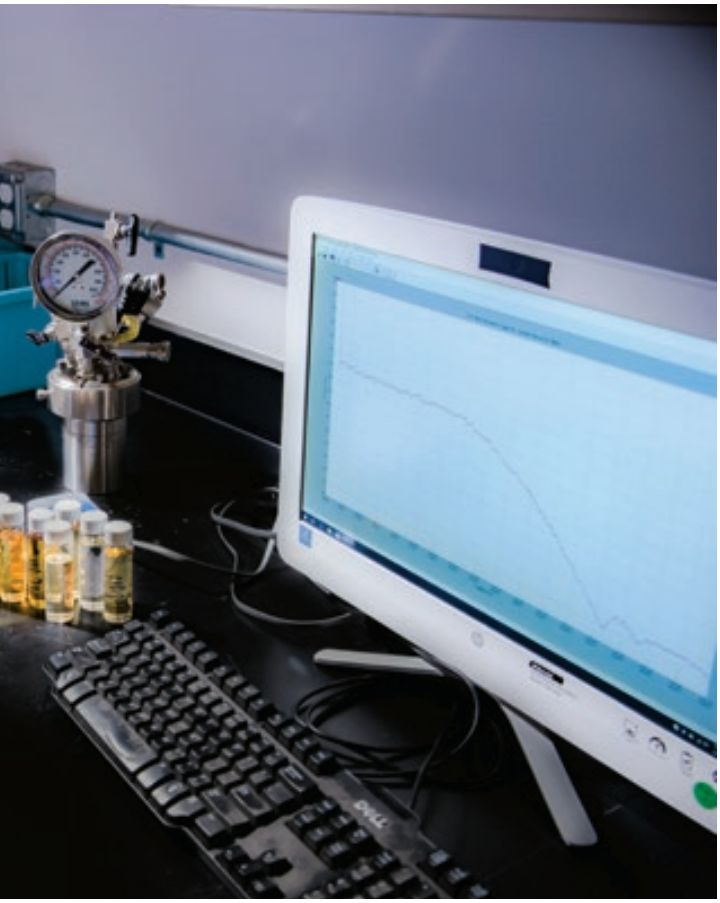
Investing in energy

Our corporate venture capital subsidiary, **Saudi Aramco Energy Ventures (SAEV)**, headquartered in Dhahran and with a presence in North America, Europe, and Asia, invests globally in startup and high-growth companies developing technologies of strategic importance to us. In 2016, SAEV made eight new direct investments and began a series of technology pilot projects.

A highlight of 2016 was the acquisition of Novomer's **Converge®** polypropylene carbonate polyols product line. The acquisition of the technology, driven by our integrated downstream expansion strategy, will enable the conversion of waste CO_2 into cleaner, high-value materials with significant performance, cost, and carbon footprint improvements.

We plan on manufacturing and marketing Converge® and its associated products through our **Aramco Performance Materials** subsidiary. The development of full-scale production facilities in Saudi Arabia will help spur further technological innovation in the Kingdom, new jobs, and domestic demand for our products through growth in the petrochemicals conversion sector.

Our acquisition of Converge®, a polyol technology, will enable us to transform emissions into value. The technology combines waste CO_2 with hydrocarbon feedstocks to create high performance polyols for use in a variety of everyday applications.



By connecting energy, people, and ideas, we expand the possibilities created by our business to drive sustainable economic growth. Our In Kingdom Total Value Add program seeks to lift our spending for locally produced energy-related goods and services to 70% by 2021.

enhancing our commercial ecosystem

By leveraging the immense promise of the Kingdom's resources, we enable a thriving commercial ecosystem that benefits our business and the country.

The Kingdom's Vision 2030 is a blueprint for attaining greater levels of sustained economic growth and diversification, and for creating new opportunities for its citizens. Our strategic objectives are consistent with many aspects of Vision 2030, and our support for the Vision, built upon collaboration, will enable the achievement of shared goals—and in ways that produce more impactful results.

Our IKTVA initiative to grow the energy services sector and increase the amount of goods and services procured in the Kingdom enables us to operate more efficiently while helping to strengthen and diversify the local economy and domestic supplier base. Our efforts to broaden the impact of our commercial ecosystem extend to addressing climate change, including efforts to reduce greenhouse gas emissions and promoting energy efficiency within our enterprise and with end-users, further enabling economic growth.

Building a globally competitive energy sector

IKTVA is our roadmap for advancing the way we procure goods and services. The program strives to localize 70% of expenditures for goods and services by 2021, supporting an internationally competitive energy sector capable of exporting 25% to 30% of its output per year.

We have made significant headway toward this goal, and in 2016 we increased the value of our material procurement spending awarded to local manufacturers to reach $2.9 billion—an increase of $800 million over 2015 and the highest level of local content in our history. We also completed the third-party IKTVA certification of our 100 top service providers, representing 80% of our procurement.

A significant landmark of the commitment to our IKTVA program by leading international businesses was the expansion of the General Electric (GE) **GEMTEC gas turbine manufacturing** facility. At the facility, in support of our Master Gas System Expansion Project, four high-efficiency gas compression trains were assembled locally for the first time. As part of the program, GE Oil and Gas qualified a network of Saudi-based suppliers for local and international GE markets—boosting the profile of in-Kingdom manufacturers and helping to catalyze further growth.

In another prominent example of how IKTVA is enabling new opportunities that also strengthen our network of service suppliers, we assisted the opening of Schlumberger's **Middle East Center for Reliability and Efficiency** at Dammam Second Industrial City. Dedicated to advance maintenance and servicing of oil and gas technologies, the new cutting-edge facility is the largest of its kind in the world.

We also signed two joint venture agreements designed to help spur the localization of the energy value chain and enhance in-Kingdom technical capabilities:

- With Nabors Industries Ltd., a global leader in drilling rigs, to manage and operate onshore drilling rigs along with capital commitments toward future rigs manufactured in Saudi Arabia.
- With Rowan Companies plc, a global offshore contract driller, to own, operate, and manage offshore drilling rigs. The agreement also committed the new company to purchase future newly built rigs constructed in Saudi Arabia.

To learn more about our achievements in drilling, see pg. 22

These two joint ventures, which are expected to create 5,000 jobs, illustrate our strategy to connect energy, people, and ideas to create new opportunities and additional value for our company and for Saudi Arabia.

New industries, new growth opportunities

With the laying of the cornerstone by The Custodian of the Two Holy Mosques for the **King Salman International Complex for Maritime Industries and Services** in Ras Al-Khair, we marked a significant milestone in our efforts to support the Kingdom's development objectives. Designed to spur the growth of energy-related industries, the project is consistent with the localization and diversification goals outlined by Saudi Vision 2030.

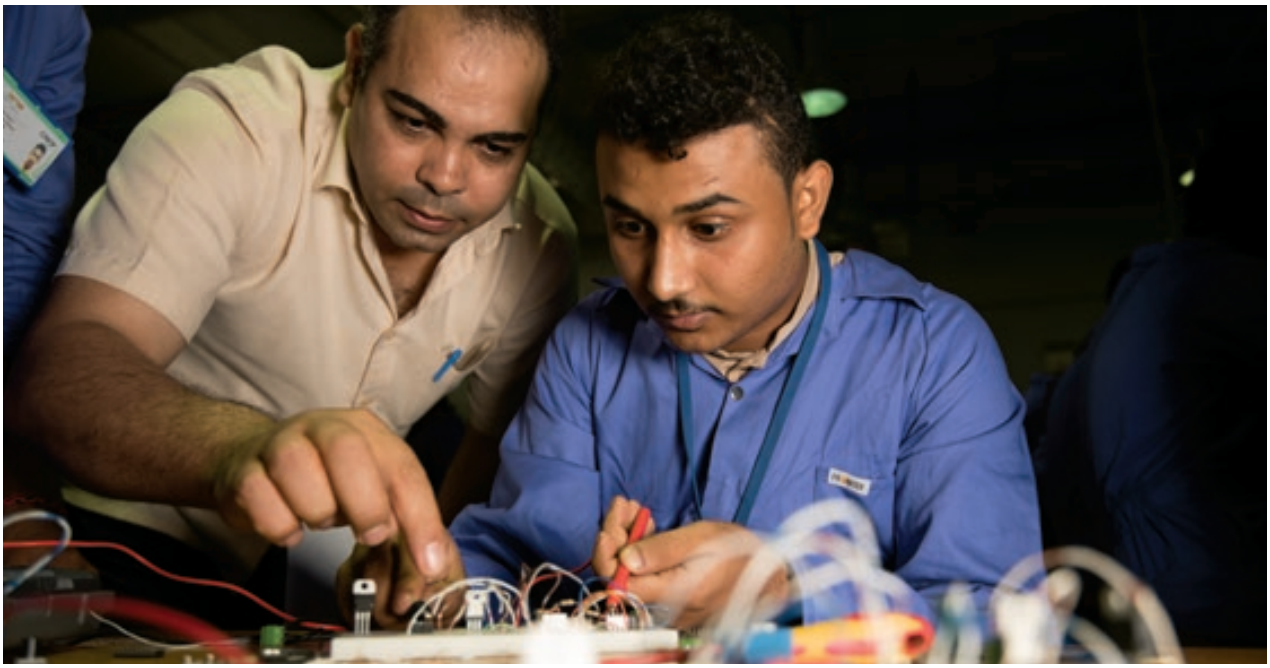
We are heading an alliance of leading shipping and industrial companies for the construction of the complex that, when reaching full production capacity in 2022, will be the largest maritime industries complex in the Kingdom and a hub for regional maritime engineering, construction, and related expertise. We anticipate the industrial complex could contribute roughly $3 billion to the Kingdom's GDP per year, and significantly increase maritime-related domestic production. In 2016, we advanced the project with the signing of a Memorandum of Understanding with GE and Cividale SpA of Italy to build a $400 million forging and casting manufacturing facility near the complex—the first of its kind in Africa and the Middle East.

By 2030, the King Salman International Complex for Maritime Industries and Services will create more than 80,000 in-Kingdom job opportunities.

Our strategic investments enable the growth of diversified manufacturing and service industries linked to our business, driving the development of new industries and the creation of new jobs.

Enabling a competitive workforce

The sustainable growth and diversification of the Saudi economy, essential to our long-term commercial interests, requires a workforce with the right skills. We therefore support human resource development in the broader economy through a wide range of corporate citizenship initiatives. For example, in 2016, through the launch of our **Industry Partnership** initiative, we established collaborative relationships with more than 20 organizations, including multinational and regional companies and nonprofit



Abdulrahman Hagawi is one of hundreds of young men from Jazan receiving training as electricians, mechanics, and technicians at the Maharat training academy. Our support for training in specialized fields helps build the capacity essential to our long-term commercial interests.

societies, to support female advancement in the petroleum industry through reviewing policies, sharing best practices, and benchmarking.

In cooperation with Wipro and Princess Nora Bint Abdulrahman University, we inaugurated the Kingdom's first **all-women business and technology park** in Riyadh. The park, envisioned to be the largest hub of engineering drafting, business processes, and IT services in the region, is targeting the creation of employment opportunities for up to 20,000 Saudi women.

In collaboration with the Ministry of Communications and Information Technology, the Communications and Information Technology Commission, and the Technical and Vocational Training Corporation, we signed a Memorandum of Understanding to establish the **National Information Technology Academy**. The academy is designed to tap the potential for job creation, particularly for women, in the expanding digital economy. The academy plans to enroll 700 students by late 2017.

To support the development of the King Salman International Complex for Maritime Industries and Services, we signed a Memorandum of Understanding with key stakeholders for a **National Maritime Academy** that targets a student population of 1,100. Another Memorandum of Understanding was signed to create a **National Aviation Academy**. Designed to meet the needs of the region's fast growing airline industry, it is anticipated to accommodate 1,450 trainees.

We also facilitated the launch of the **Saudi Arabian Drilling Academy (SADA)**. The first project of its kind in the world, and supported and funded by private drilling companies, SADA will help equip Saudis with drilling and workover skills. With 4,000 drilling technicians needed each year to work in the industry in Saudi Arabia, there are significant employment opportunities for trainees.

We have helped establish 12 specialized training academies across a wide range of disciplines, with a total capacity of more than 11,000 Saudi trainees.

To learn more about our efforts to spur innovation, see pg. 65

Empowering entrepreneurs

Strengthening and diversifying the Saudi economy entails developing an ecosystem of small- and medium-sized enterprises that can capitalize on innovations and opportunities. We have provided a key enabler of that ecosystem: The **Aramco Entrepreneurship Center (Wa'ed)**, located in Dhahran Techno Valley Company (DTVC) on the campus of the King Fahd University of Petroleum and Minerals (KFUPM). We are a strategic partner in DTVC. Wa'ed is a business incubator that offers entrepreneurship training and mentorship programs, non-collateralized loans or venture capital partnering, and assistance in forging alliances with key stakeholders to foster human capital development, funding, and access to markets.

In 2016, Wa'ed funded 12 projects and five investment deal proposals were approved. Since Wa'ed's inception, $74 million has been committed to nearly 75 companies, including ventures in the medical sector, commercialization of technology, localization of our upstream value chain, and innovative solutions such as online payments. With the expectation that Wa'ed supported startups can create nearly 3,000 jobs, it is positioned to play a vital role in our knowledge-based economy.

Addressing climate change

Searching for ways to make petroleum energy more sustainable is embedded in our activities. We continuously work to improve the practices and technologies used in the discovery, recovery, processing, distribution, and end-use of energy resources to ensure energy efficiency. This approach creates benefits beyond cost savings: Local pollutants and global greenhouse gas emissions are diminished, helping to reduce the industry's environmental footprint and enabling sustainable economic growth.

Our strategy for carbon management

How do we help meet the world's energy needs while managing greenhouse gas emissions? We plan to answer this question with a comprehensive carbon management strategy, based on **four pillars**: shrinking our carbon footprint; harnessing the power of R&D; transforming emissions into value; and participating in impactful collaborations.

Raising energy efficiency, reducing emissions

We recognize that the quality of life for future generations will depend on how well we manage energy consumption today. Accordingly, the **first pillar** of our carbon management strategy consists of concerted efforts to shrink our carbon footprint, including working closely with the Saudi Energy Efficiency Program, growing the contribution of renewables in the energy mix, and expanding gas supplies with a plan to increase the share of clean gas in power generation.

A key element of our commitment to meet rising energy demand in Saudi Arabia is our **Energy-to-the-Kingdom (E2K)** initiative. In 2016, the Kingdom's utility energy efficiency improved to 36%, up from 32% in 2013, and due in part to efforts driven by our E2K initiative.

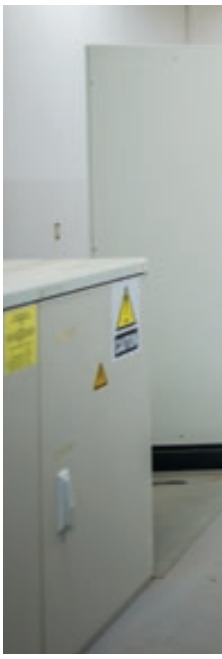
To help reduce the consumption of high-value liquids in energy generation, we provided 67 billion scf of nonassociated gas through our **Peak Seasonal Production Program**, saving 9 million barrels of crude oil equivalent. With the inclusion of renewables and other sources of power, efficiency in the utility sector is expected to increase to 45% by 2030.

Our level of **flared gas** per raw gas production continued at less than 1% and is set to continue to decline through our Flare Minimization Plan and the installation of Flare Gas Recovery systems. We recovered more than 9 billion scf of gas through **zero discharge technology**, mainly utilized in well site operations.

New energy from renewables

Over the last three years, we have built technical, planning, and commercial capabilities in renewables, including evaluating more than 380 project locations; surveying 75 local and 131 global manufacturers; and

To learn more about our Global Research Network, see pg. 41



assembling an international team of renewables experts.

We also continued to participate in the Kingdom's renewable program, advancing efforts to introduce new fuels and renewable resources to the Kingdom's utility mix. This effort included our support for the Kingdom's drive to become a **solar powerhouse**:

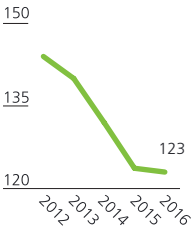
- A new agreement to conduct a joint feasibility study (under the auspices of the National Industrial Cluster Development Program) with Showa Shell, a public company in which we are an indirect shareholder, and its subsidiary, Solar Frontier, for the development of a solar photovoltaic panel manufacturing plant in Saudi Arabia.
- We produced a low cost technology to mitigate the negative impact of dust on solar panel productivity. A dust storm can lead to a 40% reduction in efficiency of solar panels, and dust accumulation can lead to an efficiency reduction of 2% per week or more. After two years of research and prototype testing, the solution offered by the technology is a robotic, dry cleaning technology that is fully automated to run on schedule or on command. The technology has multiple patents pending and discussions are underway to commercialize the technology and bring the product to market.

We partnered with GE to erect the **Kingdom's first wind turbine** at our Turaif Bulk Plant. Conceived as a demonstration project to highlight the viability of wind power, the turbine, installed in January 2017, is capable of generating 2.75 megawatts of power and will reduce the use of liquids for power generation at the bulk plant, saving roughly 19,000 barrels of oil equivalent per year.

The **second pillar** of our carbon management strategy is harnessing the power of R&D to make game-changing advances in legacy fuels and new transport technologies. For details on our efforts in this domain, please turn to page 40.

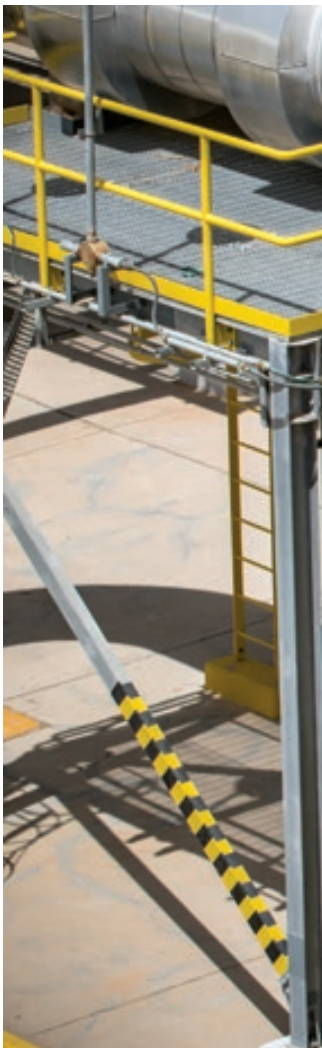
Energy intensity required to produce one barrel of oil equivalent

(thousands of Btu)



Data revised based on new methodology.

Solar panels on the parking structures at our Midra Tower in Dhahran gather energy during the day. Substations connect and control the energy flow from the panels to help power the office building, emblematic of our efforts to introduce renewable resources to the utility mix.



Carbon dioxide is captured at our Hawiyah NGL Plant, compressed, and piped to the 'Uthmaniyah oil field where it is injected into the oil reservoir, sequestering the gas while also helping maintain pressure in the reservoir to recover more oil.

Creating value from emissions

The **third pillar** of our carbon management strategy is converting emissions into value by turning carbon dioxide into beneficial products. Our acquisition of Converge®, a polyol technology, from U.S.-based Novomer, demonstrates the seriousness of our intent. This technology combines CO_2 with hydrocarbon feedstocks to create high performance polyols for use in everyday applications such as adhesives, sealants, and elastomer applications, covering a broad spectrum from automobile seats to building insulation panels.

Compared to conventional polyols, Converge® polyols have approximately one-third the carbon footprint and demonstrate superior performance, including increased strength; improved resistance to abrasion, chemicals, and weather; better adhesion, hardness, and tear-strength; and greater load-bearing capacity.

Collaborating to reduce greenhouse gas emissions

The **fourth pillar** of our carbon management strategy is participation in impactful collaborations, such as the Oil and Gas Climate Initiative (OGCI), a CEO led initiative composed of 10 global oil and gas companies committed to reducing greenhouse gas emissions through technology.

Membership in the OGCI places us at the forefront of climate change solutions.

We are a founding member of the OGCI, whose member companies together account for one-fifth of the world's oil and gas production. The OGCI is committed to deliver technology on a scale that will create a step change to help reduce greenhouse gas emissions while still meeting the world's energy needs.

Over the next decade, a majority of the original OGCI members have each pledged an investment of $100 million to develop and accelerate the commercial deployment of innovative, low-emission technologies.

The **OGCI Climate Investments Initiative** will also identify ways to cut the energy intensity of both transport and industry, and work with like-minded initiatives across all stakeholder groups and sectors to multiply the impact of its emission reduction efforts.

Achieving self-sufficiency in power generation

Achieving self-sufficiency in electrical power for our operating plants through cogeneration is a key element of our energy management efforts. By utilizing the waste heat from our facilities, we generate electricity to run our operations, lower emissions, and reduce our impact on the nation's power grid.

During 2016, we brought 984 megawatts of new power capacity online by completing a suite of cogeneration projects, including the expansion of facilities at Shaybah, completion of facilities at Wasit Gas Plant, and the construction of joint venture facilities with the Power Cogeneration Project Company at Hawiyah, Abqaiq, and Ras Tanura.

Environmental stewardship: a local and global commitment

In addition to deploying technology and practices across our operations to reduce our environmental footprint, we also support positive environmental stewardship in the Kingdom. Highlights from 2016 include:

- Our **Environmental Education Program** is designed to instill the values of conservation and stewardship in young people. To date, 1,830 schools have been reached and 1,146 Friends of the Environment clubs have been established Kingdomwide.
- We reached 29,000 families and students at 167 schools in three cities with our **water conservation** campaign, raising awareness and demonstrating ways of reducing water consumption.

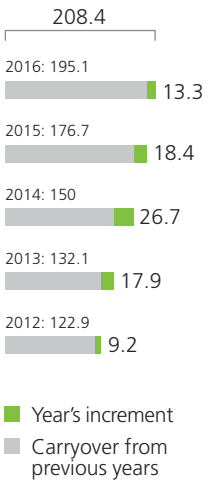
Environmental protection and sustainability remain critical as we contribute to the growth of the Kingdom's economy — the protection of Saudi Arabia's air, water, and land resources is a high priority.

Conserving water resources

We have always strived to protect the Kingdom's water resources, including maximizing wastewater reuse and

Energy conservation savings in company operations

(thousands of boe per day)



promoting sustainable alternatives to groundwater. Today, **we reuse more than 75% of our sanitary wastewater and over 80% of our produced water** (water produced with oil from a well)—among the highest reuse rates in the region.

Protecting ecosystems

We work to preserve and restore natural habitats by protecting biodiversity and ecologically sensitive areas and promoting greater environmental awareness. For example, in 2016, with support from thousands of company and community volunteers—including schoolchildren—we planted 800,000 mangrove seedlings along the Arabian Gulf, raising our total number of seedlings planted to approximately 1.7 million.

We inaugurated our 637 square km **wildlife sanctuary** in Shaybah. The fenced sanctuary protects dozens of native plant and animal species, including reintroduced populations of Arabian oryx, Arabian sand gazelles, and ostriches.

Internationally, our Houston subsidiary supports the reforestation efforts of nonprofit agency Trees for Houston by helping replant trees in ecologically sensitive areas, and the Galveston Bay Foundation's Oyster Shell Recycling Program, which is working to construct new oyster beds to restore the eco-balance of vital wetlands. As part of our Tokyo subsidiary's ongoing support for a marine conservation initiative in Okinawa, we supported "Coral Week," a week-long campaign promoting the protection of coral reefs by the Okinawa Coastal Ocean Observatory System.

Our long-term direction is a powerful combination of increased energy efficiency, more gas, ultra-clean oil fuels, advanced technologies, and renewables.

Our Shaybah wildlife sanctuary protects reintroduced native species such as the Arabian oryx, Arabian sand gazelles, and ostriches — part of our efforts to protect ecologically sensitive areas and promote environmental responsibility in Saudi Arabia.

The Saudi Arabian Drilling Academy, funded and supported by private drilling companies, instills safety training and specialized skills in the next generation of drilling professionals, thousands of whom are needed in the coming years.

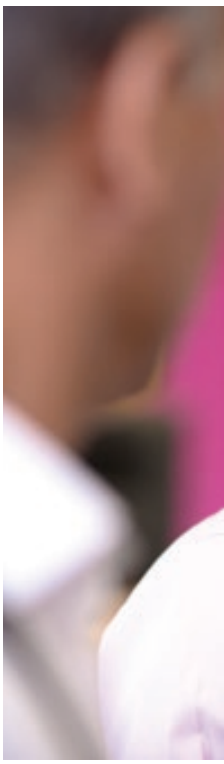
human resources and safety: realizing potential

We help our people realize their full potential, unlocking the promises of greater value and broader opportunities inherent in the Kingdom's energy resources.

Sustained investment is required to empower the right people with the right skills in an evolving and challenging business landscape. We believe the return on this investment far surpasses the cost, and that our development and training programs position us to navigate challenging times and allow us to seize new opportunities.

In 2016, we continued our efforts to build a proactive, agile, and adaptive workforce—one more capable of meeting evolving needs and managing risks. Our companywide **Operational Excellence (OE)** initiative integrates existing management systems and best practices to raise performance standards and enable organizations to achieve and sustain leading performance in efficiency, reliability, and safety in a cost-effective manner. The ongoing implementation of our **Enterprise Risk Management** framework equips our leadership with the tools to guide and oversee our corporate risk management strategies and activities.

Knowledge transfer from our veteran employees to our newest people takes many forms. Informal discussions can lead to new ideas and new ways of thinking while mentorship programs, internships, immersive courses, and interactive training help ensure our people have the skills to meet tomorrow's challenges.



Embedding a performance culture

We completed 42 corporate OE assessments in 2016, conducted eight OE assessor certification classes for 178 assessors, and offered 11 OE implementer classes, resulting in 229 newly trained implementers. Two OE key performance indicators are project schedule control and project cost compliance. In 2016, project schedule control was favorable to the target established in the Business Plan and project cost compliance was better than planned.

Our **Four Critical Behaviors** are the backbone of our workplace culture. Together, these four behaviors—people conversations, empowerment, collaboration, and decision making—enhance our performance culture and strengthen our ability to execute strategy.

In 2016, we conducted companywide pulse surveys and delivered 125 workshops and other events to more than 10,000 recipients to instill the behaviors in the day-to-day activities of our workforce at every level.

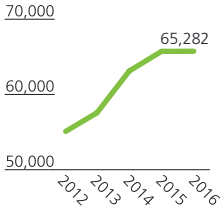
We also launched our "Thumbs Up" real-time application to recognize employee excellence in the Four Critical Behaviors and safety. Helping embed a results-based culture, the application works as an online collaboration tool where outstanding work can be recognized immediately in a way that is meaningful and public.

Enhancing skills

Meeting the energy challenges of tomorrow requires investing in our people today. Our long-term vision for managing the country's energy resources for the benefit of future generations is mirrored in our commitment to develop our people at every stage of their career.

We integrate hands-on technical training with a wealth of online classes, rotational assignments, intern and mentorship opportunities, sponsored university degree programs, and leadership courses to ensure we have a deep reservoir of skilled people able to meet future challenges.

Workforce



Shaping the workforce of tomorrow

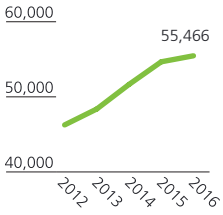
In 2016, we launched our **Industrial Sponsorship Program**, which supports high-achieving male and female students at intermediate colleges and institutions in disciplines aligned with our skills requirements. We also converted all of the classrooms and workshops in our Industrial Training Centers into smart learning environments, and streamlined an existing maintenance craft training program. In 2016, 3,952 Saudis graduated from our Apprentice Program and joined the workforce.

We endeavor to provide our people with world-class training facilities and academic programs. In support of this ambition, in 2016 we achieved Global Standard Accreditation from the Accrediting Council for Continuing Education and Training for 28 of our training centers. Our **College Preparatory Program** received recognition from the Saudi Ministry of Education, seven Australian universities, and Delft University in the Netherlands, enhancing our ability to place students in top universities around the world.

To equip our people with a strong knowledge foundation, we work to place participants in our **Advanced Degree Program (ADP)** and **College Degree Program for Non-Employees (CDPNE)** in the world's top universities. In 2016, 2,009 company sponsored students were enrolled at colleges and universities in North America, Europe, Asia, and Australia, and a total of 373 CDPNE graduates joined the workforce.

There is no better investment we can make in the future than developing the minds of young men and women.

Saudi workforce



To learn more about our R&D programs, see pg. 33

Fulfilling the promise of technology

Talent development in the upstream sector is crucial to our shared, secure energy future. Investing in technology and research to solve upstream challenges also requires investing in the people who will develop and use these tools.

Our **Upstream Professional Development Center (UPDC)**, through its broad suite of interactive programs, compresses the time required for new engineers and geoscientists to contribute in their jobs, while capturing the knowledge and experience of more senior professionals. In 2016, UPDC delivered 430 training sessions for more than 6,800 participants, and delivered programs in professional engineering development and a series of engineering, inspection, and professional certification sessions for more than 6,000 participants.

Energizing our leadership

To maximize the value from Saudi Aramco's move into new businesses and new geographies, our next generation needs a new set of leadership skills. Our **Leadership Series** imparts these skills through programs that address critical challenges at each level of responsibility, ensuring that core leadership skills are developed early and are enhanced at each successive level.

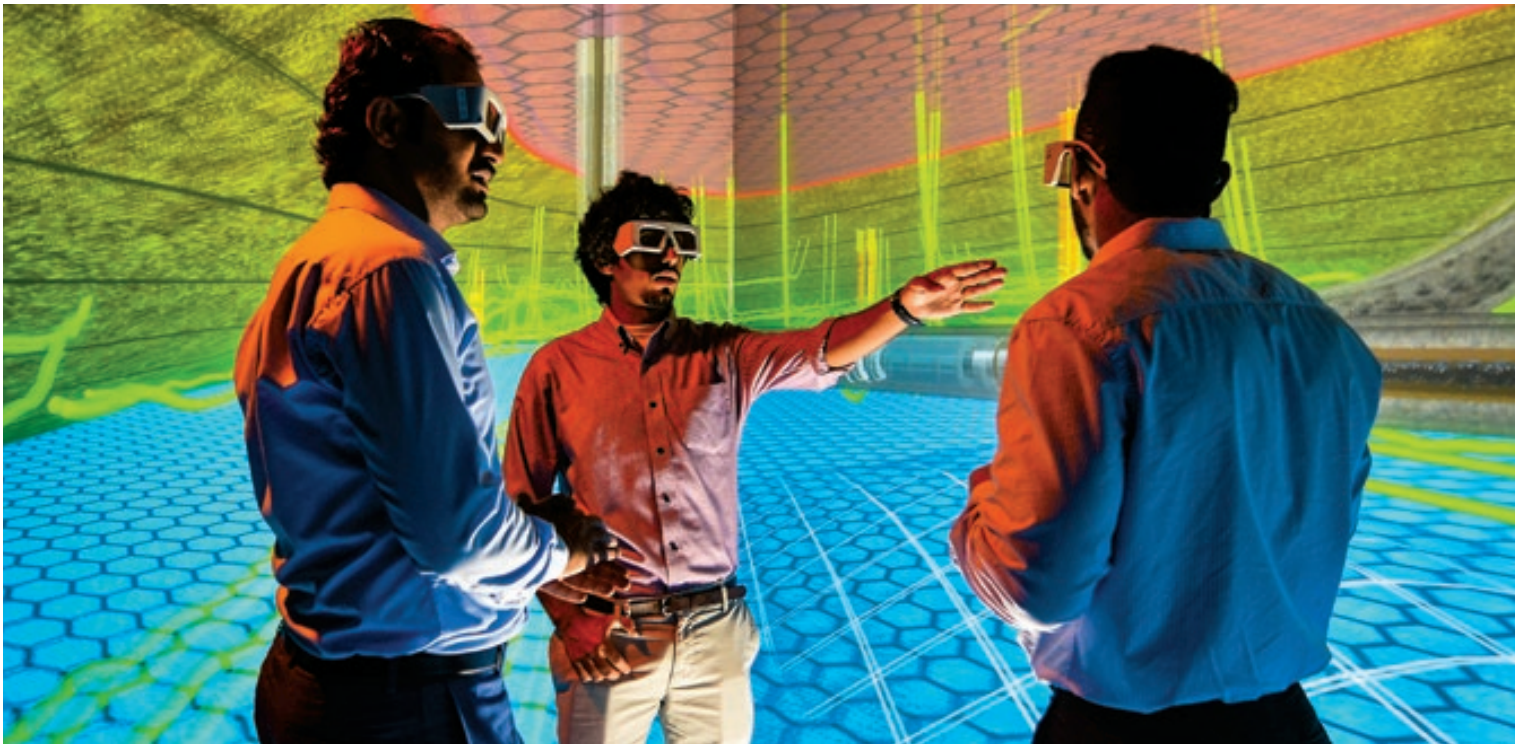
We delivered two new leadership programs to approximately 1,000 frontline supervisors, while more than 90 managers and 100 division heads participated in our Leadership Series sessions, and more than 60 people took part in our Advanced Manager program.

Ensuring the safety of our people

A culture of safety underlies and sustains the performance of our entire workforce—in Saudi Arabia and around the globe. Fundamentally, we aspire to be safety leaders in the Kingdom and in the industry, ensuring that safety is not only a standard, but an integral part of our business culture.

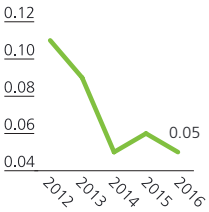
Across our organization, we live safety all day, every day, in our facilities and in our

Our Upstream Professional Development Center provides cutting-edge training technology to equip young professionals with a comprehensive grounding in the upstream disciplines.



Lost-time injury rate

(per 200,000 work hours)



homes, on- and off-the-job. Our leadership actively integrates safety into business strategies, processes, and performance measures to build a strong safety culture across the enterprise.

Our unrelenting focus is the safety of all our people and the communities where we do business.

Our safety performance

Our safety performance showed positive trends, with our on-the-job lost-time incident metric remaining consistently low at 0.05 per 200,000 man-hours, reflecting the impact of our deepening safety culture and open reporting environment. We introduced a corporate Process Safety Event Rate key performance indicator to strengthen our alignment with industry best practices and launched an incident reporting system to expand and simplify incident reporting across the company.

Any fatality is unacceptable to us. Sadly, we lost three employees in two on-the-job accidents in 2016. We investigated the accidents and communicated findings and lessons learned through an intensive campaign to all management and key personnel across operating areas to ensure that the root causes were clearly understood and addressed.

Improving traffic safety

The most serious safety risk for our employees remained driving off-the-job. To reduce this risk, we installed driver monitoring devices in approximately 80% of our company vehicles, and 2,100 devices in the private vehicles of our young trainees as part of our **Automatic Vehicle Locator Program**. These devices enable us to track and improve employee driving behaviors and reduce the risk of traffic incidents.

The **Traffic Safety Signature Program**, a collaborative effort with government ministries, traffic enforcement agencies, and civilian entities, is designed to drive a cultural transformation in traffic safety and

eliminate the root causes of traffic incidents. Highlights of our activities in 2016 include conducting a traffic safety campaign at Dammam University that targeted more than 1,000 students, and presentations to more than 7,400 students at 77 schools in the Eastern Province. These events help empower youth to become safe driving role models and safety advocates for the wider benefit of their communities.

Caring for contractor safety

In 2016, we continued our efforts to enhance the safety performance of our contractors. We performed approximately 3,500 audits and inspections of contractor residential camps and construction camps. In addition, we developed and rolled out electronic multimedia safety overviews to better manage the contractor onboarding process and ensure contractors are familiar with our safety requirements.

Creating sustainable communities

Enhancing the quality of life for our employees and encouraging the growth of healthy, safe, and vibrant communities has been a guiding mission of our company for many decades, providing benefits to our company.

Since 1951, our Home Ownership Program has financed nearly 67,000 new homes for Saudi families.

In 2016, work progressed on more than 10,000 housing units, including our South Dhahran planned community, which will provide 8,500 residential units for Saudi employees and their families. We completed five model units and anticipate completing the first batch of 249 units in 2017.

We also completed the first phase of the **East Dammam 1** Home Ownership Project, delivering 104 high-quality homes to employees, and distributed 270 lots under our **East Dammam 2** program. These residential developments provide our people with safe and comfortable homes and serve as model communities for planning, efficiency, and construction standards—a blueprint that can be applied by the housing industry across the Kingdom.

Ethics and compliance

Our corporate values are the basis for a suite of policies, codes, and guidelines that inform our employees as they implement the company's business strategy. These same components shape our compliance program that serves as the benchmark against which we measure our performance and that of our partners—contractors, consultants, suppliers, affiliates, and joint ventures within the Kingdom of Saudi Arabia and abroad.

The compliance program is supported by:

- Our Corporate Compliance office, which is responsible for the further development, support, and monitoring of the program and for following external legal and regulatory developments.
- Our businesses and subsidiaries, which implement the necessary policies and procedures, assisted by embedded compliance representatives who also monitor compliance with the program.

Additionally, our Supplier Code of Conduct promotes our values and extends and maintains our ethical standards across our supplier network, enabling long-term, mutually beneficial partnerships.

Enabling opportunity

Realizing our full potential to create the greatest benefits for the company, the Kingdom, and energy consumers around the world requires us to protect and develop our most important resource—our people. By maintaining our unwavering focus on supporting our people—whether through improving safety or enhancing their skills—we enable greater opportunities for new ideas and new ways of doing business to flourish.

Our focus on safety encompasses employees, contractors, and the younger generation of trainees now entering our workforce.

Through workplace inspections, safety audits, and training, we ensure that everyone lives safety every day.

Inspired by the geology of Saudi Arabia, the King Abdulaziz Center for World Culture includes components such as the Keystone Idealab and the Knowledge Tower to foster a culture of intellectual curiosity and a love of learning to encourage the innovators of the future.

citizenship: energizing the knowledge economy

The Kingdom is a land rich in natural resources—especially oil and gas. But its real wealth lies in the talents of its people and the potential of its younger generations.

We help unleash this potential by delivering community-based corporate citizenship initiatives that give people the tools they need to seize the opportunities of the future.

Today, consistent with Vision 2030, we continue our focus on enabling the Kingdom's citizens—particularly Saudi youth—to fulfill their ambitions, ensuring a brighter future for themselves, their communities, and the Kingdom as a whole.

Throughout 2016, our citizenship efforts contributed to three main areas consistent with the aspirations of Vision 2030 to create a vibrant society with strong roots, generating more positive impacts for the Kingdom's people.

We fostered curiosity and creativity in children to build a foundation for lifelong learning; we supported youth programs focused on STEM skills (science, technology, engineering, and mathematics), the arts, entrepreneurship, and employment-related skills; and we enhanced the ability of families with special needs to participate fully in society.

Enabling a knowledge-based society

Providing support to students and teachers in the Kingdom's education system—from seminars and workshops that develop skills to equipping classrooms with the latest technology—builds capacity and helps to ensure the country's youth are ready to take on tomorrow's challenges at our company and beyond.

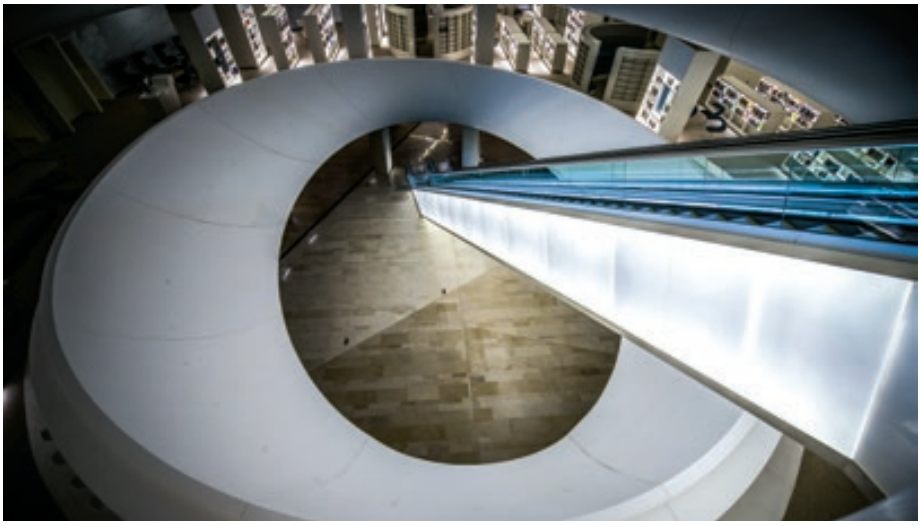
In 2016, we continued our program to update and enhance our 141 **company built schools**. We equipped 77 schools with smart classrooms, computer labs, and modern science labs. To ensure the best possible learning environments, we implemented safety enhancement protocols to improve traffic flow around schools and in parking lots at 54 schools, and installed new playground equipment at eight schools. We also replaced air conditioning units with more energy efficient models at 11 schools.

We delivered our **STEMania** program, which works to increase the number of women entering STEM fields, to 300 female students in the Eastern Province. In support of higher education, we facilitated 10 seminars at **women's universities** in Riyadh and Dammam, which attracted 3,000 students. The seminars helped prepare female university seniors for their transition to the workforce.

Applicants to iRead
14,000

Prototypes produced at FABLAB-Dhahran
5,900

Company built schools equipped with smart classrooms
77



The King Abdulaziz Center for World Culture: enriching minds, inspiring imaginations

In December, the Custodian of the Two Holy Mosques, King Salman ibn 'Abd Al-'Aziz Al Sa'ud, presided over the official inauguration ceremony of the King Abdulaziz Center for World Culture, our flagship initiative for enabling the knowledge economy through creativity and culture.

The Center is the first institution of its kind in the Kingdom, bringing together multiple educational and cultural offerings under one roof. The Center will stimulate curiosity, provide opportunities, and challenge minds through traditional and unconventional resources in the arts and sciences, enabling and encouraging the innovators, entrepreneurs, and leaders of an economy built on knowledge and inventiveness. We anticipate the Center's exhibits, programs, and workshops will draw 1.5 million visitors per year.

In addition to commissioning activities for the official opening, Center staff continued to offer offsite educational programs, including:

- **iRead**, dedicated to promoting reading, theater, and the visual arts among the Kingdom's young people, marked its fourth year in 2016. The iRead website drew more than 2 million views, and 36 young readers were selected from 14,000 applicants to

With a 21st century library, a four-gallery museum, an energy exhibit, and performance and collaborative spaces, the King Abdulaziz Center for World Culture will inspire imaginations and help spur innovation.

Olive tree seedlings planted

≈2 million

Educational tablets distributed

19,551

participate in the program's camp and workshop. More than 1,000 people attended the "Reader of the Year" ceremony to honor the eight winners.

- **FABLAB-Dhahran**, a digital fabrication laboratory located on the campus of KFUPM, launched its first community project—FABHouse, an energy efficient house manufactured by young Saudis. In 2016, 5,900 prototypes were produced at FABLAB-Dhahran—three times the average over the previous two years—while the Prototyping Week received 115 applications from across the Kingdom.
- To help nurture the local arts and culture environment, the Center sponsored 1,000 visitors at the award ceremony for the **3rd Dammam Saudi Film Festival**, an event organized by the Saudi Arabian Society of Culture and Arts. The festival featured 70 films and provided a platform to encourage the country's nascent film industry.
- The **Bridges to Saudi** international outreach initiative conducted three programs—Saudi Film Days, the Saudi Comedy Tour, and the Ambassadors of Influence—in 14 U.S. cities. More than 18,000 visitors experienced the programs, which featured 27 young Saudi artists, 20 talks, seven films, and four exhibits.
- The **"Roads of Arabia: Archeological Treasures of Saudi Arabia"** exhibition, a joint initiative of the Center and the Saudi Commission for Tourism and National Heritage, opened in December for a three-month stay at the National Museum of China in Beijing. The exhibition will also go on display in Seoul, South Korea, and Tokyo, Japan. Our sponsorship of the exhibition's Asian tour is driven by our commitment to help preserve and promote the Kingdom's heritage.

Talented young innovators gather at FABLAB-Dhahran, a digital fabrication center on the campus of KFUPM to gain hands-on experience in using 3-D printing, programming, and robotics. By supporting programs in science, technology, engineering, and mathematics, we help enable the growth of a knowledge economy.

Children fitted with hearing aids

1,300

Coffee farmers supported

560+

Empowering communities

In 2016, we engaged communities throughout the Kingdom with a wide range of programs that build on the country's cultural and social traditions to facilitate greater economic opportunities while instilling sustainable environmental practices. By providing enhanced skills, practices, and tools to a broad spectrum of craft workers, farmers, and micro-enterprises, we seek to make a real difference in the ability of people to achieve a successful future for themselves, their families, and their local communities.

We also strive to make positive contributions to the international communities in which we operate. Our people support their local communities by volunteering their time, skills, and resources to help others. For example, in the U.K., we supported the Cambridge Chemistry Challenge, which reached out to more than 8,500 high school students interested in developing their knowledge of chemistry, an area of strategic importance to us. Organized by a committee of academics from Cambridge and Oxford universities, the program is open to students from around the world who are studying in the U.K. Winners have included students from Saudi Arabia and the United Arab Emirates.

More than 650 volunteers from our affiliate offices in Houston, Boston, and Detroit supported 11 local nonprofit organizations with a combined 3,525 hours of service in 2016.

Beekeepers in al-Bahah, coffee farmers in Jazan, olive growers in al-Jawf, and fishermen in Yanbu' benefit from our scientific, technical, and business support—examples of how we help empower people and communities to create additional value from traditional resources.

Enhancing sustainable practices

These programs, designed to empower people to shape their own economic future by creating additional value from traditional crafts and resources, help communities secure a sustainable future—for themselves and the environment of Saudi Arabia.

- In al-Bahah, southwestern Saudi Arabia, we supported families by building a training center for **beekeeping** and developing training courses in partnership with the Beekeepers Cooperative Association. The project also included the planting of 50,000 tree seedlings to support a larger population of bees. The area has a long tradition of honey production and our support is helping raise standards, expand the industry, and increase honey production.
- In partnership with the Warehouse Charitable Society, we established nurseries for growing **olive tree seedlings** at al-Jawf in northern Saudi Arabia to generate new income opportunities for families. We installed 10 nurseries, planted nearly 2 million olive tree seedlings, and provided training to 10 families, with a goal to train 100 families.
- We worked with the Aldayer Charitable Society to raise knowledge and improve standards for **coffee production** among more than 560 farmers in the Jazan Mountains, southwestern Saudi Arabia. We provided training and tools, planted new coffee trees, and secured an off-taker to elevate product standards and support the growth of the industry.
- Through collaboration with the Coast Guard and Ministry of Environment, Water, and Agriculture in the Yanbu' area, we helped boost the ability of 50 **fishermen** to support their families by enriching their knowledge, improving standards, and providing them with new fishing boats and related equipment.
- Our Beijing subsidiary, in collaboration with an international nonprofit, launched an innovation challenge in five Asia Pacific countries. The **"Innovative Challenge for Energy, Environment, and Climate Sustainability"** is designed to inspire university students to develop creative solutions to climate change, sustainability, and energy efficiency. Winners from local competitions will advance to the Aramco Asia Cup Finals in Beijing in late 2017.
- We provided equipment and training to raise standards and product quality of the **wool and textile** production in Hafer Al Batin, making local businesses more competitive and sustainable. As part of this effort, we worked with the Committee for Civil and Social Development to renovate a local textile center, and provided training and marketing expertise to 200 beneficiaries with the goal of expanding the local economy.
- To empower the **craft and souvenir industry in Makkah**, we partnered with the Um AlQura Females Charitable Organization to generate income opportunities for the local workforce. We provided advanced equipment and training to 23 candidates, from a target of 100, and established relationships with packaging, marketing, and distribution experts to localize the production of gifts and souvenirs.

We enthusiastically share our time, expertise, and resources to create new opportunities for Saudi Arabian communities.

Increasing access to opportunities

All people, regardless of circumstances, should have the opportunity to lead fulfilling lives. We help groups with special needs through impactful programs that deliver targeted resources, training, and support, and our campaigns often feature volunteer support and contributions from employees.

Highlights from our activities in 2016 include:

- Our Kingdomwide **I Want to Hear** campaign was launched during Ramadan to make a life-changing difference for hearing-impaired Saudi children. The program was enthusiastically supported by our employees who made their own financial contributions, fully matched by Saudi Aramco, to provide hearing assessments and the molding and fitting of sophisticated hearing aids for more than 1,300 children.
- In Qassim, in central Saudi Arabia, we worked with the King Abdulaziz Women Charity Committee to assist 70 women with special needs to grow their income through a **new sewing center** and the marketing of different product lines. As part of this effort, we helped fund a suitable facility, supplied advanced equipment, and provided training.
- In Dammam, we completed construction of a **new sewing center for the hearing impaired**. Through partnering with Nesma Holding Co. and Al-Rahma Medical Charitable Society, we hired specialist trainers to equip an initial group of 30 women, from a target of 100, with the skills they need to start working at the center.
- With Roa'ya, a charity organization for the vision impaired, we established a **maintenance center for Braille printers** in Madinah. We provided training for 100 visually impaired men and women to enable new income opportunities.
- Our **Gift of Knowledge** campaign distributed nearly 20,000 tablet PCs to students in communities along the Kingdom's southern border. This marked the second year of the campaign, conducted in partnership with the Takaful Charity Foundation and supported by employee contributions and other local companies. Loaded with educational applications, the tablets help students develop the skills needed in a knowledge economy.

Transforming community health care

In addition to supporting our employees and their families, Johns Hopkins Aramco Healthcare (JHAH), our joint venture with Johns Hopkins Medicine, contributes to the health and well-being of the people of Saudi Arabia through collaboration, research, and education, and helps to develop the Kingdom's health care industry. During the year, JHAH conducted 45 outreach events in company and local communities, helping to raise awareness of critical health issues for thousands of people.

In 2016, JHAH marked a major milestone on its journey to advance the capabilities of health care professionals in the Kingdom with the establishment of a **medical residency program** for licensed Saudi physicians interested in advanced training in their areas of specialty. The program accepted its first residents in October.

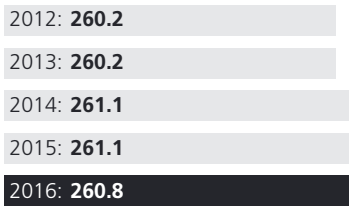
Accelerating potential

Our targeted citizenship engagement programs are consistent with the Kingdom's Vision 2030 goals for social and economic development. Their cumulative effect will help accelerate the potential of people throughout the Kingdom to build dynamic and vibrant communities, and spur progress toward an innovative, diverse, and sustainable economy that supports our long-term business vision.

We aid the localization of the Makkah gift industry, creating income prospects for local women. Our establishment of a maintenance center for Braille printers enables economic opportunities for the visually impaired, and more than a thousand children across the Kingdom benefited from our "I Want to Hear" campaign.

our performance in 2016

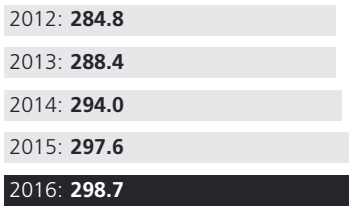
Crude oil and condensate reserves *(billions of barrels)*



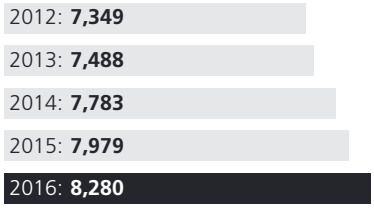
Daily crude oil production *(millions of barrels)*

Raw gas processed *(billions of scfd)*

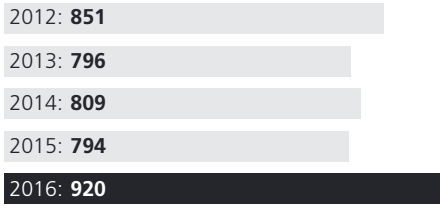
Gas reserves *(associated and nonassociated, trillions of scf)*



Sales gas produced *(millions of scfd)*



Ethane produced *(millions of scfd)*



scf = standard cubic feet
scfd = standard cubic feet per day
NGL = natural gas liquids

Crude oil production and exports *(millions of barrels)*

	2015	2016
Crude oil production, excluding condensate blended	3,708	3,828
Crude oil exports	**2,603**	**2,799**

NGL: production from hydrocarbon gases *(millions of barrels)*

	2015	2016
Propane	181.3	195.7
Butane	119.5	127.0
Condensate	83.1	83.4
Natural gasoline	90.5	91.4
Total NGL production	**474.4**	**497.5**

Sulfur recovery *(millions of metric tons)*

2016	**6.0**
2015	**4.9**

Refined products production and exports *(millions of barrels)*

	2015	2016
Refined products production	641	665
Refined products exports	232	296

NGL: sales *(millions of barrels)*

	2015	2016
Propane	165.5	183.3
Butane	96.9	107.9
Condensate	1.3	1.3
Natural gasoline	67.5	73.0
Total NGL sales	**331.2**	**365.5**

Sulfur exports *(millions of metric tons)*

2016	**4.0**
2015	**3.8**

Refining capacity *(thousands of bpd)*

	Total capacity	Saudi Aramco or affiliate ownership	Saudi Aramco share of capacity
Saudi Arabia			
Ras Tanura	550	100%	550
Riyadh	126	100%	126
Jiddah	77	100%	77
Yanbu'	243	100%	243
Petro Rabigh	400	37.5%	150
SAMREF-Yanbu'	400	50%	200
YASREF-Yanbu'	400	62.5%	250
SASREF-Jubail	305	50%	153
SATORP-Jubail	400	62.5%	250
Total Saudi Arabia	**2,901**		**1,999**
Worldwide			
Motiva-USA	1,070	50%	535
S-OIL-South Korea	669	63.4%	424
Showa Shell-Japan	445	14.96%	67
FREP-China	280	25%	70
Total	**5,365**		**3,095**

Chemicals production capacity *(kilotons per annum)*

Product groupings	In-Kingdom	Out-of-Kingdom	Total capacity	Saudi Aramco share*
Ethylene	2,714	1,100	3,814	1,682
Propylene	1,471	2,565	4,036	1,775
Paraxylene (including xylenes)	700	3,881	4,581	2,194
Benzene	732	1,218	1,950	925
Polyolefins	2,700	1,503	4,203	1,691
Synthetic rubber and elastomers	—	1,708	1,708	854
Intermediates, derivatives, and others	6,067	1,665	7,732	4,164
Total	**14,384**	**13,640**	**28,024**	**13,285**

**Saudi Aramco's share of capacity is based on the percentage allocation of the capacity volumes based on the ownership structure in the respective entities. Production capacity figures for 2016 reflect the startup of commercial operations at Sadara and the launch of the Arlanxeo joint venture.*

Principal products manufactured at in-Kingdom refineries *(millions of barrels)*

2016	LPG	Naphtha	Gasoline	Jet fuel/ kerosene	Diesel	Fuel oil	Asphalt & misc.	Total
Ras Tanura	4.743	17.578	46.112	11.858	65.893	31.260	5.344	182.788
Yanbu'	3.601	3.368	11.018	(0.521)	35.154	36.955	—	89.575
Riyadh	2.462	—	12.569	4.904	21.054	(0.047)	7.375	48.317
Jiddah	0.804	2.362	4.063	0.159	2.397	6.837	5.527	22.149
Total in-Kingdom	**11.610**	**23.308**	**73.762**	**16.400**	**124.498**	**75.005**	**18.246**	**342.829**

Saudi Aramco share *(millions of barrels)*

2016	LPG	Naphtha	Gasoline	Jet fuel/ kerosene	Diesel	Fuel oil	Asphalt & misc.	Total
SAMREF	(0.671)	—	24.079	10.481	19.814	14.384	—	68.087
SASREF	1.387	11.787	2.219	10.983	16.580	12.339	—	55.295
Petro Rabigh	0.810	8.482	5.357	5.016	10.829	13.919	—	44.413
SATORP	0.254	3.919	16.627	10.496	45.997	1.716	—	79.009
YASREF	—	—	21.942	—	53.038	—	—	74.980
Total share	**1.780**	**24.188**	**70.224**	**36.976**	**146.258**	**42.358**	**—**	**321.784**
Grand total	**13.390**	**47.496**	**143.986**	**53.376**	**270.756**	**117.363**	**18.246**	**664.613**

Negative figures primarily indicate products that were reprocessed into other refined products.

Principal products manufactured at in-Kingdom refineries *(millions of barrels)*

2015	LPG	Naphtha	Gasoline	Jet fuel/ kerosene	Diesel	Fuel oil	Asphalt & misc.	Total
Ras Tanura	5.487	19.227	42.304	8.495	71.828	34.385	8.029	189.755
Yanbu'	3.461	3.8	10.485	(0.457)	34.037	35.110	—	86.436
Riyadh	2.11	—	11.379	3.95	21.249	0.026	7.184	45.898
Jiddah	0.714	2.54	3.738	(0.047)	2.922	7.790	6.383	24.040
Total in-Kingdom	**11.772**	**25.567**	**67.906**	**11.941**	**130.036**	**77.311**	**21.596**	**346.129**

Saudi Aramco share *(millions of barrels)*

2015	LPG	Naphtha	Gasoline	Jet fuel/ kerosene	Diesel	Fuel oil	Asphalt & misc.	Total
SAMREF	(0.571)	—	23.766	9.882	21.147	14.310	—	68.534
SASREF	1.269	10.540	2.255	8.963	14.112	12.678	—	49.817
Petro Rabigh	0.969	6.181	4.566	4.204	9.051	11.565	—	36.536
SATORP	0.629	3.525	15.639	10.070	43.732	0.643	12.079	86.317
YASREF	—	—	14.222	—	35.505	—	4.684	54.411
Total share	**2.296**	**20.246**	**60.448**	**33.119**	**123.547**	**39.196**	**16.763**	**295.615**
Grand total	**14.068**	**45.813**	**128.354**	**45.060**	**253.583**	**116.507**	**38.359**	**641.744**

Negative figures primarily indicate products that were reprocessed into other refined products.

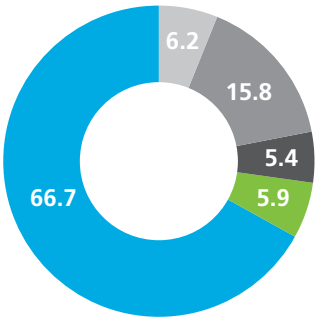
In-Kingdom product sales by region *(millions of barrels)*

2016	Central	Eastern	Western	Total
LPG	2.396	8.230	6.006	16.632
Gasoline	73.055	40.597	93.721	207.373
Jet fuel/kerosene	10.386	3.561	20.107	34.054
Diesel	68.844	59.133	121.194	249.171
Fuel oil	1.653	1.769	151.827	155.249
Asphalt	6.980	6.638	8.690	22.308
Naphtha	—	1.811	—	1.811
Total	**163.314**	**121.739**	**401.545**	**686.598**

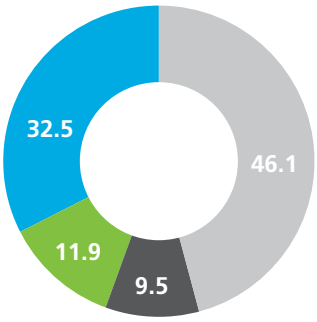
2015	Central	Eastern	Western	Total
LPG	2.095	7.513	5.806	15.414
Gasoline	71.873	41.014	93.511	206.398
Jet fuel/ Kerosene	9.632	3.011	18.723	31.366
Diesel	81.248	64.540	130.756	276.544
Fuel oil	0.32	2.273	132.879	135.472
Asphalt & misc.	7.59	12.401	11.126	31.117
Total	**172.759**	**130.753**	**392.801**	**696.313**

2016 exports by region *(percent)*

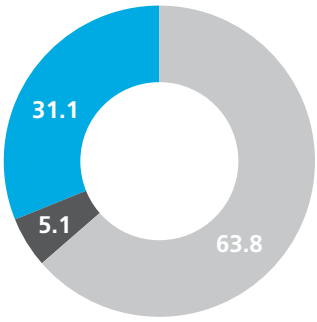
Crude oil

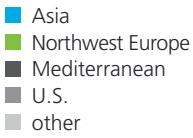


Refined products



NGL*





**includes sales on behalf of SAMREF & SASREF.*

Ship calls at Saudi Aramco terminals

Ship calls by product type	2016	2015	2014	2013	2012
Crude oil	2,013	2,210	1,936	2,018	1,998
Products	1,007	649	1,028	824	1,027
LPG	259	250	200	198	229
Total ship calls	**3,279**	**3,109**	**3,164**	**3,040**	**3,254**

Exports from Ras Tanura, Ju'aymah and Yanbu' and transfers at Jiddah, Rabigh, Yanbu' and coastal bulk plants.

Due to further data reconciliation, the figures in this table have been revised.

Human resources

Employees

65,282

Saudi 55,466
Expatriate 9,816

Saudi development programs *participants enrolled at year-end 2016*

Regular development programs

605

College Degree Program for Non-Employees (CDPNE)

1,441

College Degree Programs

1,967

Apprentice Program

5,055

CDPNE graduates joining the company

373

Apprentice graduates joining the company

3,952

awards

Our Exploration and Petroleum Engineering Center-Advanced Research Center (EXPEC ARC), along with Schlumberger, received Hart Energy's **Intelligent Systems and Components** category award and the **Best Completions Technology** at the 2016 World Oil Awards for its Manara Production and Reservoir Management System, the world's first "smart lateral" system for improving well productivity through drainage optimization.

EXPEC ARC was also recognized at the Abu Dhabi International Petroleum Exhibition and Conference with the top award for **Best Oil & Gas Health, Safety and Environment Project** for our carbon capture and sequestration and CO_2 enhanced oil recovery project, which also won the **Energy Institute Environment Award**.

Our Oil & Gas Treatment R&D organization received the internationally recognized **Manufacturing Leadership Award for Engineering & Production Technology Leadership**. Winners in this category are recognized for embracing new design and production approaches to drive game-changing process improvements through adopting technologies such as advanced 3-D modeling and simulation.

The **Saudi Arabia National Award** from Energy Globe, given in recognition of projects that conserve resources, was presented to our Berri Gas Plant for its development of a new ethane liquefaction heat exchanger that improved efficiency, reduced operation and maintenance costs, and raised ethane liquefaction capacity by 25%. The initiative also received a **Sustainability Leadership Award** from the Manufacturing Leadership Awards.

Our Jazan Refinery and Terminal Project was recognized by Houston-based *Hydrocarbon Processing* in its **"Top Hydrocarbon Processing Industry Projects of 2016."** The trade publication identifies significant refining and petrochemicals projects that are anticipated to positively impact the global and/or regional downstream industry. Our SATORP and Sadara joint ventures were honorees in 2014.

Along with our R&D collaboration partner JGC Catalysts and Chemicals, we were awarded the **International Technology Exchange Award** by the Japan Petroleum Institute for development of the CAN-15 hydrocracking catalyst, which enables fuel efficiency and reduced emissions.

At the Annual Technical Conference and Exhibition, the annual flagship event of the **Society of Petroleum Engineers** (SPE), the SPE Kingdom of Saudi Arabia Section was named the recipient of the 2016 **President's Award for Section Excellence**. Company personnel were honored by SPE at a number of events, receiving awards for Young Member Outstanding Service, Improved Oil Recovery Pioneer Award, Distinguished Membership, and Honorary Membership—the highest honor SPE bestows on an individual.

An Honorary Member and two Distinguished Service awards were bestowed on three Saudi Aramco geoscientists at the 2016 Annual Convention and Exhibition of the **American Association of Petroleum Geologists** in Calgary, Canada.

Saudi Aramco was named **Best Employer Brand-Private Sector** at the LinkedIn Talent Middle East and Northern Africa awards.

Our *AramcoWorld* magazine was honored with 12 **magazine industry awards**—the most ever received by the publication—from the international juried competition sponsored by Folio. Winning its first award at the same competition was *Al-Ayyam Al-Jamilah*, our magazine for retired expatriate employees.

Our film "Where Energy is Opportunity" was awarded a bronze medal at the 2016 New York Festivals **World's Best TV and Films**.